Environmental Assessment

Boulder Landscape Plan

BLM

Pinedale Field Office, Wyoming

January 2014

The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

DOI-BLM-WY-100-2009-35-EA

Environmental Assessment

for

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Prepared by

Bureau of Land Management
Pinedale Field Office
Pinedale, Wyoming

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1.0 INTRODUCTION

1.1 Background

The Pinedale Resource Management Plan (RMP) Record of Decision (ROD) was finalized on November 26, 2008. The RMP provides overall direction for the management of all resources on BLM-administered land in the Pinedale planning area.

The Landscape Planning process is intended to pick up where the RMP process left off. Several important decisions, including renewal of livestock grazing permits and the establishment of travel management plans, remain to be made. This Landscape Plan will finalize grazing permit renewal and transportation management decisions for the Boulder landscape area (Map 1).

Proposal

The BLM Pinedale Field Office (PFO) proposes to implement a landscape plan for the Boulder landscape area (Map 1). In the landscape plan, the BLM proposes to renew livestock grazing permits for 18 livestock grazing allotments in the Boulder area. BLM also proposes to develop and implement a travel management plan (TMP) for the Boulder landscape area.

Location and Topography

The Boulder landscape is located approximately 15 miles southeast of Pinedale, Wyoming. It is bounded on the north by Wyoming Highway 353 (the Boulder Highway), on the west by US Highway 191, on the south by the boundary between the Pinedale (PFO) and Rock Springs (RSFO) Field Offices of the BLM, and on the east by the Boulder Highway and the Bridger Teton National Forest (BTNF). The area includes 18,400 acres of private lands, 10,200 acres of State of Wyoming lands, and 72,000 acres of public lands administered by the Bureau of Land Management, for a total of 100,600 acres (Map 1). The area is drained by Muddy Creek and the East Fork River, with few flowing waters located on public lands.

The topography of the area ranges from somewhat rolling sagebrush areas in the main portion of the landscape that lies between the Boulder Highway and Hwy 191, to somewhat steeper, rockier, and a few timbered areas in the East Fork Common allotment and Irish Canyon area that extends from the Boulder Highway to the BTNF boundary. The area also includes Fremont Butte and Chalk Butte at the northern end of the landscape. The elevation varies from about 7000' near the western boundary, to about 9000' in the northeast corner of the East Fork Common allotment, on the BTNF boundary.

Purpose and Need for the Boulder Landscape Plan

BLM has two purposes in preparing the Boulder Landscape Plan. The first purpose is to provide the opportunity for continued livestock grazing in the 18 allotments in the Boulder landscape area. The second purpose of the Landscape Plan is to designate a sustainable transportation network that provides for public access to recreate, perform permitted activities, and manage public lands.

The need for the action is to meet the fundamentals of rangeland health in the 18 allotments; to act on BLM's responsibility under FLPMA and the Taylor Grazing Act to provide orderly use of the rangeland resource, where appropriate; and to fulfill a commitment made in the 2008 Pinedale RMP to complete transportation planning.

Decisions to be Made
The BLM will decide whether or not to renew grazing permits in 18 allotments in the Boulder landscape area, and if so, under what terms and conditions. The BLM will designate a transportation network of roads that support land use management objectives. Motorized travel may be restricted seasonally, and roads improved or closed to protect natural resources and improve visitor experiences.

1.3 Relationship to Statutes, Regulations, Plans or Other Environmental Analyses

Management guidance for the PFO, including the Boulder Landscape Plan area, is provided by the Pinedale RMP, finalized in November 2008. The RMP specifies that travel management implementation/activity plans for the PFO area should be completed within 5 years of finalization of the RMP; that livestock grazing management will be conducted such that allotments meet the Wyoming Standards for Rangeland Health; and that adjustments in grazing allotments or permits be based on monitoring information and considered on a case by case basis, as in this landscape plan.

Off-Highway-Vehicle (OHV) designations were determined during the 2008 PFO RMP; OHV decisions classified all BLM lands in the PFO as Open, Limited or Closed to motorized travel. Lands classified as Limited restricted travel to existing roads, designated roads and trails, or limited motorized access seasonally or by mode of travel. The BLM is required to select and designate all roads recognized in the public transportation network of roads and trails including primitive roads (two-track roads). The Pinedale RMP (2008; p. 2-36) stipulates that restrictions to existing roads and trails will remain in effect until travel management planning is completed and designated roads are identified.

Travel Management Plans (TMP) describe the process and decisions related to the selection and management of the transportation network on BLM-administered public lands. Comprehensive travel management planning considers all types of travel on public lands, including motorized, non-motorized mechanized, pedestrian and travel by other means such as horse. BLM travel management decisions do not apply to United States or State of Wyoming highways or Sublette County roads.

Travel management actions ensure that public and administrative access is met, resources protected, and regulatory needs considered.

A number of authorities apply to the analysis and selection and implementation of management actions in this EA, including:

The National Environmental Policy Act
Federal Land Policy and Management Act
Taylor Grazing Act
Public Rangelands Improvement Act
Federal Noxious Weed Act

This EA must comply with all applicable statutes, laws, and national and Wyoming BLM policy. Laws and policies of the State of Wyoming, including Executive Orders, also apply to the extent they do not conflict with national laws and policy.

Relevant objectives and management action decisions from the Pinedale RMP (2008) include:

Objectives:

- Protect national Register of Historic Places (NRHP)-eligible cultural sites and National Historic Trails.

- Maintain, restore, or enhance livestock grazing to meet the Wyoming Standards for Rangeland Health and achieve allotment objectives.
- Maintain or enhance the health and viability of recreation-dependent natural resources and settings within the planning area.
- Provide needed and appropriate ingress, egress, and access routes to and across public lands for authorized uses.
- Make public lands available for responsible OHV use where appropriate.
- Manage public lands in a manner that protects the quality of the scenic values of those lands.
- Maintain and/or enhance native vegetation community health, composition, and diversity in conformance with Wyoming Standards for Rangeland Health.
- Maintain or enhance aquatic and wildlife habitat.
- Sustain the sagebrush biome on a landscape scale to provide the amount, continuity, and quality of habitat necessary to maintain viable populations of sage-grouse and other sagebrush obligate species.
- Maintain and enhance big game habitats to support big game populations at WGFD planning objective levels.
- Conserve functioning sagebrush habitats on a landscape scale sufficient to support identified wildlife objectives.
- Maintain raptor habitats and territories within the planning area to ensure long-term species sustainability and widely distributed functioning habitats in accordance with the MBTA.
- Maintain and improve wildlife habitats, big game migration corridors and bottlenecks, scenic quality, and recreation values and uses in the Wind River Front Management Area.

Management Actions:

- The Wyoming Standards for Rangeland Health apply to all resource management decisions and activities, and Guidelines for Livestock Grazing Management apply to all livestock grazing activities on public lands. BLM will consult, cooperate, and coordinate with livestock grazing permittees and interested members of the public to determine the most appropriate guidelines to implement.
- Forage will be made available for livestock grazing use.
- Monitoring of the range and the vegetation resource will be conducted at a level sufficient to detect changes in grazing use, trend, and range conditions. Monitoring will be tied to land health standards and indicators that help determine change in status and progress toward meeting objectives. Data will be used to direct and support grazing management decisions consistent with national policy.
- Conversions from one type of livestock to another will be evaluated on a case-by-case basis, including an environmental analysis, and will be authorized in conformance with the goals and objectives of the RMP.
- The current grazing preference of 107,907 animal unit months (AUM) will be maintained, unless changes are warranted through site-specific monitoring.
- Grazing systems will be designed to maintain or improve watershed and range condition; for example, through changing seasons of use, implementing rotational or other grazing management systems, or developing infrastructure for livestock management.
- Grazing seasons in allotments containing elk parturition areas will be adjusted to begin after June 1 to reduce the potential for brucellosis transmission. This action will only occur after, and in conjunction with, development of a herd management plan through coordination and cooperation with the affected grazing permittee and the Wyoming Game and Fish Department (WGFD).
- OHV designations for restrictions to existing roads and trails will remain in effect until travel management planning is completed and designated roads and trails are identified.

- Road or trail closure and abandonment will be based on desired road or trail densities, demands for new roads, closure methods, type of access needed, resource development or protection needs, and existing uses.

1.4 Scoping, Public Involvement and Issues

The scoping process for the Boulder Landscape Plan began in March, 2009. To initiate the process and gather input from on the ground users, a meeting was held with grazing permittees on March 31, 2009. A meeting was held with potential cooperating agencies on April 14, 2009. A notice that BLM intended to conduct Standards for Rangeland Health Assessments in the area was posted on BLM's website. A letter was sent to the Shoshone, Arapaho, Bannock, and Ute tribes on May 28, 2009. BLM cultural staff met with representatives of the tribes on September 18, 2009. This meeting took place in the field. The Shoshone tribe recommended no oil and gas exploration in the Boulder Landscape area and complete avoidance of all features of cultural significance to the Eastern Shoshone Tribe.

A public scoping notice was released on April 17, 2009. A public meeting was held at the Pinedale BLM Field Office on April 27, 2009. A 30-day comment period was open until May 20, 2009. A total of 7 comment letters was received from private individuals, recreation and environmental groups, and government agencies.

A second public scoping notice was mailed out on April 12, 2011. The purpose of the second notice was to provide those interested in the Boulder landscape plan process with the monitoring and assessment information that BLM will use in this EA. Seven comment letters were received in response to this notice.

On July 2, 2012, a public meeting was held at the Boulder Community Center. Preliminary transportation planning scenarios were presented, and the public provided relevant comments.

The Rangeland Health Assessment for the Boulder Landscape was distributed on July 25, 2012. This document included the Health Assessment, as well as a Determination for 18 allotments regarding whether each allotment met the Standards for Rangeland Health as established by BLM for lands in Wyoming. Five comment letters on the Health Assessment were received.

In March, 2013, meetings were held at the Pinedale Field Office with permittees of the five largest allotments in order to document current allotment use, management needs, and operator preferences for future management.

The scoping comments received through all these processes and venues are summarized in a separate scoping report (Appendix 1).

The major scoping issues raised through this process are:

Cultural Resources:

- How can the viewshed and integrity of the Lander Trail be maintained?

Livestock Grazing:

- How can both individual livestock permittee and overall grazing allotment/resource needs (vegetation, wildlife, soils, watershed, etc.) be met?

Transportation Planning:

- How can the appropriate balance between existing roadless areas and existing roaded access be achieved or maintained?
- How can appropriate public access to the public lands be maintained?

Wildlife:
- How can sage-grouse and their habitats be protected?
- How can big game crucial ranges and migration routes be protected?

General Concerns:
- How will management of the Boulder landscape affect visual resource management classes in the area?
- How will management of the Boulder landscape affect air quality?

The issues identified through scoping and during development of this EA are addressed in later sections of the document.

The criteria for consideration of route designations and closures were developed by the BLM Pinedale Field Office and used by an interdisciplinary team to assess the route inventory map and make initial road use recommendations. The criteria are listed in the Draft Travel Management Plan, Appendix 2.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

Livestock Grazing
Livestock grazing permits would be renewed for 10-year terms. According to the grazing regulations at 43 CFR 4100, permittees who are leasing the base property supporting the permit for a period less than 10 years would be issued a BLM grazing permit for the term of their private base property lease. Permits would be renewed in 18 allotments, with a total of 8,099 permitted AUMs.

Permits would include changes to the terms and conditions. Grazing would be permitted as shown in Table 1:

Table 1. Livestock grazing allotments and use, Proposed Action (Mandatory Terms and Conditions)

Allotment	Category	Livestock # and type		Dates of Use	BLM Acres	% Public Land	BLM AUMs
Big Sandy Individual	M	6	C	7/1 – 11/30	280	100	30
Boulter Pasture	M	2	H	11/01 – 11/30	20	100	2
Butte Individual	M	Unallocated			70		7
Chalk Butte Common	M	167	C	5/10 – 6/30	3,445	100	244
Circle 9 Individual	M	67	C	5/1 – 6/10	520	71	63
Cowley Tract	M	5	C	5/6 – 7/5	80	100	10
East Fork Common	M	897	C	5/1 – 7/5	6,905	97/72	793
Fremont Butte Common*	M	839	C	5/1 – 7/5	21,015	100	1,822
Fremont Butte Individual	M	240	C	5/5 – 7/5	4,385	85	417
Individual Fenced	C	2	C	5/1 – 10/15	250	100	11

Irish Canyon Tracts Ind.	M	15	C	5/6 – 7/5	332	100	30
Muddy Meadows	M	4	C	5/1 – 9/30	40	100	20
North Pasture Individual	M	10	H	5/1 – 8/28	480	79	31
Sandy Fenced	M	150	C	6/2 – 9/30	250	5	30
Sandy Individual	C	4	C	5/1 – 8/15	120	100	14
Sandy Upper Muddy	M	7	C	5/1 – 10/15	660	100	47
Southwest Pasture Ind.	M	56	C	7/1 – 7/31	480	100	59
Square Top Common	I	2,370 35	C H	5/1 – 9/30 5/10 – 11/30	38,509	100	4,469

*The remaining 517 cattle/588 AUMs would be in the West Fremont Butte allotment in the Anticline landscape.

The maximum grazing use on 18 allotments in the Boulder Landscape area would be 8099 AUMs, the same as in the No Action alternative.

In the Square Top Common allotment, some horse AUMs would be converted to cattle AUMs. Three permittees currently have horse AUMs on the permit.

Table 2. Horse AUMs in the Square Top Common allotment

Permit	**# of horses**	**Season of use**	**AUMs**	**Future permit status**
Mayo	25 H	5/1 – 11/15	164 AUMs	Remain as horse permit
Richie	22 H	5/1 – 11/30	155 AUMs	Convert to cattle use; 74 C 5/10 – 7/5
Jones	10 H	5/1 – 11/30	70 AUMs	Remain as horse permit

155 AUMs of horse use, currently authorized from 5/1 through 11/30 annually on the Richie permit, would be converted to cattle use. The season of use for these AUMs would also be changed to coincide with the current cattle grazing season in May and June. This would result in removing 111 AUMs of use from the traditional horse grazing period July through November. This would increase Richie's permitted use in their 5/10 – 7/5 use period from 301 to 385 cattle. The total number of AUMs authorized on Richie's grazing permit would stay the same at 758 AUMs.

234 AUMs of horse use on the Mayo and Jones permits would remain the same, with 25 horses (Mayo) using the allotment 5/1 – 11/15, and 10 horses (Jones) 5/1 – 11/30.

The Fremont Butte Common allotment would be separated into two allotments along the US Highway 191 corridor that splits the allotment naturally. The portion in the Boulder landscape would still be named Fremont Butte Common. The portion west of Hwy 191 would be renamed West Fremont Butte Common. The West Fremont Butte Common allotment would contain 5,883 BLM-administered acres and 588 BLM AUMs. Two grazing permits in this allotment would be renewed with no changes. The permits would be addressed further, as appropriate, as part of the Anticline/Jonah landscape.

The Square Top Common allotment would not be split into smaller allotments.

Spring turn-out criteria would be applied in all allotments in drought or drought recovery years to ensure that the vegetation has reached a development stage appropriate for livestock turnout. Turnout would not occur prior to this. Spring turn-out criteria include soil moisture and plant growth. Soils may be damp, but not saturated, and should be firm to avoid excessive compaction due to livestock.

Turn-in dates on the more productive sites such as loamy, shallow loamy and sandy range sites will be allowed when active new vegetative growth reaches an average leaf length of four to six inches and/or fourth leaf stage in the primary livestock use areas on key bunchgrasses. (Some common key bunchgrass species for these sites are bluebunch wheatgrass, needle-and-thread, Indian ricegrass, Idaho fescue, and bottlebrush squirreltail).

Turn-in dates on lower productive sites, such as shallow clay range sites will be allowed when active new vegetative growth reaches an average leaf length of two to four inches and/or the fourth leaf stage in the primary livestock use areas on key species. (Some common key species for these sites are bottlebrush squirreltail, inland sedge, Sandberg's bluegrass, bluebunch wheatgrass, prairie Junegrass, Indian ricegrass and needle-and-thread).

The above criteria allows for a two inch range in leaf length growth prior to turn-in. This provides some flexibility when considering the differences in plant species, site potential, and present rangeland health. Some of the main indicators of rangeland/plant health that will be looked at prior to establishing the exact turn-in dates are, ground cover, soil stability, soil moisture, residual stubble height, plant basal area size/vigor, and the presence of key species, all will be considered in relationship to the potential of a site.

Flexibility criteria would be part of each renewed grazing permit. Each permit would specify that grazing could vary from the dates specified on the permit by up to 2 weeks (14 days), and that the number of livestock specified could vary by up to 20% more than the number on the permit, as long as the total number of AUMs to be authorized is not greater than the number of AUMs allowed on the grazing permit. Varying the number of livestock less than the number specified on the permit could be approved without additional analysis, as long as the total number of AUMs to be used does not exceed those on the grazing permit. Flexibility must be applied for and approved by the authorized officer annually.

Trailing use would be authorized within 2 weeks either side of the permitted grazing period. Trailing livestock would be required to be under direct supervision and making significant progress daily. Proper application for trailing use to the authorized officer at least 5 days before the requested trailing use would be required. If livestock are trailed within the timeframe of their permit, and on their permitted allotments, no trailing permits would be required.

Terms and Conditions to Appear on Grazing Permits:

1. The permittee must properly complete, sign and date an Actual Grazing Use Report (BLM Form 4130-5) annually. The completed form(s) must be submitted to the BLM Pinedale Field Office within 15 days from the last day of authorized annual grazing use.
2. Feed supplements such as salt and minerals may be allowed on the allotments to promote proper grazing distribution. If used, supplements will be located on ridge tops and/or approximately one-quarter mile away from any riparian habitat. Placement of supplements near water sources, such as wells and reservoirs, will consider rangeland objectives, such as grazing distribution, wildlife habitat requirements, and reclamation success. Salt or mineral supplement blocks will not be placed within one-quarter mile of an occupied sage-grouse lek or a known Special Status Plant Species. Supplemental forages including protein block and cottonseed cake are prohibited unless specifically approved by the Authorized Officer in an emergency situation.
3. Grazing use will be in accordance with the Standards for Rangeland Health and Guidelines for Grazing Management. Grazing use will also be in accordance with 43 CFR Subpart 4180

- Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration.

4. If future monitoring data indicates that Standards and Guidelines for Grazing Administration are not being met, and livestock grazing is determined to be a causal factor, the permit will be reissued subject to revised terms and conditions.
5. The permittee is responsible for all maintenance of assigned range improvements including wildlife escape ramps for both permanent and temporary water troughs. Maintenance must be completed prior to livestock turnout annually, and periodically throughout the grazing period even if taking non-use for that grazing year.
6. Grazing permittees will meet with BLM twice annually at a minimum; before turnout to schedule maintenance activities and after the grazing season to discuss monitoring.
7. Maximum allowable use levels will be as follows: Key upland forage species: 50% of the current year's growth. Livestock will be moved to another authorized pasture or removed from the allotment before utilization objectives are met or no later than 5 days after meeting the utilization objectives.
8. The following changes to the grazing schedule may be allowed with approval by the authorized officer at the BLM. The request must be made at least 3 business days in advance.
    a) The grazing permittee may change the actual use inclusive of where, how many, and how long livestock graze on an allotment, or on a portion or pasture of an allotment. Grazing could vary from the dates specified on the permit by up to 2 weeks (14 days), and the number of livestock specified could vary by up to 20% more than the number on the permit, as long as the total number of AUMs to be authorized is not greater than the number of AUMs allowed on the grazing permit. Varying the number of livestock less than the number specified on the permit could be approved without additional analysis, as long as the total number of AUMs to be used does not exceed those on the grazing permit. Flexibility must be applied for and approved by the authorized officer annually.
    b) Livestock may be required to exit the allotment earlier than scheduled if grazing use reaches or exceeds stipulated levels. Extensions based on utilization need to be approved in advance and as appropriate by the authorized officer at the BLM.
    c) Drought years with unfavorable climatic conditions may require changes to the active preference or actual use that has normally occurred in the allotment in any one year. Adjust grazing use, as necessary, which may include but is not limited to reducing livestock numbers, shortening the season of use, altering pasture move dates, changing pasture rotations, authorizing water hauling (after documenting NEPA compliance), closing allotments to grazing use, or allowing use in vacant allotments.

Upland trend monitoring would be conducted at existing monitoring sites. Existing inventory information from the North Wind data would be used to establish vegetation objectives for each monitoring site. Upland trend monitoring would be conducted at intervals of 5-10 years on each upland site, at a time when plant phenology allows for the greatest success in plant identification. The 4C's joint cooperative monitoring program would also be continued.

Transportation Management

BLM would maintain the areas established in the RMP as limited to existing roads and trails, limited to designated roads and trails, and closed to OHV use. A travel and transportation plan would be developed, with roads selected and designated for use. Roads not designated for travel would be closed (10 miles, Map 2).

Table 3. Proposed Action Transportation Route Statistics

Road Type	Miles
Open Year Around	364
Open with Seasonal Closure	0
ATV and Non-Motorized Use Only	0
Closed	10
Total:	**374**

Washed out roads would be repaired for access to range improvements in 3 locations:

T31N, R108W, sec 11 NENE, access to the East Fork Well #2
T31N, R108W, sec 24 NWNE, access to the Sand Spring Well #2
T31N, R107W, sec 4 SESE, access to a monitoring site and private lands

Travel Management Plan

The OHV designations would be implemented according to Map 2, showing the road use recommendations in the following categories, "Open to motorized vehicles", "Seasonally Open to motorized use", or "Closed to motorized vehicles". The route designations would apply only to BLM administered public land and would be clearly identified by maps, information signs, and route markers as specified in the activity plan. The management actions are described in detail in the Travel Management Plan (Appendix 2).

The draft Travel Management plan identifies specific action items to implement the designations and achieve the following goals and objectives:

- Maps: Produce an official travel management map to document route designations.
- Signs and Markers: Identify the designated routes on-the-ground in a clear and consistent manner to facilitate compliance and enforcement of the route designations.
- Education and Information: Provide clear and consistent information related to the route designations and the implementation process that will help ensure public understanding and compliance with the designations.
- Barriers: Use physical barriers if necessary to discourage use and allow rehabilitation of closed routes.
- Rehabilitation: Apply rehabilitation techniques to closed routes where necessary to speed the healing process, discourage use of closed routes, and minimize the impact on visual resources.
- Monitoring: Identify specific actions, including timeframes, methods, and anticipated resource needs for environmental monitoring.
- Enforcement: Identify specific actions, including timeframes, methods, and anticipated resource needs for compliance and enforcement related to the route designations and other implementation actions.
- Maintenance: Document maintenance standards and needs.
- Implementation: Implement the action items specified in this plan in a consistent and timely manner.

The activity plan would initially be implemented in the summer of 2014, with additional signing and rehabilitation completed in subsequent years, as funding allows. Monitoring and enforcement of the route designations would be ongoing, as specified in the Travel Management Plan.

2.2 Alternative 1 – No Action

Alternative 1 (No Action) would continue the current management of the Boulder landscape. Grazing permits in the 18 allotments (8,099 AUMs) would be renewed with no changes to season of use or livestock number or type. BLM would not alter any grazing permits. No roads would be upgraded, constructed, or closed.

Livestock Grazing
The 18 allotments, with a total of 8,099 permitted AUMs, are grazed as described in Table 4. Under this alternative, all the livestock grazing permits would be renewed with their current terms and conditions (Map 1).

Table 4. Livestock grazing allotments and current use, No Action alternative (Mandatory terms and conditions)

Allotment	Category	Livestock # and type		Dates of Use	BLM Acres	% Public Land	BLM AUMs
Big Sandy Individual	M	6	C	7/1 – 11/30	280	100	30
Boulter Pasture	M	2	H	11/01 – 11/30	20	100	2
Butte Individual	M	Unallocated			70		7
Chalk Butte Common	M	167	C	5/10 – 6/30	3,445	100	244
Circle 9 Individual	M	67	C	5/1 – 6/10	520	71	63
Cowley Tract	M	5	C	5/6 – 7/5	80	100	10
East Fork Common	M	897	C	5/1 – 7/5	6,905	97/72	793
Fremont Butte Common	M	1,356	C	5/1 – 7/5	21,015	100	2,410
Fremont Butte Individual	M	240	C	5/5 – 7/5	4,385	85	417
Individual Fenced	C	2	C	5/1 – 10/15	250	100	11
Irish Canyon Tracts Ind.	M	15	C	5/6 – 7/5	332	100	30
Muddy Meadows	M	4	C	5/1 – 9/30	40	100	20
North Pasture Individual	M	10	H	5/1 – 8/28	480	79	31
Sandy Fenced	M	150	C	6/2 – 9/30	250	5	30
Sandy Individual	C	4	C	5/1 – 8/15	120	100	14
Sandy Upper Muddy	M	7	C	5/1 – 10/15	660	100	47
Southwest Pasture Ind.	M	56	C	7/1 – 7/31	480	100	59
Square Top Common	I	2,308 57	C H	5/1 – 9/30 5/10 – 11/30	38,509	100	4,469

Under this alternative, the grazing season would run from May 1 through November 30 annually, with most of the use occurring between May 1 and July 5.

No criteria would be applied for determining range readiness for spring turnout.

No annual drought evaluation criteria would be applied.

No horse AUMs would be converted to cattle AUMs.

No allotments would be split.

No flexibility criteria would be incorporated in renewed grazing permits.

The following specific terms and conditions would be applied to renewed grazing permits:
Other Terms and Conditions:

1. The permittee must properly complete, sign and date an Actual Grazing Use Report (BLM Form 4130-5) annually. The completed form(s) must be submitted to the BLM Pinedale Field Office within 15 days from the last day of authorized annual grazing use.
2. Supplemental feeding is limited to salt or mineral in block or granular form. If used, these supplements must be placed at least ¼ mile away from any riparian area, spring, stream, meadow, aspen stand, sensitive plant species, playa, or water development.

Existing range improvements would be retained. No new range improvements would be constructed.

Utilization and trend monitoring would be conducted at existing monitoring sites in allotments larger than 1000 acres, using the existing 4Cs (coordination, cooperation, consultation in the spirit of conservation) initiative.

Transportation Management
The current road network is shown in Map 3. Pursuant to the 2008 Pinedale RMP, the majority of the Boulder landscape area (63,673 acres) is limited to existing roads and trails. The East Fork area is limited to designated roads and trails (7,112 acres); and a small area near the East Fork River unit, suitable for inclusion in the Wild and Scenic Rivers System, is closed to OHV use (1132 acres). Under this alternative, the areas limited to existing roads and trails and closed to vehicles would remain the same. In the area limited to existing roads, no roads would be designated or closed. The existing 374 miles of roads would remain open for travel use.

Table 5. No Action Transportation Route Statistics

Road Type	**Miles**
Open	374
Open with Seasonal Closure	0
ATV and Non-Motorized Use Only	0
Closed	0
Total:	**374**

In the area limited to designated roads (Map 11), the available roads would be designated and signed. Maps of the available road network would be provided by the BLM. No road closures would be implemented, and no new roads or extensive road repairs would be performed.

2.3 Alternative 2 – No Livestock Grazing

Livestock Grazing
Under this alternative, all 18 public land allotments in the Boulder landscape would be permanently closed to livestock grazing. No domestic livestock would be permitted to graze on BLM-administered public lands in the Boulder landscape area. Because there would be no livestock use, no grazing systems would be implemented. No range readiness, utilization criteria, drought evaluation criteria, brucellosis guidelines, permit flexibility criteria, or specific terms and conditions would be implemented.

Unnecessary fences would be removed. This would include fences that separate allotments but would not include fences that separate public lands from private lands. Private property boundary fences and highway right-of-way fences would be retained (Map 4). In some areas, new fences might be needed to segregate public lands from private lands.

Water developments on public lands would be removed.

Upland trend monitoring would be conducted periodically at intervals of 5-10 years on each upland site, at a time when plant phenology allows for the greatest success in plant identification.

Transportation Management
Under Alternative 2, BLM would maintain the areas established in the RMP as limited to existing roads and trails, limited to designated roads and trails, and closed to OHV use as described in Alternative I. A travel and transportation plan would be developed, with roads selected and designated for use. Roads not designated for travel would be closed (191 miles, Map 5). The remaining 183 miles of roads would remain available for use.

Table 6. Alternative 2 Transportation Route Statistics

Road Type	**Miles**
Open	183
ATV and Non-Motorized Use Only	0
Closed	191
Total:	**374**

In addition, BLM would close the Jim Creek trail to motor vehicle use under this alternative. Use of the Jim Creek trail for livestock access between private lands and USFS grazing allotments would still be necessary. Grazing permits would specify that no motor vehicles could be used on the Jim Creek trail. No improvements or structural obliteration of the Jim Creek trail would be implemented.

2.4 Alternative 3 – Rotational Grazing

Livestock Grazing
Under this alternative, permits in the 18 existing allotments would be renewed for 8,099 AUMs of total permitted use. According to the grazing regulations at 43 CFR 4100, permittees who are leasing the base property supporting the permit for a period less than 10 years would be issued a BLM grazing permit for the term of their private base property lease.

For most allotments encompassing more than 1000 acres, rest- or deferred-rotation grazing systems would be implemented. Because of the distribution of water wells in the allotments and the reliance of livestock on those water wells, no additional fences would be constructed. Rotation and livestock control would be achieved through herding and management of water sources (e.g., turning off wells in areas not scheduled for livestock use at that time) (Map 6).

Permits in allotments containing less than 1000 acres would be renewed with no change in the terms and conditions regarding season of use and number and kind of livestock. These allotments tend to be small, intermingled with private lands, and grazed more in conjunction with those private lands than in conjunction with the larger public land allotments.

Grazing seasons and permitted use would be as described in Table 7.

Table 7. Livestock grazing allotments and use, Rotational Grazing Alternative (Mandatory Terms and Conditions)

Allotment	Category	Livestock # and type		Dates of Use	BLM Acres	BLM AUMs
Big Sandy Individual	M	6	C	7/1 – 11/30	280	30
Boulter Pasture	M	2	H	11/1 – 11/30	20	2
Butte Individual	M	Unallocated			70	7
Chalk Butte Common Fremont Butte Common Fremont Butte Individual	M	1415	C	5/1-7/5	23,475	3,071
Circle 9 Individual	M	67	C	5/1 – 6/10	520	63
Cowley Tract	M	5	C	5/6 – 7/5	80	10
East Fork Common	M	897	C	5/1 - 7/5	6,905	793
Individual Fenced	C	2	C	5/1 – 10/15	250	11
Irish Canyon Tracts Ind.	M	15	C	5/6 – 7/5	332	30
Muddy Meadows	M	4	C	5/1 – 9/30	40	20
North Pasture Individual	M	10	H	5/1 – 8/28	480	31
Sandy Fenced	M	150	C	6/2 – 9/30	250	30
Sandy Individual	C	4	C	5/1 – 8/15	120	14
Sandy Upper Muddy	M	7	C	5/10 – 10/15	660	47
Southwest Pasture Ind.	M	56	C	7/1 – 7/31	480	59
Square Top Common	I	2,388	C	5/1 – 7/5	38,509	4,469

Specifics of the rotational grazing systems:

Fremont-Chalk Butte Rotation:
A 4-pasture rest-rotation grazing system would be established by combining the Chalk Butte Common (3,445 acres, 244 AUMs), Fremont Butte Common (15,645 acres, 1808 AUMs), and Fremont Butte Individual (4,385 acres, 417 AUMs) allotments into a rotational system. Because the Fremont Butte Common allotment is significantly larger than the others, it would be used as 2 pastures, Lander Trail and Sand Springs, making a 4-pasture system when used with the other two allotments (Map 6). Fremont Butte Common contains 4 dependable water wells, 2 on the east side and 2 west of a virtual north-south dividing line that would create an eastern and a western pasture (Map 6). Livestock location in the pastures would be controlled through control of the water wells. If fencing becomes necessary to control livestock, it would be analyzed in a separate EA. The rotation would proceed as follows:

Year	Chalk Butte	Sand Springs	Lander Trail	Fremont Butte Ind.
1	Rest	6/14 – 7/5	5/23 – 6/13	5/1 – 5/22
2	5/1 – 5/22	Rest	6/14 – 7/5	5/23 – 6/13
3	5/23 – 6/13	5/1 – 5/22	Rest	6/14 – 7/5
4	6/14 – 7/5	5/23 – 6/13	5/1 – 5/22	Rest
5	Repeat Year 1			

East Fork Common:
Because of the elevational differences in the East Fork Common allotment (approximately 7,200' at the Boulder Highway to approximately 8,600' at the Forest boundary), its relatively small BLM acreage, and

the need for its use as a route to and from the Forest for several permittees, it is not practicable to establish a true rotational grazing system in this allotment. However, a change from the current system is proposed. With the spring use period (5/1–7/5) combined with extended fall trailing (permits allow trailing for 3 days in September but current permit terms and conditions allow for livestock to be present and "trailing" from August through October) there are potentially livestock present in this allotment for most of the summer and fall.

In this alternative, spring use would be delayed until June 16 in elk parturition areas, unless other management prescriptions have been agreed upon in a Brucellosis Herd Plan with the Wyoming Livestock Board. Fall trailing would be controlled under a trailing permit. Trailing use would be authorized within 2 weeks either side of the permitted grazing period. Livestock would be required to be moved a minimum of 5 miles per day, would be actively herded and supervised. Proper application for trailing use to the authorized officer at least 5 days before the requested trailing use would be required.

Square Top Common:
A 3-pasture deferred rotation system would be established within the Square Top Common allotment. The pastures would be controlled through herding and management of water wells to place and keep livestock in the appropriate pasture.

The Sandy pasture would be located in the easternmost portion of the allotment, and would include the Boundary Line and Sandy Flat water wells. The Water Hole pasture would be approximately the southern half of the remainder of the allotment, and would include the Water Hole Draw well, Wolf well, and New Square Top well, and other water facilities in this area. The Desert pasture would be the northern portion of the allotment, and would include the Fremont Butte well, Lander Trail well #2, Square Top well #2, and other water facilities (Map 6). The rotation would proceed as follows:

Year	**Desert**	**Water Hole**	**Sandy**
1	5/1 – 5/22	5/23 – 6/13	6/14 – 7/5
2	5/23 – 6/13	6/14 – 7/5	5/1 – 5/22
3	6/14 – 7/5	5/1 – 5/22	5/23 – 6/13
4	Repeat Year 1		

Horse AUMs would be converted to cattle AUMs in allotments greater than 1000 acres, and the season of use changed to match the cattle grazing use season.

The Fremont Butte Common allotment would be separated into two allotments along the US Highway 191 corridor that splits the allotment naturally. The portion in the Boulder landscape would still be named Fremont Butte Common. The portion west of Hwy 191 would be renamed West Fremont Butte Common. The West Fremont Butte Common allotment would contain 5,883 BLM-administered acres and 588 BLM AUMs. Two grazing permits in this allotment would be renewed with no changes. The permits could be addressed further, as appropriate, as part of the Anticline/Jonah landscape.

Flexibility criteria would be part of each renewed grazing permit. Each permit would specify that grazing could vary from the dates specified on the permit by up to 2 weeks (14 days), and that the number of livestock specified could vary by up to 20% more than the number on the permit, as long as the total number of AUMs to be authorized is not greater than the number of AUMs allowed on the grazing permit. Varying the number of livestock less than the number specified on the permit could be approved without additional analysis, as long as the total number of AUMs to be used does not exceed those on the grazing permit.

Trailing use would be authorized within 2 weeks either side of the permitted grazing period. Trailing livestock would be required to be under direct supervision and making significant progress daily. Proper application for trailing use to the authorized officer at least 5 days before the requested trailing use would be required. If livestock are trailed within the timeframe of their permit, and on their permitted allotments, no trailing permits would be required.

Terms and Conditions to Appear on Grazing Permits:

1. The permittee must properly complete, sign and date an Actual Grazing Use Report (BLM Form 4130-5) annually. The completed form(s) must be submitted to the BLM Pinedale Field Office within 15 days from the last day of authorized annual grazing use.
2. Feed supplements such as salt and minerals may be allowed on the allotments to promote proper grazing distribution. If used, supplements will be located on ridge tops and/or approximately one-quarter mile away from any riparian habitat. Placement of supplements near water sources, such as wells and reservoirs, will consider rangeland objectives, such as grazing distribution, wildlife habitat requirements, and reclamation success. Salt or mineral supplement blocks will not be placed within one-quarter mile of an occupied sage-grouse lek or a known Special Status Plant Species. Supplemental forages including protein block and cottonseed cake are prohibited unless specifically approved by the Authorized Officer in an emergency situation.
3. Grazing use will be in accordance with the Standards for Rangeland Health and Guidelines for Grazing Management. Grazing use will also be in accordance with 43 CFR Subpart 4180 - Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration.
4. If future monitoring data indicates that Standards and Guidelines for Grazing Administration are not being met, and livestock grazing is determined to be a causal factor, the permit will be reissued subject to revised terms and conditions.
5. The permittee is responsible for all maintenance of assigned range improvements including wildlife escape ramps for both permanent and temporary water troughs. Maintenance must be completed prior to livestock turnout annually, and periodically throughout the grazing period even if taking non-use for that grazing year.
6. Grazing permittees will meet with BLM twice annually at a minimum; before turnout to schedule maintenance activities and after the grazing season to discuss monitoring.
7. Maximum allowable use levels will be as follows: Key upland forage species: 50% of the current year's growth. Livestock will be moved to another authorized pasture or removed from the allotment before utilization objectives are met or no later than 5 days after meeting the utilization objectives.
8. The following changes to the grazing schedule may be allowed with approval by the authorized officer at the BLM. The request must be made at least 3 business days in advance.
    a) The grazing permittee may change the actual use inclusive of where, how many, and how long livestock graze on an allotment, or on a portion or pasture of an allotment. Grazing could vary from the dates specified on the permit by up to 2 weeks (14 days), and the number of livestock specified could vary by up to 20% more than the number on the permit, as long as the total number of AUMs to be authorized is not greater than the number of AUMs allowed on the grazing permit. Varying the number of livestock less than the number specified on the permit could be approved without additional analysis, as long as the total number of AUMs to be used does not exceed those on the grazing permit. Flexibility must be applied for and approved by the authorized officer annually.
    b) Livestock may be required to exit the allotment earlier than scheduled if grazing use reaches or exceeds stipulated levels. Extensions based on utilization need to be approved in advance and as appropriate by the authorized officer at the BLM.

c) Drought years with unfavorable climatic conditions may require changes to the active preference or actual use that has normally occurred in the allotment in any one year. Adjust grazing use, as necessary, which may include but is not limited to reducing livestock numbers, shortening the season of use, altering pasture move dates, changing pasture rotations, authorizing water hauling (after documenting NEPA compliance), closing allotments to grazing use, or allowing use in vacant allotments.

Utilization of key, native perennial bunchgrasses would be limited to 50%. Key species would typically be bluebunch wheatgrass, Indian ricegrass, and needleandthread. Utilization monitoring would be conducted at the end of the grazing season or the end of the growing season, as appropriate for each allotment or pasture.

Upland trend monitoring would be conducted at existing monitoring sites in allotments larger than 1000 acres. Existing inventory information from the North Wind data would be used to establish vegetation objectives for each monitoring site. Upland trend monitoring would be conducted at intervals of 5-10 years on each upland site, at a time when plant phenology allows for the greatest success in plant identification.

In allotments less than 1,000 acres, periodic monitoring would be conducted as appropriate. Depending on the size, season of use, and other factors, this monitoring might consist of photo documentation or other approved methods from BLM monitoring manuals.

Transportation Management

Under Alternative 3, BLM would maintain the areas established in the RMP as limited to existing roads and trails, limited to designated roads and trails, and closed to OHV use as described in the Proposed Action. A travel and transportation plan would be developed, with roads selected and designated for use. Roads not designated for travel would be closed (10 miles, Map 2). More roads (364 miles) would be available for use under this alternative than under Alternative 2.

Table 8. Alternative 3 Transportation Route Statistics

Road Type	**Miles**
Open	283
Open with Seasonal Closure	81
ATV and Non-Motorized Use Only	0
Closed	10
Total:	**374**

All roads in big game crucial winter ranges and raptor nesting areas would be subject to annual seasonal closures (81 miles, Map 2) to protect wildlife and habitats during sensitive life stages.

BLM would close the Jim Creek trail to vehicle use under this alternative. Use of the Jim Creek trail for livestock access between private lands and USFS grazing allotments would still be necessary. No improvements or structural obliteration of the Jim Creek trail would be implemented. Signs and physical blocks would be placed on the trail.

2.5 Alternative 4 – Late Season Grazing

Livestock Grazing
Livestock grazing permits would be renewed for 10-year terms. Permits would be renewed in 18 allotments, with a total of 8,099 permitted AUMs. According to the grazing regulations at 43 CFR 4100, permittees who are leasing the base property supporting the permit for a period less than 10 years would be issued a BLM grazing permit for the term of their private base property lease.

This alternative would change the season of use to a late season, September-October use period in allotments containing more than 1,000 acres. Permits in allotments containing more than 1,000 acres of BLM-administered public lands and allotments would include changes to the terms and conditions.

Table 9. Livestock grazing allotments and use, Allotments over 1000 acres, Late Season Use Alternative (Mandatory Terms and Conditions)

Allotment	Category	Livestock # and type		Dates of Use	BLM Acres	% Public Land	BLM AUMs
Chalk Butte Common	M	121	C	9/1 – 10/31	3,445	100	244
East Fork Common (Jensen)	M	399	C	9/1 – 10/31	6,905	72	576
East Fork Common (Bousman)		111	C	9/1 – 10/31	6,905	97	216
Fremont Butte Common	M	995	C	9/1 – 10/31	15,645	100	1,822
Fremont Butte Individual	M	244	C	9/1 – 10/31	4,385	85	417
Square Top Common	I	2228	C	9/1 – 10/31	38,509	100	4,469

Permits in allotments containing less than 1,000 acres would be renewed with no change in the terms and conditions regarding season of use and number and kind of livestock. These allotments tend to be small, intermingled with private lands, and grazed more in conjunction with those private lands than in conjunction with the larger public land allotments because they are not adequate in size to handle herds coming from the large allotments. Grazing seasons and permitted use would be as described in Table 10:

Table 10. Livestock grazing allotments and use, allotments with less than 1000 acres, Late Season Use alternative (Mandatory Terms and Conditions)

Allotment	Category	Livestock # and type		Dates of Use	BLM Acres	% Public Land	BLM AUMs
Big Sandy Individual	M	6	C	7/1 – 11/30	280	100	30
Boulter Pasture	M	2	H	11/1 – 11/30	20	100	2
Butte Individual	M	Unallocated			70		7
Circle 9 Individual	M	67	C	5/1 – 6/10	520	71	63
Cowley Tract	M	5	C	5/6 – 7/5	80	100	10
Individual Fenced	C	2	C	5/1 – 10/15	250	100	11
Irish Canyon Tracts Ind.	M	15	C	5/6 – 7/5	332	100	30
Muddy Meadows	M	4	C	5/1 – 9/30	40	100	20
North Pasture Individual	M	10	H	5/1 – 8/28	480	79	31
Sandy Fenced	M	150	C	6/2 – 9/30	250	5	30
Sandy Individual	C	4	C	5/1 – 8/15	120	100	14

Sandy Upper Muddy	M	7	C	5/10 – 10/15	660	100	47
Southwest Pasture Ind.	M	56	C	7/1 – 7/31	480	100	59

No criteria would be applied for determining range readiness for spring turnout.

Horse AUMs would be converted to cattle AUMs in allotments greater than 1000 acres, and the season of use changed to 9/1 – 10/31 to concur with the cattle grazing season.

The Fremont Butte Common allotment would be separated into two allotments along the US Highway 191 corridor that splits the allotment naturally. The portion in the Boulder landscape would still be named Fremont Butte Common. The portion west of Hwy 191 would be renamed West Fremont Butte Common. The West Fremont Butte Common allotment would contain 5,883 BLM-administered acres and 588 BLM AUMs. Two grazing permits in this allotment would be renewed with no changes. The permits could be addressed further, as appropriate, as part of the Anticline/Jonah landscape.

Flexibility criteria would be part of each renewed grazing permit. Each permit would specify that grazing could vary from the dates specified on the permit by up to 2 weeks (14 days), and that the number of livestock specified could vary by up to 20% more than the number on the permit, as long as the total number of AUMs to be authorized is not greater than the number of AUMs allowed on the grazing permit. Varying the number of livestock less than the number specified on the permit could be approved without additional analysis, as long as the total number of AUMs to be used does not exceed those on the grazing permit. Flexibility must be applied for and approved by the authorized officer annually.

Trailing use would be authorized within 2 weeks either side of the permitted grazing period. Trailing livestock would be required to be under direct supervision and making significant progress daily. Proper application for trailing use to the authorized officer at least 5 days before the requested trailing use would be required. If livestock are trailed within the timeframe of their permit, and on their permitted allotments, no trailing permits would be required.

Terms and Conditions to Appear on Grazing Permits:

1. The permittee must properly complete, sign and date an Actual Grazing Use Report (BLM Form 4130-5) annually. The completed form(s) must be submitted to the BLM Pinedale Field Office within 15 days from the last day of authorized annual grazing use.
2. Feed supplements such as salt and minerals may be allowed on the allotments to promote proper grazing distribution. If used, supplements will be located on ridge tops and/or approximately one-quarter mile away from any riparian habitat. Placement of supplements near water sources, such as wells and reservoirs, will consider rangeland objectives, such as grazing distribution, wildlife habitat requirements, and reclamation success. Salt or mineral supplement blocks will not be placed within one-quarter mile of an occupied sage-grouse lek or a known Special Status Plant Species. Supplemental forages including protein block and cottonseed cake are prohibited unless specifically approved by the Authorized Officer in an emergency situation.
3. Grazing use will be in accordance with the Standards for Rangeland Health and Guidelines for Grazing Management. Grazing use will also be in accordance with 43 CFR Subpart 4180 - Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration.
4. If future monitoring data indicates that Standards and Guidelines for Grazing Administration are not being met, and livestock grazing is determined to be a causal factor, the permit will be reissued subject to revised terms and conditions.
5. The permittee is responsible for all maintenance of assigned range improvements including wildlife escape ramps for both permanent and temporary water troughs. Maintenance must be

completed prior to livestock turnout annually, and periodically throughout the grazing period even if taking non-use for that grazing year.

6. Grazing permittees will meet with BLM twice annually at a minimum; before turnout to schedule maintenance activities and after the grazing season to discuss monitoring.
7. The following changes to the grazing schedule may be allowed with approval by the authorized officer at the BLM. The request must be made at least 3 business days in advance.
    a) The grazing permittee may change the actual use inclusive of where, how many, and how long livestock graze on an allotment, or on a portion or pasture of an allotment. Grazing could vary from the dates specified on the permit by up to 2 weeks (14 days), and the number of livestock specified could vary by up to 20% more than the number on the permit, as long as the total number of AUMs to be authorized is not greater than the number of AUMs allowed on the grazing permit. Varying the number of livestock less than the number specified on the permit could be approved without additional analysis, as long as the total number of AUMs to be used does not exceed those on the grazing permit. Flexibility must be applied for and approved by the authorized officer annually.
    b) Livestock may be required to exit the allotment earlier than scheduled if grazing use reaches or exceeds stipulated levels. Extensions based on utilization need to be approved in advance and as appropriate by the authorized officer at the BLM.
    c) Drought years with unfavorable climatic conditions may require changes to the active preference or actual use that has normally occurred in the allotment in any one year. Adjust grazing use, as necessary, which may include but is not limited to reducing livestock numbers, shortening the season of use, altering pasture move dates, changing pasture rotations, authorizing water hauling (after documenting NEPA compliance), closing allotments to grazing use, or allowing use in vacant allotments.

Utilization of key, native perennial forage grass species would be limited to 50%. Key species would typically be bluebunch wheatgrass, Indian ricegrass, and needleandthread. Utilization monitoring would be conducted at the end of the grazing season or the end of the growing season, as appropriate for each allotment.

Upland trend monitoring would be conducted at existing monitoring sites in allotments larger than 1000 acres. Existing inventory information from the North Wind data would be used to establish vegetation objectives for each monitoring site. Upland trend monitoring would be conducted at intervals of 5-10 years on each upland site, at a time when plant phenology allows for the greatest success in plant identification.

In allotments less than 1,000 acres, periodic monitoring would be conducted as appropriate. Depending on the size, season of use, and other factors, this monitoring might consist of photo documentation or other approved methods from BLM monitoring manuals.

Transportation Management

Under Alternative 4, BLM would maintain the areas established in the RMP as limited to existing roads and trails, limited to designated roads and trails, and closed to OHV use as described in the Proposed Action. A comprehensive travel and transportation plan would be developed, with roads selected and designated for use. All existing roads would be designated for travel; no roads would be closed under this alternative (374 miles, Map 2).

Table 11. Alternative 4 Transportation Route Statistics

Road Type	Miles
Open	283
Open with Seasonal Closure	81
ATV and Non-Motorized Use Only	0
Total:	**374**

All roads in big game crucial winter ranges and raptor nesting areas would be subject to annual seasonal closures to protect wildlife and habitats during sensitive life stages (81 miles).

The Jim Creek trail would not be closed to vehicle use under this alternative.

2.6 Alternatives Considered but not Analyzed in Detail

Closing the Lander Trail to motorized use
The ID team discussed closing the Lander Trail to motorized use on BLM-administered lands in the Boulder landscape area. This was found not to be necessary or practical. The road has been used by motorized vehicles for many years and provides access to several fences and other range improvements. It also provides east-west access across the area from US Highway 191 to the Boulder Highway (WY 353). Traffic on the road is light but regular. Damage from structures necessary to effect a closure would be greater than that caused by vehicle use presently.

Intermediate decreases or increases in permitted livestock grazing use
Available information does not indicate a need to increase or decrease AUM numbers. Based on current knowledge, soils are stable, hydrologic function and biotic integrity exists.

Implementing an early Spring grazing season (April-May) in allotments larger than 1000 acres
This alternative was considered as a way to relieve grazing pressure during the critical June growing season for mid-stature bunchgrasses such as Indian ricegrass, needle and thread, and bluebunch wheatgrass. Livestock would be consuming largely residual forage from the previous year under this scheme, and grasses would be able to complete their growth cycle and go to seed in June-July. It was eliminated from detailed analysis due to the impracticality of physically grazing the allotments in April of most years, when too much snow is generally present to allow effective grazing use of the allotments.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

The following table lists resources typically considered in environmental analyses. For each resource, a determination is made whether that resource is present in the Boulder Landscape and would be affected by the alternatives in this EA. Those resources determined to be Not Present (NP) or No Impact (NI) are not considered further in this EA.

Table 12. Resources Considered

Determination[1]	Resource	Rationale for Determination
PI	Air Quality/Green House	See Section 3.2

Determination[1]	Resource	Rationale for Determination
	Gas Emissions	
NP	Areas of Critical Environmental Concern	No ACECs are present in the project area.
PI	Cultural Resources	See Section 3.3
NI	Environmental Justice	The action alternatives were reviewed in accordance with Executive Order 12898 and no impacts to minority and low-income populations are expected.
NP	Farmlands: Prime or Unique	No Prime or Unique Farmlands (as defined by 7 CFR 657.5) are present in the project area.
PI	Floodplains	See Section 3.10
NP	Fuels/Fire Management	No fuels projects are planned or proposed within the project area. All wild land fires and fire management will be managed according to BLM protocol.
PI	Invasive Species/ Noxious Weeds	See Section 3.7
NI	Lands/Access	No rights of way or other land use authorizations are required to implement the proposed action or alternatives. No rights of way or other land use authorizations would be impacted through selection of an alternative.
PI	Lands with Wilderness Characteristics	See Section 3.5
PI	Livestock Grazing	See Section 3.6
NP	Native American Religious Concerns	None present.
PI	Paleontology	See Section 3.8
NI	Public Health & Safety	Public Health and Safety will not be impacted by any of the alternatives.
PI	Rangeland Health Standards	See Livestock Grazing section 3.6
PI	Recreation	See Section 3.9
PI	Socio-Economics	See Section 3.4
PI	Soils	See Section 3.11
PI	Special Status Plant Species	See Section 3.12
PI	Special Status Wildlife Species	See Section 3.17
PI	Threatened, Endangered or Candidate Plant Species	See Section 3.12
PI	Threatened, Endangered or	See Section 3.17

Determination[1]	Resource	Rationale for Determination
	Candidate Animal Species	
NP	Wastes (hazardous or solid)	There are no known hazardous or solid wastes present in the project area.
NI	Water Resources/Quality (drinking/surface/ground)	Guidance from BLM IM No. WY-98-061 identifies that the Wyoming Department of Environmental Quality (WDEQ) is the responsible agency for the administration of the Clean Water Act. WDEQ's 2010 Wyoming Water Quality Assessment (2010 Integrated 305b and 303d Report) identified that there are no impaired streams within the Boulder Landscape area (WDEQ 2010). Riparian areas are covered in Section 3.10.
PI	Wetlands/Riparian Zones	See Section 3.10
PI	Wild and Scenic Rivers	See Section 3.16
NP	Wilderness	No wilderness or WSA's are present within the project area.
NI	Woodland/Forestry	The forests and woodlands in the project area would not be affected by any of the actions.
PI	Vegetation	See Section 3.14
PI	Visual Resources	See Section 3.15
PI	Wildlife/Fisheries	See Section 3.17

[1]Determination:

NI: No Impact expected from action alternatives.

NP: Not Present in the area impacted by the action alternatives.

PI: Potential Impact due to one or more action alternatives; therefore, analyzed in the NEPA document.

3.2 Air Resources

The Boulder landscape is located downwind from multiple potential air pollutant sources, including energy development in the Anticline, Jonah, LaBarge, and Moxa gas fields, and Salt Lake City. As a result, an air quality monitoring program has been established in the vicinity of the town of Boulder http://www.wyvisnet.com/shel1/index.html. Data from this site is maintained by the WYDEQ. This data shows that based on the fourth highest eight hour average (state standard) there was an exceedence of the Wyoming state ozone standard at the Boulder air monitoring station in 2008. Continued and expanded monitoring is continuing in the Boulder landscape and surrounding areas to address this issue.

The effects of this proximity of the Boulder landscape to a particulate and pollution source have not been well studied. It has been assumed that the greater buffering capacity of the sediment derived soils, in the western side of the planning area would have some effect on the response of water quality to depositional changes from up-wind sources, as compared to the granitic soils located to the eastern side of the Boulder landscape but this has not been confirmed at this time.

Air quality, climate, and visibility are the components of air resources which the BLM must consider and analyze to address the potential effects of authorized activities on air resources as part of the planning and decision making process. The Pinedale RMP addresses air quality issues, impacts, and potential mitigations.

Air Quality

Regional air quality is influenced by the interaction of meteorology, climate, the magnitude and spatial distribution of local and regional air pollutant sources, and the chemical properties of emitted air pollutants.

The monitoring and enforcement of air-quality standards are administered by the Wyoming Department of Environmental Quality-Air Quality Division (WDEQ-AQD). Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS) identify maximum limits for concentrations of criteria air pollutants at all locations to which the public has access. The WAAQS and NAAQS are legally enforceable standards. Concentrations above the WAAQS and NAAQS represent a risk to human health that, by law, require public safeguards be implemented. State standards must be at least as protective of human health as federal standards, and may be more restrictive than federal standards, as allowed by the Clean Air Act (CAA). Currently, the WDEQ-AQD does not have regulations regarding greenhouse gas emissions, although these emissions are regulated indirectly by various other regulations.

Pollutant concentration can be defined as the mass of pollutant present in a volume of air and is reported in units of micrograms per cubic meter ($\mu g/m^3$), parts per million (ppm), or parts per billion (ppb). The state of Wyoming has used monitoring and modeling to determine compliance with Wyoming and federal concentration standards. In addition, other monitoring systems are operational in the Pinedale area, including the *Clean Air Status and Trends Network* (CASTNet) and *Wyoming Air Resources Monitoring System* (WARMS). Monitoring data from these systems have been determined to be representative of the area. There are four monitoring sites within the Pinedale Field Office.

Criteria air pollutants are those for which national concentration standards have been established; pollutant concentrations greater than the established standards pose a risk to human health and/or welfare.

Carbon monoxide (CO) is an odorless, colorless gas formed during combustion of any carbon-based fuel, such as during operation of engines, fireplaces, furnaces, etc. Because carbon monoxide data are generally collected only in urban areas where automobile traffic levels are high, recent data are often unavailable for rural areas.

Nitrogen dioxide (NO_2) is a highly reactive compound formed at high temperatures during fossil fuel combustion. During combustion, NO is released into the air which reacts with oxygen in the atmosphere to form NO_2. NO plus NO_2 is a mixture of nitrogen gases, collectively called nitrogen oxides (NO_x). NO_x emissions can convert to ammonium nitrate particles and nitric acid, which can cause visibility impairment and atmospheric deposition. Nitrogen dioxide can contribute to “brown cloud” conditions and ozone formation, and can convert to ammonium (NH_4), nitrate particles (NO_3), and nitric acid (HNO_3). Internal combustion engines are one source of NO_x emissions.

Ozone (O_3) is a gaseous pollutant that is generally not emitted directly into the atmosphere but is formed in the atmosphere from complex photochemical reactions involving NO_2 and volatile reactive organic compounds (VOC). Sources of VOCs include automotive emissions, paint, varnish, oil and gas operations and some types of vegetation. The faint acrid smell common after thunderstorms is caused by ozone

formation by lightning. Ozone is a strong oxidizing chemical that can burn lungs and eyes, and damage plants. Ozone is a severe respiratory irritant at concentrations in excess of the federal standards.

Particulate matter (PM) refers to the small particles (i.e., soil particles, pollen, etc.) suspended in the air that settle to the ground slowly and may be re-suspended if disturbed. Ambient air particulate matter standards are based on the size of the particle. The two types of particulate matter are:

- PM_{10} (particles with diameters less than 10 micrometers): small enough to be inhaled and capable of causing adverse health effects.
- $PM_{2.5}$ (particles with diameters less than 2.5 micrometers): small enough to be drawn deeply into the lungs and cause serious health problems. These particles are also the main cause of visibility impairment.

Sulfur dioxide (SO_2) and sulfates (SO_4) form during combustion from trace levels of sulfur in coal or diesel fuel. Sulfur dioxide also participates in chemical reactions and can form sulfates and sulfuric acid in the atmosphere.

Ozone

Air quality in the Pinedale Field Office (PFO) meets the Wyoming Ambient Air Quality Standards (WAAQS) and the National Ambient Air Quality Standards (NAAQS), with the exception of ozone. Several of Sublette County's ambient air monitoring stations recorded ozone concentrations above the current ozone standard of 75 parts per billion (ppb) over an eight-hour period on several occasions in 2005, 2006, 2008 and 2011.

Although elevated ozone occurs throughout the year, the occurrence of high ozone events from early February to late March contrasts with the more typical summer occurrences in other areas of the United States. Winter ozone becomes elevated in the upper Green River basin when there is a presence of ozone-forming precursor emissions including oxides of nitrogen (NOx) and volatile organic compounds (VOCs) coupled with strong temperature inversions, low winds, snow cover and bright sunlight. Ozone advisories are issued by the Wyoming Department of Environmental Quality-Air Quality Division (WDEQ-AQD) when weather conditions appear conducive for the formation of ozone. Ozone levels are measured at five permanent monitoring stations: the Wyoming Range, Pinedale, Daniel, Boulder and Juel Spring.

In March 2008 the U.S. Environmental Protection Agency (EPA) promulgated a new National Ambient Air Quality Standard (NAAQS) for ozone. The ozone standard was lowered from 0.08 parts per million (ppm) to 0.075 ppm based on the fourth highest 8-hour average value per year at a site, averaged over three years. Based on monitoring results from 2006 through 2008, the entire state of Wyoming is in compliance with this standard except for at a single monitor, the Boulder monitor, in Sublette County. The Wyoming Department of Environmental Quality, Air Quality Division (AQD) evaluated whether a nonattainment area should be designated due to the monitored results at the Boulder monitor. The AQD recommended that the Upper Green River Basin (UGRB) be designated as nonattainment for the 2008 ozone National Ambient Air Quality Standard (NAAQS). The AQD based this recommendation on a careful review of the circumstances surrounding the incidence of elevated ozone events. Elevated ozone in the UGRB is associated with distinct meteorological conditions. These conditions have occurred in February and March in some (but not all) of the years since monitoring stations began operation in the UGRB in 2005.

On March 12, 2009, Governor Freudenthal submitted a recommendation to the U.S. EPA that the agency should designate the UGRB in southwest Wyoming as an ozone nonattainment area. The AQD submitted

a Technical Support Document to EPA on March 26, 2009, which described the technical analysis which supports the boundary selection of the proposed nonattainment area. The AQD submitted additional documentation to the EPA on May 19, 2009 and August 17, 2009.

On December 8, 2011, the EPA issued a letter to Wyoming's Governor Matt Mead stating that it intended to support Wyoming's recommended nonattainment area designation and boundary for the Upper Green River Basin (UGRB). On May 2, 2012, the EPA announced that it would formally designate the UGRB as a 'marginal' ozone nonattainment area, the lowest of five ratings for air pollution severity.

EPA's designation of the UGRB as a marginal ozone nonattainment area has significant implications for BLM management actions.

Twelve months after final designation of the nonattainment area, the BLM must comply with General Conformity regulations in 40 CFR 93 subpart B for any federal action within a designated nonattainment area. The BLM must conduct a conformity evaluation and cannot approve any action that would cause or contribute to a new violation of the NAAQS or increase the frequency or severity of any existing violation. A conformity determination must be conducted for any action where the total of direct and indirect emissions for the proposed action exceeds the de-minimus levels specified in 93.153(b). For projects located in a marginal ozone nonattainment area, this de-minimus level is 100 tons per year of VOC or NOx. The proposed action cannot be implemented until a determination of conformity is achieved.

The BLM continues to work collaboratively with the WDEQ-AQD, the U.S. Forest Service, EPA and local communities to address and mitigate air-quality impacts from its proposed management actions.

Visibility

The 1997 CAA amendments declared "as a National Goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas in which impairment results from manmade air pollution." The CAA gives federal managers the affirmative responsibility, but no regulatory authority, to protect air quality-related values, including visibility, from degradation. A wide variety of pollutants can impact visibility, including particulate matter, nitrogen dioxide, nitrates (compounds containing NO_3), and sulfates (compounds containing SO_4). Fine particles suspended in the atmosphere decrease visibility by blocking, reflecting, or absorbing light. Regional haze occurs when pollutants from widespread emission sources become mixed in the atmosphere and travel long distances.

Climate

Annual precipitation ranges from 7-19 inches per year and elevations range from 7,000 to 9,000 feet above sea level. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which allows for rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures.

Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

3.3 Cultural Resources

The Boulder landscape area has been subject to a light to moderate amount of formal cultural resources inventory, predominantly linear inventory in support of geophysical operations (SWCA, 2010). This effort lies exclusively in the western planning area, south of the Lander Trail. Other formal inventories have been performed by BLM in support of timber sales, minerals material sales and range improvement projects. One large block inventory encompassing over 3,000 BLM acres was performed in 2003 and centered on the Lander Trail. The specific methods used (historical research, metal detection, Condition Assessment) of this inventory were geared towards the identification and evaluation of historic period resources associated with the Lander Trail. An early landscape level archaeological investigation aimed at identifying major sites in the planning area is Love (1976). Thus knowledge of cultural resources in the planning area is based upon two data sets, formal Class III inventory and subjective, reconnaissance type efforts that are more impressionistic than scientific. Approximately 700 acres of known historic properties consisting of scattered polygons exist within the planning area. Both information sets have value for planning purposes.

Native American consultation letters were sent to the Eastern Band of the Shoshone, Arapaho, Utes and the Bannock Tribal Business Councils identifying the planning efforts and soliciting Tribal input in 2009. No response was forthcoming from the Arapaho, the Utes or the Bannock. The Eastern Band of the Shoshone visited the Planning Area on October 23, 2009 and indicated that the area is of cultural significance to them (R. Ferris 2009). R. Ferris verbally acknowledged the Indian Trails mentioned by Robert Stuart in 1812 (Robbins, 1995, p. 160-163) and Shoshone (aka Snake) use of the area at this time. During a more recent Tribal Consultation onsite, the Tribal Consultant stated (while looking toward the Wind River Front in the area of the Boulder Landscape) that an area of clay and mineral procurement "used in one of our ceremonies" (Eastern Band of the Shoshone) is found near here (W. Ferris, 2012).

Prehistoric Sites

Prehistoric cultural resources have been identified in all regions throughout the planning area ~~effort~~. Site types known or expected within the planning area include: Prehistoric camp sites, hunting sites and blinds, faunal and floral processing areas, lithic extraction sites, rock alignments, ceremonial sites, "Indian Trails", burials, caches and possible rock art locations. Since water is a scarce resource, proximity to water plays an important role in determining prehistoric site location and density. Water sources have always been important to both human and animal populations through the centuries. Not only is water needed to sustain life, but it also draws wildlife into concentrated areas that allow for simpler procurement methods by indigenous people and those people of the historic past. Another environmental factor influencing prehistoric site location is topography, where ridge tops, mesa edges and saddles between major topographic features were special use areas for prehistoric inhabitants. Soil type, especially eolian sand deposits, were favored use areas for prehistoric peoples, as were ecological edge areas, i.e. the timber fringe, the interface between timbered areas and grassy meadows and the sagebrush steppe, and alluvial terrace deposits.

Historic Sites

The Euroamerican history of this area begins in October, 1812 when Robert Stuart, a returning Astorian passed through the region searching for a southern pass across the Rocky Mountains that was easier than the Montana route of Lewis and Clark a decade earlier. Stuart's journal describes his friendly encounter with Shoshone Indians with whom he traded for an old horse. These Native Americans were described as living in pine pole lodges in the vicinity of modern day Big Sandy (Rollins, 1995, p. 160-164). Stuart was following an "Indian travois trail" that he described as a road coursing along the foothills of the Wind

River Range. It is probable that part of this Indian trail was used in the 1830's when Captain L.E. Bonneville brought wagons to the 1832 (and later) Rendezvous. In 1842, John C. Fremont came across South Pass and navigated through the planning area, heading for his possible camp near Boulder Lake. 48SU419 relates to his camping at Fremont Butte (Jackson and Spense 1970). Later (1858-59), Frederick W. Lander established the first surveyed and constructed emigrant road west of the Mississippi which crosses the planning area. Thus Indian trails, early historic routes and later roads may be identified in the planning area.

One prominent historic site present in the planning area is 48SU387, the Lander Trail. Also known as the Lander Road, or Lander's Cutoff, this Emigrant Trail is an element of the congressionally designated National Historic Trails system. Some 15 miles of Lander Trail course through the Planning Area, ~~10~~ ten miles of which lie on BLM-administered land. Emigrant camp sites are expected along the Lander Trail, especially where the Trail crosses or intersects permanent water. Satellite sites relating to the concentrated use at Buckskin Crossing and Sand Springs, such as at 48SU5278 in the planning area, are expected. The Lander Trail on BLM land is recognized to be a contributing segment of the National Historic Trails system due to high integrity of setting, place, association and feeling.

Other historic sites and routes in the area include the Pinedale to Lander mail road (48SU422), also known as a freight road. WyCRO records suggest that part of the Pinedale to Lander Road became portions of Sublette County Road 118 in the planning area (Wyoming Recreation Division/Historic Division 2005). Flanking the area to the west lays the National Register Eligible New Fork Wagon Road (48SU1408). The New Fork Wagon Road connected the city of Rock Springs and the Union Pacific railhead with the small community of New Fork (until the 1916 cholera epidemic decimated this community) and, later connected to the town of Pinedale.

The Boulder area contains many historic ranches. Noteworthy are 48SU446, the Steele Homestead (National Register Nomination 1985) and 48SU976, the Jensen Ranch (National Register Form 1988), which are both formally listed on the National Register of Historic Places.

Other historic sites and places include such locally significant buildings such as the Emerson School (48SU958), a one room schoolhouse built by Metinus Jensen about 1909 (Rosenberg 1988) and was in use until about 1959. The Big Sandy Post Office (48SU957) stood nearby (Rosenberg 1988). The Silver Creek School, 48SU1047, was built about 1908 and was used until 1944 (Rosenberg 1988). Mail stops at local ranches, homesteads such as the Bertoncelj homestead (48SU984) (Rosenberg 1986) and the Gilligan Ranch, sawmills, trapper camps and mining claims are historic site types known or suspected to be located in the planning area. Many of these historic sites are within deeded lands (privately held) within the project area.

3.4 Economic and Social Conditions

The main economic use of the Boulder landscape area is livestock grazing. The 18 grazing allotments are used by local ranchers mainly in May and June, but some areas are used season long. Many of those using these allotments use ranching as their primary source of income.

Livestock ranching has been a featured element of the economies of Sublette County and town of Pinedale for over a century. Ranching enterprises contribute year around revenue in the form of services and supply purchases, and modest contributions of employment. Since around 2000, with the increase in year around natural gas development, ranching revenues have declined as a proportion of the overall economic portfolio of the county. On an individual basis however, ranching is a central source of income

for individual families employed in or engaged directly or indirectly in this industry. Livestock herds are a primary source of this income.

Other uses of the area are for gravel extraction, hunting, hiking, camping, and OHV use. The Boulder landscape area is not available for new oil and gas leasing; however, there are a few valid oil and gas leases located along US Highway 191. There are one or two producing gas wells on these leases, and more could be developed according to the terms and conditions of the existing leases.

Within the past ten years, Sublette County has changed from a primarily rural agricultural county to the largest gas-producing county in the state, producing 44% of Wyoming's gas in 2006 (Wyoming Oil and Gas Conservation Commission 2007). In 2007, Agriculture provided 4% of the employment in Sublette County, with not quite 100 employees. The average wages for a job in the agriculture, forestry, fishing and hunting sector was $20,099 in 2001. In 2007, oil and gas provided over 94% of the county's taxable value (Sublette County Socioeconomic Impact Study 2008). Of over 34 million calves produced in the United States in 2012, about 660,000 (about 1.9%) came from Wyoming (USDA National Agricultural Statistics Service).

3.5 Lands with Wilderness Characteristics

All BLM lands are required to be inventoried for the presence of Lands with Wilderness Characteristics (LWC). Lands that have wilderness characteristics are described as roadless, greater than 5,000 acres in size, appear natural and contain outstanding opportunities to experience solitude or primitive and unconfined recreation.

The project area was inventoried for LWC using the procedures identified in BLM Manual 6301 Wilderness Characteristics Inventory (LWC). The inventory identified 4 of 7 units of the Boulder Landscape Planning area as possessing wilderness characteristics (North Irish Canyon*, Unit WYDO1-600,* North Speedway, *Unit WYDO1-602,* South Speedway, *Unit WYDO-603,* and Sandy Flat Unit *WYDO-604).* Two of the 7 units fail to meet the 5,000 acre size criterion.

3.6 Livestock Grazing

The Boulder landscape area contains 18 allotments that range in size from 20 acres to over 38,000 acres. A portion of the Fremont Butte Common allotment is located west of Highway 191, and is not included in this landscape plan, as it is administered separately from that portion of the allotment on the east side of Highway 191. No separate pasture boundaries exist for any of the allotments, with the exception of the Square Top Common allotment which contains a "Holding Pasture," separated from the whole of the allotment by land ownership boundaries (Map 1).

There is little written record of the grazing history of this area pre-1960, but it is evident that great numbers of cattle began arriving and being dispersed over the then free and open range in the late 1860's and into the 1870's. By 1960, grazing use in this area was mainly by cattle in the spring and sheep in the spring, fall, and winter accompanied by use by various types of wildlife. *Bureau of Land Management, Wyoming Grazing District No. 5, Pinedale, Wyoming Area 3* completed the East Fork Community Watershed Program (1960) recognizing that the public lands in this area were in need of improvement and development. The objectives of this program were to improve the lands in this watershed "to their highest potential for sustained productivity under multiple-use and conserve their waters for greatest beneficial utilization by increasing production of desirable vegetative cover and decreasing soil erosion, sedimentation, and destructive runoff." Out of this program, came structural range improvements (fences,

stockwater wells and reservoirs), vegetative treatments (erosion control dams and sagebrush sprays), and adjusted stocking methods in some cases. See Table 13 for current permitted use in each allotment. See Table 14 for actual billed use 2000-2010.

Table 13. Boulder Landscape Permitted Grazing Use

Allotment Name	Allot. #	Category	Livestock # and type		Dates of Use	BLM Acres	Public Land %	BLM AUMs	Acres/ AUM
Big Sandy Individual	02192	M	6	C	7/1 – 11/30	280	100	30	9.3
Boulter Pasture	12117	M	2	H	11/01 – 11/30	20	100	2	10
Butte Individual	02191	M	-	-	Not specified	70		7	10
Chalk Butte Common	02168	M	167	C	5/10 – 6/30	3445	100	244	14.1
Circle 9 Individual	02047	M	67	C	5/1 – 6/10	520	71	64	8.3
Cowley Tract	02052	M	5	C	5/6 – 7/5	80	100	10	8
East Fork Common	12022	M	897	C	5/1 – 7/5	6905	97/72	792	8.7
Fremont Butte Common	12009	M	1,356	C	5/1 – 7/5	21,015	100	2410	8.7
Fremont Butte Individual	02181	M	240	C	5/5 – 7/5	4385	85	417	10.5
Individual Fenced	12109	C	2	C	5/1 – 10/15	250	100	11	22.7
Irish Canyon Tracts Ind.	02180	M	15	C	5/6 – 7/5	332	100	30	11.1
Muddy Meadows	12112	M	4	C	5/1 – 9/30	40	100	20	2
North Pasture Individual	12115	M	10	H	5/1 – 8/28	480	79	31	15.5
Sandy Fenced Individual	02184	M	150	C	6/2 – 9/30	250	5	30	8.3
Sandy Individual	12111	C	4	C	5/1 – 8/15	120	100	14	8.6
Sandy Upper Muddy	12110	M	7	C	5/1 – 10/15	660	100	39	14
Southwest Pasture Ind.	12116	M	56	C	7/1 – 7/31	480	100	57	8.1
Square Top Common	02051	I	2308 57	C H	5/1 – 9/30 5/1 – 11/30	38,509	100	4432	8.6

***Category** M=Maintain C=Custodial I=Improve ****Type** C=Cattle H=Horse

Table 14. Boulder Landscape 2000-2010 Actual Billed Grazing Use

Allotment Number	Allotment Name	Average % Use compared to Active AUMs (Based on 2000-2010 Bill Summary)	
		Over	Under
2192	Big Sandy Individual	0%	0%
12117	Boulter Pasture	0%	0%
2191	Butte Individual	n/a	n/a
2168	Chalk Butte Common		3%
2047	Circle 9 Individual		24%
2052	Cowley Tract	0%	0%
12022	East Fork Common		3%
12009	Fremont Butte Common		14%
2181	Fremont Butte Individual		9%
12109	Individual Fenced	0%	0%
2180	Irish Canyon Tracts Individual	0%	0%
12112	Muddy Meadows		2%
12115	North Pasture Individual		1%
2184	Sandy Fenced Individual	0%	0%
12111	Sandy Individual	0%	0%

12110	Sandy Upper Muddy Individual	0%	0%
12116	Southwest Pasture Individual		3%
2051	Square Top Common		38%

When actual billed use differs from the permitted use, it is typically taken in the traditional use season but with fewer livestock.

In many allotments, livestock grazing permittees have engaged in many ongoing activities to benefit both livestock and wildlife, specifically sage-grouse. These activities include marking of fences to make them visible, and conversion of water wells to solar power to eliminate the potential of raptor perching on windmills.

Ecological Sites

Ecological sites are the basic component of a land-type classification system that describes ecological potential and ecosystem dynamics of land areas. All land/land use types are identified within the ecological site system, including rangeland, pasture, and forest land. An ecological site is defined as a distinctive kind of land with specific soil and physical characteristics that differ from other kinds of land in its ability to produce a distinctive kind and amount of vegetation and its ability to respond similarly to management actions and natural disturbances. Lands are classified considering discrete physical and biotic factors. Physical factors include soils, climate, hydrology, geology, and physiographic features. Biotic factors include plant species occurrence, plant community compositions, annual biomass production, wildlife-vegetation interactions, and other factors. Ecological dynamics, primarily disturbance regimes, such as grazing; fire; drought; management actions; and all resulting interactions are also a primary factor of ecological sites. Information and data pertaining to a particular ecological site is organized into a reference document known as an Ecological Site Description (ESD). ESDs function as a primary repository of ecological knowledge regarding an ecological site. ESDs are maintained on the NRCS Ecological Site Information System (ESIS), which is the repository for information associated with ESDs and the collection of all site data (NRCS 2013).

State and transition models are the key component of ESDs, as they depict and organize information regarding the ecological dynamics of an ecological site. States are stable, long term ecological conditions that are produced on a site due to the interactions of the biotic, physical, and disturbance factors. States are composed of usually several plant community phases, which vary based on species composition and production. Expression of community phases can be, and often is, dynamic on a particular ecological site location due to the interaction of all ecological factors. This interaction of ecological factors resulting in different plant community phases is termed community pathways. Ecological sites will also display multiple states, with the change from one state to another being non-reversible without significant management inputs. A native shrubland state being converted to cropland and then converted to introduced pasture grasses is an example of three distinct states. Transitions are the drivers and mechanisms of changes between states and the ESD will describe how these function. Management actions, such as conservation practice implementation, grazing management, and other land use decisions are a significant part of the described state and transition model (NRCS 2013).

The Natural Resources Conservation Service (NRCS) has divided the United States into Major Land Resource Areas (MLRAs). These areas encompass large geographic areas with similar elevation, topography, geology, climate, water, soils, biological resources, and land use. The Boulder Landscape encompasses two MLRAs (MLRA 34A Cool Central Desertic Basins and Plateaus; MLRA 43B Central Rocky Mountains). Within each MLRA, the NRCS has made divisions along specific soil and

precipitation zones. These divisions or units are called ecological sites and are described in an Ecological Site Description (ESD). The dominant Ecological Sites within the Boulder Landscape are as follows:

MLRA 34A	Sandy 7-9" Green River and Great Divide Basin (GR)
	Loamy 7-9" GR
	Shallow Clayey 7-9" GR
	Clayey 7-9" GR
MLRA 34A	Sandy 10-14" Foothills and Basin West (W)
	Loamy 10-14" W
	Shallow Clayey 10-14" W
	Clayey 10-14" W
MLRA 43B	Course Upland 15-19" W

MLRA 34A can be grouped into five categories. These categories as they relate to the dominant ecological sites within the Boulder Landscape are:

1. Ecological sites that provide key big sagebrush habitat.	Sandy (Sy) Loamy (Ly)
2. Ecological sites with heavy or shallow soils.	Shallow Clayey (SwCy) Clayey (Cy) Course Upland (CU)
3. Ecological sites with salty soils	
4. Ecological sites with basin big sagebrush.	
5. Ecological sites with riparian characteristics.	

For a more thorough discussion of these categories and a discussion of sagebrush and herbaceous (grass and forb) interaction and competition, see Cagney et al. (2010), *Grazing Influence, Objective Development, and Management in Wyoming's Greater Sage-Grouse Habitat*.

4C's Joint Cooperative Monitoring Program

In 2003 specified allotments within the Pinedale Field Office were selected as part of a Department of Interior pilot program known as the 4C's (consultation, cooperation, and coordination, in the service of conservation). The program was outlined in three phases: 1- Scoping, Planning, and Implementing (1 year); 2- Continued Supervised Monitoring (4-5 years); 3- Assessments and Evaluation. The goal of this program was to implement cooperative monitoring. As a result, a soil survey was initiated, allotments were reviewed and past studies were compiled and assessed to determine what studies would be continued. The 4C's studies include Utilization, Photo Points, Line Intercept, and Line Point Intercept. Four allotments within the assessment area were part of this program: East Fork Common, Fremont Butte Common, Fremont Butte Individual, and Square Top Common. Upon initiation of the 4C's, the Landscape Appearance method was used for estimating herbaceous utilization. For locations of monitoring sites see Map 8.

2009 Jonah Interagency Office (JIO) Baseline Habitat Sampling

In 2009, the Jonah Interagency Office (JIO) conducted a baseline habitat sampling project for the Wind River Front. The project was completed by North Wind, Inc., and it provides information on species composition, productivity, shrub condition and age classification, and overall canopy structure of sage-steppe habitat. The data was sampled at various ecologic sites, and determines Similarity Index (SI) as a percentage of the Historic Reference Plant Community (HRPC) for the particular soils and climate found at 27 sample sites within the assessment area. This comprehensive document may be reviewed at the

Pinedale Field Office. The study provides quantitative data to describe the dominant Ecological Sites and associated plant communities within the five largest allotments (over 1,000 acres) in the Boulder landscape assessment area. For study site locations see Map 9.

Rangeland Health Indicators

Members of an interdisciplinary team (IDT) visited 12 grazing allotments within the assessment area during the summer of 2009 and completed *Rangeland Health Indicator Evaluation Matrices* at 19 locations on various ecological sites and plant associations. The *Rangeland Health Indicator Evaluation Matrix* consists of an assessment of "17 indicators" of rangeland health that are compared to a description of the ecological site potential, which is based on soil survey information. These indicators cover characteristics of the site regarding soil stability, hydrologic function, and biotic integrity. Some examples of the indicators assessed include rills, pedestals, bare ground, litter, plant composition, soil compaction, and plant production.

The evaluations were based on past studies (North Wind baseline habitat sampling, 4C's information, other studies where available) and information collected during site visits. Tables 15 and 16 summarize the 17 indicators assessments.

Table 15. Boulder Rangeland Health Summary of 17 Indicators

Allotment		Boulter Pasture 12117	Chalk Butte Common 2168 Site 1	Chalk Butte Common 2168 Site 2	Circle 9 Individual 2047	Cowley Tract 2052	East Fork Common 12022	Fremont Butte Common 12009 Site 1	Fremont Butte Common 12009 Site 2	Fremont Butte Individual 2181	Muddy Meadows Ind 12112	Sandy Fenced Ind 2184	Southwest Pasture Individual 12116	Sandy Individual 12111	Square Top Common 2051 Site 1	Square Top Common 2051 Site 2	Square Top Common 2051 Site 3a	Square Top Common 2051 Site 3b	Square Top Common 2051 Site 4	Square Top Common 2051 Site 5
Ecological Site		Sy 7-9 GR	Ly 15-19w	Sy 7-9GR	Ly 7-9 GR	Ly 7-9 GR	CU 15-19 w	Ly 7-9 GR	SwCy 7-9 GR	Ly 7-9 GR	CU 15-19 w	Ly 7-9 GR	SwCy 7-9 GR	Ly 10-14 w	Cy 7-9 GR	Ly 10-14 w	Sy 10-14 w	Sy 10-14 w	Ly 7-9 GR	Ly 10-14 w
Indicator	***Attribute***	**Departure from Expected**																		
1. Rills	**SH**	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S
2. Water Flow Patterns	**SH**	N-S	N-S	N-S	S-M	N-S	N-S	N-S	N-S	N-S	N-S	N-S	S-M	N-S	S-M	S-M	N-S	N-S	S-M	N-S
3. Pedestals/Terracettes	**SH**	S-M	N-S	S-M	S-M	N-S	N-S	S-M	S-M	N-S	N-S	N-S	S-M	N-S	M	M	N-S	N-S	M	M
4. Bare Ground	**SH**	M	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	S-M	N-S	N-S	N-S	N-S	N-S	N-S	N-S
5. Gullies	**SH**	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S
6. Wind Scoured, Blowouts and/or Depositions	**S**	N-S	N-S	N-S	N-S	S-M	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S
7. Litter Movement	**S**	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	S-M	N-S	N-S	N-S	N-S	N-S	M	N-S
8. Soil Surface Resistance to Erosion	**SHB**	N-S	N-S	N-S	S-M	N-S	N-S	N-S	N-S	N-S	N-S	N-S	S-M	N-S	N-S	N-S	N-S	N-S	N-S	N-S
9. Soil Surface Loss or Degradation	**SHB**	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	S-M	N-S	S-M	N-S	N-S	N-S	N-S	N-S
10. Plant Community Composition & Distribution Relative to Infiltration & Runoff	**H**	N-S	N-S	N-S	N-S	N-S	N-S	S-M	S-M	S-M	N-S	N-S	M	N-S	S-M	S-M	S-M	M	M	N-S
11. Compaction Layer	**SHB**	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S
12. Functional/Structural Groups	**B**	N-S	N-S	N-S	N-S	S-M	N-S	S-M	S-M	S-M	N-S	N-S	M	N-S	M	M	N-S	N-S	S-M	M
13. Plant Mortality/Decadence	**B**	S-M	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	S-M
14. Litter Amount	**HB**	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S
15. Annual Production	**B**	N-S	N-S	N-S	N-S	M-S	N-S	S-M	S-M	S-M	N-S	N-S	M	N-S	M	M	S-M	M	M-E	M
16. Invasive Plants	**B**	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	M	N-S	N-S
17. Reproductive Capability of Perennial Plants	**B**	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S	N-S

Attribute
S Soil & Site Stability
H Hydrologic Function
B Biotic Integrity

Departure from Expected
N-S None-Slight
S-M Slight-Moderate
M Moderate
M-E Moderate-Extreme
E-T Extreme-Total

Departure from Expected
N-S None-Slight
S-M Slight-Moderate
M Moderate
M-E Moderate-Extreme
E-T Extreme-Total

Table 16. Boulder Rangeland Health General Summary

Allotment Name (Site #)	WY #	Category	Ecological Site	Plant Association	Degree of Departure		
					Soil Site Stability	Hydrologic Function	Biotic Integrity
Big Sandy Individual	2192	M	CU 15-19 W	Big Sage/Bunchgrass	N/A	N/A	N/A
Boulter Pasture	12117	M	Sy 7-9 GR	Sagebrush/Rhizomatous Grass-Bluegrass	Slight-Moderate	Slight-Moderate	None-Slight
Butte Individual	2191	M	CU 15-19 W	Unidentified	N/A	N/A	N/A
Chalk Butte Common (1)	2168	M	Ly 10-14 W	Sagebrush/Rhizomatous Grass-Bluegrass	None-Slight	None-Slight	None-Slight
Chalk Butte Common (2)	2168	M	Sy 10-14 W	Sagebrush/Bunchgrass	None-Slight	None-Slight	None-Slight
Circle 9 Individual	2047	M	Ly 7-9 GR	Sagebrush/Rhizomatous Grass-Bluegrass	Slight-Moderate	Slight-Moderate	None-Slight
Cowley Tract	2052	M	Ly 7-9 GR	Sagebrush/Rhizomatous Grass-Bluegrass	None-Slight	Slight-Moderate	Slight-Moderate
East Fork Common	12022	M	CU 15-19 W	Mountain Big Sage/Bitterbrush	None-Slight	None-Slight	None-Slight
Fremont Butte Common (1)	12009	M	Ly 7-9 GR	Sagebrush/Rhizomatous Grass-Bluegrass	None-Slight	None-Slight	None-Slight
Fremont Butte Common (2)	12009	M	SwCy 7-9 GR	Early Sage/Rhizomatous Grass-Bluegrass	None-Slight	Slight-Moderate	Slight-Moderate
Fremont Butte Individual	2181	M	Ly 7-9 GR	Sagebrush/Rhizomatous Grass-Bluegrass	None-Slight	None-Slight	Slight-Moderate
Individual Fenced	12109	C	Ly 10-14 W	Big Sage/Bunchgrass	None-Slight	None-Slight	None-Slight
Irish Canyon Tracts Individual	2180	M	CU 15-19 W	Mountain Big Sage/Bitterbrush	N/A	N/A	N/A
Muddy Meadows	12112	M	Sy 10-14 W	Big Sage/Bunchgrass	None-Slight	None-Slight	None-Slight
North Pasture Individual	12115	M	Sy 10-14 W	Sagebrush/Rhizomatous Grass-Bluegrass	N/A	N/A	N/A
Sandy Fenced Individual	2184	M	Ly 7-9 GR/ 10-14 W	Big Sage/Bunchgrass	None-Slight	None-Slight	None-Slight
Sandy Individual	12111	C	Ly 10-14 W	Sagebrush/Rhizomatous Grass-Bluegrass	None-Slight	None-Slight	None-Slight
Sandy Upper Muddy	12110	M	CU 15-19 W	Mountain Big Sage/Bitterbrush	None-Slight	None-Slight	None-Slight
Southwest Pasture Individual	12116	M	SwCy 7-9 GR	Sagebrush/Rhizomatous Grass-Bluegrass	Slight-Moderate	Slight-Moderate	Slight-Moderate
Square Top Common (1)	2051	I	Cy 7-9 GR	Sagebrush/Rhizomatous Grass-Bluegrass	Slight-Moderate	Slight-Moderate	Slight-Moderate
Square Top Common (2)	2051	I	Ly 10-14 W	Sagebrush/Rhizomatous Grass-Bluegrass	Slight-Moderate	Slight-Moderate	Slight-Moderate
Square Top Common (3a)	2051	I	Sy 7-9 GR/ 10-14 W	Bunchgrass	None-Slight	None-Slight	None-Slight
Square Top Common (3b)	2051	I	Sy 7-9 GR/ 10-14 W	Unidentified (Increased Rabbitbrush)	None-Slight	Slight-Moderate	Slight-Moderate
Square Top Common (4)	2051	I	Ly 7-9 GR	Sagebrush/Rhizomatous Grass-Bluegrass	Moderate	Moderate	Moderate
Square Top Common (5)	2051	I	Ly 10-14 W	Sagebrush/Rhizomatous Grass-Bluegrass	Slight-Moderate	Slight-Moderate	Slight-Moderate

Individual Allotment Summary

Big Sandy Individual Allotment (02192)

No quantitative data exists for this allotment. In 2009, ocular estimates of utilization appeared to be light and condition appeared to be what is expected for the site.

Boulter Pasture Allotment (12117)

No quantitative data for the allotment exists; however, a team did complete the 17 indicators for rangeland health in the allotment in 2009 using ocular estimates and adjacent Square Top Common Allotment information.

Butte Individual Allotment (02191)

No quantitative data for the allotment exists. In the past, when the allotment was permitted for livestock grazing, the use occurred primarily on the State land due to steep topography and presence of large rock outcrops on the BLM portion; the only water source in the allotment is the East Fork River on State land. There is currently no active livestock grazing permit in this allotment.

Chalk Butte Common Allotment (02168)

The 17 indicators of rangeland health were collected in 2009 at representative Loamy 10-14" W and Sandy 10-14" W sites. Cheatgrass is present on the steep south facing slopes adjacent to the site but has not invaded the site itself. Green rabbitbrush is scattered throughout the site but does not exceed what is expected for the site. Little additional data exists for this allotment. Notes to the file over the years suggest that the allotment is in good condition and gets very little use on the east side due to lack of water. Several requests have been made over the years to develop water in the southeast part of the allotment. Utilization information was collected in the allotment in 1987, 1989, 2002, 2003, and 2008 and ranged from 8%-47% with an average of 22%.

Circle Nine Individual Allotment (02047)

The primary water source in the allotment is the East Fork River on private land. ESDs were not sampled in this allotment; however, the 17 indicators of rangeland health were collected at a representative Loamy 7-9" GR site in 2009 and ocular estimates of utilization levels appeared light. Past utilization data was collected in 1987, 1997, and 2002. Use ranged from 0% - 39% with the average at 16%.

Cowley Tract Allotment (02052)

The site conditions are similar to that of the adjacent Square Top Common allotment. The deeded land has been treated in the past for brush control with what appears to be a high kill-rate. The BLM portion is untreated but is near to the reservoir that occurs on deeded land. No quantitative data for the allotment exists; however, a team did complete the 17 indicators for rangeland health in the allotment using ocular estimates and adjacent allotment information in 2009.

East Fork Common Allotment (12022)

The allotment is comprised of glacial till found in the foothills of the Wind River Mountains. It is bisected from east to west by the East Fork River. Three ESD sampling plots were situated across the allotment; one plot north of the river and two plots south of the river.

In 2009, the 17 indicators of rangeland health were collected at a representative Course Upland 15-19" site south of the East Fork River and west of the isolated parcel of private land commonly known as the "Wheeler Place." Cheatgrass is present on south facing slopes and in some disturbed areas adjacent to the site but has not invaded the site itself.

The following is a summary of other studies and observations that have been conducted throughout the allotment:

4C's Joint Cooperative Monitoring Program
In 2003, utilization values ranged between 2.5% and 53% with an overall average of 15.8%. Data collected for the 4C's since 2004 in this allotment are missing from the BLM files.

Other Studies/Observations/Considerations
In 1984, it was noted in the file that the west-end State lands in the allotment were in "poor" condition with heavy pressure from livestock. The BLM lands in the allotment were noted as "fair to good" depending on distance to water. Brush density was high.

Utilization monitoring was conducted twice in 2000; measurements were made in July on % of current growth and in October on % of total year's growth. Different key species were measured at different times of year. Utilization values varied between 6% and 72% with the overall average at 40%.

Six upland trend transects were located in 2000 throughout the allotment to give an overall picture of allotment condition. Two types of data were collected on each transect. The first is a measure of community composition by weight using the Dry Weight Rank method. In addition, Nested Frequency was collected on each transect to show the frequency of each plant species in the community, and changes in frequency over time. Range condition on most of the sites was considered "good". Two transects, located in areas where livestock concentration tends to be dense, scored in the "fair" range. Vegetation treatments were not considered imperative but were suggested as a consideration to rejuvenate the aging bitterbrush community throughout the allotment. The Irish Canyon fire burned mostly state land in the allotment in late July 2000.

<u>Fremont Butte Common Allotment (12009)</u>
Fremont Butte Common Allotment is situated along a bench above the New Fork and East Fork Rivers, and abuts Chalk Butte Common Allotment along its north eastern boundary and Fremont Butte Individual allotment along its southern boundary. The allotment is bisected by U.S. Highway 191, with approximately 5,000 acres west of the highway. The western portion also lies within the Pinedale Anticline gas field. Eight plots were needed to sample the ESDs encountered inside the allotment.
The following is a summary of studies and observations that have been conducted throughout the allotment:

4C's Joint Cooperative Monitoring Program
Data was collected at five sites from 2004-2009, although some sites were missing a few years of data. Utilization averaged between 4% at SDL7 to 9.55% at Tibbles Corner. The low utilization numbers show that there are areas that are being used very lightly but may not be representative of the entire allotment or even an average of the allotment.

Other Observations/Considerations
Utilization monitoring has been conducted intermittently. Data was collected in 1986, 1987, 1991, 1996, 2000, 2001, 2002, and 2003. Utilization values for these years varied between 4% and 58% with the overall average of 26%.

Utilization studies were conducted and a utilization map was made in 2010 (Map 10) to see if there might be the need for additional sites or moving sites to get a more accurate utilization measurement that will

represent a larger area and to better understand distribution in the allotment. 2010 utilization levels showed utilization levels higher than the 4C's study had depicted, though they are mostly within acceptable range (Map 10).

The allotment has historically been used and still is used as a spring use allotment. A number of range improvements have been implemented in the allotment over the years, mostly consisting of water developments. Much like the Square Top Common allotment (discussed later in this section), information contained in the files suggest that the range condition in this allotment has been deficient in terms of productivity but is stable and static.

Fremont Butte Individual Allotment (02181)

Fremont Butte Individual Allotment lies in between U.S. Highway 191 and the East Fork River, and abuts Fremont Butte Common Allotment along its northern and western boundary. Three plots were sampled within the allotment to encompass the Loamy 7-9", Shallow Clayey 7-9", and Clayey 7-9" ESDs. Rangeland health indicators were sampled in the Loamy 7-9" GR ESD.

The following is a summary of studies and observations that have been conducted throughout the allotment:

4C's Joint Cooperative Monitoring Program

Data is available for 2004-2009 for both FBI 1 and FBI 2. Utilization varied at both sites from 5%-20% at FBI 1 with an average of 12.6% and 3%-15%, an average of 9.5% at FBI 2. Variation is expected due to differences in yearly production and cattle distribution; both of these sites have light utilization well below the BLM guidelines of 50% utilization in upland areas.

Other Observations/Considerations

Utilization monitoring has been conducted intermittently. The allotment was rested periodically throughout the 1980's. Utilization numbers for these years varied between 0% and 57%.

An Allotment Management Plan (AMP) was developed for this allotment in 1972. As stated earlier, the allotment was rested periodically throughout the 1980's. Livestock distribution was managed primarily with mineral supplement. In 1989 it was recommended to rest the allotment one out of every three years and develop water. In 1994 the Diablo well was drilled and the AMP was modified, changing the season of use from May 1-September 30 to June 1-June 30. Also in 1994, it was noted in the file that there was adequate water and the range was in good condition. In 2002, a note in the file recommended that the AMP be modified to reflect the "current" grazing strategy that employs control of water by alternating years and turnout areas, June 5-July 5.

Individual Fenced Allotment (12109)

The Individual Fenced Allotment has two isolated BLM parcels totaling 250 acres (11 AUMs), fenced into a larger tract of deeded land along the East Fork River. The ESDs encompassed by the allotment are Loamy 10-14"W and Sandy 10-14"W. A dry weight rank transect was conducted in this allotment in 2004 and supports the presence of a vegetation community expected for the site (sagebrush and understory grasses such as bluegrass, bottlebrush squirreltail, Letterman's needlegrass, and various forbs). A team completed the 17 indicators for rangeland health in the allotment using ocular estimates and adjacent allotment information in 2009.

Irish Canyon Tracts Individual Allotment (02180)
The Irish Canyon Tracts Individual Allotment consists of four isolated tracts of BLM land totaling 332 acres (30 AUMs) fenced in with a larger tract of deeded land. The allotment lies in the foothills of the Wind River Mountains and is comprised of glacial till with the majority of the allotment described by the Course Upland 15-19”W ESD. Much of the land suitable for grazing within the allotment is located on deeded land as the majority of the BLM land is forested by lodgepole pine. The Muddy Creek Elk Feedground is located just over a mile from the southeast boundary. In 1995, ocular estimates of utilization showed overall light use. Recent visits to the allotment and ocular estimates show overall light use by livestock.

Muddy Meadows Allotment (12112)
The Muddy Meadows Allotment consists of 40 acres of BLM land (20 AUMs) fenced in with deeded lands. The ESD on this parcel is Sandy 10-14”W. Approximately one-third of the allotment is irrigated meadow. During a 2009 site visit to evaluate the indicators for rangeland health it did not appear that the BLM portion of the meadow had been hayed. No quantitative data for the allotment exists; however, ocular estimates and adjacent allotment information show that vegetative community is diverse and robust with very few increaser species present. The team noted the increased ground cover and quantity of bluebunch wheatgrass and desirable forbs. An irrigation ditch runs through the allotment and provides a microclimate for willows, cottonwoods, rose and other shrubs. Forage use was light in 2009.

North Pasture Individual Allotment (12115)
The North Pasture Individual Allotment consists of 480 acres of BLM (31 AUMs) fenced in with 150 acres of deeded land. The ESDs encompassed by the allotment are Sandy 10-14”W and Loamy 10-14”W. The water source for the allotment is an irrigation ditch. In 1983, it was noted that the allotment was unproductive and was considered in Low Fair to High Poor condition. No quantitative data exists for the allotment; however, in 2009 ocular reconnaissance showed that the vegetation community composition was as expected for the site with no obvious soil, hydrologic, or biotic concerns and forage use appeared to be light.

Sandy Fenced Individual Allotment (02184)
The Sandy Fenced Individual Allotment consists of five isolated tracts of BLM land totaling 250 acres (30 AUMs) fenced in with 1,200 acres of deeded lands. The BLM lands primarily occur on the bluff above the East Fork River, while the deeded land occurs in the more productive bottomland along the river (30 BLM AUMs vs. 2,916 deeded AUMs). The primary ESD encompassed by the BLM portion of the allotment is Loamy 7-9” GR/10-14” W. The management status of the allotment is categorized as “M” Maintain; however, a 1991 memo to the file recommends that the management status of the allotment be changed to “C” Custodial because of the land ownership status and absence of any resource problems. During a 2009 site visit to evaluate the indicators for rangeland health, ocular estimates and adjacent allotment information show little sign of current use by livestock with some signs of past trailing due to the narrow distance between the steep bluff edge and the fence in some areas. Mid-stature bunchgrasses and a variety of forbs were present with no apparent sign of soil or excessive water movement from the site.

Sandy Individual Allotment (12111)
The Sandy Individual Allotment consists of 120 acres of BLM land (14 AUMs) fenced in with approximately 150 acres of deeded land. The allotment encompasses the Loamy 10-14” W ESD. During a 2009 site visit to evaluate the indicators for rangeland health, ocular estimates and adjacent allotment information show the expected vegetative community with little to no sign of unexpected soil or water movement. Forage use appears to be light. The water source is an irrigation ditch.

Sandy Upper Muddy Allotment (12110)
The Sandy Upper Muddy Allotment consists of 660 acres of BLM land (39 AUMs) fenced in with three isolated tracts of deeded land and two isolated tracts of State land. Much of the allotment has unmapped soils, however, it can be assumed that the BLM portion encompasses the Course Upland 15-19" W ESD. The topography is steep and scattered ephemeral drainages are armored with boulders and vegetation. No live water occurs on the BLM portion of the allotment. Ocular reconnaissance shows a variety of diverse vegetative community types including mountain shrub, aspen, mountain big sagebrush, and grassland. The Muddy Creek Elk Feedground is located on State land just on the other side of the east boundary of the allotment. Due to topography and lack of water, livestock use is not evident on the BLM land.

Southwest Pasture Individual Allotment (12116)
The Southwest Pasture Individual Allotment consists of 480 acres of BLM land (57 AUMs) fenced in with two isolated tracts of private land and one tract of State land. The ESDs encompassed by the allotment are Shallow Clayey 7-9" GR and Sandy 7-9" GR. During a 2009 site visit to evaluate the indicators for rangeland health, ocular estimates and adjacent allotment information show a larger than expected quantity of rhizomatous grasses coupled with low diversity of other grasses and few desirable forbs, and signs of past pedestalling and water flow patterns give way to departure from what is expected for the reference site. These indicators appear to be influenced by past grazing management as current use appeared light. The primary water source is a water well located on BLM land.

Square Top Common Allotment (02051)
The Square Top Common Allotment is the largest allotment in the landscape area. It is made up of two segments totaling 40,403 acres of both federal, State and deeded land, which are positioned between U.S. Highway 191 and Wyoming Highway 353 near the foothills of the Wind River Mountain Range. In 2009, ten baseline inventory sampling plots were positioned across the allotment, one of which was within a historic range treatment. The habitat types were dominated by three ESDs.

Rangeland health indicators were collected at six sites throughout the allotment in 2009. Site 1 was sampled in the Clayey 7-9" GR ESD. Lower ratings relate to water flow patterns that were observed off of trails and pedestalling appeared to be historical with biological crusts holding onto pedestals. The A horizon (soil) was measured at less than three inches (reference) indicating that soil loss may have occurred. Plant community composition and distribution relative to infiltration showed that basal cover and plant canopy is within expected range but the ratio of shrubs to grasses and forbs has a slight-moderate departure from what is expected for the site. Functional/structural groups show moderate departure from what is expected as shrub composition is too high and grasses and forbs are low compared to the reference site. Annual production measured as a moderate departure from what is expected.

Site 2 was sampled in the Loamy 10-14" W ESD and was selected to represent the north eastern part of the allotment as it is far enough east to characterize the 10-14 inch precipitation zone—the area is a transition from the 7-9 inch zone. 12 indicators showed a None-Slight departure from the reference sheet. A few indicators caused the overall rating to go down. Some short water flow patterns were observed but appeared to be stable, slight active pedestalling occurred in interspaces but no terracettes were present. Plant community composition and distribution relative to infiltration showed an increase in shrubs, decrease in desirable grasses and forbs from what is expected. Similarly, the functional/structural groups and annual production were moderately departed from what is expected due to increased shrubs and decreased desirable grasses and forbs.

Site 3a and 3b were sampled near to one another in order to compare obvious differences in vegetation on the Sandy 7-9" GR/10-14" W ESD. For Site 3a, plant community composition and annual production showed a reduced amount of desirable plant species as compared to the reference. At Site 3b, plant community composition, annual production and invasive plants showed a moderate departure from what is expected. This site is in an old treatment area and the quantity of green rabbitbrush (11.1% measured vs. 5.0% expected composition by weight) and mat forming species such as Hood's phlox (13.1% measured vs. 5.0% expected composition by weight) is over and above what is expected for the site. The quantity of Wyoming big sage is considerably reduced from what is expected (2.9% measured vs. 15.0% expected composition by weight).

Site 4 was sampled in the Loamy 7-9" GR ESD within the southern portion of the allotment. Evidence of water-flow patterns, some active pedestalling in flow paths and interspaces, and moderate movement of small litter around obstructions and depressions cause the Soil and Site Stability and Hydrologic Function attribute ratings to be lower. Wyoming big sage far exceeds that of the reference (59.8% measured composition by weight vs. 10.0% expected composition by weight); consequently the functional/structural groups and annual production indicators show a departure from the reference.

Site 5 was sampled in the Loamy 10-14" W ESD within the northeast flat of the Square Top "holding pasture," a non-contiguous portion of the allotment used seasonally to gather cattle. Evidence of slight active pedestalling was observed in the interspaces, shrubs dominate the site and there is a moderate reduction in cool season bunchgrasses, all of which are a departure from the reference.

The following is a summary of other studies and observations that have been conducted throughout the allotment:

4C's Joint Cooperative Monitoring Program
Data is available for 2004-2009 on three sites: SU11, SU10 and DS01. There is some variation from year to year; variation is expected due to differences in yearly production and cattle distribution. The average utilization at all three sites was below 10%. The low utilization numbers show that there are areas that are being used very lightly, but these may not be representative of the entire allotment. Utilization data was gathered over a large area and a utilization map was made in 2010 (Map 10) to see if there might be the need for additional sites or moving sites to get a more accurate utilization measurement that will represent a larger area. This 2010 map shows that utilization levels were exceeding 10% throughout the allotment, indicating that the 4C's sites may not be representative of the entire allotment.

Other Observations/Considerations
Utilization monitoring was conducted in the allotment in 1988, 1989, 1990, 1995, 1997, and 2002. Utilization numbers for these years varied between 10% and 44%.

Large quantities of records exist for this allotment area going back as far as the 1950's with references to even earlier dates. Much of the information contained in these files are conversation and meeting notes and agreements about how to manage livestock in the area via allocations, range improvements, and other accepted forms of range management. The central theme contained within these files is that the range condition is deficient in terms of productivity but is stable and static. References recall great numbers of livestock in the area in the late 1860's through 1870's; additional references account of heavy grazing use in the 1940's. 1980's interviews with long-time ranchers in the allotment consider that the area has never recovered from those periods. Since the 1960's, many range improvements including water developments and vegetative treatments have occurred in the allotment. There have been recommendations and requests

made for additional improvements, including dividing the common allotment up into smaller allotments, employing intensive cattle management via riding, and implementing deferred spring turnout areas.

Jonah Interagency Office Baseline Habitat Sampling Plant Community Summary

Square Top Common

ESD Label	% of Allotment	Acres	Plant Community
Ly 7-9	29%	11676	Sagebrush/Rhizomatous Grass-Bluegrass
Sy 7-9	26%	10585	Sagebrush/Rhizomatous Grass-Bluegrass
SwCy 7-9	19%	7596	Rhizomatous Grass-Bluegrass/Early Sage

Fremont Butte Common (east side of highway)

ESD Label	% of Allotment	Acres	Plant Community
Ly 7-9	42%	6620	Sagebrush/Rhizomatous Grass-Bluegrass
Ly 10-14	18%	2817	Sagebrush/Rhizomatous Grass-Bluegrass
SwCy 7-9	9%	1393	Early sage/Rhizomatous Grass-Bluegrass

East Fork Common

ESD Label	% of Allotment	Acres	Plant Community
CU 15-19	47%	4719	Mountain Big Sage/Bitterbrush
Ly 10-14	20%	1977	Sagebrush/Bunchgrass
Sb 15-19	4%	430	Unidentified

Fremont Butte Individual

ESD Label	% of Allotment	Acres	Plant Community
Ly 7-9	64%	3132	Sagebrush/Rhizomatous Grass-Bluegrass
SwCy 7-9	15%	734	Rhizomatous Grass-Bluegrass/Early Sage
Sy 7-9	8%	406	Sagebrush/Bunchgrass

Chalk Butte Common

ESD Label	% of Allotment	Acres	Plant Community
Ly 10-14	26%	864	Sagebrush/Rhizomatous Grass-Bluegrass
Sy 10-14	24%	811	Sagebrush/Bunchgrass
Cu 10-14	11%	379	Unidentified

A number of range improvements and projects have been conducted over the years in the allotments making up the Boulder landscape. A listing of range improvements is included in Table 17.

Table 17. Boulder Landscape Range Improvements

Allotment	Name	Type	Const. Year	T.	R.	SEC.
Chalk Butte Common	Chalk Butte Sp 1	Water development	1962	32	107	20
	Chalk Butte Spring Pit #	Water development	1961	32	107	20
	Fremont Butte Pit	Water development	1988	32	107	21
Fremont Butte Common	Two Elk Spring	Water development	1996	31	108	15

	East Fork Reservoir #1	Water development	1961	31	108	10
	East Fork Res. #2	Water development	1961	31	108	10
	East Fork Reservoir #3	Water development	1961	31	108	1
	East Fork Reservoir #4	Water development	1961	31	108	1
	East Fork Reservoir #5	Water development	1961	31	108	1
	East Fork Reservoir #6	Water development	1961	31	108	36
	Vible Res #1	Water development	1949	31	108	9
	Bailey Res #2	Water development	1949	31	108	11
	Green River Ret Dam #5	Water development	1951	31	107	30
	Green River Ret Dam #6	Water development	1951	31	108	14
	Lander Cut-Off Res	Water development	1952	31	107	10
	Fremont Butte Reservoir	Water development	1952	32	107	32
	Anna S Tibbals Res	Water development	1941	31	107	9
	Three Ball Co. Res	Water development	1943	31	107	4
	East Fork Well #1	Water development	1967	31	108	9
	Two Elk Spring	Water development	1995	31	108	15
	East Fork Well #2	Water development	1967	31	108	2
	Fremont Butte Well #2	Water development	1967	31	107	6
	Lander Cut-Off Well	Water development	1991	31	107	8
	Sand Springs Well #2	Water development	1967	31	108	13
Fremont Butte Individual	Stark Reservoir	Water development	1946	31	107	17
	Green River Ret Dam #4	Water development	1951	31	107	29
	Diablo Well	Water development	1993	31	107	22
	Lander Trail Well #1	Water development	1967	31	107	20
Sandy Fenced Individual	Fremont Butte Trough	Water development	1993	32	107	34
Southwest Past Individual	Big Sandy Sagebrush	Vegetative manipulation	1968	30	106	5
	John Jensen S.W. Pasture Well	Water development	1981	30	106	5
Square Top Common	Big Sandy Spray	Vegetative manipulation	1969	30	106	15
	Mud Hole Well Su	Water development	1970	29	107	10
	Mrak Fence Cattle	Management facility	1963	31	107	14
	Sandy Fence Cattle G	Management facility	1980	30	107	28
	Lander Trail Well #2	Water development	1968	30	107	4
	Muddy Creek #1	Water development	1967	30	106	17
	Square Top Res. #6	Water development	1963	30	107	34
	Square Top Res. #2	Water development	1963	30	106	30
	Square Top Res #5	Water development	1963	30	106	18

	Square Top Res #1	Water development	1963	31	107	35
	Speedway Pit	Water development	1963	30	107	12
	Square Top Res #8	Water development	1963	30	107	14
	Lost Res	Water development	1942	30	107	3
	Desert Reservoir #1	Water development	1946	31	107	26
	Desert Res #4	Water development	1946	30	107	27
	Desert Res #6	Water development	1946	30	107	9
	Frank C Mayo Res	Water development	1938	30	106	19
	Sand Springs Well #1	Water development	1961	30	107	6
	Lander Well #2	Water development	1972	30	107	4
	Mud Hole Well	Water development	1963	29	107	10
	Waterhole Draw Well	Water development	1983	29	107	2
	New Square Top Well #1	Water development	2007	0	0	0
	Square Top Well #1-Abandoned Location	Water development	1941	30	107	13
	Square Top Well #2	Water development	1941	300	107	2
	Muddy Creek Well #1	Water development	0	30	106	17
	Wolf Well	Water development	1997	30	106	32
	Boundary Line Well	Water development	1963	30	106	22
	Sandy Flat Well	Water development	1963	30	109	12
	Fremont Butte Well	Water development	1955	31	107	23
	East Fork Trough	Water development	1988	31	107	14

Wyoming Standards for Rangeland Health assessments

A rangeland health assessment provides information on the functioning of ecological processes relative to the reference state for the ecological site or other functionally similar unit for that land area (Technical Reference 1734-6). It gives an indication of the status of the three attributes of an evaluation area: Soil & Site Stability, Hydrologic Function, and Biotic Integrity. The rangeland health assessment protocol includes five steps:

1. Determine soil and ecological site at the evaluation area (Required).
2. Obtain or develop reference sheet (Required).
3. Collect supplementary information (Strongly Recommended).
4. Rate the 17 indicators on Evaluation sheet and justify ratings with written comments (Required).
5. Evaluate the three Rangeland Health Attributes based on the ratings of the 17 indicators and justify ratings with written comments (Required).

In June, 2012, the PFO issued determinations of whether the 18 allotments in the Boulder landscape meet the Standards (BLM 2012). BLM determined at that time that the allotments meet Standards 1-5. Because of the ozone nonattainment status of Sublette County, the allotments failed to meet Standard 6, Air Quality; this was determined not to be due to livestock grazing.

The issue of scale must be kept in mind in evaluating each standard. It is recognized that isolated and localized sites within a landscape may not be historic reference condition; however, considering broader

scope and scale, the area may be in proper functioning condition. Furthermore, just because a standard is being met, doesn't mean that the conditions on the ground represent desired resource condition or habitat objectives (e.g. fire regime condition class or sage-grouse habitat objectives). For example, an upland site with reduced composition of bunchgrasses relative to the historic plant community may meet the upland health standard if it sustains a native plant community and provides for stable soils and proper hydrologic function. However, the site may not provide the livestock forage or wildlife cover that it would if the composition of bunchgrasses were increased to historic levels.

3.7 Noxious Weeds

Executive Order (EO) 13112, "Invasive Species," was signed by President Clinton in 1999 to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. Noxious weeds are defined in this EO as those "species whose introduction does or is likely to cause economic or environmental harm or harm to human health." Noxious weeds and other invasive species, when introduced to an area, are aggressive and often dominate natural communities. They are often able to establish in areas following disturbance and are present primarily along roads and fence lines and in heavily grazed areas.

The State of Wyoming has designated 25 weeds as noxious and Sublette County has placed 5 additional species on their declared list of weeds. Of these 30 species, there are 3 which are problems within certain portions of the Boulder Landscape Planning Area. In addition, there are 3 other invasive species that are prevalent and disruptive to the native vegetation. The noxious weeds and other invasive species present within the Boulder landscape include Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), black henbane (*Hyoscyamus niger*), cheatgrass (*Bromus tectorum*), halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola tragus*). Though Russian thistle, cheatgrass and halogeton are not identified as noxious weeds by the state of Wyoming or Sublette County Weed and Pest District, they are generally considered undesirable for livestock and wildlife forage and are a significant fire hazard. Of these, halogeton is the most problematic in the planning area. Cheatgrass occurs in scattered locations and has the potential to increase throughout the planning area. Potential sources of invasion include livestock, wildlife as well as seed and soil carried to the area on vehicles.

3.8 Paleontological Resources

The Probable Fossil Yield Classification (PFYC) system, as adapted by BLM's Regional Paleontologist (BLM 2002), serves as a guide for classification for potential paleontological resources (BLM 2003). The PFYC is a draft classification system wherein geological units are classified according to the probability of yielding paleontological resources that are of concern to land managers (USFS 2001).

Areas underlain by either the Wasatch or Green River formations have a high potential for containing vertebrate paleontological resources (fossils) and must be surveyed by a qualified paleontologist before surface disturbing activities will be authorized. Based on the results of the paleontological survey, additional monitoring and/or mitigation will be necessary.

In recently-surveyed areas near the Boulder landscape area, significant fossil fish localities have been discovered in a pipeline trench on and near Yellow Point Ridge in the Jonah Field (2006) along Luman Road expanding the northerly limits of the ancient lake, Gosiute. Crocodilian fossils recently discovered near Stud Horse Butte ~~may~~ represent a new species (UintaPaleo 2007). Sands placed by alluvial processes hold many crocodilian teeth and cannot be eliminated from paleontological inventories.

3.9 Recreation

While not as popular for recreation as some other areas in the Pinedale Field Office area, the Boulder landscape supports many types of recreation activities, including hiking, hunting, bird watching, camping, fishing, and OHV use. The public's winter recreation use of the area is extremely low in comparison to the fall season as visitors seek opportunities to hunt small and big game. The area is popular for hunting sage-grouse, antelope and mule deer in the lower elevations and elk and forest grouse in the foothills of the Wind River Range. The BLM issues Special Recreation Permits for commercial guided big-game hunting. The majority of recreational use occurs as hunting as hunting by the private non-commercial visitor.

There is one developed recreation facility, the Irish Canyon trailhead and parking area (Map 2). This facility provides access for winter snowmobile and cross-country ski use of the Continental Divide Snowmobile Trail.

The Lander Trail attracts visitors interested in the history of human settlement of the West. Maps of the Lander Trail and trail markers provide the public with access information and guide travelers along the route.

Recreation management for the planning area is guided by decisions within the Pinedale RMP. The recreation management goal is: Provide substantial personal, community, economic, and environmental benefits to local residents and visitors through recreational uses of public lands.

The planning area is encompassed by the Extensive Recreation Management Area (ERMA). The management objective of the ERMA is to provide an array of resource-dependent dispersed recreation opportunities, such as hunting, fishing, motorized use, and open space. Management will be extensive rather than intensive. Management actions would be custodial and focus on:

- The development of new recreation facilities only when necessary to protect human health, safety, and natural resource values.
- The maintenance and enhancement of important public access
- The resolution of resource and social conflicts

Recreation activities are dispersed. Specific actions are generally unnecessary to prevent impacts, avoid conflicts among users or protect public health and safety. Management focus is to enable unstructured recreational use of public lands. Recreation related experiences; personal, economic, social and environmental benefits were not prescribed for the planning area (ERMA) during the land use planning process. However, substantial benefits do occur as visitors experience dispersed recreation activities within the planning area. The recreation setting is generally described as rural and back country (primitive) where contacts with other visitors are infrequent and the presence of visitor services are largely absent. To the degree possible, the concepts of benefits based management are addressed in the EA.

Off-Highway Use

The planning area supports many types of recreation activities, including hiking, hunting, bird watching, camping, fishing, and OHV use. Other than the Irish Canyon trailhead and parking area, there are no developed OHV trails or facilities. Motorized use increases in the fall with the opening of hunting seasons. The area is popular for hunting sage-grouse, antelope and mule deer in the lower elevations, as well as elk and forest grouse in the foothills of the Wind River Range. Heavy winter snowfall makes the area generally inaccessible for most OHV activities during the winter months. The Irish Canyon road

provides access to the Continental Divide Snowmobile trail, a popular system of snowmobile trails managed in cooperation with the Wyoming State Trails, State Parks and Trails Division.

The 2008 Pinedale RMP restricts OHV travel to existing roads and trails until activity plans are developed. An estimated 50% of the OHV use is recreation related activities including hunting, both for access and for retrieving game. Damage or impacts due to OHV use specific to high speed sport riding such as ATVs and motorcycles are uncommon in the area. However, new routes are sometimes created by hunters and others throughout the planning area. Most recently, the use of ATVs has generated new routes in the higher elevations near the East Fork River. The Jim Creek trail, which is used to move livestock to and from allotments on the Bridger-Teton National Forest, has been used as an All-Terrain Vehicle (ATV) trail more and more in recent years. This is a rough, rocky and unimproved trail that provides access to an area about 3 miles wide between the USFS boundary and the Bridger Wilderness boundary. There are no routes with pending requests for Right-Of-Way or easements.

An estimated 30% of the OHV use is attributed to grazing permittees for the maintenance of range improvements and management of livestock, and 20% for administrative use and other permitted activities. Commercially guided hunting or recreation makes up a minor portion of the overall recreational use in the assessment area.

3.10 Riparian Resources, Watershed and Hydrology

Riparian and wetland communities are the transitional zones between terrestrial and aquatic ecosystems (Gregory et al. 1991). These communities are found in moist areas along perennial or intermittent drainages, seeps, and springs. Typically, soils consist of deep, rich loams with high amounts of organic matter. Because of the high productivity of riparian areas, they are very important resources for wildlife and livestock. The lush vegetation in riparian communities provides valuable food and cover; if water is present, the importance of these areas increases even more. Within the landscape area, riparian/wetland vegetation types include riparian forest, shrubland, and herbaceous meadow/wetland areas.

The primary method used in evaluating riparian condition is through a qualitative assessment procedure called Proper Functioning Condition (PFC). This process evaluates physical functioning of riparian/wetland areas through consideration of hydrology, vegetation, and soil/landform attributes. A properly functioning riparian/wetland area will provide the elements contained in the definition:

- dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality
- filter sediment, capture bed load and aid floodplain development
- improve flood-water retention and ground water recharge
- develop root masses that stabilize streambanks against cutting action

The minimum desired riparian condition is Proper Functioning Condition (PFC) as defined by BLM Technical References 1737-15 (BLM 1998) and 1737-16 (BLM 1999). Riparian habitat in the Boulder landscape was assessed for PFC following prescribed methodologies in August 2009. The results are summarized in Table 18.

Table 18. Riparian Functioning Condition

Reach or Wetland	Type	Miles or Acres	PFC rating
Jim Creek	Lotic	1 mile	PFC
Irish Canyon Creek	Lotic	1 mile	PFC
East Fork River	Lotic	3.5 miles	PFC
East Fork Ponds	Lentic	26 acres	PFC
Irish Canyon Ponds	Lentic	1 acre	PFC
Chalk Butte Spring	Lentic	1 acre	PFC
East Fork River	Lotic	0.32 miles	FAR

It is important to note that PFC is a minimum standard of physical site stability, not a final vegetation community or habitat quality objective. Riparian areas in the Boulder landscape tend not to be dependent on vegetation for their physical stability, but are generally inherently stable through landform and rock content.

Riparian-wetland habitats within the assessment area are generally springs and streams that flow out from the higher mountains, snow supported seeps and/or larger river systems. Streams in this assessment area generally flow perennially in the higher elevations and support riparian vegetation. The higher elevations contain rocky steep timbered slopes with incised rocky channels dominated by early seral riparian habitat types. Less dominant habitat types include several willow/sedge riparian areas, aspen/conifer riparian woodlands, and few cottonwood woodlands. Willow/sedge riparian areas occur as scattered individuals or as denser communities, on wet sites and beaver complexes that are somewhat thermally protected along drainages. Aspen riparian woodlands occur at higher elevations in the foothills of the mountain ranges in deep, loamy soils and on north and east aspects where snow drifts protect and support their moisture requirements. Spruce/fir woodlands occur along the highest elevation foothill and mountain streams within steep gradients and confining topography and line the larger water courses, including the East Fork River, and major contributors, such as Irish Canyon Creek.

The seeps, springs, and streams in the higher elevations support a mixture of early seral riparian species and willow/sedge riparian shrubland habitat types. Early seral riparian areas are generally the same as those listed above with numerous perennial riparian forbs and shrubs. The willow/sedge riparian shrublands are dominated by Geyer's, Booth, sandbar, and yellow willows. Additional shrubs found here include: chokecherry, dogwood, water birch, currant, snowberry, Wood's rose, and individual quaking aspen. The herbaceous understory generally includes: Nebraska sedge, beaked sedge, wooly sedge, tufted hairgrass, Kentucky bluegrass and redtop. Adjacent to these habitats are: cottonwood, aspen, and, in some cases, spruce/fir riparian woodlands. Some examples of these drainages are: Irish Canyon Creek, Jim Creek, and the East Fork River. In all, approximately 5.5 miles of flowing riparian systems are located within the Boulder landscape.

Over-story species are aspen, willow, Engelmann spruce, subalpine fir, and lodgepole pine. The shrub layer is more open than the willow riparian sites and is dominated by serviceberry, chokecherry, common juniper, currants, Wood's rose, silver sagebrush, and mountain big sagebrush. Other species associated with this habitat type are shrubby cinquefoil, tufted hairgrass, Columbia needlegrass, elk and other sedges, bluegrasses, wildrye, rushes, and various forbs in the herbaceous layer. At middle and higher elevations, quaking aspen can also be added to this list. Cottonwood riparian woodlands are found on lower gradient and sometimes drier sites. Understory species include many of those already listed above, with a tendency towards those shrubs and herbaceous plants that like drier meadow habitats.

The remaining portion of the Boulder landscape consists of the valley bottom where almost all of the perennial water courses lie on deeded land. Water courses on public land within this portion of the watershed consist of intermittent to ephemeral drainages. Where water is more reliable, usually tied to springs or snowmelt, these areas may support riparian vegetation. As water becomes more limited the areas do not support wetland vegetation, nor do they have hydric soils.

Lentic systems within the assessment area primarily consist of natural spring and/or seep sites either perched within mostly upland portions of drainages or within water courses either below the upland vegetation line or immediately above it. Regardless of location, these sites are generally relatively small (less than an acre to an acre or two) and, during a normal year, flow water only a short distance down slope or stream, sometimes drying completely by late summer prior to fall moisture.

The Boulder landscape is entirely within the Green River/Colorado River drainage and is primarily drained by the New Fork River. The southern end of the Boulder landscape, approximately 10% of the area, is drained by the Big Sandy River. Based on the Wyoming Climate Atlas, http://www.wrds.uwyo.edu/sco/climateatlas/title_page.html the Boulder landscape contains a variety of ecotones and climatic conditions. Annual precipitation averages between 8 inches in the lower elevations and 20 inches or more in the higher elevations. Average annual free water evaporation ranges between 40 to 45 inches in the lower elevations to 35 inches in the upper elevations. A cold winter climate results in an accumulation of an annual snow pack between mid-October and mid-June. The average depth of the snow pack and snow water equivalent can vary greatly depending on annual precipitation, timing, and location within the Boulder landscape.

Surface water flows tend to be from east to west following the general slope of the topography. Fluvial and glacial geology dominates the area, creating a variety of groundwater conditions that include shallow groundwater associated with surface water, deeper lenticular semi-confined aquifers associated with buried fluvial structures, and discontinuous aquifers associated with glacial structures.

One notable feature of the Boulder landscape is Sand Springs Draw. For most of the channel length, conditions are such that surface flows are ephemeral, with the exception of a geologically induced upwelling of groundwater in the vicinity of the junctions of Hwy 191N and 351. This isolated perennial water source corresponds with a length of privately held lands along the channel that bridges the boundary between the Boulder landscape and the adjacent Anticline Jonah Landscape Planning Area.

3.11 Soils

Two basic soil types exist within the Boulder landscape, those derived from sedimentary deposits, which are located near the western side of the planning area, and those derived from granitic weathering, located to the eastern side of the planning area, originating primarily from the granitic rocks of the Wind River Mountains. The sediment-derived soils tend to have a greater salt content and buffering capacity than granitic weathering-derived soils.

Lowland and upland soils exist within the assessment area. The slope within the assessment area is 0 to 60 percent. The soil depth (depth to bedrock) within the assessment area is less than 10 inches to greater than 60 inches. The drainage classes for soils in the assessment area are very poorly drained to somewhat excessively drained. Erosion potential due to runoff is variable across the landscape. Areas most susceptible to erosion from runoff are very poorly drained to somewhat poorly drained soils; depth to bedrock less than 40 inches from the surface; silty clay soil texture at the surface and slopes greater than 25 percent. Tolerable soil loss within the assessment area is 0 to 5 tons per acre per year. The wind

erodibility index is 0 to 160 within the assessment area. The assessment area is defined as having highly erodible lands, calculated from the wind erodibility index. Lands with wind erodibility index values above 8 are considered highly erodible. The wind erodibility index is the potential erodibility divided by tolerable soil loss. Frost action for the soils within the assessment area is low to moderate (NRCS Soil Data Mart).

Quantifiable data about current erosion levels and stream flows, as well as condition and trend, are not available. However, stream channels are generally stable, with good vegetative cover and/or rock for armoring, and good width-to-depth ratios. Vegetative cover and litter on upland sites vary with the soils, slope, aspect, elevation, and precipitation. At higher elevations, plant cover is usually higher due to increased moisture and density of plants.

3.12 Special Status Plants

There are no habitats for Federally listed Threatened or Endangered plant species in the Boulder landscape planning area. The area is too high in elevation for the Threatened Ute ladies'-tresses (*Spiranthes diluvialis*) and there are no sandy areas with blowouts where the Endangered blowout penstemon (*Penstemon haydenii*) is known to occur. These species will not be considered further.

There are 4 Wyoming BLM sensitive species that either occur in the Boulder area or have habitat in the area and are known to occur nearby. These are Cedar Rim thistle (*Cirsium aridum*), large-fruited bladderpod (*Lesquerella macrocarpa*), Beaver Rim phlox (*Phlox pungens*) and meadow pussytoes (*Antennaria arcuata*). The area lacks sufficient inventory to know the current status and extent of these species. Cedar Rim thistle has been identified in the Boulder landscape area by the botany and range staff.

Table 19. Special status plant species

Special Status Species	Scientific Name	Habitat	Occurrence in the Boulder landscape
Blowout penstemon Listed Endangered	*Penstemon haydenii*	Sand blowouts or dunes from 6,850 to 7,450 feet elevation.	Does not occur
Ute ladies'-tresses Listed Threatened	*Spiranthes diluvialis*	Moist, sub-irrigated or seasonally flooded soils in valley bottoms, gravel bars, old oxbows or floodplains that border springs, lakes, rivers or perennial streams below 7,000 feet elevation.	Does not occur
Meadow pussytoes BLM Sensitive	*Antennaria arcuata*	Moist hummocky meadows, seeps or springs surrounded by sagebrush/grasslands from 4,950 to 7,900 feet elevation.	May occur
Cedar Rim thistle BLM Sensitive	*Cirsium aridum*	Barren, chalky hills, gravelly slopes, and fine textured, sandy-shaley draws from 6,700 to 7,200 feet elevation.	Present
Large-fruited	*Lesquerella macrocarpa*	Sparsely vegetated	May occur

bladderpod BLM Sensitive		Gardner's saltbush-squirreltail communities on barren, fine-textured clays and shales, often with gypsum or bentonite, between 7,200 and 7,700 feet elevation.	
Beaver Rim phlox BLM Sensitive	*Phlox pungens*	Sparsely vegetated slopes on sandstone, siltstone or limestone substrates between 6,000 and 7,000 feet elevation.	May occur

3.13 Transportation Management

Transportation and access is managed in accordance with 43 CFR 8340 and utilizing guidance and policy defined in BLM Handbook H-8342-1, Travel and Transportation.

LUP Manual H1601, Appendix C (planning guidance), directs the BLM to develop a process for managing travel management areas. The BLM is required to delineate a network of routes available to the public and specifying limitations on use. The products of the process are:

- A map of roads and trails for all travel routes
- Definitions and additional limitations for specific roads and trails (defined in 43 CFR 8340.0-5 (g).
- Criteria to select or reject specific roads and trails in the final travel management network add new roads or trails and specify limitations.
- Guidelines for management, monitoring, and maintenance of the system.
- Indicators to guide future plan maintenance, amendments, or revisions related to travel management network.
- Needed easements and rights-of-way (to be issued to the BLM or others) to maintain the existing road and trail network providing public access

OHV designations for the Boulder area were established by the 2008 Pinedale RMP (Map 11). The majority of the area, including the Fremont Butte, Square Top, and Muddy Creek areas, is limited to existing roads and trails. Lands east of the Wyoming Highway 353, including the East Fork and Irish Canyon areas, are limited to designated roads and trails. A small area surrounding the proposed East Fork Wild and Scenic River segment is closed to vehicle use. This restriction does not provide any added protection to the area, as it is physically inaccessible to vehicles due to steep slopes and large rocks. This TMP will designate all routes open for motorized use.

The network of routes in the Boulder landscape was created first by commerce; roads to get people, goods and services from a ranch to a community or other ranches. Second, routes were generated by ranchers, and BLM, to accommodate grazing (moving cattle, managing salt blocks, constructing fences, water developments etc.). Third and mixed in with grazing, routes have been created by "recreational hunting" and geophysical operations. Nearly all the routes are user created by the passage of vehicles. Few have been constructed or maintained. The scoping process identified no specific conflicts among the recreational visitor or between participants with authorized uses. Additional actions designed to reduce

user conflict or facilitate additional access to undeveloped recreation opportunities were not warranted based upon current or future estimated recreation demand.

Approximately 374 miles of roads are located on public lands in the Boulder landscape. There are 3 improved roads: the Irish Canyon road, Sublette County Road 118, and the Muddy Speedway (Sublette County 113). The remainder are unimproved 2-track routes, and one constructed but abandoned road. The Boulder landscape area does not include many flowing water streams, but intermittent and ephemeral flows and the resulting cutting down of drainages has damaged some routes in the Square Top area. When roads crossing drainages become impassible, users create ever-larger detours around the head of the downcutting area. In addition, some new routes have been pioneered in cases where existing roads have become impassible or difficult to navigate due to holes, mud, or other characteristics.

The Lander Trail also traverses the area, and is used for recreational, working, and administrative vehicle access. More discussion of the Lander Trail is in the Cultural section, 3.3.

3.14 Vegetation

Vegetation types listed are from the Wyoming GAP data, completed by the Wyoming Cooperative Fish and Wildlife Research Unit and the University of Wyoming in 1996.

Sagebrush communities are the most extensive plant cover type. Sagebrush communities in the planning area are dominated by two subspecies of big sagebrush (Wyoming big sagebrush and mountain big sagebrush), with a well-established grass and forb component.

Native sagebrush communities across the West have been altered by changes to the natural fire regime and disturbances, such as herbicides, cultivation, excessive grazing, and insect activity. European settlement and impacts in sagebrush-dominated regions brought about changes in many of these areas, including an increase in sagebrush density, introduction of non-native species, and reduced numbers of certain native grasses and forbs (Tisdale and Hironaka 1981). Although the species composition of these communities may have changed somewhat since European settlement, these rangelands are still dominated by native plant communities. A majority of the species that were present in historic plant communities are still present today.

Overgrazing by livestock tends to deplete sagebrush communities of their native grass and forb element, resulting in increases in density of sagebrush or, alternatively, invasion of exotic weedy species (USDI, BLM 1999). Within the Boulder landscape, grazing has resulted in increases in the density of sagebrush and some changes in the herbaceous plant communities. In addition, long-term fire suppression and natural vegetation succession have contributed to sagebrush dominance in many plant communities. No widespread invasions involving exotic weedy species that dominate the native plant communities have been observed. Wildland fires in sagebrush communities have increased in number and intensity compared with historical levels in some parts of the West, but that has not been an issue in the Boulder landscape.

Much of the assessment area falls within the Wyoming Big Sage/Rhizomatous Grass-Bluegrass State. This state contains a sagebrush canopy with an herbaceous plant community dominated by rhizomatous grasses and bluegrasses. This community is likely the result of continuous season-long grazing (Cagney 2010). Rhizomatous grasses and bluegrasses are more resistant to grazing than are larger stature bunchgrasses. This state produces less forage and cover than the Sagebrush/Bunchgrass State. Wyoming big sagebrush eventually dominates this plant community. Forbs such as phlox, larkspur, buckwheat, and

pussytoes increase. Grasses such as Sandberg bluegrass, Letterman needlegrass, and rhizomatous wheatgrass increase in proportion to other grasses such as bluebunch wheatgrass, Indian ricegrass, and needleandthread. The larger stature bunchgrasses can be found on many of these sites in the assessment area; however they are not proportionate to the assessment area's potential.

The Sagebrush/ Bunchgrass Plant Community is considered a reference state or the "potential" within the assessment area. This state evolved with grazing by large herbivores (Cagney 2010). This HRPC provides a mix of sagebrush and herbaceous understory for ample cover and forage for livestock and wildlife. Potential vegetation is estimated at 75% grasses or grass-like plants, 10% forbs, and 15% woody plants (USDA). The major grasses include rhizomatous wheatgrass, bluebunch wheatgrass, Letterman needlegrass, Canby bluegrass, and needleandthread. Other grasses may include Indian ricegrass, prairie junegrass, bottlebrush squirreltail, Sandberg and mutton bluegrass, and threadleaf and needleleaf sedge. Wyoming big sagebrush is the dominant woody plant. Other woody species include rabbitbrush and winterfat. For further description of the plant communities associated with the Boulder landscape ecological sites, refer to the USDA NRCS Technical Guide, Section IIE. See Appendix 3 for a list of plant species that occur in the Boulder landscape assessment area.

The health of vegetation communities includes the stage of succession within the ecological site and other factors, such as grazing or browsing, insects, disease, fire, chemical and mechanical treatments, and climate. Typical elements used in describing health include: species and cover composition, vertical structure, and age class and contains appropriate plant communities that are resilient, diverse, and able to recover from natural and human disturbance.

Vegetation in the Boulder landscape consists of a variety of habitat and range types. An assortment of environmental factors influence the location(s), extent, state, and/or types of vegetation found throughout the area. Elevation, precipitation zone, topography, soils and underlying parent materials, slopes, and exposures all contribute to the general vegetation composition throughout the assessment area.

Lodgepole pine occurs in the Boulder landscape at elevations over 8,000 feet. Lodgepole pine is considered a pioneer species, as it returns rather quickly following fire. The lodgepole pine forest canopy does not allow for a very diverse understory plant community. Plants that occur here are: pine reedgrass, Wheeler bluegrass, heartleaf arnica, bedstraw, whortleberry, common juniper, wood rose, wax currant, and russet buffalo berry. Lodgepole pine will grow in mixed stands of aspen, Engelmann spruce, subalpine fir, and Douglas fir.

Cottonwood occurs near or within riparian zones, primarily on private and state land. Understory vegetation is often mixed including mesic grasses and forbs.

Growth of native cool season plants begins about April 15 and continues to about July 15 in lower elevations and in higher elevations, growth of native cool season plants begins about May 15 and continues to about August 15. Cool-season plant growth may occur in September if moisture is available.

Snowfall levels are a relatively good indicator of in-channel flows but are not always reflective of vegetation production. Small precipitation events at key moments in plant growth cycles can result in higher than average vegetative mass production, even in a drought year. A general drought was characterized from 2000 to 2010. The 2010 to 2011 winter provided greater than average total precipitation, however, this one year did not negate the long term effects of the drought, including reductions in plant production, reproductive capability, and vigor.

3.15 Visual Resource Management

The landscape contains lands classified as VRM class II, III, and IV. A large portion of the landscape is VRM Class II, including lands within 3 miles of the Lander Trail and lands along the Wind River Front. Lands along US Highway 191 and in the Fremont Butte area are VRM Class III. Smaller areas near the boundary with the Rock Springs Field Office and south of Fremont Butte are VRM Class IV (Map 12).

The VRM objectives are:

- **Class I Objective:** To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
- **Class II Objective:** To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
- **Class III Objective:** To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
- **Class IV Objective:** To provide for management activities that requires major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

Projects, including surface disturbing activities should incorporate techniques and methods designed to mitigate visual impacts to the characteristic landscape to comply with the areas VRM Objectives.

3.16 Wild and Scenic Rivers

The Boulder landscape contains a segment of the East Fork River that was determined in the Pinedale RMP to be eligible and suitable for inclusion in the Wild and Scenic Rivers System. An area of land within approximately ¼ mile of the suitable segment (approximately 1,130 acres) has management stipulations determined in the RMP (Map 2). The area is closed to surface disturbing activities, commercial timber sales, salable mineral development, OHV use, ROWs, water impoundments and diversions (except those necessary to access adjudicated water rights), and increases in grazing preference.

This area is rugged, mountainous, and timbered. The river and associated riparian areas are boulder-lined and not susceptible to damage by livestock. Livestock use of the suitable Wild and Scenic Rivers polygon is negligible, as determined by field personnel who visited the sites in 2009 to conduct PFC assessments. Changes in livestock grazing permits in the East Fork Common allotment are not expected to impact the East Fork Wild and Scenic River area.

3.17 Wildlife and Fisheries

Terrestrial Wildlife

The plant communities/habitat types that occur within the Boulder landscape vary greatly in their ability to support wildlife, depending on species composition, age classes, single-species dominance, horizontal and vertical structure, type abundance, mosaic mix with other habitats, and proximity to features such as migration corridors and winter concentration areas. While some wildlife species use several to many habitat types, other species are very specific in their habitat needs, and are known as obligate species. The diverse natural communities throughout the assessment area support a wide variety of animal species, including several Special Status Species. This section presents the current known status, distribution and habitat needs of wildlife within and specific to the Boulder landscape as well as any important topics

related to those species in the area. Although many of these species occupy the assessment area all year, some species are present only seasonally.

Big Game

Big game populations in the Boulder landscape are part of larger herd units within the Green River Basin. Data from the following table is summarized from the Pinedale Region Annual Big Game Herd Unit Reports 2010 JCRS. 2010 WGFD JCR population status reports identify both population estimates and general trends relative to management objectives.

Table 20. Boulder Landscape Big Game Population Status

Species	Herd Unit	2007-2011Avg	Population Estimate 2012 Post-Season	Ratio per 100 females 2012		Population Objective	% Above /Below Objective	# Years Above/ Below Objective
				males	Juv			
Pronghorn	Sublette	55050	40770	59	63	48,000	-15.1	2
Mule deer	Sublette	24,528	21,969	36	74	32,000	-31.3	9
Elk	Pinedale	1909	2253	19	33	1,900	+19	0
Moose	Sublette	1172	1300	65	39	1200	+8	0

Table 21. Designated Big Game Habitats (acres) within the Boulder Landscape

	Pronghorn	Mule Deer	Elk	Moose
Crucial Winter Range	46,120	13,780	1,050	15,690
Winter	0	19,260	0	0
Winter /Yearlong	0	17,700	0	0
Spring /Summer /Fall	54,370	5,880	2,200	6,740
Migration Corridors (miles)	46	13	<1	0
Parturition	0	0	180	0

2009 JIO Baseline Habitat Sampling

The vegetation monitoring locations that were established by this habitat inventory were chosen based on representative sites within ecological sites in major allotments and were not specifically chosen with wildlife habitat delineations in mind. This data set is the only vegetative data set within the Boulder landscape area. The following table explains which sites are spatially representative of certain designated or identified wildlife habitats within the Boulder landscape area.

Table 22. Boulder Landscape Designated Species Habitat by Major Allotment

ESD Reference Site		Designated Species Habitat			
		Sage-grouse* EB=Early Brood LB=Late Brood	Pronghorn	Mule Deer	Elk
Square Top Common	STC Site #1 Ly 7-9	Breeding (Nesting, EB rearing) Winter	Spring-Summer-Fall	Not suitable	Not suitable
	STC Site #2 Sy 7-9	Breeding (Nesting, EB Rearing) Upland Summer (LB Rearing) Winter	Spring -Summer-Fall Crucial Winter	Not suitable	Not suitable

	STC Site# 8 SwCy 7-9	Breeding (EB Rearing, Roosting)	Spring -Summer-Fall Crucial Winter	Not suitable	Not suitable
Fremont Butte Common	FBC #1 Ly 7-9	Breeding (Nesting, EB Rearing) Upland Summer (LB Rearing) Winter	Spring -Summer-Fall Crucial Winter	Not suitable	Not suitable
	FBC Site #4 Ly 10-14	Breeding (Nesting, EB Rearing) Upland Summer (LB Rearing) Winter	Spring -Summer-Fall Crucial Winter Migration	Winter	Not suitable
	FBC Site #7 SwCy 7-9	Breeding (Nesting, EB rearing) Winter**	Spring -Summer-Fall Crucial Winter Migration	Winter	Not suitable
Fremont Butte Individual	FBI Site#1 Ly 7-9	Breeding (Nesting, EB rearing) Winter	Spring-Summer-Fall	Not suitable	Not suitable
	Sy 7-9	Breeding (Nesting, EB rearing) Winter	Spring-Summer-Fall	Not suitable	Not suitable
	FBI Site#2 SwCy 7-9	Breeding (EB Rearing, Roosting) Winter**	Spring -Summer-Fall Crucial Winter	Winter	Not suitable
Chalk Butte Common	CBC Site #1 Sy 10-14	Breeding (Nesting, EB Rearing) Upland Summer (LB Rearing)	Spring -Summer-Fall	Winter Crucial Winter	Not suitable
	CBC Site #3 Ly 10-14	Breeding (Nesting, EB Rearing) Upland Summer (LB Rearing)	Spring -Summer-Fall Crucial Winter	Winter Crucial Winter	Not suitable
	Cu 10-14	Not Suitable	Spring -Summer-Fall	Winter Crucial Winter	Not suitable
East Fork Common	EFC Site #1 Cu 15-19	Breeding (Nesting, EB Rearing) Upland Summer (LB Rearing)	Spring -Summer-Fall	Crucial Winter Migration	Not suitable
	EFC Site #3 Ly 10-14	Breeding (Nesting, EB Rearing) Upland Summer (LB Rearing)	Spring -Summer-Fall	Crucial Winter Migration	Not suitable
	Sb15-19	Summer (LB Rearing)			Not suitable

*Sage-grouse habitats are not designated. Determinations were made using proximity to known leks, nesting sites and winter habitats.
** Site is within delineated winter concentration but early sage in not typically accessible in average winter conditions

Pronghorn
Pronghorn are selective browsers that require a variety of species on the landscape rather than monotypic vegetative communities. Their diet is typically heavy on browse such as sagebrush and other shrubs and forbs. Grass is consumed only when green and succulent. The availability of browse, especially sagebrush, appears to be the limiting factor for pronghorn on the winter range. Under severe winter conditions, pronghorn are further confined to limited crucial range generally occurring on lower south-southwest facing slopes that remain open during adverse conditions. Salt desert shrubs also are an important forage species in some areas (USDI, BLM 1986a).

The Boulder landscape boundary falls within the boundaries of the 10,546 square mile Sublette pronghorn herd unit. Pronghorn in the Sublette herd unit are known for long migrations, primarily the 150 plus mile migration between summer ranges in the Jackson Hole Valley and wintering areas along the Green River

near Seedskadee National Wildlife Refuge and areas within and south of Jonah Natural gas field (WYDOT 2002).

The sage-brush dominated uplands in the Boulder landscape area serve as habitat for pronghorn throughout the year. Pronghorn crucial winter range was recently re-delineated in the Upper Green River Basin (UGRB) by the Wyoming Game and Fish Department (WGFD). Pronghorn seasonal use areas and migration corridors within the Boulder landscape are shown on Map 13. See Table 21 for big game habitat acreages found in the Boulder Landscape.

Mule Deer

Mule deer are primarily browsers with the majority of their diet comprised of forbs and shrubs. Given their smaller rumen they have more selective diets than other ungulates such as elk. It is therefore important to maintain a diversity of forage on the landscape to allow for a variety of browse options. Winter browse habits are dominated by shrubs such as sagebrush, salt brush, and bitterbrush. In addition to winter availability shrubs typically retain a higher percent of their nutritional value over winter compared to dormant forbs and grass.

The Boulder landscape area is a relatively small subsection of land within a conglomeration of broader habitats found throughout the UGRB that are used by the Sublette deer herd. Crucial winter habitat, transitional ranges and migration routes overlap along the foothills of the Wind River Mountains and stretch from as far north as Fremont Lake all the way to the south side of the Big Sandy River. A portion of these critical winter habitats intersect the Boulder landscape along its eastern border near the East Fork River and Irish Canyon Creek drainages. There is also crucial winter range delineated around Fremont and Chalk Buttes in the northern end of the assessment area.

The assessment area is important to mule deer from the Sublette Herd Unit as it provides wintering habitat and crucial wintering habitat for deer that summer as far as 70 miles north of the project area. It also provides transitional habitat for deer migrating from summer ranges in the adjacent Wind River Mountains to their winter ranges further south of the assessment area. The Sublette mule deer herd is highly migratory, potentially the most migratory herd within the western states, often spending 4 to 5 months per year on transition ranges and travelling over more rugged terrain than any other Wyoming deer herd (Sawyer and Lindzey 2001).

In general, higher elevation transitional ranges such as those found in the Boulder landscape provide a more diverse foraging regime than can be found on lower elevation winter ranges which are typically composed of a more monotypic habitat type. These transition ranges allow individuals to maintain or recover body condition when facing or coming out of the winter months respectively (Short 1981). Retaining deer within transition ranges for longer amounts of time effectively reduces the foraging pressure on lower elevation winter ranges (Sawyer and Lindzey 2001).

Sawyer identified two winter complexes used by the deer in the Sublette herd unit in his 2001 final report for the Sublette Mule Deer Study. The two complexes were the Mesa Winter Range Complex and the Pinedale Front Winter Range Complex. The Pinedale Front Winter range complex was generally described as the lands east of US Highway 191 from Fremont Lake in the north to the Little Sandy/Elk Mountain area in the south. The Boulder landscape assessment area is situated within the Pinedale Front complex. The Mesa Complex is outside of the assessment area.

Although fidelity to winter ranges and winter range complexes is apparent with little overlap, many deer from different winter complexes were found to summer together on the same summer ranges. (Sawyer

and Lindzey 2001).

Although some parturition may occur within the assessment area, there is evidence that a majority of the deer that use the area in winter give birth to young outside of the area.

Resident deer are also known to use the agricultural lands along the East Fork River and Muddy Creek year round. Mule deer may occasionally use the lands and habitats found in the southern half of the assessment area, although it does not commonly occur and the area is delineated as not suitable habitat (Table 21) (Map 14).

Elk

Elk diets consist mostly of grasses and forbs in the spring and summer. Shrubs represent an especially important component of winter forage given the reduced accessibility of grasses and forbs. The majority of the Boulder landscape area is not typically used by elk. The eastern edge of the project encompasses spring/summer/ fall habitat and some crucial winter habitat for the Pinedale Elk Herd (PEH). These habitats are only portions of larger contiguous habitats that also overlap Bridger-Teton National Forest (BTNF) managed lands to the east of the Boulder landscape area project area.

In general, elk migration within and along the Boulder landscape occurs between summer ranges in the Wind River Mountains east of the project area and the Muddy feedground which is the only feedground found in the Boulder landscape area; this feedground exists on lands owned by the WGFD (Map 15).

The first known record of supplemental elk feeding within the PEH occurred during the winter of 1948-1949, when elk were reportedly fed throughout western Wyoming (WGFD 2006) Approximately 2,000 head were fed in the Green River-Pinedale area. The WGFD began supervising supplemental elk feeding in the PEH in 1958-1959, when 236 elk were fed on Muddy Creek feedground (WGFD 2006). Initially these feedgrounds served a dual purpose during severe winters; to provide sustenance for overtaxed wintering elk herds and to reduce elk depredation of rancher's haystacks.

Because of the congregation of hundreds of elk in relatively small wintering and supplemental feeding areas, density dependent diseases such as *Brucellosis abortus* (brucellosis) and Chronic Wasting Disease (CWD) are more easily spread amongst the numerous congregated elk. Brucellosis is known to be present in the elk herd using the Boulder landscape and usually results in affected cow elk aborting the first pregnancy after being infected. Today the primary role of feedgrounds is to not only prevent starvation during severe winters but to prevent or reduce comingling of elk and cattle in an attempt to prevent the transmission of diseases between the two species. CWD has yet to be documented in the Upper Green River Basin.

Recent parturition studies associated with brucellosis prevalence in elk near the Muddy feedground have also documented interchange between elk at the Muddy feedground and native wintering elk herds north and east of the town of Farson in the Rock Springs field office (Jared Rogerson, personal communication, May 30, 2012).

Designated elk parturition areas are currently very limited within the Boulder landscape area. Historically the majority of elk were known to calve in BTNF lands east of the Boulder landscape. Recent parturition studies associated with brucellosis prevalence in elk near the Muddy feedground have revealed that there is much more use of habitats at lower elevations and in more localities than was previously expected as suitable parturition areas (Jared Rogerson, personal communication, May 30, 2012). Large portions of the transitional ranges within the aspen/sagebrush interface areas from the Muddy Creek north to Scab Creek

are being used from mid-May to mid-June for elk parturition. Although these habitats have not been officially designated, they include lands managed by BLM on the eastern edge of the Boulder landscape. Typically, 98% of elk have completed calving by June 15 (Brandon Scurlock pers. comm. Jan. 15, 2013). The WGFD has a continuing project to more accurately map these elk parturition areas.

Brucellosis guidelines are an important consideration in the East Fork Common allotment. This allotment has two grazing permittees, both of which have brucellosis herd plans with the Wyoming Livestock Board. These plans include requirements for testing and vaccination of livestock, separation of cattle from elk and bison between January 1 and June 15 annually, and reporting of wildlife or livestock abortions or commingling.

Moose

Moose are generalist browsers and are known to eat willow, bitterbrush, serviceberry, sedges, rushes, and a number of conifer species. The assessment area supports the Sublette herd unit. Moose can be found within the Boulder landscape along willow-covered riparian communities such as the East Fork River and on the aspen-conifer foothills like those found along the eastern edge of the Boulder landscape throughout the year (USDI, BLM 1985). Some intermediate areas between the stream bottoms and higher summer range are used during spring and fall. Winter populations within BLM lands are considerably larger than summer populations, because moose summering at higher elevations on the BTNF migrate to the lower stream bottoms to escape extreme snow depths (USDI, BLM 1985). Crucial winter and yearlong habitat is found along the Wind River foothills and along the East Fork River, mostly on private lands, within the Boulder landscape. Spring/summer/fall habitat also exists along the eastern edge of the assessment area (Table 21).

Migratory Birds

More than 400 avian fauna species have been documented in Wyoming; 73 of these use riparian habitats. Most of the avian species are classified as passerine or songbirds, and more than half of these are considered year-round residents. Most songbird populations in the area are adapted for open areas. The vast sagebrush component of the assessment area provides habitat for major indicators of that type—namely, sage thrasher, Brewer's sparrow, and sage sparrow. Forest, riparian, and water resources also provide requisite habitats for multitudes of other species.

Corvid species such as the common raven and magpie are common in the planning area. American Crows may also occur in the area. Corvids are opportunistic and intelligent. They are scavengers, feeding on carrion; eggs, including sage-grouse eggs; and garbage.

Raptors

Raptor nesting data for the PFO outside of developed gas fields is limited due to a lack of intense survey efforts. There are currently very few known raptor nest locations within the Boulder landscape. Suitable habitat for nesting raptors exists throughout the assessment area and nesting raptors abundance is most likely greater than is represented in the current data set. Key nesting locations in the area may consist of the Fremont and Chalk Buttes and the riparian corridors such as the East Fork River, Muddy Creek and Irish Canyon Creek drainages. There are known nesting locations for Osprey, Bald Eagle, Golden Eagle, Red-tail hawk, Swainson's hawks, American kestrel, Ferruginous hawks, Great Horned owl and Burrowing owls within or along the boundaries of the Boulder landscape. Other common raptors that may be present in or along the boundary include sharp-shinned hawk, Cooper's hawk, northern harrier, prairie falcon, northern saw-whet owl, and long-eared and short-eared owls. Raptors that reside in the area solely

in the winter months include the rough-legged hawk and potentially, the snowy owl. There are no known nest locations in the central and eastern portions of the area, although there may be suitable nesting habitat in those areas.

Special Status Wildlife Species

A number of special status wildlife species may potentially be found in the Boulder landscape, or are known to occur.

Table 23. Threatened & Endangered/ Special Status Species Presence

Common Name	Special Status	General Habitat	Presence in the Boulder Landscape
MAMMALS			
Black-Footed Ferret	Federally Listed - Endangered Species BLM Sensitive	Closely associated with prairie dog towns of 12.5 acres or larger (burrows used for denning and shelter) and rely almost entirely on these rodents as prey.	**UNKNOWN** - There are some prairie dog towns in the Boulder landscape but the likelihood of ferrets occurring in these towns is very small. The entire Boulder landscape has been block cleared by the USFWS.
Canada Lynx	Federally Listed - Threatened Species BLM Sensitive	High-elevation forested areas that support ample populations of snowshoe hares and other preferred prey species.	**UNKNOWN** - Extensive potential habitat for this species occurs immediately adjacent to the planning area in the forest service managed lands in the Wind River Mountains. There is delineated potential lynx habitat within the BLM lands along the most eastern edge of the Boulder Landscape. Canada lynx inhabiting the forest service lands could be expected to range into the potential habitat situated within the Boulder Landscape.
Grizzly Bear	Federally Listed - Threatened Species BLM Sensitive	Montane forests	**UNKNOWN** - Grizzly Bears are known to occur in the Upper Green River Basin, primarily on USDA Forest Service lands but occasionally have roamed onto BLM administered lands in the past. Grizzly Bears may occur on BLM administered lands within the Boulder Landscape.
Gray Wolf	Federally Listed - Threatened Species BLM Sensitive		**PRESENT** - Wolves have been observed in the Boulder landscape.
White-tailed Prairie Dog	BLM Sensitive		**PRESENT** - There are currently only a handful of known white-tailed prairie dog towns in the southern portion of the Boulder landscape but the area has not been thoroughly surveyed
Pygmy Rabbit	BLM Sensitive	Pygmy rabbits are typically associated with tall dense stands of sagebrush in loose, deep soils. They are the only lagomorph native to North America that digs its own burrows which are most often found at the base of tall sagebrush plants. Sagebrush not only provides cover from predators but comprises the majority of the pygmy rabbit diet.	**PRESENT** - Pygmy Rabbits are abundant in the Boulder landscape. In 2011 occupancy in the Boulder landscape was estimated at 84% (95%CI 73-91%) (HWA 2011)

Common Name	Special Status	General Habitat	Presence in the Boulder Landscape
Long-Eared Myotis	BLM Sensitive	Frequently found roosting under the bark or within cavities of ponderosa pine trees during the daytime, although it can also be found at much higher and lower elevations in deciduous forests and in caves.	**UNKNOWN** - The long-eared myotis has been reported throughout the PFO (Luce et al. 1997) and likely is scattered throughout the BL where suitable roost sites exist.
Idaho Pocket Gopher	BLM Sensitive	Can be found in subalpine mountain meadows, shrub steppes, and various grasslands, but appears to favor rocky, shallow soils.	**UNKNOWN** - Documented within the PFO and may exist in the Boulder landscape (WYNDD 2012)
BIRDS			
Western Yellow-Billed Cuckoo	Federally Listed – Candidate Species BLM Sensitive	Large tracts of deciduous riparian woodlands with dense, scrubby undergrowth. Cuckoos frequently use willow thickets for nesting and they forage among large cottonwoods (Bennett and Keinath 2001).	**UNKNOWN** - It is unlikely that the Western Yellow Billed Cuckoo exists in the Boulder Landscape.
Northern Goshawk	BLM Sensitive		**PRESENT -** Two Observations of Northern Goshawks were made within the Boulder landscape along its eastern boundary in 2002 (WYNDD 2012).
Ferruginous Hawk	BLM Sensitive		**PRESENT** - There are currently two known nesting areas within the Boulder landscape which encompasses 13 known nest locations. Suitable nesting and foraging habitat exists within the Boulder landscape but survey efforts have been minimal
Bald Eagle	BLM Sensitive		**PRESENT** - Bald Eagle nests and observation locations exist along the East Fork River near the northwest corner of the Boulder landscape
Burrowing Owl	BLM Sensitive	Burrowing owls nest in grassland, scrub, and steppe areas, usually using burrows excavated by other animals such as the prairie dog (Martin 1973).	**PRESENT** - Documented nesting has occurred in the Boulder landscape and may be more prevalent than current records portray
Sage Thrasher	BLM Sensitive		**PRESENT** - Sage thrashers have been documented within the PFO (WYNDD 2012) and are known to occur in the Boulder landscape
Sage Sparrow	BLM Sensitive		**PRESENT** - Sage Sparrows have been documented within the PFO (WYNDD 2012) and are known to occur in the Boulder Landscape
Brewer's Sparrow	BLM Sensitive		**PRESENT** - Brewer's Sparrows have been documented within the PFO (WYNDD 2012) and are known to occur in the Boulder Landscape.
Loggerhead Shrike	BLM Sensitive		**PRESENT** - The Loggerhead Shrike has been documented within the PFO (WYNDD 2012) and is known to occur in the Boulder Landscape.
Mountain plover	BLM Sensitive	Short grass prairie/ sparse vegetation.	**UNKNOWN** - Potential habitat exists in the Boulder landscape primarily in its southern portion. Surveys for the species are lacking inside the Boulder landscape and currently there are no documented sightings in the project area although the likelihood of occurrence is probable.
White-Faced Ibis	BLM Sensitive	Marshes and wet	**UNKNOWN** - Confirmed as nesting in the PFO (Luce et

Common Name	Special Status	General Habitat	Presence in the Boulder Landscape
		meadows	al. 1997) but no documentation of the species in the Boulder Landscape. These birds may stop over at local stock reservoirs but are likely not found nesting in the Boulder Landscape.
Trumpeter Swan	BLM Sensitive	Lakes, ponds, marshes, and other wetlands areas	**UNKNOWN** - Trumpeter swans have been observed in the PFO. Trumpeter swans have been periodically released on public land in the New Fork Potholes area and may occur in the Boulder Landscape.
American Peregrine Falcon	BLM Sensitive	Peregrine falcons nest on high cliffs, trees, high riverbanks, towers, and tall buildings (Savage 1992).	**UNKNOWN** - This species is considered uncommon in the PFO, but some nesting has occurred (Luce et al. 1997). Peregrine falcons have been released on public lands near the Upper Green River and may occur in the Boulder Landscape.
Long-Billed Curlew	BLM Sensitive	Long-billed curlews usually nest in prairie and grassy meadows near water but occasionally choose dry upland sites.	**UNKNOWN** - Nesting and breeding has been documented in the PFO (WYNDD 2012) (Luce et al. 1997) and the species may occur in the Boulder landscape specifically along the agricultural lands in the eastern ½ of the project area.

Greater Sage-grouse

On March 23, 2010 the USFWS published its finding that the greater sage-grouse warrants protection under the Endangered Species Act (75 FR 13910 (2010-3-23). Proposing the species for protection was deemed to be precluded by the necessity to focus efforts on higher priority species. The sage-grouse is therefore considered a Candidate on the list of species that will be considered for protection under the Endangered Species Act and all management of the species should be oriented to prevent further impacts to the species that may result in its listing.

Sage-grouse are a sagebrush obligate species that depends on the sagebrush for nearly all components of its lifecycle. In general sage-grouse require a continuous mosaic of sagebrush habitat with access to seasonal use areas. Nesting and early brood rearing habitat is characterized by 10-25% sagebrush cover with a variety of forb and native bunch grasses for food and nesting residual cover. Breeding (lekking) will occur in suitable open spaces adjacent to suitable nesting habitat. Late summer brood rearing requires upland sagebrush habitat for roosting and riparian areas to provide the succulent grass and forb forage species. Winter habitat is driven by access to suitable sagebrush canopy cover above the snow (10-30% canopy cover). During the winter season sagebrush provides the primary food source and crucial cover from harsh conditions.

The Boulder landscape area provides a vast expanse of sage-brush dominated habitats used by sage-grouse. The majority of seasonal habitats on the landscape are readily accessible throughout most of the year, with the exception of the higher elevation lands found on the eastern portion of the assessment area. Portions of these lands are dominated by aspen/conifer interface and high snow loads making them unsuitable winter habitat in most years.

In response to the Warranted but Precluded determination made by USFWS regarding the listing of Greater Sage-Grouse for protection under the Endangered Species Act (ESA), the state of Wyoming Governor's Sage-Grouse Implementation Team developed a Core Population Area Strategy for the conservation of Sage-Grouse in Wyoming (Wyoming Governor's Executive Order 2011-5). Through this effort, management priority areas and management controls were identified and implemented in an effort to conserve the sage-grouse and avoid potential significant adverse impact on the state economy associated with a listing under ESA. On February 10, 2012 the BLM Wyoming implemented a Greater Sage-Grouse Habitat Management Policy that is consistent with the guidelines and recommendations

provided for in the Core Population Area Strategy (BLM IM No.WY-2012-019). This guidance effectively adopted the State's Sage-Grouse Core Protection Area Strategy standards and practices for habitat conservation, restoration and reclamation practices in designated Core habitat in Wyoming. The BLM Wyoming IM meets the intent of the National Policy set forth in WO IM-No.2012-044 and therefore represents the official management policy for BLM land in the State of Wyoming.

The majority (approximately 90,000 acres) of the Boulder landscape is considered part of the Greater South Pass sage-grouse core area. The only portion of the Boulder landscape that is not considered as sage-grouse core is the extreme eastern portion (approximately 8830 acres) surrounding the Muddy Feedground.

The core area was delineated primarily by buffering known occupied sage-grouse leks by four miles. Various studies have shown that a majority of collared sage-grouse, anywhere from 74.4% (Holloran and Anderson 2005) to 96.8 %, (Graham and McConnell 2004) (Graham and Jones 2005) nest within four miles of an occupied lek. Any Upland Sagebrush dominated habitats within 4 miles of an occupied lek in the Boulder landscape will be considered nesting habitat for the purposes of this document. There are approximately 66,451 acres of nesting habitat on BLM administered lands and 8,947 acres of nesting habitat on state lands in the Boulder landscape area.

The Boulder landscape assessment area contains 14 known leks. Three of these leks, located along the western edge of the assessment area, are unoccupied. One lek in the area is of unknown status and the other 10 are considered occupied. Leks from the Speedway, Big Sandy, East Fork and Yellowpoint complexes exist within the area. There are currently seven documented leks (five occupied, two unoccupied) within the East Fork complex, all of which are situated within the Boulder landscape. There are four occupied leks from the Speedway complex that exist within the Boulder landscape and 1 that is located approximately 500 feet outside of the Boulder landscape. There are two occupied leks from the Big Sandy Complex that exist within the Boulder landscape. One unoccupied lek from the Yellowpoint complex exists along its western border. The Boulder landscape does not encompass all of the leks from the Speedway, Yellowpoint, or Big Sandy complexes (Map 16).

Summarized lek attendance data for the assessment area can be found in Tables 24 through 26 and is based on leks of occupied or unknown status. The majority of leks are located in the Fremont Butte Common (5) and Squaretop Common (5) allotments. The remaining lek is found on private land.

There are 98 documented sage-grouse nesting records within the Boulder landscape. In general, nesting grouse within the Boulder landscape remain on the upland sage-brush areas until forbs dry up and then move to key late brood rearing habitats found along the East Fork River and the Muddy Creek drainage. Evidence from past studies documents the importance of the Boulder landscape to birds that breed and nest across Highway 191 in the Anticline and Jonah gas fields. Collared birds from this study nested in sagebrush lands in the Jonah and Southern Anticline and within a matter of a few days, moved over eleven miles to summer and raise broods in the assessment area (Kaiser 2006).

Inventory and delineation of sage-grouse winter concentration, winter use, and lekking habitats has been an ongoing effort in the PFO. Aerial surveys performed during the spring and winter months of 2009-2011 were used to locate strutting (breeding) and wintering sage-grouse respectively. Collaboration with local WGFD specialists has resulted in winter concentration polygons being produced. Winter concentration areas were delineated using winter flock observation records of greater than or equal to 50 birds. Winter use areas can be delineated using flock sizes less than 50 birds along with winter field sign. Winter use areas have not been officially designated in the Boulder landscape area but data exist to do so.

In general winter use typically falls along the perimeter of the delineated winter concentration polygons. There are two large delineated winter concentration areas within the Boulder landscape; one in the northwest portion of the planning area and one within the southern portion consisting of about 23,830 acres (Map 16). With continued monitoring flights the winter concentration delineations will continue to be refined.

Table 24. Boulder Landscape 2004-2013 Summarized Sage-Grouse Lek Attendance

Year	# Leks	# Leks checked	#active counted	Max count Male	Male/Active Lek
2004	11	10	10	549	55
2005	11	10	9	686	69
2006	11	10	8	729	73
2007	11	9	8	881	98
2008	11	8	8	879	110
2009	11	9	8	665	83
2010	11	9	9	544	60
2011*	11	6	5	251	50
2012	10	9	9	466	52
2013	10	9	9	438	49

Summarized lek attendance data for the occupied or unknown status leks found within the Boulder Landscape. Summarized data was calculated using individual lek attendance data (provided by WYG&FD) from occupied or unknown status leks occurring in the Boulder landscape area.

*Due to severe winter, access to lek location was limited.

Table 25. Fremont Butte Common 2004-2013 Summarized Sage-Grouse Lek Attendance

Year	# Leks	# Leks checked	#active counted	Max count Male	Male/Active Lek
2004	5	4	3	154	39
2005	5	4	4	188	47
2006	5	4	3	222	56
2007	5	3	3	274	91
2008	5	3	3	251	84
2009	5	3	3	213	71
2010	5	3	3	142	47
2011*	5	Unknown	Unknown	Unknown	Unknown
2012	4	3	3	142	47
2013	4	3	3	134	44

Table 26. Square Top Common 2004-2013 Summarized Sage-Grouse Lek Attendance

Year	# Leks	# Leks checked	#active counted	Max count Male	Male/Active Lek
2004	5	5	5	358	72
2005	5	5	4	459	92
2006	5	5	4	469	94

2007	5	5	4	568	114
2008	5	5	4	593	119
2009	5	5	4	412	82
2010	5	5	5	367	73
2011*	5	5	5	269	54
2012	5	5	5	293	59
2013	5	5	5	290	58

Sage-Grouse Habitat Assessment Framework

2009 Baseline habitat data within the Boulder landscape area was analyzed using tools found in the Sage-Grouse Habitat Assessment Framework *Multi-scale Habitat Assessment Tool* in order to evaluate habitat conditions in the area. Third order and fourth order habitat descriptions worksheets were used to assess habitat conditions for Breeding (nesting, early brood rearing), Summer (upland) and Winter (winter concentration and winter use) habitats at the top three ESD reference sites within the five largest allotments in the Boulder landscape area. Summary results of the assessment are presented in Table 27.

Table 27. Boulder Landscape Sage-Grouse Habitat Assessment Framework Summary

ESD Reference Site					**Sage-grouse Habitat**	
		% of Allotment Represented	**Acres Represented**	**Plant Community**	**Seasonal Use**	**Condition**
Square Top Common	STC Site #1 Ly 7-9	29%	11,676	Sagebrush/ Rhizomatous Grass-Bluegrass	Nesting/EB rearing	Suitable
					Upland summer/ LB rearing	Suitable
					Winter	Suitable
	STC Site #2 Sy 7-9	26%	10,585	Sagebrush/ Rhizomatous Grass-Bluegrass	Nesting/EB rearing	Suitable
					Upland summer/ LB rearing	Suitable
					Winter	Suitable
	STC Site# 8 SwCy 7-9	19%	7,596	Rhizomatous Grass-Bluegrass/Early Sage	Nesting/EB rearing	Unsuitable *
					Upland summer/ LB rearing	Unsuitable *
					Winter	Unsuitable *
Fremont Butte Common	FBC #1 Ly 7-9	42%	6,620	Sagebrush/Rhizomatous Grass-Bluegrass	Nesting/EB rearing	Suitable
					Upland summer/ LB rearing	Suitable
					Winter	Suitable

	FBC Site #4 Ly 10-14	18%	2,817	Sagebrush/Rhizomatous Grass-Bluegrass	Nesting/EB rearing	Suitable
					Upland summer/ LB rearing	Suitable
					Winter	Suitable
	FBC Site #7 SwCy 7-9	9%	1,393	Early sage/Rhizomatous Grass-Bluegrass	Nesting/EB rearing	Unsuitable*
					Upland summer/ LB rearing	Unsuitable*
					Winter	Unsuitable*
Fremont Butte Individual	FBI Site#1 Ly 7-9	64	3,132	Sagebrush/Rhizomatous Grass-Bluegrass	Nesting/EB rearing	Suitable
					Upland summer/ LB rearing	Suitable
					Winter	Suitable
	FBI Site#2 SwCy 7-9	15	734	Rhizomatous Grass-Bluegrass/Early Sage	Nesting/EB rearing	Unsuitable*
					Upland summer/ LB rearing	Unsuitable*
					Winter	Unsuitable*
	FBI Site# Sy 7-9	8	406	Sagebrush/Rhizomatous Grass-Bluegrass	Nesting/EB rearing	Suitable**
					Upland summer/ LB rearing	Suitable**
					Winter	Suitable**
Chalk Butte Common	CBC Site #3 Ly 10-14	26	864	Sagebrush/Rhizomatous Grass-Bluegrass	Nesting/EB rearing	Suitable***
					Upland summer/ LB rearing	Suitable***
					Winter	Suitable***
	CBC Site #1 Sy 10-14	24	811	Sagebrush/Bunchgrass	Nesting/EB rearing	Suitable***
					Upland summer/ LB rearing	Suitable***
					Winter	Suitable***
	Cu 10-14	11	379	Unidentified	Nesting/EB rearing	Unsuitable
					Upland summer/ LB rearing	Unsuitable
					Winter	Unsuitable

E a	EFC Site # 1	47	4,719	Mountain Big	Nesting/EB	Suitable

	Cu 15-19			Sage/Bitterbrush	rearing	
					Upland summer/ LB rearing	Suitable
					Winter	Unsuitable
	EFC Site # 3 Ly 10-14	20	1,977	Sagebrush/Bunchgrass	Nesting/EB rearing	Suitable
					Upland summer/ LB rearing	Suitable
					Winter	Unsuitable
	Sb15-19	4	430	Unidentified	Nesting/EB rearing	Unsuitable
					Upland summer/ LB rearing	NA
					Winter	Unsuitable

*The dominant shrub found in SwCy 7-9 site is Early sage. Early sage is a low stature sage that will never reach heights that will provide adequate cover for nesting and early brood rearing and is not typically accessible during winter due to snow loads. These areas still provide valuable habitat to sage-grouse depending on patch size, shape and proximity to other habitat types.
**Assessment was based on data taken from Sy 7-9 site in the nearby Square Top Common allotment.
***Though considered suitable using the habitat assessment framework, these habitats are likely marginal habitats due to the nearby buttes which serve as perceived perch sites.

Pygmy Rabbit

Pygmy rabbits are typically associated with tall dense stands of sagebrush in loose, deep soils. They are the only lagomorph native to North America that digs its own burrows which are most often found at the base of tall sagebrush plants. Sagebrush not only provides cover from predators but comprises the majority of the pygmy rabbit diet.

In association with current and proposed natural gas development in the PFO, several years of site occupancy analysis have been conducted for pygmy rabbit populations. Occupancy analysis represents a reliable index of current population size. A portion of the Boulder landscape was chosen as a reference area for the Anticline development. In 2011, occupancy in the Boulder landscape was estimated at 84% (HWA 2011) which is much greater than other undeveloped areas of the field office. For example, occupancy is 25% (Germaine et al *unpub* 2012) in the surrounding areas south and east of the assessment area. These data suggest that there is a relatively large and viable pygmy rabbit population in the Boulder area compared to other undeveloped areas.

Pygmy rabbit habitat has not been mapped or modeled in the assessment area but occupancy sampling efforts have resulted in the recording of numerous pygmy rabbit field sign and rabbit observations in the area. These locations have been documented throughout the assessment area but may not represent all suitable habitat.

The major contributors to habitat fragmentation in the assessment area are natural geographic barriers such as rivers and anthropogenic barriers such as main roads and agricultural development. These disturbances are relatively few and likely play only a minor role in pygmy dispersal given the remaining large expanses of uninterrupted sage-brush habitat.

Aquatic Species
Fisheries in the Boulder landscape area are restricted to the East Fork River and Irish Canyon creek. These streams are moderately productive cold-water fisheries. The area is currently managed as a trout fishery, with genetically pure Yellowstone cutthroat trout in Irish Canyon Creek.

Fisheries Distribution
The Boulder landscape area contains a portion of the East Fork River watershed in the Green River Basin of the Upper Colorado hydrologic region.

Approximately 5.5 miles of stream and riverine habitat and 27 acres of wetland habitat occur in the landscape area. However, only Irish Canyon Creek and the East Fork River support fish. Fisheries within the area consist of native and non-native game and nongame species. The East Fork River contains brown trout, brook trout and rainbow trout. According to WGFD sampling records, trout densities range from 174 to 220 trout/mile between two sampling stations. The majority of these were brook trout. A large number of mottled sculpin also exist in this river. Habitat quality at both stations was rated as poor due to wide channel, shallow pools, substrate embeddedness, and a low amount of instream cover. Irish Canyon creek contains Yellowstone cutthroat trout (*Onchorhynchus clarki bouvieri*) at a current density of 296 fish/mile and a large number of mottled sculpin (WGFD, 2007 sampling records). The population of Yellowstone cutthroat trout which is present in Irish Canyon Creek is outside of its native historical range. This population was formerly thought to be a pure population of CRCT (WGFD, 2007). Recent genetic analysis by WGFD (Sexauer, pers. comm., 2013) has shown that this population is, instead, Yellowstone cutthroat. Though Yellowstone cutthroat trout are considered a sensitive species within their historic range, the population in Irish Canyon Creek is outside that range and will be managed as a sport fishery, and will not be addressed further in this document. BLM has no recent data on fisheries habitat parameters other than inferences made from the riparian inventories. Since streams are rated as Proper Functioning Condition, the physical conditions are such that fisheries habitat should be able to improve over time.

According to WGFD observations, no fish have been observed or recorded in Jim Creek. WGFD has interviewed several other people who hunt/recreate in this area and none recall this watershed ever supporting trout, although there have been some indications that fish may have been planted in Jim Lake many years ago. They have concluded that the Jim Creek watershed currently does not support any trout.

The WGFD classifies streams within the Green River Basin and planning area according to the relative productivity of each reach's trout fishery (States West 2000). Within the landscape area, stream and river reaches have been classified as yellow or brown waters.

Yellow waters: Important trout waters and fisheries of regional importance with trout production of 50 to 300 pounds of trout per mile.

Brown waters: Low-production water and fisheries of local importance with trout production of less than 50 pounds of trout per mile.

The WGFD habitat quality indices show that habitat quality in the landscape area is sufficient for maintaining game and nongame fisheries. However, the data provided appear to indicate that instream cover and water temperature values could be improved in some areas to enhance existing habitats.

Water Quality Effects on Fisheries

The majority of the waters in the landscape area (East Fork River and Irish Canyon Creek) are listed as Class 2AB waters by the Wyoming DEQ, Water Quality Division (WDEQ 2001a). Class 2AB waters are defined as those waters known to support game fish populations or spawning and nursery areas at least seasonally, perennial tributaries and adjacent wetlands, and areas in which game fishery and drinking water use is otherwise attainable (WDEQ 2001a). Additional protections of Class 2AB waters include "non-game fisheries, fish consumption, aquatic life other than fish, primary contact recreation, wildlife, industry, agriculture and scenic values" (WDEQ 2001a).

Special Status Fish Species
Federally Listed Species

Water flowing into the Green River drainage is a direct contributor to the habitat for four endangered fish species in the upper Colorado River. All water withdrawals from these tributaries are considered to adversely affect these species and require ESA Section 7 consultation with the USFWS.

Table 28. Special status fish species

Special Status Species	Scientific Name	Habitat	Occurrence in the Boulder landscape
Colorado pikeminnow Listed Endangered	*Ptychocheilus lucius*	Colorado River and its major tributaries	Does not occur
Razorback sucker Listed Endangered	*Xyrauchen texanus*	Colorado River and its major tributaries	Does not occur
Bonytail Listed Endangered	*Gila elegans*	Colorado River and its major tributaries	Does not occur
Humpback chub Listed Endangered	*Gila cypha*	Colorado River and its major tributaries	Does not occur
Yellowstone cutthroat trout BLM Sensitive	*Onchorhynchus clarki bouvieri*	Yellowstone watersheds	Present but stocked outside of historic range and managed as a sport fishery

4.0 ENVIRONMENTAL EFFECTS

The purpose of this chapter is to analyze and disclose the environmental consequences of the Proposed 1 Action and alternatives. The analysis is guided by the regulations set forth by the Council on Environmental Quality (CEQ), which call for analysis of the direct, indirect, and cumulative impacts of the Proposed Action and the alternatives (40 Code of Federal Regulations [CFR] 1500-1508). Direct effects are those caused by an action and occurring at the same time and place as the action (e.g., removal of vegetation when animals are grazing). Indirect effects are caused by the action but typically occur at later time or location than the action area (e.g., the effects on plant communities of grazing by animals over many years or decades). Cumulative impacts are those that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Direct and indirect impacts are described together under each resource section and cumulative impacts are presented in Section 4.2 (*Cumulative Effects*).

Direct impacts are generally attributable to implementation of an alternative that affects a specific resource, and generally occur at the same time and place. Indirect impacts can result from one resource affecting another (e.g., soil erosion and sedimentation affecting water quality) or can occur in a different

time or place, but can be reasonably expected to occur. Short-term impacts result in changes to the environment that are stabilized or mitigated rapidly, do not result in any long-term effects, and typically occur for less than 5 years. Long-term impacts result in lasting effects that typically occur for more than 5 years.

4.1 Direct and Indirect Effects

Proposed Action

Air Resources

Ozone
The Wyoming Department of Environmental Quality (WDEQ) has responsibility for air quality regulation in Wyoming. WDEQ does not require analyses of methane emissions from cattle when doing general conformity reviews for BLM actions in the ozone nonattainment area in the Upper Green River Basin in Wyoming. Neither the State of Wyoming nor the Environmental Protection Agency (EPA) considers methane to be a volatile organic compound with respect to ozone formation. Methane has been determined by the EPA to have negligible photochemical reactivity, meaning that it does not react easily in the presence of sunlight to form ozone.

Global Climate Change
The assessment of greenhouse gas (GHG) emissions and climate change is in its formative phase. It is currently not feasible to know with certainty the net effects from the proposed action on climate. The inconsistency in results of 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 effects of decisions made at this level. When further information on the effects to climate change is known, such information would be incorporated into the BLM's planning and NEPA documents as appropriate.

Cultural and Paleontological Resources
Livestock and vehicle traffic on and off road is known to trample, dislocate and sometimes destroy certain types of cultural resources (Gifford-Gonzales 1985). Compression and trampling caused by OHV use and livestock can negatively affect fossils, which can be directly related to effects on cultural remains. Livestock and OHV use can lead to dislodging, breakage and loss of provenance (Ross 1976) of individual fossils/artifacts and destruction of known and undiscovered fossil localities or archaeological sites. "Badlands" (areas containing high amounts of shale and clay) are the most susceptible to damage and erosion problems affecting fossils. Cultural materials can often be found in sandy areas that are affected in the same way as fossils in "Badlands" and are susceptible to erosional degradation. Historic remains that tend to be surficial are highly vulnerable to breakage and dislocation due to trampling and OHV use (Gifford-Gonzalez 1985). Areas of sandstone and limestone outcrops are sometimes used by animals as "rubbing areas" and may have in the past served as shelter for indigenous peoples and rock art locations, these areas may also contain fossil localities. Concentrating animal or OHV use in outcrop areas can also dislodge, rub out, and break cultural/fossil remains. Such areas should be inventoried prior to any development including fence placement, or trail and road construction/reclamation. Water wells/tanks/troughs and salt block locations should not be placed within known cultural sites or fossil localities due to the same effects mentioned above in other areas of animal concentration or OHV use.

Economic and Social Impacts

While livestock grazing is no longer the primary economic activity of Sublette County or Wyoming, it is a major land use in the Boulder landscape. Many individuals are operating family ranches that have been in existence for 100 years or more. Ranching is an important use in the Boulder area in economic, social, and historic terms.

The proposed action would provide for the stability of these operations, to the extent that continued access to public lands for grazing can provide that stability. Other factors, including market prices, weather, family dynamics, and local and national economic and cultural forces would also impact the stability of the ranching community in the Boulder area.

The proposed action would provide for the continuance of livestock grazing on the 18 allotments of the Boulder landscape, for the most part continuing the traditional seasons of use that are coordinated with ranchers' use of their private lands and USFS grazing permits. Restrictions on spring range readiness could cause delays in spring turnout that could cause economic or other hardships in the short term; however, adhering to these requirements should result in more abundant and higher quality forage in the long term as vegetation communities respond.

Converting horse AUMs to cattle use in the Square Top Common allotment would allow the Richies to make more use of their grazing permit, and should result in some economic benefit.

There should be no impact from splitting the Fremont Butte Common allotment into two separate allotments, as it currently functions as two separate units.

Flexibility criteria as described in the Proposed Action should provide some economic benefit to livestock grazing permittees as a result of flexibility within their grazing permits.

Lands with Wilderness Characteristics
Changing the grazing prescriptions would not affect LWC. New fences, substantial road improvements, ROW etc. could affect LWC, however no improvements of this type are proposed. The ten miles of route closures and rehabilitation would reduce to a small degree features that adversely impact wilderness characteristics.

Livestock Grazing
This alternative provides flexibility to the livestock operations associated with the Boulder landscape by allowing the permittees to adjust their stocking density or turnout dates based on climatic conditions and resource condition. Permittees could graze more livestock for a shorter time period as long as they do not exceed their AUM's and are within their permitted dates. This grazing scheme could reduce diet crude protein content and digestibility compared to other grazing systems (Holechek et. al., 2004). The permitted use would remain at 8,099 AUMs; however, 155 unused horse AUMs in the Square Top Common would be converted to cattle AUMs which would remove late season grazing pressure on this allotment. Range readiness criteria would be implemented to ensure that the key plant species are at a proper growth stage that will provide the necessary protein requirements to sustain a yearling or cow calf pair during the grazing season. Cool season grasses are more palatable and have a higher forage quality in the spring than the summer and will provide better weight gains on yearling steers, higher milk production on lactating cows and higher conception rates than forage that has cured in the late summer or fall (Barnes et. al, 2003; Jurgens 1997).

Noxious Weeds
Some noxious weeds and other invasive species are present in the Boulder Landscape area. Treatment of these species utilizing Integrated Pest Management techniques is handled through a Cooperative Agreement between BLM and Sublette County Weed & Pest District. There would be no change in the amount or distribution of these invasive species.

Recreation
The renewal of grazing permits and related site specific actions would create no direct effects to recreation resources. However, improvements to rangeland health could benefit wildlife and improve opportunities to hunt big game, and the availability of big game for wildlife viewing.

The closure of roads (10 miles) would reduce impacts to soil, vegetation, water and wildlife. The routes proposed for closure are generally redundant and serve no purpose. Access to public lands would not be curtailed because over 300 miles of roads accessing the area would remain open.

The backcountry, primitive recreation setting for visitors would be indirectly impacted by the route signing and the provision user information at primary area access portals. Recreational benefits would remain as access is maintained for visitors to pursue the areas recreation opportunities.

The signing of routes and publishing maps could reduce trespass on private lands, reduce unnecessary travel and increase awareness of the presence and the need to protect sensitive natural resources.

The seasonal closure to motorized vehicles would provide protection for wintering wildlife in crucial big game winter range. This protection could play a role in enhancing wildlife populations and possibly big game hunting opportunities. Since motorized vehicles would not be allowed on the roads during the seasonal closure, the potential for vehicles to cause ruts and resource damage by driving on wet and muddy roads would be reduced. This would enhance the recreation setting and benefit visitor experiences.

Implementing the seasonal closure would pose additional restrictions on the recreating public and would increase the administrative presence of the BLM in this area. The impact of additional restrictions is expected to be minimal because vehicle access to a majority of the planning area is available year-round. Allowing exceptions for certain administrative uses, emergency use, and flexibility in the closure dates would accommodate future management needs as deemed appropriate by the BLM Authorized Officer.

There would be no direct or indirect effects to non-motorized modes of travel since no actions were proposed to manage user conflict or improve opportunities for travel by bicycle, horse, foot etc.

The proposed action would implement the Boulder Travel Management Activity Plan and would designate routes as shown on Map 2.

Riparian Resources, Watershed, and Hydrology
The Boulder landscape does not encompass any streams on Wyoming's list of impaired waters: http://deq.state.wy.us/wqd/watershed/Downloads/305b/2008/2008%20Integrated%20Report.pdf

Much of the Boulder landscape consists of shallow soils underlain with bedrock or boulders. This structure creates a great deal of vertical stability and can result in less visible grazing impacts, as compared to areas with deeper soils that are more dependent on vegetation than rock for channel stability.

Because of the inherent geologic stability of the riparian areas, continuation of livestock grazing at levels similar to those currently ongoing should not cause any impacts or changes in riparian condition in most areas. Along some streams, the vegetation community is not at its potential, and would likely remain in its current condition with the continuation of mostly-similar grazing practices. Four short segments of the East Fork River on public lands (totaling about 0.32 miles) would likely remain in their current FAR condition unless protected from livestock impacts including forage utilization and bank trampling. Each of these segments is located in a different allotment, is too short to manage or rate as an individual segment, and could only be effectively managed with fencing, which would cause other impacts and could be difficult to maintain in these riparian areas.

Changes to require range readiness would have more impact on upland species than those in riparian areas, which are not water limited and continue to grow throughout the growing season.

Soils
Soil erosion may occur along cattle migration routes. The actual amount of erosion that could occur would depend on wind, snow melt, rainfall, soil erodibility, slope length and gradient, plant cover, and erosion control practices. Soil erosion would also negatively impact soil health and productivity.

Concentrated activity along cattle migration routes would cause compaction which could damage soil structure, minimize infiltration and increase runoff potential.

Loss of plant cover due to heavier grazing in livestock concentration areas would increase bare soil, which would increase erosion potential. Erosion could result in sediment loading and nutrient loading from animal waste into perennial surface water bodies. Compaction could result in reduced vegetation restoration, by disallowing new shoots to penetrate soil and reduce plant uptake of water because of reduced water infiltration due to ponding and surface runoff.

Special Status Plants
Cedar Rim Thistle is known to be present in the Boulder Landscape area. Three other BLM Sensitive Plant Species have habitat in the area and may also occur. These species are either unpalatable or low growing and not usually utilized by livestock. There would be no change in the amount or distribution of these sensitive species. Where these species occur there would be no impact from changes in livestock grazing or transportation. There would be no change in the amount or distribution of these sensitive species.

Vegetation
The Reference Plant Community for a site in North America is the plant community that existed at the time of European immigration and settlement. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site. This plant community was in dynamic equilibrium with its environment. It is the plant community that was able to avoid displacement by the suite of disturbances and disturbance patterns that naturally occurred within the area occupied by the site. Natural disturbances, such as drought, fire, grazing of native fauna, and insects were inherent in the development and maintenance of these plant communities. The effects of these disturbances are part of the range of characteristics of the site that contribute to that dynamic equilibrium. Fluctuations in plant community structure and function caused by the effects of these natural disturbances establish the boundaries of dynamic equilibrium. They are accounted for as part of the range of characteristics for an Ecological Site. Plant communities that are subjected to abnormal disturbances and physical site deterioration or that are protected from natural influences, such as fire, for long periods seldom typify the

historic Reference Plant Community and may exist in a steady state that is different from the historic Reference Plant Community.

In parts of the Boulder landscape, mid stature bunch grasses and forbs, both playing important roles in valuable wildlife habitats, are lacking both in production and abundance while rhizomatous grasses and sage brush are often overrepresented when compared to the RPC. The spring grazing season in most of the Boulder landscape would stay essentially the same. Annual spring grazing is the most detrimental system that can be applied to mid-stature bunchgrasses such as bluebunch wheatgrass, Indian ricegrass, and needle and thread. Repeated spring grazing is detrimental to these species. Systems that provide periodic rest during the spring growing season, such as deferred or rest rotation systems, are recommended to maintain the health and productivity of these species (USDA NRCS 2002, Ogle et al. 2013). Continued annual spring grazing would likely result in continued decline of these species in the plant communities of the Boulder landscape.

In order to maintain established stands of bluebunch wheatgrass, delaying of spring grazing until plants have reached 6 inches in height is recommended (Ogle et al. 2013). Other researchers recommend attainment of at least 4 inches of growth for mid stature bunchgrasses (Holechek 2004), or the development of at least 4 leaves on most plants (Fraser 2003) before initiation of spring grazing in bunchgrass communities.

Other viewpoints recommend abandonment of range readiness criteria (Perryman et al. 2005). However, these authors assume that advanced grazing strategies are being applied; and also recommend that early grazing seasons be kept short, ending while soil moisture is still adequate, and temperatures cool enough, for cool-season grasses to complete their growth and reproductive cycle (Perryman et al. 2005). In the Boulder area, ending the grazing season early enough to accomplish this would mean removing livestock from the allotments sometime between May 15 and about June 10, depending on the prevailing weather patterns in the year in question (Clause 2013 pers. comm.).

The Proposed Action implements a range readiness criterion of 4” of plant growth, to be measured on key forage bunchgrasses. Delay of grazing until this standard is reached would allow some plant growth, but would not ensure that livestock are removed early enough for plants to accomplish their growth cycle. Repeated spring grazing of the Boulder allotments, without provision for rotational use or early livestock removal, could lead to continued declines in the density, production and vigor of native mid-stature bunchgrass species.

Loss of plant cover due to heavier grazing in livestock concentration areas would increase bare soil, which would increase erosion potential. Soil compaction due to animal concentration along trail routes and concentration areas such as water developments could result in reduced vegetation restoration, by disallowing new shoots to penetrate soil and reduce plant uptake of water because of reduced water infiltration due to ponding and surface runoff.

This alternative would have a slight beneficial impact compared to the No Action Alternative.

Visual Resource Management

Grazing Permit Renewals

The visual impacts would be localized and in the foreground, site specific and subjective. The proposed action and alternatives would have little impact on VRM values.

OHV Route Designations
Implementing the route designations would define an appropriate network of routes and would reduce the occurrence of unauthorized cross-country travel or travel on routes not suitable for the vehicle type. A portion of the routes proposed for closure would be rehabilitated as described in the activity plan. Rehabilitation efforts such as ripping the route surface to create a rough surface and applying seed would result in short term surface disturbance and impacts to visual resources. Since the rehabilitation efforts would take place within the existing route surface, visual impacts are not expected to be greater than those in the existing environment. Re-seeding and subsequent revegetation would increase the site stability, reduce the potential for establishment of invasive species, and reduce impacts to visual resources. The route closures and rehabilitation efforts in the proposed action would have an overall beneficial effect on soils, vegetation, water and visual resources. Visual resources would be positively impacted through reclamation efforts that would obliterate closed routes, and reduce route proliferation, returning the area to a more natural appearance. Visual resources would be negatively impacted by an increased number of signs and route markers, and man-made barriers in the area. This would be mitigated through consideration of sign and marker design, color and placement.

Implementing travel management decisions would be beneficial to visual resources as pioneering of new routes would be reduced. The closure and reclamation of closed roads would enhance the visual setting by reducing the contrast in line, color, form and texture of the landscape.

These actions considered individually or in combinations would be minor changes to the existing landscape setting. All of the actions proposed would comply with the areas visual resource management objectives

Wildlife and Fisheries Resources
The conversion of horse AUMs to cattle AUMs could result in marginal positive impacts for wildlife. Horses have less-efficient digestive systems and a tendency to eat a wider variety of plants than cattle. Removing horse grazing pressure and replacing it with cattle could slightly reduce the impact from grazing. The timing of the grazing pressure is also of importance. Removing pressure in the late summer would reduce the utilization of dried standing crop, and allow for more residual cover to be carried into the following grazing season. Any increase in residual grass cover will benefit sagebrush steppe passerine nesters, small mammalian rodent species, and sage-grouse the following spring.

The native wildlife species found in the Boulder landscape can be considered to have evolved in an ecosystem whose plant community was very similar to the RPC. Any shift to move the plant community closer toward the RPC while still maintaining the human presence (and its impacts) required to manage the land under the multiple use mandate afforded to the BLM would be an overall benefit to the ecosystem and its wildlife species as a whole.

All sage-grouse habitats would remain suitable in the short term with higher quality wintering habitat persisting at the expense of suitable but sub optimal nesting and early brood rearing habitat. Though some species may thrive in the current state (mountain plover and burrowing owls prefer more heavily grazed areas), other species may persist but not thrive. The quality and amount of forage and cover would continue to not provide the greatest potential for the greatest amount of species. Most wildlife habitats would remain in a suitable state however. Trampling of wildlife habitats would still occur, most notably in areas surrounding water sources, salt blocks, and fence lines

Even though all water troughs have been retrofitted with escape ramps, the small potential for avian and small mammal drowning that still persists would not be eliminated. Likewise, the threat of West Nile

virus (WNV) would still persist wherever standing water occurs (water troughs, reservoirs etc.) West Nile virus outbreaks have been shown to be devastating to sage-grouse populations, and any sage-grouse die offs that could occur from WNV would play a huge role in reduction of the local population. Though WNV has been documented in the Upper Green River basin, elevation and the persistence of cold temperatures in the area may result in a lessened effect to the vector species. Though present, WNV may not currently pose a severe threat in the Upper Green. Never the less a threat does exist and potential for impacts would remain.

Any manmade structures upon the landscape would continue to serve as potential nesting structures and perches for predatory bird species, most notably ravens and golden eagles. Numerous efforts have been undertaken to convert windmills to solar power in an attempt to reduce the impacts of predation on sage-grouse eggs and chicks. Vertical structures also serve as a perceived threat to prey species. Whether or not a raptor or corvid is using or will use a structure to perch or nest upon may not matter to the prey species using the area. The perception of a perch in an otherwise suitable habitat can deter prey species from occupying an area. These impacts would continue to occur for all prey base species although mitigated to some level by the efforts to convert windmills to solar power.

Big game species avoiding areas of high cattle use would continue to avoid those areas. In areas where cattle and elk do comingle (elk parturition areas in East Fork Common allotment) Brucellosis transmission potential from elk to cattle would remain the same. Many efforts have been implemented by both WYG&FD and private land owners/permittees to reduce this potential but the potential would remain however slight it may be.

In the initial stages of permanent road closures (10 miles) and repair of washout in certain areas, negative impacts to nesting songbirds and various small mammals using the habitats surrounding those roads could be accrued. Reclamation of roads and the surface disturbance spilling over beyond the actual travel way could remove habitats and could potentially result in direct impacts to animals using those areas. However, permanently closing and reclaiming roads, in the long run, would reduce motorized vehicle use and associated disturbance in the area, and would reduce the amount of habitat fragmentation in the landscape. Wildlife use in these areas may increase as a result of decreased disturbance and habitat fragmentation. Current wildlife use would continue in areas where transportation management would not change.

This alternative would provide a slight benefit overall to wildlife habitat over the No Action alternative.

Fisheries

For more than 30 years research, studies and other observations have been made concerning various public land use practices and management strategies and their direct and indirect effects on riparian areas, streams and fisheries. Direct effects to fisheries could be such things as livestock stepping on redds (areas where eggs are deposited during spawning) and destroying eggs or fry (Peterson, et. al., 2010), heating of water during wildfire, dewatering of streams or entrainment of fish through irrigation diversions, etc. Indirect effects could be such things as sedimentation to streams resulting from livestock grazing and trampling that may destabilize streambanks (Armour et. al, 1991; Kauffman and Krueger, 1984), erosion from roads, upland erosion from poor vegetative cover, wildfire removal of vegetation in large areas, etc., which in turn could cover up eggs during spawning or adversely affect aquatic macroinvertebrates as a food supply; effects to terrestrial invertebrates which studies show can contribute upwards of ½ the diet of native fishes (Saunders and Fausch 2009; Baxter et al. 2005); and changes to in-stream habitat diversity.

Most of the fisheries and fish habitat within the boundaries of the Boulder landscape is on private or state lands. That occurring on public lands is primarily in the East Fork Common allotment consisting of the East Fork River and Irish Canyon Creek between Forest Service and State of Wyoming ownership. Riparian areas for both streams are rated as Proper Functioning Condition. This means that there is sufficient vegetation and channel character to dissipate energies during high flows but does not necessarily represent desired conditions if managing for other values such as quality fish habitat. In relation to this, fish habitat quality for the East Fork at two WGFD monitoring stations was rated as poor due to wide channel, shallow pools, substrate embeddedness, and a low amount of instream cover. The East Fork has the proper characteristics (PFC) to be able to improve towards better fish habitat.

The East Fork Common is permitted to be grazed by livestock for 2 months in the spring and early summer. The rest of the growing season, with the exception of fall trailing, should be un-grazed which theoretically would allow for increased riparian plant vigor. Range readiness criteria would be implemented for turnout which should improve upland health. No riparian vegetation utilization criteria would be implemented, but upland use criteria would. It is anticipated that improvements to upland and riparian health will decrease sedimentation from public lands to streams. Much of the East Fork, Irish Canyon Creek and Jim Creek dissipate stream energies through geologic means (i.e., they are rocky streams) and vegetation plays a minor role in these sections. In the portions that do rely on vegetation for stream health, this alternative should help to improve conditions for fish habitat, though more slowly than Alternatives 2 and 3. Continued monitoring of these key sections of stream (vegetative control areas) should be a priority. Direct impact of livestock on fish redds has not been documented but is not believed to be a problem in these streams. Maintaining vegetation health at stream edges will help keep invertebrate populations intact as a food source for fisheries.

Alternative 1 – No Action Alternative

Air Resources
Impacts to ozone conditions and global climate change would be similar to those described for the Proposed Action.

Cultural and Paleontological Resources
Impacts would be similar to those described for the Proposed Action. Changing seasons of use would not change the impacts on these resources.

Economic and Social Impacts
Impacts would be similar to those described for the Proposed Action, with the exceptions that there would be no spring turnout delays to accommodate range readiness, and there would be no conversion of horse to cattle AUMs in the Square Top Common allotment.

Lands with Wilderness Characteristics
Impacts would be similar to those described for the Proposed Action.

Livestock Grazing
Continuous early season use could impact the vegetation's growth and therefore could reduce the protein intake of cattle on the range. If cattle are competing for a limited supply of resources, weight gains and conception rates could be negatively affected and death loss could occur due to the increased stress on livestock.

Noxious Weeds
Impacts would be similar to those described for the Proposed Action.

Recreation
There would be no positive beneficial impacts to the recreation setting, recreation opportunities or compliance with appropriate travel on public lands. No additional regulations or control of motorized use would be implemented.

The OHV designation decisions would not be implemented. An appropriate network of vehicle routes would not be defined, leaving the area more susceptible to route proliferation due to unauthorized cross-country travel. Motorized travel would be allowed on existing roads and trails with no specific route designations, travel management plan, or rehabilitation efforts. Issues related to resource protection, public safety, and conflicts between various uses of public lands would not be addressed. All routes would be designated in the Irish Canyon area, but a Travel Management Plan would not be completed.

Visitor use levels and related resource concerns would continue to increase. OHV management necessary to address public and administrative access needs, protect resources, promote public safety and minimize conflicts among various uses of public lands would not be implemented.

No seasonal closures would be implemented. No additional protection would be provided to the wintering wildlife in big game crucial winter range. Motorized vehicle use during spring snow melt also has the potential for vehicles to cause ruts and resource damage by driving on wet and muddy roads. This can cause increased erosion and additional resource damage as vehicles tend to create new routes to avoid the ruts.

Riparian Resources, Watershed, and Hydrology
Impacts would be similar to those described for the Proposed Action.

Soils
Impacts would be similar to those described for the Proposed Action.

Special Status Plants
Impacts would be similar to those described for the Proposed Action.

Vegetation
Under the No Action Alternative there would be no change in the vegetation resources in the Boulder Landscape area. Continued spring use could further reduce the ability of the native grasses to recover. Along with continuing drought conditions, the native habitat could be negatively affected.

The no action alternative would renew permits for grazing of domestic livestock under the same terms and conditions of the current grazing permits. Grazing management in the Boulder landscape has changed very little in the last century with the bulk of grazing overlapping the critical growing season. This grazing management scenario has in a general sense been carried forth year after year with no mandatory or voluntary rest or rotational grazing scheme significantly being implemented across the planning area. Continued spring use, along with natural vegetation succession, has contributed to the current condition of plant communities described in section 3.14, where shrubs are over-dominant in the community and perennial mid-stature bunchgrasses are less dominant than expected for the ecological sites present.

With no changes in grazing management, production of plant species would remain out of balance. Neither the grass nor forb component would increase to the levels called for in the reference state. Sagebrush and shrubs would remain at levels above what is described in the reference states for the ecological sites in the allotments.

Visual Resource Management
Proliferation of unauthorized routes could adversely impact visual resources. Any new surface disturbance would create contrasting color, line, form and texture to the characteristic landscape.

Wildlife and Fisheries Resources
Sage-grouse habitats would remain suitable in the short term with higher quality wintering habitat persisting at the expense of suitable but sub optimal nesting and early brood rearing habitat.

Though some species may thrive in the current state, other species may persist but not thrive. The quality and amount of forage and cover would continue to not provide the most ideal balance for all species involved.

Impacts from fencing, water developments, and other manmade structures would be similar to those described for the Proposed Action. Impacts to big game habitats and impacts from trampling wildlife habitats would be similar to those described for the Proposed Action.

With no change in transportation management current wildlife use and avoidance of roads in the landscape would not change. Habitat fragmentation and vehicular disturbance would still occur in areas with roads open for use.

In areas where cattle and elk comingle (elk parturition areas in East Fork Common allotment) Brucellosis transmission potential from elk to cattle would remain the same.

Fisheries
Under this alternative the grazing season and number is the same as the Proposed Action. Fall trailing would be 'uncontrolled' which means that livestock could be present in the East Fork Common allotment season long. This would not be good for riparian health. There would be no range readiness turnout criteria or upland or riparian utilization criteria for moving animals. Improvements to upland and riparian health would not be expected. Sedimentation to streams could increase, damaging fish habitat. Much of the East Fork, Irish Canyon Creek and Jim Creek dissipate stream energies through geologic means (i.e., they are rocky streams) and vegetation plays a minor role in these sections. In the portions that do rely on vegetation for stream health, this alternative would not help to improve conditions for fish habitat.

Impacts of grazing on fish redds and invertebrate populations would be similar to those described for the Proposed Action.

Alternative 2 – No Livestock Grazing Alternative

Air Resources
Impacts to ozone conditions and global climate change would be similar to those described for the Proposed Action.

Cultural and Paleontological Resources
The impacts described for the Proposed Action would not take place under this alternative. No trampling, breakage, or movement of cultural or paleontological materials would occur due to the presence of livestock.

Economic and Social Impacts
Eliminating livestock grazing would impact grazing permittees who use the 18 allotments in the Boulder landscape. Livestock grazing on 72,000 acres of public lands providing 8099 AUM's of forage on 18 grazing allotments would not occur. This would lead to increased costs for livestock operators in the form of increased fencing, feed, water, and supplements. Operations may be forced to sell cattle to reduce herd sizes to levels that could be run on the associated deeded lands and other leased lands. Loss of livestock grazing permits on the 18 allotments could render at least some of the ranches non-viable economically. Although it is not possible to say what other sources of income are available to those who use these grazing permits, it is safe to predict that the impact, both economically and socially, to those who lose the grazing permits would be significant and in some cases devastating. In addition to a source of income, ranching is a way of life for residents of the Boulder landscape, and its loss would cause impacts on family dynamics, career paths, individual economic status, and the collective culture of the community. If ranches were to become uneconomically nonviable, conversion of private-land open space to subdivisions could result in some areas.

On a larger scale, the economic impact of loss of livestock grazing in the Boulder area would likely be very apparent in Sublette County, detectable in western Wyoming, and not detectable on a national scale.

Lands with Wilderness Characteristics
The elimination of livestock grazing would not impact the wilderness characteristics of the area. There would be some gain in aesthetic and wilderness character with removal of the interior allotment boundary fences in the Boulder landscape. Closure and reclamation of 191 miles of roads would enhance wilderness character.

Livestock Grazing
Access to public lands for grazing would cease and would require livestock to remain on private lands. Although nutritional requirements would be met due to these lands being more productive bottom lands, issues would arise when these same private lands would be needed to grow a hay crop to support the herd through the winter. The possibility of cattle contracting Brucellosis on BLM lands would be removed but would increase on private lands that are used for parturition areas by elk.

Noxious Weeds
Alternative 2 would be similar to the Proposed Action, with invasive species having similar distribution and abundance.

With no livestock grazing there would be one less vector for the introduction and distribution of weed seeds, but with continued access by vehicles and other wildlife there would be little difference seen in the overall abundance or distribution.

Recreation
Impacts would be similar to the Proposed Action; however motorized access to some areas would be diminished. Opportunities for visitors to enjoy the benefits provided by motorized activities would be reduced causing visitors to seek other areas to recreate. Visitors interested in a primitive recreation setting would realize greater benefits as roads are closed and the opportunity to encounter other people using motorized equipment are reduced.

Riparian Resources, Watershed, and Hydrology
The response of water and riparian conditions within the Boulder landscape to a removal of domestic grazing could be less evident than applying similar actions to other landscapes within the PFO, but could make a discernible difference in riparian conditions. The exact effect that this would have on water quality is unknown due to a large number of variables but would most likely result in a long term improvement.

It is unknown to what extent the removal of domestic grazing impacts would allow for increases in obligate wetland plants, or in what timeframe these effects would be seen. However, it is common for areas excluded from livestock grazing to experience increases in density and vigor of obligate wetland species such as Nebraska and beaked sedge. These plants provide the root mass necessary to dissipate stream energy, reduce erosion, filter sediment, develop floodplains, improve flood-water retention and groundwater recharge, and stabilize streambanks. This, in turn, could result in an increased amount of riparian area, narrowed channels and increased capacitance in terms of the riparian areas' ability to capture and slowly release water volumes associated with high flows. Areas that presently experience the greatest grazing impacts would most likely show the greatest change. As such change would require the capture and vegetative colonization of sediment and this being a relatively sediment poor set of stream reaches, the response to removal of grazing could be comparatively slower than more sediment rich areas.

Soils
Erosion and runoff would result from natural processes but to a lesser degree than the proposed action.

Special Status Plants
Under Alternative 2 there would be no impacts to Special Status Plant Species. Where these species occur there would be no impact from changes in livestock grazing or transportation. There would be no change in the amount or distribution of these sensitive species.

Vegetation
Over the long term, the no grazing alternative would improve the habitat by allowing the native grasses to produce greater above ground foliage and increase the root reserves throughout the season. Wildlife would consume some of this extra vegetative growth, but overall the condition of the native habitat would be improved, which would be a benefit for wildlife. This would also help prevent upland erosion through increased vegetative cover, improving water quality.

This alternative would also provide rest for the plant community and the lack of grazing pressure could allow plants such as Indian ricegrass, needle and thread and bluebunch wheatgrass to become more vigorous and produce more seed. Over a ten year period, the lack of grazing pressure could result in a slight increase in the frequency of some deep rooted perennial species and a shift in the plant community toward a more desirable bunchgrass/big sage status. However, this alternative alone would not be sufficient to reduce the dominance of shrubs in the vegetation community.

Increases in the standing crop of herbaceous vegetation under this alternative could lead to an increased chance of wildfire. Wildfire would provide the needed energy input to reduce the dominance of sagebrush in the plant community, further allowing ecological sites to shift toward the Bunchgrass/Sagebrush state.

This alternative would have a beneficial impact compared to the Proposed Action.

Visual Resource Management
There would be no impacts to visual resources from removal of livestock grazing. Removal of fences and abandonment of 191 miles of roads could result in some improvements in visual values. The removal of range improvements and reclamation of roads would enhance the visual values somewhat. As roads return to a more natural state and fences are removed, there would be a reduction is contrast with the visual elements of the characteristic landforms.

Wildlife and Fisheries Resources
In addition to the elimination of the potential direct impacts of trampling of wildlife habitats, the resulting benefits from complete rest for a period of 10 years across the Boulder landscape would greatly benefit nearly all wildlife species. The amount of forage typically used by domestic livestock would become available to wildlife species both in the form of an increase in the availability of food (forage) as well as an increase in vegetative protective structures (cover).

If grazing were removed from the landscape indefinitely, natural ecological processes could in the long term result in a balancing effect on the plant communities, shifting them toward the reference state resulting in an overall benefit to all wildlife species.

An increase in screening cover both in the form of a greater amount of residual grass in early spring, and current year's growth throughout the summer months, as well as an increase in abundance of plants would result in higher quality nesting and early brood rearing habitat for sage-grouse and most all avian species nesting in the upland sagebrush habitats found in the Boulder landscape. The increase in vegetative biomass could also support a greater abundance of desirable insect species used by foraging insectivorous avian species as well as sage-grouse. The resulting improvement in nesting and early brood rearing habitat for these bird species could increase nests success and chick survival which in turn could play a part in an increase in population in the area. Increased screening cover could also play a positive role in prey based species' ability to evade predators.

If domestic livestock grazing were not allowed on the landscape there would be no need for internal allotment fencing. Removal of this existing fencing would decrease potential raptor perching and subsequently the indirect impacts of raptors preying on grouse as and other prey species. The removal of fencing could also eliminate any direct mortality due to grouse colliding with problem fences. Removal of fences could also reduce the utility of the travel corridors used by predators found along those corridors. Vegetative structures are usually altered along fence lines and two track roads typically follow the fence on one or both sides. These parameters may allow for the persistence of predator travel corridors, however, at least until vegetation recovers in these areas. The removal of any fences in the Boulder landscape would greatly benefit the ease of Big game migrations and would eliminate mortality associated with entanglements that may have been occurring in those fences. In certain areas of the Boulder Landscape some amount of new fencing may need to be constructed to separate private lands from public lands. All of the impacts that would be reduced in areas where fences were removed would be increased in areas where these new fences would be placed.

The elimination of congregating livestock and wildlife in the areas surrounding water sources as well as in areas surrounding artificial mineral blocks could reduce the overgrazing and trampling effects that occur in these areas. Over the long term (>10 years), these areas could recover and become more suitable for nesting and early brood rearing habitats as well.

Big game species have been documented to completely avoid areas where cattle use is occurring. Removal of livestock from the landscape would eliminate the avoidance of these areas. This could result

in a distribution shift of big game species and could make certain habitats available to wildlife that may have been avoided when cattle had been present in the past. The complete removal of cattle from the landscape would also completely eliminate the issue of potential transmission of Brucellosis from the elk population to cattle on BLM lands. If private land owners were to then make further use of their own lands to sustain their cattle operations, an increase in the number of cattle on private lands that overlap Elk parturition could see a potential increase in brucellosis transmission on private lands.

Big game parturition habitats and riparian habitats in the higher elevations of the Boulder landscape would see an overall benefit from removal of cattle induced browse pressure and trampling of key plant species. By removing the livestock component of browse and trampling in these important habitat types, an overall increase in plant production could result. This increase in production could be realized in the form of overall increase in forage and cover to all species of wildlife using those habitat types.

Some species of wildlife could see an initial negative impact from removing livestock grazing from the landscape. Species like mountain plover and burrowing owl utilize more heavily grazed areas and could see a reduction in habitat suitability if grass production in their habitats were increased. These species often overlap prairie dog colonies and though habitat suitability may decrease in some areas, it would likely remain suitable in prairie dog towns where grazing pressures from the prairie dogs would persist.

The elimination of livestock grazing would allow plants to grow larger and unconsumed standing forage to remain on the landscape from previous years. This increase in the proportion of older forage could result in a reduction in forage palatability for wildlife. Any decreases in palatability would likely be offset by increases in forage availability and abundance.

Removal of livestock water developments could result in some redistribution of wildlife use, particularly for pronghorn antelope in the summer. Deer and elk, as well as sage-grouse, use patterns should not change appreciably.

Impacts of closing roads and seasonal road closures on wildlife populations would be similar to those described for the Proposed Action but would be more beneficial. More miles of roads would be closed and rehabilitated in this alternative resulting in a greater decrease in habitat fragmentation and vehicular disturbance. Current wildlife use and avoidance in areas with no change in transportation management would not change. Habitat fragmentation and vehicular disturbance would still occur in areas with roads open for use.

Overall, this alternative would provide greater benefits to wildlife habitat than the Proposed Action.

Fisheries

The East Fork Common would not be grazed by domestic livestock and there would be no adverse impact to riparian areas, stream morphology or fisheries directly or indirectly from livestock. It is anticipated that improvements to upland and riparian health would occur that will decrease sedimentation from public lands to streams. Much of the East Fork, Irish Canyon Creek and Jim Creek dissipate stream energies through geologic means (i.e., they are rocky streams) and vegetation plays a minor role in these sections. In the portions that do rely on vegetation for stream health, this alternative would help to improve conditions for fish habitat more quickly than any of the other alternatives. Continued monitoring of these key sections of stream (vegetative control areas) should be a priority. Direct impact of livestock on fish redds would not occur. Any streambank trampling that occurs would be directly attributable to wildlife. Maintaining vegetation health at stream edges will help keep invertebrate populations intact as a food source for fisheries. Closing the Jim Creek trail to vehicular use would also decrease a potential source of

sediment to the East Fork. Other roads not designated for motorized use could also decrease sediment sources if reclaimed.

Alternative 3 – Rotational Grazing

Air Resources
Impacts to ozone conditions and global climate change would be similar to those described for the Proposed Action.

Cultural and Paleontological Resources
Impacts would be similar to those described for the Proposed Action, but could be increased due to the concentration of animals required to implement the rotational grazing systems.

Economic and Social Impacts
This alternative would allow for continued livestock grazing, avoiding the impacts discussed in Alternative 2. However, changes in management required of grazing permittees to follow the grazing rotations outlined would be significant in some cases. Additional labor would be required, potentially necessitating the hiring of additional help; a cost that could be difficult for individual ranches to bear but that could provide a slight boost to the labor market in the area.

Other impacts would be similar to those described for the Proposed Action.

Lands with Wilderness Characteristics
Changing the grazing system should not have any impact on LWC. Impacts would be similar to those described for the Proposed Action.

Livestock Grazing
The rotational grazing system would provide rest one out of every three years for the suggested pastures. Pastures, in general, will supply most of the nutrients needed but if a pasture is short or inadequate, cows cannot milk well and heifers will not grow rapidly without adequate energy (Jurgens, 1997).

Concentrating large numbers of livestock and rotating them through pastures could reduce gains and conception rates on livestock due to increased competition for resources. Also, the current water wells are not capable of handling this increased concentration of livestock numbers and it might become difficult to keep the water tanks full or to provide adequate water for the larger herd sizes caused by this concentration.

Overall, this alternative might not provide any benefits over the Proposed Action.

Noxious Weeds
In general, impacts on noxious weeds would be similar to those described for the Proposed Action.

Recreation
Impacts would be similar to the Proposed Action. Additionally, opportunities for non-motorized or primitive recreation may benefit from fewer roads and less motorized access. Cross country hiking, mountain biking, horseback riding and hunting are some activities which could be enhanced.

The seasonal closure to motorized vehicles would provide protection for wintering wildlife in crucial big game winter range. This protection could play a role in enhancing wildlife populations and possibly big game hunting opportunities. Since motorized vehicles would not be allowed on the roads during the seasonal closure, the potential for vehicles to cause ruts and resource damage by driving on wet and muddy roads would be reduced. This would enhance the recreation setting and benefit visitor experiences.

Implementing the seasonal closure would pose additional restrictions on the recreating public and would increase the administrative presence of the BLM in this area. The impact of additional restrictions is expected to be minimal because vehicle access to a majority of the planning area is available year-round. Allowing exceptions for certain administrative uses, emergency use, and flexibility in the closure dates would accommodate future management needs as deemed appropriate by the BLM Authorized Officer.

Riparian Resources, Watershed, and Hydrology
Impacts would be similar to those described for the Proposed Action.

Soils
Erosion, compaction and runoff would be to a lesser degree than the proposed action and no action because cattle migration routes and plant utilization would be different thus protecting the soil stability by protecting the plant cover.

Special Status Plants
Under Alternative 3 there would be no impacts to Special Status Plant Species. Where these species occur there would be no impact from changes in livestock grazing or transportation. There would be no change in the amount or distribution of these sensitive species.

Vegetation
In Alternative 3 there would be a change to a rotational grazing system with an emphasis on protecting and managing greater sage-grouse habitats along with additional transportation management to protect sage-grouse habitats and allow reasonable access to the Boulder landscape. This would allow native species to produce greater above ground foliage which would then lead to an increase in the root reserves. Rotational grazing is recommended in many studies for management of mid-stature bunchgrasses such as Indian ricegrass, needle and thread, and bluebunch wheatgrass (Ogle et al. 2013, USDA NRCS 2002, 2005). A shift in the plant community towards the reference plant community could result in the long term. This would help prevent upland erosion from poor vegetative cover.

Fall trailing in the East Fork Common would be controlled so that it is an active trailing use, not an extended use period. This would benefit the vegetation by having less use during a shorter period rather than throughout the season.

Utilizing the flexibility criteria would also allow more control on the use of the native vegetation in a period of early growth which would improve its condition before it is grazed compared to the conditions under current management.

A shift in the plant community toward a Bunchgrass/Sagebrush state would be somewhat less likely than under Alternative 2, No Grazing. Shifts in plant community composition on uplands are long term and may take many years to be visible.

This alternative would have a beneficial impact compared to the No Action Alternative but would not be as beneficial to the native habitat as in the Proposed Alternative.

Visual Resource Management
Impacts would be similar to those described for the Proposed Action.

Wildlife and Fisheries Resources
Trampling impacts from cattle on wildlife habitats could be more severe in areas in allotments that were not being rested in any given year. These impacts would be due to the fact that more cattle would be concentrated in each of the pastures not being rested for the year.

In the short term, increase in production in an allotment in the year it was being rested could positively impact nesting and early brood rearing avian species by progressively increasing screening cover throughout the nesting and early brood rearing season. Sage-grouse hens choose nest sites based upon the standing crop and its cover that is available at the time of breeding, and any increase in screening cover throughout the year would benefit them. The positive impacts could result in greater nest success and survivorship of current years' chicks. Conversely, nesting and early brood rearing habitats for sage grouse and other avian species (songbirds) could see a reduction in suitability due to more widespread utilization and removal of the standing crop in pastures that were not being rested. The reduction in suitability could occur in areas seeing increased utilization by cattle due to there being more cows in non-rested pastures than had typically used the area.

However, nest success the following season could decrease from the initial season in which the allotment was rested. This would be a result of a progressive reduction throughout the year in the standing crop available to sage-grouse hens at the time of choosing a nest site. This in theory is not different from the functions being realized in the current state of grazing in the Boulder landscape except that it could be intensified due to greater amounts of cattle being placed in each pasture than have been grazing at any one time in the allotments in the past, could occur in areas that had not been utilized by cattle in the past, and that it would follow a year of greater nest success than has been realized in past years. These same impacts to forage and screening cover could be realized for the passerine bird species and the small mammals prey based species, both within rested allotments as well as allotments being grazed.

Any shift toward the reference plant community would greatly benefit the suite of native species that utilize the Boulder landscape since the reference plant community is representative of the most natural state in which those animals evolved.

Rest rotation is not proposed in the East Fork Common, which would not see the impacts discussed above. However, it is suggested that a shift to active trailing through the area could result in vegetative benefits in that area. Any increase in grass production realized in that allotment could result in a positive benefit for wildlife in the form of increased forage and cover albeit a slight benefit. It is also proposed in that turnout in the East Fork Common would not occur until after June 15. If cattle are not in areas of elk parturition during the calving season the potential of transmission of brucellosis from elk to cattle would be greatly reduced and potentially eliminated in those areas.

Impacts of open and closed roads and seasonal road closures on wildlife populations would be similar to those described for the Proposed Action.

This alternative would provide more benefits to wildlife habitat than the No Action alternative but less than No Grazing.

Fisheries
The East Fork Common would be permitted to be grazed by livestock for 2 months in the spring and early summer. The rest of the growing season, with the exception of fall trailing, would be un-grazed and should allow for increased riparian plant vigor. Fall trailing would be strictly controlled and limited to 'active trailing'. Range readiness criteria would be implemented for turnout along with a delay until June 16 in portions of the allotment which should improve upland health. No riparian vegetation utilization criteria would be implemented, but upland use criteria would be. It is anticipated that improvements to upland and riparian health would decrease sedimentation from public lands to streams. Much of the East Fork, Irish Canyon Creek and Jim Creek dissipates stream energies through geologic means (i.e., they are rocky streams) and vegetation plays a minor role in these sections. In the portions that do rely on vegetation for stream health, this alternative should help to improve fish habitat more quickly than any of the other 'grazing' alternatives.

Impacts of grazing on fish redds, invertebrate populations would be similar to those described for the Proposed Action. This alternative has the greatest chance to improve and maintain fisheries and fish habitats short of Alternative 2 (No Livestock Grazing).

Alternative 4 – Fall Grazing

Air Resources
Impacts to ozone conditions and global climate change would be similar to those described for the Proposed Action.

Cultural and Paleontological Resources
Impacts would be similar to those described for the Proposed Action. Changing seasons of use would not change the impacts on these resources.

Economic and Social Impacts
Changing the grazing season from spring to fall in the 5 largest allotments would cause upheaval in the management of ranches in the Boulder area. Many ranchers would have difficulty in arranging pasture for their animals in May and June, the traditional use season for most of the Boulder allotments. This change could generate large additional expenses, and could render some ranching operations economically unviable. For those operations, impacts could approach those described for Alternative 2. For allotments and livestock grazing permittees not changed to a Fall use season, impacts would be similar to those described for the Proposed Action.

Lands with Wilderness Characteristics
Impacts would be similar to those described for the Proposed Action.

Livestock Grazing
Fall grazing would allow forage the ability to grow, set seed and store carbohydrates before grazing occurs. Short and Knight (2003) found that fall grazing would increase percent green biomass in both spring and summer, not reduce green grass standing crop in spring, not reduce green forb standing crop in summer, not alter species richness of the sites, and not alter relative abundance of plant species present. Although improved plant community health and abundance should contribute to livestock health and reproductive rates, it could pose several hardships to livestock. According to (Barnes et. al, 2003), developmental stage of growth is the dominant factor that affects digestibility of grasses. With cool-season grasses, spring grazing offers higher protein content and easier digestibility and grazing forage in

the fall after these grasses have grown stems and produced seed will reduce the appetite and digestibility of cattle because forage in this growth stage takes longer to break down.

Noxious Weeds
Alternative 4 would be similar to the Proposed Action with invasive species having the same distribution and abundance. Fall grazing would allow the native vegetation to have better regrowth in the spring but with the amount of wildlife use and continued access by vehicles the amount and distribution of invasive species in the area should show little change.

Recreation
In general, impacts to recreation uses would be similar to those described for the Proposed Action. However, concentrating livestock use in the fall could cause conflicts between grazing use and hunting, including cattle presence in campsites leading to damage of camping equipment and vehicles. It is also possible that livestock presence in the fall could affect the distribution patterns of big game, affecting traditional hunting areas for some users.

Riparian Resources, Watershed, and Hydrology
Impacts would be similar to those described for the Proposed Action.

Soils
Impacts to Soils would be similar to those described for the Proposed Action.

Special Status Plants
Under Alternative 4 there would be no impacts to Special Status Plant Species. Where these species occur there would be no impact from changes in livestock grazing or transportation. There would be no change in the amount or distribution of these sensitive species.

Vegetation
This alternative would change the season of use to a late season use period in allotments containing more than 1,000 acres. This delay in the spring would allow the native vegetation a period of undisturbed early growth which would improve its condition before it is grazed compared to the conditions under the current management.

Utilizing the flexibility criteria would also allow more control on the use of the native vegetation in a period of early growth which would improve its condition before it is grazed compared to the conditions under current management.

This alternative would have a beneficial impact compared to the Proposed Action but would not be as beneficial to the native habitat as the No Grazing Alternative.

Visual Resource Management
Impacts would be similar to those described for the Proposed Action.

Wildlife and Fisheries Resources
Fall grazing would have a beneficial impact to nesting and early brood rearing habitats for grouse and various other upland sagebrush nesting avian species as well as all species benefitting from greater forage and cover amounts. Grasses in the area would be able to grow throughout their life stages before being grazed in the fall. The production of the grasses would reach their full potential relative to the weather and climatic conditions realized in that season. Fall grazing would however remove residual cover up to

the 50% utilization limit, reducing cover and potential forage available in the fall and winter or early spring of the following season. In the spring of the year, residual cover would be reduced in the initial stages of sage-grouse nesting but would progressively increase throughout nesting season until the greatest benefit would be realized during early brood rearing. The benefits of increased forage and cover would be reduced annually once grazing pressure in the fall began to remove the initial increase of production.

Over time the grass component's ability to mature each year, produce seed, and the seeds' ability to grow into new grass plants could shift the community toward the reference plant community, providing long term benefits in nesting and brood rearing cover.

The potential for brucellosis transmission from elk to cattle would become almost nonexistent since cattle would not be around parturition areas during elk calving season. The potential for nest trampling would be reduced since cattle would not be on the landscape during those important timeframes. Potential habitats that are being avoided due to cattle presence would be available for big game species during the spring and summer months.

Impacts of open and closed roads and seasonal road closures on wildlife populations would be similar to those described for the proposed action but would be less beneficial as a result of no road closures.

This alternative would provide more benefits to wildlife habitat than the Proposed Action but less than the No Grazing alternative.

Fisheries
The East Fork Common would be permitted to be grazed by livestock for 2 months in the late summer and early fall. The rest of the growing season in spring and summer would be un-grazed and would allow for increased plant vigor on riparian grass-like species. Willow use by livestock could increase dramatically and may adversely affect this community. Monitoring would be essential to prevent adverse effects. No riparian vegetation utilization criteria will be implemented but upland use criteria will. It is anticipated that improvements to upland and riparian health will decrease sedimentation from public lands to streams. Much of the East Fork, Irish Canyon Creek and Jim Creek dissipate stream energies through geologic means (i.e., they are rocky streams) and vegetation plays a minor role in these sections. In the portions that do rely on vegetation for stream health, this alternative could help to improve fish habitat, but without bank stability monitoring or willow community monitoring it is unclear how quickly it would improve, if at all. Continued monitoring of these key sections of stream (vegetative control areas) should be a priority. Direct impact of livestock on fish redds has not been documented but is not believed to be a problem in these streams. Maintaining vegetation health at stream edges will help keep invertebrate populations intact as a food source for fisheries. Though not anticipated in this alternative, any severe decrease in willow and sedge plant communities on streambanks could destabilize banks, increase water temperatures, decrease invertebrate production, increase sediment and overall decrease fish habitat.

4.2 Cumulative Effects

Introduction
According to the 1994 BLM publication (attached to WO-IB-94-310) "Guidelines for Assessing and Documenting Cumulative Impacts," the cumulative analysis can be focused on those issues and resource values identified by management, the public and others during scoping that are of major importance." Additionally, the guidance provided in the National BLM NEPA Handbook H-1790-1 (2008), for

analyzing cumulative effects issues states, "determine which of the issues identified for analysis may involve a cumulative effect with other past, present, or reasonably foreseeable future actions.

Past Actions

Livestock grazing has occurred in the area since the late 1860's by cattle and sheep with conversion to cattle in the late 1960's. Range improvement projects have been implemented across the various CIAA's to improve grazing management, including spring developments, fencing, and vegetation treatments. Various wildlife habitat improvement projects have occurred in the various CIAA's in the past.

The area has seen sustained drought in the recent past.

Oil and gas development has occurred in the CIAA's. Urban sprawl in recent past has resulted in various subdivision expansions in the area. Elk feed grounds have been managed in the area since the 1950's.

Various highways, county roads, utility corridors and gravel pits occur in the CIAA's.

Present Actions

There are 216 allotments where grazing occurs in the CIAA with additional grazing occurring on U.S. Forest Service and private lands.

Oil and gas leasing, exploration and development are ongoing in the area on a few valid leases. Most of the area is unavailable for new oil and gas leasing.

All previous actions discussed above are currently ongoing.

Reasonably Foreseeable Actions
Livestock grazing use is currently permitted and will reasonably continue throughout the CIAA's as well as the other activities listed above.

Air Resources
Air quality would be impacted much more by ongoing oil and gas activity in the Jonah and Anticline fields, and the proposed NPL field, than by actions considered in this EA. Ozone and other air quality issues would likely continue, although the impacts of the proposed action and alternatives would be negligible.

Cultural and Paleontological Resources
Over time the collective effects of livestock and OHV use in the planning area could lead to advanced areas of erosional degradation, and more dispersal and shattering of artifacts/fossils. Further, with more human use through time, in the area, looting and vandalism may decimate cultural and paleontological remains. Another outcome could be the eventual closure of the Lander Trail due to overuse by recreational and ranching communities and the erosional degradation caused by this misuse of the Trail. One of the effects of these increases could be the need for more monitoring and stricter law enforcement strategies. A second outcome could lead to a complete Class III inventory of the planning area. Further, areas that concentrate animals within the project area may need Class III surveys completed, including: fence lines, stock tanks, water wells, and salt licks. New roads, road improvements or road closures may cause inadvertent erosional problems if people choose to go around closure methods (signs, boulders) or mud holes. Increased OHV use may also lead to further degradation of sensitive soils within the planning

area.

Economic and Social Impacts
Continued oil and gas activity in the active Jonah and Anticline and proposed NPL fields would have a greater economic impact on Sublette County than would the proposed action and alternatives discussed in this EA. Alternatives that limit or eliminate livestock grazing could exacerbate the ongoing social change in the county from primarily agricultural to a more industrial landscape and economic climate.

Lands with Wilderness Characteristics
The incremental addition of LWC lands outside of the planning area would not create impacts to LWC within the planning area. Changes to the existing LWC units from land management practices such as grazing and fluid mineral development or changes in human activity related to recreation could create incremental and direct adverse impacts to LWC. However, past, present or reasonably foreseeable actions that directly or indirectly may impact LWC are not anticipated.

Livestock Grazing

Proposed Action
The proposed action would have minimal cumulative effects to rangeland health because the proposed action includes range readiness criteria, flexibility in turnout dates, flexibility in the length of grazing season and flexibility in numbers of livestock.

Alternative 1 – No Action Alternative
The no action alternative would have minimal cumulative impacts on livestock grazing because the current livestock grazing scheme would not be changed.

Alternative 2 – No Livestock Grazing Alternative
The no grazing alternative would have minimal cumulative impacts to rangeland health because livestock would be removed from public lands. The No Grazing alternative could result in increased grazing on and increased fencing of private lands.

Alternative 3 – Rotational Grazing
The rotational grazing alternative would have minimal cumulative impacts to rangeland health because livestock would be actively managed through the rotational grazing system.

Alternative 4 – Fall Grazing
The fall grazing alternative would have minimal cumulative impacts on rangeland health due to grazing the range after the plants have completed their growth cycle for the season.

Noxious Weeds
No impact to the area or concentration of noxious weeds is expected as a result of the proposed action or alternatives.

Recreation
The implementation of a comprehensive travel management plan for the Boulder Travel Management Area and other TMAs would reduce adverse impacts and enhance recreation experiences. Changes in grazing management and other authorized activities such as fluid mineral development may create unanticipated adverse impacts to recreation resources and visitor experiences; however no existing or future actions are anticipated.

Riparian Resources, Watershed, and Hydrology
The riparian areas in the Boulder landscape are geographically far removed from oil and gas activities. No additional impacts to those described in previous sections are expected.

Soils
Cumulative soil impacts (not significant) would exist for all alternatives to some degree. The hierarchy of impacts would be: (No Action, Proposed Action, Alternative 4) would be greater than Alternative 3, which would be greater than Alternative 2.

Special Status Plants
No impact to the area or concentration of special status plants is expected as a result of the proposed action or alternatives.

Vegetation
Livestock grazing is the activity that would have the single largest impact on vegetation communities in the Boulder landscape. In localized areas, disturbances due to oil and gas exploration (in areas with valid leases) or other activities such as gravel pits would have a small impact. It is reasonable to expect continued drought conditions, which could delay favorable vegetation responses or speed unfavorable ones.

Visual Resources
The implementation of a comprehensive travel management plan for the Boulder Travel Management Area and other TMAs would reduce adverse impacts to visual resources created by unauthorized OHV activities. Actions related to permitted activities such as fluid mineral exploration and development within the Boulder Landscape Planning area may create direct adverse impacts to visual resource values; however, none are anticipated at this time.

Wildlife and Fisheries Resources
An overview of the impacts to wildlife discussed earlier in this document reveals that there are generally 5 types of impacts analyzed and that therefore would be considered in the cumulative impacts. These five different categories likewise can contain either a positive or negative impacts. For example, bullet 1 below discusses changes in habitat condition. Certain projects can have a more negative impact, and could degrade or completely remove habitats while other project are designed to enhance existing habitats.

-Habitat condition (Enhancement/ degradation or loss of habitat)
-Mortality (an increase or decrease in the amount of direct and indirect mortality)
-Avoidance or shift in distribution
-Disease transmission
-Animal health/ physiological condition and/or processes

Livestock grazing, various oil and gas development projects, urban sprawl and various gravel pits among other projects in the various CIAAs play a role in the cumulative impacts within the CIAA. These types of projects typically add to the negative impacts as they pertain to wildlife species. For example: oil and gas development typically result in habitat loss and degradation, an increase in direct and indirect mortality rates of wildlife, avoidance of and distribution shifts away from development, and can induce stressors that negatively impact animal health and can disrupt physiological processes.

Other projects are designed to minimize or mitigate impacts to various wildlife species and their habitats. Project such as wildlife friendly fence conversions, habitat treatments designed to enhance wildlife habitat somewhat offset other negative impacts within the various CIAAs. These types of project generally have a more positive impact to wildlife resources.

Though being a part of the overall cumulative impact in the various wildlife CIAAs, the impacts realized in all the alternatives in the BL are not considered to play a large role within any of the CIAAs. The cumulative impacts within the CIAA however are moderately expansive, both spatially within the various CIAAs as well as in terms of their relative occurrence.

Alternative 1 – No Action Alternative
The types of impacts that are currently being realized in the Boulder landscape would persist as discussed earlier in this document. Though playing a role in the cumulative impacts in each of the wildlife CIAAs, these impacts are not considered to be significant.

Alternative 2 – No Livestock Grazing Alternative
Although removal of fences, removal of domestic livestock grazing pressure, increased forage production, reduction in potential disease transmission and a potential shift toward the RPC could be realized in this alternative and would result in positive local benefits for the wildlife and wildlife habitats in the surrounding areas, these impacts are not considered to be overarching across the various wildlife herd management areas. Increased grazing and fencing on private lands could result in the reduction of wildlife access and habitat quality on these lands.

Alternative 3 – Rotational Grazing

Although increases in forage, reduction in potential disease transmission and a potential shift toward the RPC could be realized in this alternative which would result in positive local benefits for the wildlife and wildlife habitats in the surrounding areas, these impacts are not considered to be overarching across the various wildlife CIAAs.

Alternative 4 – Fall Grazing

Although increases in forage, reduction in potential disease transmission and a potential shift toward the RPC could be realized in this alternative which would result in positive local benefits for the wildlife and wildlife habitats in the surrounding areas, these impacts are not considered to be overarching across the various wildlife CIAAs

Fisheries
Implementation of grazing and transportation management coordinated over a larger landscape area should benefit fisheries populations and habitats on and off of public lands. However, it is unknown if Wyoming State Lands and private ownerships will implement similar management actions and overall positive impacts are minimized.

4.3 Mitigation Measures Considered

Conversion of various fences to wildlife friendly configurations, and outfitting fences with sage-grouse strike deterrents.

5.0 TRIBES, INDIVIDUALS, ORGANIZATIONS, or AGENCIES CONSULTED

Cooperating agencies consulted during the preparation of this EA include:

Sublette County Commission
Sublette County Conservation District
Wyoming Game and Fish Department
Wyoming Office of State Lands and Investments
Wyoming Department of Environmental Quality
Wyoming Governor's Office
Wyoming Department of Agriculture
Wyoming State Historic Preservation Office

On May 28, 2009, the Shoshone Business Council, Arapaho Business Council, Shoshone-Bannock Tribes of Fort Hall, and Ute Tribal Council were invited to participate in the Boulder Landscape Plan. An Eastern Shoshone Tribal Cultural Consultant visited the area on October 23, 2009 with BLM cultural staff. The Eastern Shoshone recommended no exploration in the Boulder Landscape area and complete avoidance of all features.

6.0 LIST OF PREPARERS

Interdisciplinary Team
The BLM ID team which prepared the Boulder Landscape Plan and EA:

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Appendix 1 – Boulder Landscape Plan Scoping Comments

This Appendix includes comments submitted during both the April-May 2009 and the April-May 2011 scoping periods, as well as comments received following distribution of the Rangeland Health Assessment and Determinations on July 25, 2012. A total of 14 comment letters were received during the two scoping periods, and 5 comment letters on the Health Assessment. The statements presented below are taken directly from the comment letters and are not paraphrased. The comment letters are filed at the BLM Pinedale Field Office. The scoping comments were used to develop the issues presented in section 1.4 of the EA.

Air Quality

The contribution of this area, particularly to visibility problems, needs to be assessed in a cumulative way with the tremendous impact from O & G development immediately upwind, and the Clean Air Act Class I status of the Bridger Wilderness immediately downwind. Looking at impacts on a piecemeal basis is not only unrealistic but downright dishonest.

Suppress any fugitive dust coming from gravel quarry operations in the project area, post speed limits on roads, and consider air quality levels in future NEPA documents.

Cultural

The subject area includes the historic landscape of the Lander Road, a segment of the California National Historic Trail. The maintenance of this viewshed from north of Buckskin Crossing to Highway 191 should receive the highest priority given the substantial adverse impacts in the area west of Highway 191. At the same time, we support the development of interpretation in this area and access to the area as long as impacts to the trail are minimized.

The plan should ensure historic trails are protected.

No quantities or acreage of inventory or numbers of eligible or other sites or specific sites descriptions are offered.

Lacking is a discussion of the myriad of other historic sites, homesteading, schools, post offices or other historic resources known for the planning area.

Completely lacking is the mention of Native American consultations.

Lands and Realty

The plan should comply with ROW designations made in the RMP.

Access through private property to BLM, Forest Service and Wilderness Areas should be obtained and denoted with proper signage.

Livestock Grazing

I would like to see the Boulder Landscape Area be managed for ranching, wildlife and recreation.

Livestock issues should be addressed such as erosion, overgrazing, and active vegetation management to increase forage quality of vegetation such as prescribed burns and brush beating.

The conflict between big game feed grounds in the area and domestic livestock must be addressed. Any issues with the transmission of brucellosis between wildlife and cattle should be addressed.

A concern we have is when looking at the larger landscape scale, instead of an individual allotment, individual permittee and allotment management needs may be overlooked. We strongly encourage the PFO work extremely close with all permittees associated with the Plan area throughout the entire EA process. This entails incorporating annual meetings to discuss grazing plans and rangeland improvement projects for the upcoming year for the life of the Plan.

Those permittees lacking a formal allotment management plan may unintentionally be overlooked. Those permittees without a formal plan must have their concerns and specific needs addressed in this process.

Management prescriptions in the analysis must reflect multiple use resource principles. Congressional mandates, federal statutes, and implementing regulations call for multiple uses on BLM administered lands. WDA particularly believes the Congressional policy expressed in FLPMA regarding livestock grazing, needs to be specifically noted in the environmental document. FLPMA Sec. 102(8) states "The Congress declares that it is the policy of the United States that…the public lands be managed in a manner…that will provide food and habitat for fish and wildlife and domestic animals…"

We urge the PFO to base its decisions on science, long term monitoring data and real data collected in the field. Permittees possess irreplaceable long-term, on-the-ground knowledge that should be utilized to its full advantage.

Livestock grazing is an important resource management tool used to achieve desired environmental objectives in the planning area, including obtaining positive effects upon food and habitat for wildlife and livestock. The EA must include (1) the positive effects livestock grazing has upon the environment, and (2) how livestock grazing assists in achieving environmental objectives and objectives set forth in the RMP.

The WDA does not support the use or acceptance of third party monitoring. We encourage the PFO work towards building joint cooperative monitoring with the permittees, or develop a MOA with the local Conservation District to cooperatively monitor rangeland health within the Plan area.

The WDA does not support the evaluation of a "No Grazing Alternative" in the EA.

Decisions made in the Plan should be based on a case-by-case basis and supported with peer-reviewed science. The analysis needs to identify the science supporting the decisions and discussions be based on long-term monitoring data and not based on single incidents, isolated situations, or political whims.
In addition, we would encourage the Plan to have enough flexibility to change and adapt with new technologies and changes within high development areas adjacent to the Plan area.

We support the continuance of commercial livestock grazing on the 21 grazing allotments.

Mandatory terms and conditions requiring accountability such as permit actions if failure to maintain range improvement, etc.

Clear, science based impact limitations in the terms and conditions such as 30% max upland utilization to provide SG nesting habitat, 6" stubble in riparian areas, limitation of 25% annual bank trample, 25% willow utilization.

Include upland objectives and timelines to recover HCPC with measurable objectives for 5, 10, 15 and 20 years.

Turnout is way too early.

Deal with I Category issues as was supposed to happen under the previous RMP.

Deal with the fact that current conditions on some of these allotments are based on actual use way under permitted. SO you can't just re-up the same permitted number saying they have resulted in current conditions.

Limit cattle grazing along the river to the greatest extent possible. The make-up of this river bank cannot stand up to cattle traffic, and the stream is filling in. When I bought this property it held trout and whitefish. Since Routh's ranch started grazing, it has become barren.

Consider implementation of a type of rotational grazing strategy that allows all areas to be rested during the spring growing season once every 3 years. Many allotments may need additional water sources or fencing for successful implementation.

Implement a rest rotation system for the East Fork Common and Irish Canyon Tracts allotments
Grazing should only be continued if it meets the Standards and Guidelines.

The plan should put in place and require ongoing assessments of conformance with the grazing and riparian standards and requirements to modify grazing as needed to ensure conformance with these standards.

I do not share the premise that the standards for upland rangeland health and wildlife/T&E species health is met.

Management of the area should be geared toward enhancing Indian Ricegrass and other needle and thread bunch grasses that show a minimal presence in the area. They have been reduced in composition by perennial spring grazing between 5/1 through 9/30 for cattle and 5/1 through 11/30 for horses. This could be attained by managing wells and reservoirs to move livestock around the allotment during the growing season. Continual spring grazing will always reduce desirable bunch grasses and enhance sagebrush and rabbitbrush composition in the majority of these range sites.

I would also consider moving the turn on date back to at least May 15.

(BLM should) work with the grazing users to eliminate, or at least modify, their season of use.

(BLM should) fence and modify reservoirs and water sources to better manage livestock use and provide more wildlife water sources through the grazing season.

Changing season of use by livestock could improve conditions towards the identified potential of these sites.

In core sage-grouse habitats, there will be at least one alternative that would recommend a deferred or rest-rotation grazing system.

Minerals

I think it (the Boulder Landscape Area) should be off limits to gas, oil or industrial developments.

The Jonah oil and gas complex should not be extended into the project area currently and in the future due to compounded effects with other resource use in the area.

Scenic, wild, open spaces should be limited or excluded from oil and gas development.

Proposed drilling would interfere with the antelope migration path. This interference could be avoided by directional drilling.

Recreation

I would like to see the Boulder Landscape Area be managed for ranching, wildlife and recreation.

Social and Economic

Grazing on public lands represents a vital economic value to agricultural producers and to local communities. The PFO needs to include impacts on this economic activity in the analysis.

Transportation

In general, OSLI would support the proposed travel management plan for the area. However, notwithstanding the federal NEPA process or federal approvals, we must comply with the Rules and Regulations adopted by the Board of Land Commissioners in accordance with W.S. 36-2-107, specifically Chapter 13, Section 5(a) that governs closure of established roads or access to state lands. Absent showing justification for Board closure of established roads, we would oppose the closure of BLM roads that provide access to state land for management purposes and public recreation.

There should be no new road construction.

Off road vehicle and illegal user created trails for OHV use should be monitored especially around frequently visited hunting areas near the Wind River Front.

Many of the included areas are presently roadless and as such should remain so; however, the existing roads and trails should remain open for vehicle travel as well as 4-wheel ATV use.

Need to get public access up Pocket Creek Rd.

Return Mathis Lane to county maintenance to allow access to the square top area for hunting and to the Oregon Trail sites up on the flats.

Support the current road management limited designation.

Minimize the establishment of new roads; may require increased enforcement efforts.

Motorized vehicles should be limited to designated roads in the East Fork and Irish Canyon area.

The number of roads in riparian habitats and the number of stream channel crossings should be reduced in the East Fork and Irish Canyon area.

Roads should be kept open as they are used by permittees to maintain water sources and manage their cattle.

All existing two track roads and trails should remain open to public use.

Road controls should only be implemented in areas of over use, erosion control, or construction of new roads.

BLM should ensure that the density of roads in this area does not exceed densities that are known to be incompatible with maintaining wildlife populations.

Road densities should not exceed 1 mile of road per square mile.

BLM should put in place a plan that establishes an acceptable road density and which puts in place requirements to achieve that suitable density.

Excess erosion (is) occurring along the two tracks that are probably old seismic trails that do not have adequate water management structures along them.

The Travel and Transportation Plan should address decreasing road density in this project…we recommend that motorized vehicles are only allowed on designated roads.

Unnecessary or redundant roads should be completely closed to motorized vehicles. We suggest a decrease in the number of roads in the riparian habitat and a decrease in the number of stream channel crossings in the area.

Vegetation

The following list of sensitive plant species shall be monitored from impacts due to grazing and other project activities.

Meadow Pussytoes	Nelson Phacelia	California Hesperochiron
Trelease's Milkvetch	Dwarf Woolly-Heads	Mountain Peppergrass
Cedar Rim Thistle	Hoary Willow	Juniper Prickly-Pear
Large-fruited Bladderpod	Low Spike-Moss	Desert Glandular Phacelia
Beaver Rim Phlox	Sickle Saltbush	
Tufted Twinpod	Divergent Wild Buckwheat	

Emphasis should be placed on cheatgrass management in the area. (BLM should) analyze cheatgrass treatments in excess of 300 acres/project annually.

VRM

Retain and stay out of the Visual Resource Management classes I and II.

The plan should fully comply with the provisions in the RMP that relate to VRM classes in the area.

Watershed

The project area must be buffered from the East Fork River, to decrease erosion and other impacts to the watershed.

Keep at least 500 ft. away from the edge of surface waters, riparian, wetlands, and the 100 year floodplain.

Include riparian objectives and timelines to reach PNC (PFC is only the minimum physical functioning to hold together in a 20 year flood event, not fisheries or wildlife habitat).

What are the conditions of riparian meadows and springs?

I would be willing to devote the property (private lands on the East Fork River) to wildlife and stream preservation if there were public assistance with fencing.

Wildlife

I would like to see the Boulder Landscape Area be managed for ranching, wildlife and recreation.

Monitor fish habitat conditions in streams owing to sedimentation, excess organic matter, and increased water temperatures that owe to the expanding road network, bank damage by livestock, flood irrigation runoff, and development on (i.e. gravel pits and homesites).

Keep the project area out of the designated crucial Moose and Antelope range.

Avoid creating barriers to the seasonal movements of big game and other sensitive species.

Maintain migration routes for deer, elk, pronghorn and other native species, particularly along stream & riparian corridors and along moraines.

The presence of WY G&F elk feed grounds at Scab Creek and Muddy Creek where brucellosis and other diseases are an issue make efforts to restrict elk movement (particularly with additional fencing) a concern.

Determine if sage-grouse or other species of interest seasonal habitats are present, the condition of these habitats, and the relative level of importance of these habitats. In the case of sage-grouse, it is important to know whether the population is resident or migratory when evaluating potential habitats affected by proposed actions.

Identify how much of the sage grouse habitat in the area has been impacted previously by fire (prescribed or wild), other habitat conversions, habitat losses, or fragmentation, preferably using GIS- based analysis.

Determine how much of the area is likely to burn in future wildfire and at what scale (a risk assessment).

Identify the short-term (1-14 years) and mid-term effects (15-30 years) of prescribed fires or other treatments on vegetation and key wildlife species.

Assess the presence of undesirable plant species (e.g. cheatgrass, invasive noxious weeds, rabbitbrush, juniper, and other conifer invasion) and the risk of these species under current management and/or as a result of the proposed treatment.

Determine the likely response of desirable species of vegetation that are present to the type and intensity of treatment being proposed.

Identify mitigation measures needed to offset potential adverse impacts on sage-grouse habitat.

No sagebrush control work should be done period.

The BLM buffer of ¼ -1/2 mile buffer around sage grouse leks and nesting habitat is inadequate. Leading experts recommend a buffer of at least 3-5 miles.

The following listed species shall be monitored and biological assessments shall be completed to gauge any impacts to habitat and species viability from proposed project activities.

Canada Lynx
Black-Footed Ferret
Kendall Warm Springs Dace
Western Yellow-Billed Cuckoo
Gray Wolf
Bonytail Chub
Colorado Pikeminnow
Humpback Chub
Razorback Sucker
Long-Eared Myotis
Idaho Pocket Gopher
White-Tailed Prairie Dog
Pygmy Rabbit
Gray Wolf

Grizzly Bear
White-Faced Ibis
Trumpeter Swan
Northern Goshawk
Ferruginous Hawk
Peregrine Falcon
Greater Sage-Grouse
Long-Billed Curlew
Bald Eagle
Yellow-Billed Cuckoo
Burrowing Owl
Sage Thrasher
Loggerhead Shrike
Brewer's Sparrow

Sage Sparrow
Mountain Plover
Roundtail Chub
Leatherside Chub
Bluehead Sucker
Flannelmouth Sucker
Yellowstone Cutthroat Trout
Colorado River Cutthroat Trout
Fine-Spotted Snake River Cutthroat Trout
Northern Leopard Frog
Boreal Toad
Spotted Frog

The plan should ensure sage-grouse are protected.

The plan should protect big game crucial ranges.

Look at water developments and fences in relation to leks.

Get rid of trash impacting nesting habitat.

Fences and migration – get rid of problems.

Apply habitat protection stipulations on seasonal habitats for any new permitted activities or projects.

Modify or eliminate fencing to facilitate animal movement.

Mule deer and moose crucial winter ranges are inaccurately depicted on project maps.

Elk populations are not growing in this area.

Comply with the Conservation Agreement and Strategy for CRCT.

Maintain and enhance CRCT habitat in the Irish Canyon watershed.

The Muddy Creek Feedground is mentioned with incorrect ownership.

In many cases a shrub thinning treatment would enhance the condition of the habitat for wildlife and livestock.

The Sublette antelope herd is below objective.

According to the Conservation Agreement and Conservation Strategy for Colorado River cutthroat trout, areas that currently support CRCT will be maintained, while other areas will be managed for increased abundance.

We strongly support management decisions that will lead to improved watershed stability, enhanced vegetation conditions and riparian vegetation development. It is important the project decreases sediment loading to all watersheds, not just Irish Canyon.

The preferred alternative should meet the direction of the Three States Conservation Agreement and Conservation Strategy.

Special Management Areas

Keep the project area out of the Wind River Front Management Area.

Keep the project area out of the Scab Creek WSA.

The plan should fully comply with the provisions in the RMP that relate to the management and protection of the Wind River Front Management Area.

The RMP provides that the goal in the Wind River Front Management Area is to "maintain and improve wildlife habitats, big game migration corridors and bottlenecks, scenic quality, and recreation values". It goes on to state that surface disturbing activities (including new roads) "will be mitigated" and that public access is to be focused on only in "key recreation areas". We believe all these provisions should be fully complied with as the BLM seeks to develop transportation mapping and planning and develops provisions related to rangeland health and grazing permits.

This plan (should) fully abide by and advance the management direction established for the Wind River Front Management Area… to maintain and improve wildlife habitats, big game migration corridors and bottlenecks, scenic quality, and recreation values and uses.

General

It is vital BLM evaluate all resources at the same level to ensure they are managed cumulatively. For example, the travel management plan must include how it relates to livestock grazing operations and adjacent gas field development operations. More importantly, the Plan needs to look outside the landscape boundary lines and make sure it considers adjacent activities in this planning effort.

Appendix 2.

Draft

Boulder Landscape
Travel Management Activity Plan

Introduction

This plan will serve as a comprehensive access and travel management plan for the Boulder Landscape Plan Travel Management Area (TMA). The area consists of 72,000 acres of Bureau of Land Management (BLM) administered public land located in Sublette County, south of Pinedale Wyoming. The planning area lies between the Wind River Mountains and US Highway 191, south of WY Highway 352 and north of the Big Sandy River at the BLM, Rock Springs Field Office Boundary. The planning area is shown in Map 1.

Identification of designated routes for off-highway vehicles (OHVs), identification and assessment of non-motorized recreation opportunities, and maintaining appropriate access for the variety of activities and use levels is critical to effectively manage the area. The Boulder TMA provides opportunities for a wide variety of recreation activities such as hunting, horseback riding, hiking, mountain biking, wildlife viewing, sightseeing and OHV activities.

OHV recreation is becoming more popular and the public is increasingly looking to BLM- administered public lands throughout the west for OHV recreation and a variety of other recreation opportunities. This trend is expected to continue locally as population and tourism within the Pinedale Field Office area and nearby communities continues to increase. In addition, advancements in technology have allowed increasing motorized access to previously inaccessible areas. The management of OHVs and other modes of travel on BLM-managed public lands is necessary to address public and administrative access needs, protect resources, promote public safety, and minimize conflicts among the various uses of public lands.

The Pinedale Resource Management Plan (RMP), completed in 2008, provides management direction for all BLM-managed public lands and resources within the planning area. Subsequent activity level planning is completed to implement the decisions that were made in the RMP. This activity plan will outline a specific course of action to implement the RMP decisions associated with OHV management within the Boulder TMA.

For many years the term “off-highway vehicle” (OHV) has been used by the public, industry, and the BLM interchangeably with the term “off-road vehicle” (ORV). The term “off-road vehicle” was used during the previous BLM resource management planning process and has a legally established definition in the Presidential Executive Orders and the BLM's related 43 Code of Federal Regulations (CFR) 8340. The terms will be used interchangeably in this planning process.

This travel management plan is part of a coordinated planning effort which includes the renewal of livestock grazing permits. Transportation planning for this project area complements the BLM planning and public involvement process for the Boulder Landscape. This TMA is a product generated from the consideration of all resources and does not directly address rangeland management or the permitted grazing of public lands.

Purpose and Need

One purpose of the Boulder Landscape Plan is to define and document a specific course of action necessary to implement the OHV designation decisions. The Boulder TMA outlines on-the-ground actions and guidance that will facilitate an effective implementation process. The Boulder Landscape area has been identified as a priority for implementation of grazing permit renewals in conjunction with OHV designation decisions.

The Boulder Landscape Plan, Environmental Assessment (EA) and an associated Decision Record (DR) will implement the Pinedale Field Office Resource Management Plan (RMP) OHV decisions by identifying, analyzing, and designating specific routes open for travel and approving the implementation actions outlined in this activity plan.

Preparation of this landscape plan will meet the direction contained in the Pinedale RMP to complete OHV transportation activity plans. Planning is needed to integrate management of multiple resources and activities such as travel management and access, future development of recreation facilities, implementation of range improvements, forest and range fuels management, and management of crucial winter range and other important fish and wildlife habitat.

TMP Planning Area Designations

Wind River Front Management Area (MA)

The TMP contains a portion of the Wind River Front MA. The management goal of the MA is: Maintain the visual, recreation, and air quality resources in the management area, enhance wildlife habitat, and protect the integrity of the U.S. Air Force Detachment 489 Seismic Monitoring Station.

Extensive Recreation Management Area (ERMA)

The management of recreation resources and experiences within the TMA is guided by the goals and objectives defined in the RMP for an ERMA.

An ERMA is defined as a BLM administrative unit where recreation management is only one of several management objectives and where limited commitment of resources is required to provide extensive and unstructured types of recreation activities. An ERMA contrasts with a Special Recreation Management Area, where intensive management is required and greater managerial investment is necessary.

To the degree possible, the concepts of benefits based management will be addressed through the analysis of effects of the travel management decisions upon recreation activities, experiences, outcomes and setting.

Wild and Scenic Rivers

The BLM Pinedale Field Office completed the Wild and Scenic River Review for the Pinedale planning area in 2003. The purpose of this review was to determine if any BLM administered public lands along waterways within the RMP planning area met the eligibility criteria and suitability factors as identified in the Wild and Scenic Rivers Act.

As a result of this review, BLM-administered public lands along the East Fork River and tributaries (Irish Canyon Creek) were identified as meeting the Wild and Scenic River eligibility criteria and suitability factors. This determination was made based on the presence of outstandingly remarkable values relating to scenic, ecological and fisheries value.

In 2008, interim management prescriptions were developed to provide interim protection of the Wild and Scenic River values on suitable waterway areas prior to completion of the Pinedale RMP revision. Until final decisions are made on the Wild and Scenic River (WSR) eligibility and suitability determinations, no uses will be authorized which could impair any outstandingly remarkable values along river corridors or otherwise affect their eligibility for inclusion in the National Wild and Scenic Rivers System. The East Fork WSR unit (1,130 acres) is closed to motorized access (Map 2).

National Historic Trails

The Lander Trail, a route of the Oregon Trail traverses the central and western portion of the planning area. The trail is eligible for protection and a National Historic trail and is managed according to the National Historic Preservation Act (in Section 106). The Lander Trail and its historic setting are protected by the establishment of a VRM Class II designation within 3 miles of each side of the contributing segments of the trail.

Other Resources in the Planning Area

The Pinedale RMP provides management direction for all BLM-managed public lands and resources within the planning area. The predominant uses and resources in the Boulder Landscape area include recreation, wildlife, livestock grazing, cultural, paleontological, and visual resources. The management objectives and actions from the RMP and subsequent activity planning that are relevant to the Boulder Landscape area will be carried forward into this activity plan.

Comprehensive Travel Management

A comprehensive approach to travel management recognizes that the roads and trails on BLM-managed public land serve multiple uses and help facilitate a variety of management objectives. Travel management decisions should be integrated with all BLM programs and resource use aspects (such as recreational, traditional, casual, agricultural, commercial, and educational) and accompanying modes and conditions of travel on the public lands.

In 2001, the National Management Strategy for Motorized Off-Highway Vehicle (OHV) Use on Public Lands was completed, and in 2002, the National Mountain Bicycling Strategic Action Plan was completed. These two strategies provide national guidance and have emphasized travel management as a priority for all BLM Field Offices. This priority was also emphasized by "The BLM's Priorities for Recreation and Visitor Services" that was completed in May of 2003.

All BLM-managed public lands have ORV designations, in accordance with 43 CFR 8340 – Off Road Vehicles. The designation categories (as described in 43 CFR 8340.0-5 Definitions) include:

1. open – "…an area where all types of vehicle use is permitted at all times, anywhere in the area subject to the operating regulations and vehicle standards…"

2. limited – "…an area restricted at certain times, in certain areas, and/or to certain vehicular use. These restrictions may be of any type, but can generally be accommodated within the following type of categories: Numbers of vehicles; types of vehicles; time or season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails; and other restrictions."

3. closed – "…an area where off-road vehicle use is prohibited. Use of off-road vehicles in closed areas may be allowed for certain reasons; however, such use shall be made only with the approval of the Authorized Officer.

The ORV designation decisions for the Pinedale Field Office were made in the Pinedale Resource Management Plan (RMP) in 2008. The OHV management goals identified in the RMP are:

> *"Provide access for approved public land uses consistent with public health and safety and other resource value concerns"*
>
> *"Provide opportunities for OHV use and activities, including motorized, non-motorized, mechanized and foot travel where compatible with other resource values"*

All BLM-managed public lands in the Pinedale Field Office area fall within one of the ORV categories of open, limited, or closed (Map 11). These categories can only be changed through the land use planning process by amendment, or revision of the RMP. OHV designations could be changed to "limited designated roads and trails" if the following were to occur:

- There is the presence of a previously unknown resource.
- Resource extent or condition changes.
- Resource damage to the extent that designation of routes is necessary.
- New information leads to a need to change the OHV designation.

The designation decisions are implemented on the ground through site-specific planning efforts, subsequent to completion of the RMP.

The planning area includes 18,400 acres of private lands, 10,200 acres of State of Wyoming lands, and 72,000 acres of public lands administered by the Bureau of Land Management, for a total of 100,600 acres (Map 1). The area is drained by Muddy Creek and the East Fork River, with few flowing waters located on public lands.

The OHV designation for the portion of the planning area located west of the WY Highway 353 is "limited to existing roads and trails". The remaining portion of the planning area is located east of Highway 353 and is designated as "limited to designated roads and trails." This designation decision was determined during the RMP planning process through an assessment of the resource values related to roads, trails and OHV travel. The designation is intended to minimize impact to fragile soils, Class II visual resources, significant cultural and paleontological resources, and water resources.

TRAVEL MANAGEMENT ACTIVITY PLAN

An inventory of the roads and trails in the planning area was completed using GPS/GIS technology, aerial photos, topographic maps, and historic information. Map 2 depicts all routes selected for management as part of the BLM Transportation System. For the purposes of this plan, roads, primitive roads, and trails will be referred to as routes.

The inventory map includes routes of the following types:

- Gravel Road: Road that is regularly maintained and has a gravel surface.
- Graded Dirt Road: Road that was constructed by mechanical means, may or may not be regularly maintained.

- Two-Track: Primitive route that was created and maintained by the passage of vehicles, vegetation is present between two tracks.
- ATV Trail: Route that is not suitable for full size vehicles, generally steep and narrow routes.
- Non-Motorized Trail: A single track route suitable for non-motorized uses including hiking, horseback riding, and mountain bike riding (none in the Boulder Planning Area).
- Reclaimed: Route that is naturally revegetating and no longer in use.

In April 2006, the *BLM Roads and Trails Terminology Report* were issued to standardize the terms used for transportation assets within the BLM. Following are the route definitions from that report with the corresponding route inventory types used in this planning process shown in parentheses after the definition:

- Road: A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. (Gravel Road)
- Primitive Road: A linear route managed for use by four-wheel drive or high clearance vehicles. These routes do not normally meet any BLM road design standards. (Graded Dirt Road, Two-Track)
- Trail: A linear route managed for human-powered, stock, or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles. (ATV Trail, Non-Motorized Trail)
- Transportation Linear Disturbances: Man-made linear features that are not part of the BLM's Transportation System. Linear disturbances may include engineered (planned) as well as unplanned single- and two-track linear features. (Reclaimed)

Additional recommendations from the *Roads and Trails Terminology Report* will be incorporated into this activity plan as appropriate; see references to the report in the Maps, and Maintenance Action Items.

Upon completion of this plan, a decision record will approve the official Boulder Landscape Travel Management Map showing the designated network of routes. Any modifications or additions would be addressed through the appropriate level of NEPA analysis as specified in the implementation section of this plan.

Travel Management ~~Goals and~~ Objectives

- Provide access for a wide variety of recreational activities on public lands.
- Provide administrative, commercial, and private land access where necessary.
- Discourage and reduce trespass on adjacent private lands.
- Protect and restore resource values and prevent the creation of new, unauthorized routes.
- Provide clear information to facilitate compliance with route designations.
- Identify future planning needs and opportunities related to travel management.

Route Selection Criteria

43 CFR 8342.1 - Route Designation Criteria (required)
"All designations shall be based on the protection of the resources of the public lands, the promotion of the safety of all users of the public lands, and the minimization of conflicts among various uses of the public lands."

1. Areas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of public lands, and to prevent impairment of wilderness suitability
2. Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitat.
3. Areas and trail shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
4. Areas and trails shall not be located in officially designated wilderness areas or primitive areas. Areas and trails shall be located in natural areas only if the authorized officer determines that off-road vehicle use in such locations will not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

Pinedale Field Office – Criteria for Consideration of Route Designations

Routes that provide access to existing rights with access needs such as rights-of-way (R/W), easements, private land, state land, National Park Service or Forest Service land, etc.

Routes that provide known access needs for maintenance of range improvements, law enforcement, commercial operations, or other administrative activities.

Routes identified on the BLM transportation system .

Routes that provide access to large blocks of BLM-administered public land or serve as important connecting routes.

Routes that provide access for recreational activities or unique motorized recreational opportunities for both public and commercial activities (opportunities may include wildlife and scenery viewing, scenic lookout points, hunting, OHV driving, etc).

Routes necessary to maintain the prescribed setting characteristics and the targeted activity, experience, and benefit outcomes for each recreation setting.

Pinedale Field Office – Criteria for Consideration of Route Closures

Routes causing unacceptable resource damage, erosion, or route proliferation that are not reasonably mitigated (i.e.: wash outs, deep ruts, detours, steep slopes).

Routes through soils that are easily damaged such as riparian areas, or areas highly susceptible to resource damage.

Duplicate routes to the same location.

~~Routes that are naturally re-vegetating, are no longer used, or are no longer physically present.~~

Routes that have a high potential to negatively affect T&E or sensitive wildlife species or limited and important wildlife habitat (i.e. crucial winter range). Routes that have a high potential to encourage harassment or disruption to wildlife.

Routes that pose a safety hazard to the public.

Routes causing conflict between motorized and non-motorized recreation opportunities.

Routes which may adversely affect areas of cultural or religious concern for Native Americans.

Routes which may adversely affect sites which may be eligible for the National Register of Historic Places.

~~Route closures that are necessary to maintain the prescribed setting characteristics and the targeted activity, experience, and benefit outcomes for each recreation management zone (RMZ).~~

Action Items

Maps

Objective: Produce an official travel management map to document route designations.

- An official Boulder Landscape Map will identify the designated routes. The official map will be based on Map 2. The map will be created using Arcmap and GIS technology. Routes will be designated as follows:

  Open to motorized vehicles - routes will be designated as open for motorized vehicle use.

  Administrative use only – routes will be limited to authorized vehicles only for purposes such as accessing private land, administering grazing allotments, or conducting maintenance or installation of range improvements. Administrative use authorizations are granted on a case-by-case basis with approval from the BLM Authorized Officer.

  Closed to motorized vehicles – routes will be closed to all motorized vehicle use. Where appropriate, these routes will be obliterated through reclamation efforts; others will be left to natural re-vegetation. Routes not specifically designated for use on the official travel management map will be closed to vehicle travel.

  Non-motorized travel - hiking, mountain biking, and horseback riding will be allowed on all designated routes including "Open", "ATV and Non-Motorized Use Only", and "Administrative Use Only", and on existing routes that are "Closed" to motorized vehicles, but have not been physically reclaimed. All forms of travel will be restricted from "Closed" routes or the portions of "Closed" routes that are physically obliterated by reclamation efforts such as re-contouring and re-seeding until reclamation is complete and all signs are removed. Non-motorized travel will be allowed cross-country if the use does not result in the creation of new routes or otherwise cause resource damage.

  Non-motorized use will be managed in accordance with 43 CFR 8364 – Closures and Restrictions and 43 CFR 8365 – Rules of Conduct.

  Over-the-Snow Vehicles – Use of motorized vehicles for travel over-the-snow would be subject to seasonal restrictions as needed in big game crucial winter ranges.

- Coordinate with the High Desert District engineers to update the Facility Asset Management System (FAMS), the asset management database system for the storage of all designated transportation related linear features, as required by the BLM Roads and Trails Terminology Report.

- The official Boulder Landscape Travel Management Map will be provided to the BLM Wyoming State Office for inclusion in future revisions or reprints of the 1:100,000 land status maps.

- The official map will be displayed at the BLM Pinedale Field Office and copies will be provided to local agencies and organizations that provide information to the public, such as the Forest Service, National Park Service, Game and Fish, Wyoming Office of Tourism, Chamber of Commerce, and others as necessary.

- A handout with the official map will be produced for distribution to the public and will be posted on the BLM Pinedale Field Office website. Refer to the Education and Information section below.

- The official map will be updated as necessary to reflect any modifications or additions, as described in the Implementation section below.

- Information about the route designations, signs and markers will be incorporated into the Wyoming State OHV Program Maps as they are produced.

<u>Signs and Markers</u>

Objective: Identify the designated routes on-the-ground in a clear and consistent manner to facilitate compliance and enforcement of the route designations.

Note: Sign design, color, and placement will be considered to reduce potential impacts to visual resources. As compliance with route designations increases, and some signs are found to be unnecessary, the signs will be removed.

- Information signs will be placed at each main entry point onto BLM-managed public lands in the Boulder Landscape area. The information signs will include a map of the area showing the designated routes and an explanation of the route marker system. Information will be incorporated to explain the importance of OHV designations and their link to protecting and restoring resource values such as: reducing soil erosion, reducing weed spread, improving water quality and improving wildlife habitat. Each sign will also provide tips for low impact OHV use and outdoor ethics, such as the principles of Leave No Trace and Tread Lightly!

- Route designations will be marked with brown flexible markers with standard decals as follows:

    - Designated “Open” routes will be marked with “Designated Route” or white arrow decals at intersections and periodically along the route as necessary to indicate routes that are open for motorized vehicle travel.

- "ATV and Non-Motorized Use Only" routes will be marked with standard ATV symbol decals, indicating that the route is closed to full size vehicles.

- "Administrative Use Only" routes will be marked with standard "Administrative Vehicles Only" decals.

- Closed routes will be marked with "No Motor Vehicle" or "Route Closed" decals with standard vehicle symbols. As closed routes heal through natural re-vegetation or reclamation efforts, and markers are no longer necessary, they will be removed. Closed route markers will remain where necessary for resource protection or public safety.

- Where there is a potential for an open route to be extended past its current end point by vehicle travel, "Motorized Route Ends" decals may be used.

- Signs will be placed to clearly mark the boundary of the seasonal closure area and to inform the public of the seasonal closure dates and allowed uses.

Education and Information

Objective: Provide clear and consistent information related to the route designations and the implementation process that will help ensure public understanding and compliance with the designations.

- A one page, double-sided handout showing the route designations and other travel management information will be developed and disseminated to the public. The handout will include information related to low impact OHV use, protection and restoration of resource values, prevention of spreading noxious weeds, and outdoor ethics, such as the principles of Leave No Trace and Tread Lightly!

- News releases will be prepared for key phases of the travel management planning and implementation process, to be distributed for publication in local newspapers and posted on the BLM website.

Barriers

Objective: Use physical barriers, if necessary, to discourage use and allow rehabilitation of closed routes.

- Natural barriers would include soil berms, rocks or boulders, or vegetation placed to prevent travel on closed routes.

- Fences and gates may be used where natural barriers are not feasible or effective, or where occasional administrative travel may be required on "Administrative Use Only" routes.

- Temporary or emergency closures may also be needed for safety or to facilitate maintenance and repairs or to respond to other occurrences that impact roads, facilities, or resources.

Rehabilitation

Objective: Apply rehabilitation techniques to closed routes, where necessary to speed the healing process, discourage use of closed routes, and minimize the impact on visual resources.

- Rehabilitation actions will be determined according to the following options:

  - Leave route to natural re-vegetation, route is not currently visible, no need to sign.
  - Sign route and leave to natural re-vegetation.
  - Sign route and reclaim the portion of the route that is visible from all intersections with open routes.
  - Sign route and reclaim the entire route.

- Seeding will be done where necessary to aid rehabilitation of closed routes. Appropriate seed mixtures will be selected for each site based on individual site conditions. Seed mixtures would be selected from native species that would include but not be limited to:

  <u>Grasses</u>
  bluebunch wheatgrass *(Pseudoroegneria spicata)*
  green needlegrass *(Stipa viridula)*
  needle-and-thread grass *(Stipa comata)*
  bottlebrush squirrel tail *(Elymus elymoides)*
  western wheatgrass *(Pascopyrum smithii)*
  Indian ricegrass *(Achnatherum hymenoides)*
  Idaho fescue *(Festuca idahoensis)*
  king spike fescue *(Leucopoa kingii)*
  basin wild rye *(Leymus cinereus)*
  thick spike wheatgrass *(Elymus lanceolatus)*

  <u>Forbs</u>
  milkvetch *(Astragulus spp)*
  scarlet globe mallow *(Sphaeralcea coccinea)*
  western yarrow *(Achillea millefolium L. var occidentalis DC)*
  sainfoin *(Onobrychis viciifolia)*
  Rocky Mountain penstemon *(Penstemon strictus)*
  Evening Primrose *(Oenothera cespitosa)*
  Indian Paintbrush *(Castilleja Mutis ex L. f.)*
  Rocky Mountian beeplant *(Cleome serrulata)*
  Dotted Gay Feather *(Liatris punctata)*

  <u>Shrubs</u>
  winterfat *(Karscheninnikovia Guldenstaedt)*
  fourwing saltbush *(Atriplex canescens)*

- Recommended reclamation techniques include scarifying or ripping the road surface to break up compacted soil and allow maximum moisture retention. Distribute seed uniformly over the area, and then cover the seed by raking or dragging the ground or by other methods that provide adequate cover. After the first year, seeded areas would be fertilized if seedling establishment is sparse. Broadcast seeding is the preferred method and would generally be done in the fall. Techniques such as hydraulic seeding, seed drilling, mulching, water barring, pitting, roughening, contour furrowing, or similar methods may be used as appropriate on a case-by-case basis.

- Weed treatment and control measures would be implemented as needed to promote revegetation with native plants and prevent any new weed establishment and/or control of existing weed sources.

Monitoring

Objective: Identify specific actions, including timeframes, methods, and anticipated resource needs for environmental monitoring.

- Monitoring of OHV designations is required by 43 CFR 8342.3 Designation changes:

  Monitoring use. The Authorized Officer shall monitor effects of the use of off-highway vehicles. On the basis of information so obtained, and whenever the Authorized Officer deems it necessary to carry out the objectives of this part, designations may be amended, revised, revoked, or other actions taken pursuant to the regulations in this part.

  Items to monitor and associated indicators:
  1. Resource damage resulting from OHV use.
     - Braided trails
     - Ruts
     - Hill climbs
     - Road width
     - User created roads or trails, new disturbance
     - Effects of OHV use on wildlife, cultural resources
     - Incidence of noxious weeds
  2. Compliance with route designations
     - Vandalism of signs and barriers
     - Trends in the number of OHV violations and incident reports
     - Success of rehabilitation efforts
     - Amount of natural re-vegetation of closed routes
  3. OHV user conflicts and complaints
     - OHV associated private land conflicts
     - OHV associated conflicts with other recreation activities

Monitoring of OHV impacts is the responsibility of all resource specialists, a cooperative effort is necessary to ensure that the travel management efforts are consistent with, and are helping to achieve the goals and objectives of other resources in the planning area. Annual monitoring of the above indicators will be conducted by field office staff and volunteers. The OHV Observation Report Booklet will be used initially; a more detailed monitoring checklist will be developed if necessary.

If monitoring indicates resource damage is occurring:
1. On designated routes: consider the need for road maintenance efforts, road re-routes, or installation of waterbars, culverts, etc and the feasibility to complete the maintenance in a timely manner; off of designated routes: consider the need for additional signing and barriers.
2. Increase educational efforts regarding resource damage and its consequences, ie: not driving on wet or muddy roads, staying on designated roads.

3. Consider the need for a seasonal closure, type of vehicle restrictions, or complete closure of the route.

Resource Damage is defined in IM NO. WY-2005-034 – Travel Management Guidelines for the Public Lands in Wyoming:

Resource Damage: Defined as leaving signs of vehicle use such as wheel ruts in wet meadows, visual scars on hillsides or soil erosion. Additional examples include surface disturbance that causes the loss of vegetative cover, degradation of wildlife habitat, the creation of new roads, and the introduction of noxious weeds. Damage to vegetation also includes crushing or uprooting trees and shrubs. The determination of whether resource damage has occurred is left to the discretion of Field Managers and law enforcement personnel.

If monitoring indicates a lack of compliance with OHV designations:

1. Increase public education and signing efforts:
    a. Publish a news release in local newspapers as a reminder of the OHV designations and rules.
    b. Add more prominent route markers and signs.
2. Install additional and more prominent barriers on closed routes.
3. If non-compliance continues, increase law enforcement patrol efforts in the problem areas.

If monitoring indicates that user conflicts are occurring on multiple use trails:

1. Increase public education and signing efforts.
2. If non-compliance continues, increase law enforcement patrol efforts in the problem areas.
3. Consider designating roads and trails for single uses to prevent user conflicts.

The annual monitoring results and documentation of any management actions that were taken in response to monitoring efforts will be compiled by the field office recreation staff. This information will be used to determine priority areas for future monitoring efforts, law enforcement emphasis, and funding requests. The monitoring results will also be used to evaluate the effectiveness of this activity plan and to identify needed plan amendments or modifications.

The following data gathering techniques will be utilized:

- Traffic Counters will be placed in key access locations as necessary within the Boulder TMA. Additional counters will be installed as necessary. These counters will be maintained and the traffic counts will continue to be documented for a period of at least one year. This documentation will provide a picture of the overall vehicle travel in the planning area.

- Photo-monitoring points will be established in key locations to monitor implementation actions and their effectiveness. Example photo points are: known areas where cross-country travel has occurred, closed routes, rehabilitation projects, known erosion areas, and areas of good road quality for future reference. Photo monitoring points will be documented using GPS and a monitoring schedule will be established.

- The monitoring data collected would be used to assess the effectiveness of the plan and associated implementation actions. Closed routes would be monitored for signs of use, rehabilitated routes would be monitored to determine effectiveness of seeding and water drainage. The plan area will be monitored for sign conditions. Modifications to the plan would be considered if monitoring indicates that the goals and objectives are not being met.

Enforcement

Objective: Identify specific actions, including timeframes, methods, and anticipated resource needs for compliance and enforcement related to the route designations.

- Law enforcement efforts will be implemented in stages, beginning with warnings and progressing to citations upon full implementation. Emphasis will be placed on self-regulation by user groups.

- Upon full implementation, citations will be as follows:

  - First offense will usually result in a collateral forfeiture citation.
  - Second offense will usually result in a court appearance.

- The Boulder Planning area would be identified as a priority/emphasis area for law enforcement patrol following initial implementation as time and staff allows. Educational efforts would be encouraged by staff conducting field work.

- Increased patrol would be implemented in areas where monitoring efforts detect non-compliance with route designations.

- The cooperative law enforcement agreements that are currently in place would be maintained to enhance law enforcement patrol and emergency response in the area.

- Information and regulatory sign wording will be reviewed by the Pinedale Field Office Law Enforcement Ranger.

Maintenance

Objective: Document maintenance standards and needs.

- The current route maintenance intensities for each designated route will be documented in the Facility Asset Management System (FAMS) as specified in the *Bureau of Land Management Road and Trails Terminology Report, April 2006.* Modifications will be identified and recommended if necessary.

- Maintenance of open roads, and trails will be done to minimize soil erosion and other resource degradation. This maintenance will be done on a case-by-case basis by requesting assistance from the BLM High Desert District Office operations staff.

- Maintenance procedures and schedules will be developed for signs and markers. This will include anticipated replacement needs. A sign inventory and photo database will be created to facilitate tracking of sign maintenance.

- Maintenance procedures for physical barriers will be developed.

- BLM coordination with Sublette County Weed and Pest would continue for weed treatment and control efforts.

Implementation

Objective: Implement the action items specified in this plan in a consistent and timely manner.

- Initial implementation will be in the summer of 2015 with additional signing and rehabilitation completed in subsequent years as funding and workload allow.

- Implementation of the "signs and markers", "barriers", and "rehabilitation" actions identified in this plan will be based on the following priorities:

    1. Primary routes leading into BLM lands (phase 1).
    2. Routes leading into private land, Wyoming State Lands, and U.S. Forest Service land (phase 2).
    3. All other routes (phase 3).

- Limited motorized cross-country travel, or exceptions to the route designations on BLM-managed public lands may be allowed for certain permitted uses and administrative uses as defined in 43 CFR 8340.0-5(a). Such use will be at the discretion of the Authorized Officer and determined on a case-by-case basis. Authorization for exceptions to the OHV designations for permitted uses will be documented in the respective permit files. Exceptions may also be granted by the Authorized Officer for certain pre-permit activities (ie: geophysical exploration). Verbal authorizations will be documented in writing.

    - 43 CFR 8340.0-5 Definitions.
      (a): *Off-road vehicle* means any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding:
      (1) Any nonamphibious registered motorboat;
      (2) Any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes;
      (3) Any vehicle whose use is expressly authorized by the Authorized Officer, or otherwise officially approved;
      (4) Vehicles in official use; and
      (5) Any combat or combat support vehicle when used in times of national defense emergencies.

- Limited cross country travel by motorized vehicles, or exceptions to the route designations on BLM managed public lands may be allowed for the grazing permittees within the Boulder Planning Area. The purpose of these exceptions is to authorize maintenance of range improvements, moving cattle, and accessing their private land holdings within the planning area. Travel on wet and/or muddy roads should be avoided to prevent rutting and potential soil erosion.

- Authorized exceptions to the OHV designations would be included as a statement in the appropriate NEPA documentation and in the permit stipulations, identifying the authorized route exceptions or locations of cross country travel.

- Modifications or additions to the route designations would be done through an appropriate level of environmental analysis and NEPA documentation with a statement, "this document

amends the travel management plan to include the following described route in the appropriate road use category".

- Modifications or additions to the route designations may be necessary to address proposals for new routes associated with rights-of-way or other permitted activities on public lands; to address future public access needs, or changing resource concerns; or to address the appropriate management of existing routes that are not represented on the inventory map. Any proposed changes would be subject to review and determination based on the goals and objectives and route selection criteria in this plan.

- Determination of the appropriate route designation and future management responsibilities for any new routes that are authorized would be documented as a condition of issuance of the permit or right-of-way.

- The official Travel Management Map will be updated as needed to reflect any approved modifications or additions. The revised map will be posted in the BLM Pinedale Field Office and will be available for distribution to the public.

- Additional guidance for management of motorized vehicles on BLM-managed public lands is available in the Travel Management Guidelines for the Public Lands in Wyoming (IM No. WY-2005-034), March 10, 2005, The Travel Management Handbook H-8342-1, March 29, 2012 and the BLM Roads and Trails Terminology Report (IM No. WO-2006-173), April 2006.

Specific Projects

Objective: Throughout this planning process, potential travel and access related projects were identified. The objective of this section of the plan is to document the projects to be implemented with this plan and the ideas for future consideration through the appropriate planning processes.

Projects to be implemented upon approval of this plan:

- Pursue funding for implementation of this plan through the BLM Budget Planning System.

- Pursue opportunities to involve volunteers and local clubs in implementation efforts; consider holding volunteer special events in the area to emphasize education and self-regulation of recreation groups.

- Seasonal Closure
    - Install and/or maintain signs or gates at seasonal closure gate locations as necessary to enforce the seasonal closure.
    - Prepare signs to post on each gate and on the main entry points into the planning area to inform the public of the purpose of the seasonal closure, the closure dates, and the allowable uses.
    - Distribute a news release to the local newspapers to explain and notify the public of the implementation of the seasonal closure.

- Work with the Wyoming State Trails Program to develop a volunteer trail patrol program to enhance public education and enforcement of the route designations in the planning area.

- Develop main entry point pullouts and install kiosks following necessary wildlife and cultural resource evaluations.

- Pursue easements across private land, or identify alternate access routes where necessary to ensure future public access to the Boulder Planning Area.

- Continue integrated weed control efforts in conjunction with recreational trail and road maintenance.

Appendix 3. Plant Species List for Boulder Landscape Assessment Area

Species Symbol	Scientific Name	Common Name	Nativity, Duration, and Growth Habit
ACHY	*Achnatherum hymenoides*	Indian ricegrass	Native perennial grass
ACLE9	*Achnatherum lettermanii*	Letterman's needlegrass	Native perennial grass
ACMI2	*Achillea millefolium*	Common yarrow	Native perennial forb
ACNE9	*Achnatherum nelsonii*	Columbia needlegrass	Native perennial grass
AGOSE	*Agoseris spp.*	Agoseris	Native perennial forb
ALLIU	*Allium spp.*	Wild onion	Native perennial forb
ANRO2	*Antennaria rosea*	Rosy pussytoes	Native perennial forb
ARABI2	*Arabis spp.*	Rockcress	Native perennial forb
ARARA	*Artemisia arbuscula* ssp. *arbuscula*	Low sage	Native perennial shrub
ARARL	*Artemisia arbuscula* ssp. *longiloba*	Early sage	Native perennial shrub
ARHO2	*Arabis holboellii*	Holboell's rockcress	Native perennial forb
ARHO4	*Arenaria hookerii*	Hooker's sandwort	Native perennial forb
ARTRT	*Artemisia tridentata* ssp. *tridentata*	Basin big sagebrush	Native perennial shrub
ARTRV	*Artemisia tridentata* ssp. *vaseyana*	Mountain big sagebrush	Native perennial shrub
ARTRW8	*Artemisia tridentata* ssp. *wyomingensis*	Wyoming big sagebrush	Native perennial shrub
ASCO12	*Astragalus convallarius*	Lesser rushy milkvetch	Native perennial forb
ASTRA	*Astragalus spp.*	Milkvetch	Native perennial forb
ATGA	*Atriplex gardneri*	Gardner's saltbush	Native perennial shrub
BASC5	*Bassia scoparia*	Kochia	Introduced annual forb
CAAND	*Castilleja angustifolia*	Indian paintbrush	Native perennial forb
CADU6	*Carex duriuscula*	Needleleaf sedge	Native perennial graminoid
CAFI	*Carex filifolia*	Threadleaf sedge	Native perennial graminoid
CAMO	*Calamagrostis montanensis*	Plains reedgrass	Native perennial graminoid
CASTI2	*Castilleja spp.*	Indian paintbrush	Native perennial forb
CAVA3	*Carex vallicola*	Valley sedge	Native perennial graminoid
CHVI8	*Chrysothamnus viscidiflorus*	Yellow rabbitbrush	Native perennial shrub
COUM	*Comandra umbellata*	Bastard toadflax	Native perennial forb
CRAC2	*Crepis acuminata*	Tapertip hawksbead	Native perennial forb
CREPI	*Crepis spp.*	Hawksbeard	Native perennial forb
CRFL6	*Cryptantha flavoculata*	Roughseed cryptantha	Native perennial forb
CRMO4	*Crepis modocensis*	Modoc hawksbeard	Native perennial forb
DELPH	*Delphinium spp.*	Larkspur	Native perennial forb
ELEL5	*Elymus elymoides*	Squirreltail	Native perennial grass
ELLA3	*Elymus lanceolatus*	Thickspike wheatgrass	Native perennial grass
ELTR7	*Elymus trachycaulus*	Slender wheatgrass	Native perennial grass
ERIGE2	*Erigeron spp.*	Fleabane	Native perennial forb
ERCA8	*Eriogonum caespitosum*	Matted buckwheat	Native perennial forb
ERNA10	*Ericameria nauseosa*	Rubber rabbitbrush	Native perennial shrub
EROV	*Eriogonum ovalifolium*	Cushion buckwheat	Native perennial forb
ERUM	*Eriogonum umbellatum*	Sulphur-flower buckwheat	Native perennial forb
FEID	*Festuca idahoensis*	Idaho fescue	Native perennial grass
GAYOP	*Gayophytum spp.*	Groundsmoke	Native annual forb
HACKE	*Hackelia spp.*	Stickseed	Native annual forb
HOJU	*Hordeum jubatum*	Foxtail barley	Native perennial grass
KOMA	*Koeleria macrantha*	Prairie Junegrass	Native perennial grass
KRLA2	*Krascheninnikovia lanata*	Winterfat	Native perennial subshrub
LECI4	*Leymus cinereus*	Basin Wildrye	Native perennial grass
LERE7	*Lewisia rediviva*	Bitterroot	Native perennial forb
LIPU11	*Linanthus pungens*	Granite prickly phlox	Native perennial subshrub
LODI	*Lomatium dissectum*	Fernleaf biscuitroot	Native perennial forb

LOMA3	*Lomatium macrocarpum*	Bigseed biscutroot	Native perennial forb
LUAR3	*Lupinus argenteus*	Silvery lupine	Native perennial forb
MUHLE	*Muhlenbergia spp.*	Mat muhly	Native perennial grass
OPPO	*Opuntia polyacantha*	Plains pricklypear	Native perennial shrub
ORLU2	*Orthocarpus luteus*	Yellow owl's-clover	Native perennial forb
OROBA	*Orobanche spp.*	Sand broomrape	Native perennial forb
OXYTR	*Oxytropis spp.*	Locoweed	Native perennial forb
PASM	*Pascopyrum smithii*	Western wheatgrass	Native perennial grass
PENST	*Penstemon spp.*	Beardtongue	Native perennial forb
PESI	*Pediocactus simpsonii*	Mountain ball cactus	Native perennial forb
PHHO	*Phlox hoodii*	Hood's phlox	Native perennial forb
PHLO2	*Phlox longifolia*	Longleaf phlox	Native perennial subshrub
PODI2	*Potentilla diversifolia*	Mountain-meadow cinquefoil	Native perennial forb
POFE	*Poa fendleriana*	Muttongrass	Native perennial grass
POSE	*Poa secunda*	Sandberg bluegrass	Native perennial grass
PSSP6	*Pseudoroegneria spicata*	Bluebunch wheatgrass	Native perennial grass
PUTR2	*Purshia tridentata*	Antelope bitterbrush	Native perennial shrub
SELA	*Sedum lanceolatum*	Lanceleaf stonecrop	Native perennial forb
SIDR	*Silene drummondii*	Drummond's campion	Native perennial forb
SPCO	*Sphaeralcea coccinea*	Scarlet globemallow	Native perennial forb
SPSA5	*Spergularia salina*	Salt sandspury	Native annual forb
STAC	*Stenotus acaulis*	Stemless mock goldenweed	Native perennial forb
SYMPH	*Symphoricarpos spp.*	Snowberry	Native perennial shrub
SYMPH4	*Symphyotrichum spp.*	Aster	Native perennial forb
TECA2	*Tetradymia canescens*	Spineless horsebrush	Native perennial subshrub
TRDU	*Tragopogon dubius*	Goatsbeard	Native perennial forb
TRGY	*Trifolium gymnocarpon*	Hollyleaf clover	Native perennial forb
VIAM	*Vicia americana*	American vetch	Native perennial forb

Note: Nomenclature follows the. USDA, NRCS. 2013. The PLANTS Database (http://plants.usda.gov, 21 February 2013). National Plant Data Team, Greensboro, NC 27401-4901 USA.