

Jefferson County South East Assessment Report



Butte Field Office
March, 2013

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Introduction

This document is a land health assessment of the public lands administered by the Bureau of Land Management (BLM) in the Jefferson County SE (JCSE) Planning Area (PA).

This is the first in a series of documents: the Jefferson County SE Assessment Report, the Authorized Officer's Determination of Standards, and the appropriate National Environmental Policy Act (NEPA) documentation and subsequent Decision(s) changing management where needed.

The Assessment reports the condition and/or function of public land resources within the JCSE PA to the authorized officer. The authorized officer reviews the findings in this report to determine if the five standards of rangeland health are currently being met. The authorized officer then signs a Determination of Standards documenting where Land Health Standards are met and where they are not.

In addition to the condition/function assessment, the report also contains initial recommendations developed by the interdisciplinary team (IDT) during field assessments. The recommendations in the report focus primarily on livestock grazing, timber and fuels management, noxious weed control, recreation activities, wildlife and fisheries habitat, travel plan, and road maintenance. Impacts from all uses and programs were assessed and documented as part of this process.

The assessed condition, function and recommendations in the Assessment Report and Determination of Standards will be used in the NEPA process. An environmental assessment (EA) will be written addressing all resource concerns in the watershed. The EA will include all BLM-administered public lands covered in the assessment.

Alternative management will be analyzed wherever it is determined that:

- specific grazing allotments are not meeting the Standards
- allotments are meeting the Standards but have site specific concerns
- there are unhealthy forest conditions in the watershed
- fuels conditions are outside the natural range of variability
- there are other documented resources concerns

Also, if existing grazing management practices or levels of grazing use on public lands are determined to be significant factors in failing to achieve one or more of the five Standards, the BLM is required by regulation (43 CFR 4180.1) to make grazing management adjustments.

Implementation of new plans will begin in 2013, but full implementation of forest treatments, fuels projects, revised grazing plans, and/or range improvement projects associated with these plans may take several years.

The new plans will be developed in consultation and coordination with the affected lessees, agencies having lands or managing resources within the area, and other interested parties.

The Butte Field Office (BFO) completed a Resource Management Plan (RMP) in April of 2009. This document will provide program guidance in the Butte Field Office for the next 20 years. The RMP replaces The Headwaters Resource Management Plan (1983).

In 2011, the BFO developed a prioritization method and approach for planning and implementing work across most major programs. The key concept behind this was to establish long-term Field Office Planning Areas (PAs) as well as procedures and a schedule of planning and implementation for activities occurring within those PAs. The PAs were defined as units with discrete geographic boundaries and comprised of multiple watersheds with similar vegetation and hydrologic characteristics. Other variables were also used to develop PA boundaries which included; weed management areas, grazing allotment boundaries, travel plan area boundaries, and distinct political boundaries. By working on a planning area basis, a broader landscape is considered and more consistent management can be applied. It is the BLM's intent to implement management cooperatively. Any changes in livestock management will be implemented through grazing decisions that address allotments or groups of allotments with a common permittee. Forest health and fuels management treatments or projects and any other management projects or changes will be implemented through decisions appropriate for the respective programs.

As with all similar BLM decisions, affected parties will have an opportunity to protest and/or appeal these decisions, which will be described in subsequent decision documents.

Background

The JCSE PA is located in Jefferson County, Montana and drains portions of the Boulder and Elkhorn mountain ranges and London Hills. The planning area lies within Townships 1-4 North and Ranges 1-4 West Principal Meridian Montana (P.M.M.).

The assessment area covers public lands administered by the BLM from Fitz Creek in the west to Shoddy Springs in the east, and from the Boulder River in the north, south to Huller and Sappington Springs. Elevation on BLM land ranges from approximately 4,600 to 7,100 feet. Lands administered by BLM within the JCSE receive about 8 to 19 inches of average annual precipitation.

Within the JCSE PA there are approximately 231,330 total acres of land, of which 24,490 are public lands administered by the BLM. Of the total BLM-administered lands, 24,311 acres are allotted for livestock grazing and 179 acres are unallotted. This report addresses only land health conditions on public (BLM) land.

Fire History

The presence or absence of fire plays an integral role in the composition and structure of the vegetation that occurs in the JCSE PA. Fire has shaped western landscapes for the past 10,000 years, but more than a century of settlement activities have seriously disrupted that crucial role (Arno 1980, Pyne 1982, Quigley et.al 1996). Since the mid-1800s the frequency of wildland fires occurring in Montana and throughout the west have been reduced by domestic livestock grazing, land use practices, and aggressive fire suppression procedures. Ignitions were primarily due to lightning and Native Americans, who used fire to signal, drive game, rout enemies, and green up pastures to ensure the return of game from year to year. Throughout the assessment area the signs of past fires are evident in the form of fire scars on trees and charred pieces of wood. Variance in sagebrush stand structure demonstrates the effects of more recent wildland fire events in sagebrush/grassland communities. Long term fire history is difficult to determine in the sagebrush/grassland communities due to fire generally killing and completely consuming the vegetation.

Wildfire activity has been moderate in the project area in recent decades. Historic fire data indicate that the 167 fires occurred in the planning area over the past 10 years and accounted for 1200 acres, most wildfires in the project area have been relatively small in size (less than 5 acres) due in large part to fire suppression activities. The largest fire that has occurred the past 10 years was the Antelope fire in 2012 that burned 707 acres. The remaining 500 acres were consumed by 166 separate fires that average less than .5 acre in size.

Fire Regime

The term “natural fire regime” describes the role fire would play across a landscape in the absence of modern human mechanical intervention (Agee 1993, Brown 1995). The five natural (historic) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of stand replacement) of the fire on the dominant overstory vegetation (Schmidt et al. 2002). These five regimes include:

- I – 0 to 35 year frequency and low to mixed severity * (non-lethal surface fires most common; less than 70 percent of the dominant overstory vegetation replaced);
- II – 0 to 35 year frequency and high severity (stand replacement fires);
- III – 35 to 100+ year frequency and mixed severity;
- IV – 35 to 100+ year frequency and high severity (stand replacement fires); and
- V – 200+ year frequency and high severity (stand replacement fires).

*Fire severity is what happens to the dominant vegetation (in this case trees) during a fire event. If most of the overstory trees die in most fires, (i.e., greater than 75 percent of the dominant overstory vegetation) then that area is said to be characterized by a “stand replacement fire regime.” Conversely, if most trees survive most fires, it is called a “non-lethal fire regime.” If severity is generally intermediate (many trees dying and many surviving), it is a mixed severity fire regime (Arno et al. 2000).

The dominant natural fire regimes in the JCSE landscape are represented by grass as Regime II and sagebrush as regime IV. These two strata account for 82% of the vegetation in the planning area; the remaining fire regimes are represented by III (Riparian, Lodgepole, Mahogany), while Douglas- fir and Aspen are classified as Regime I.

Due to fire suppression, natural fire regimes for the project area have been altered since pre-settlement conditions. Current forest structure and abundant ladder fuels have created forest conditions that are susceptible to stand replacement fire in the planning area rather than what would have occurred naturally.

Wilderness Study Areas

The 5,917-acre Black Sage Wilderness Study Area (WSA) was established in 1981 and is located in the JCSE PA. All sides of the area are bordered by private land, and there is no legal access. The area is characterized by rolling hills with elevations ranging from 5,000 to 6,000 feet. Approximately 40 percent of the area is vegetated with Rocky Mountain juniper (*Juniperus scopulorum*), curleaf mountain mahogany (*Cercocarpus ledifolius*), Douglas-fir (*Pseudotsuga menziesii*), and limber pine (*Pinus flexilis*); the remainder is comprised of various grasses and sagebrush. No perennial water sources occur in the area, and there are no dominant features except for a forested ridge face in the central portion of the area. A Wilderness suitability study and EIS recommended the area as unsuitable for Wilderness designation (USDI – BLM 1986); this recommendation has been forwarded to Congress. This WSA is currently being managed under the guidelines of the Wilderness Interim Management Policy (USDI – BLM 1995).

Sensitive Plant Species

BLM Sensitive Species are defined by the BLM 6840 Manual as those that normally occur on Bureau administered lands for which BLM has the capability to significantly affect the conservation status of the species through management. The State Director may designate additional categories of special status species as appropriate and applicable to his or her state's needs. The sensitive species designation, for species other than federally listed, proposed, or candidate species, may include such native species as those that:

- Could become endangered in or extirpated from a state, or within a significant portion of its distribution in the foreseeable future
- Are under status review by FWS and/or NMFS
- Are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution
- Are undergoing significant current or predicted downward trends in population or density such that federally listed, proposed, candidate, or State listed status may become necessary
- Have typically small and widely dispersed populations
- Are inhabiting ecological refugia, specialized or unique habitats
- Are State listed but which may be better conserved through application of BLM sensitive species status. Such species should be managed to the level of protection required by State laws or under the BLM policy for candidate species, whichever would provide better opportunity for its conservation

Designation Descriptions

Sensitive - Denotes species listed as sensitive on BLM lands.

Special Status - Denotes species that are listed as Threatened or Endangered under the Endangered Species Act (ESA).

No known populations of Special Status Plants occur on BLM lands within the Jefferson County Southeast Planning area. There are two known locations of Parry's fleabane (*Erigeron parryi*) on private and state lands adjacent to BLM lands. There are two (2) species of riparian plants that may occur on BLM lands within the JCSE PA that are designated as sensitive by the BLM. These species are annual Indian paintbrush (*Castilleja exilis*) and mealy primrose (*Primula incana*).

Prehistory and History of the Jefferson County SE Planning Area

The Jefferson River SE Planning Area contains the same broad spectrum of site types found in other locations within the Butte Field Office management unit. As with the rest of the region, prehistoric sites as old as 9,000 years have been recorded. Prehistoric site types follow the predominant subsistence strategy of hunting and gathering, with a few locations where large game (particularly bison) have been trapped. The single largest category of prehistoric site type is the lithic scatter, consisting of stone chips left over from tool manufacturing activity.

Historic site types are overwhelmingly represented by historic mining, although a few ranching and homesteading locations exist on private land. Miners came to this area before the end of the Civil War, and worked the local streams to recover free gold and later silver.

As the free gold played out, mining operations began to go underground to recover rich ore veins. However, the underground efforts in Jefferson County were much less productive than other nearby locations in Butte or Helena. Indeed, it can be said that the significance of

underground mining in Jefferson County rests with the present day, while the Golden Sunlight mine still operates a large open-pit mine and processes waste dump material brought in from abandoned mines from around the area.

Authorized Uses

Forest Products

Forest resources in the watershed have been utilized historically and continue to be utilized today. Evidence in the form of old stumps can be found across all ownerships through forested habitats in the assessment area. There haven't been any recent forest management activities (timber harvests) on BLM administered lands within the JCSE PA. Most of the historic forest product use on the BLM is through small sales such as firewood, small sawlogs, and post and poles.

Recreational Uses

All of the BLM-managed lands within the JCSE PA are located within the Butte Field Office's Extensive Recreation Management Area (ERMA), as defined in the Record of Decision and Approved Butte Resource Management Plan (2009). Under this definition, the primary focus of an ERMA is to provide for resource protection, public safety, and user satisfaction. Public services, monitoring, improvements, and facility maintenance are generally conducted at a lower scale, but can still be present.

Currently, recreation use within the JCSE PA is primarily dispersed in nature, with hiking, hunting, and driving for pleasure being the primary uses. However, members of a mountain bike club in Bozeman have expressed interest in developing a network of mountain biking trails in the Doherty Mountain area. This proposal is currently being finalized by the club and will be presented to BLM so that it can be addressed under the Environmental Assessment for the JCSE PA.

Mineral Resources

Mineral activity in the Planning Area is mostly concentrated in the vicinity of the Golden Sunlight Mine area at the south end of the Bull Mountains. This property was discovered in the late 1800s and was mined intermittently in the 1900s prior to being permitted as an open pit mine in 1982. Operations have continued since then and the mine has an active exploration program in the general vicinity of the mine.

The Elkhorn range north of the PA has an extensive history of mineral exploration and development, but the only historic site extending into the Planning Area is the Ida Mine at the very north end of the PA, north of the Black Sage WSA. The area east of the Boulder River in the PA consists of Paleozoic sedimentary rocks with low potential for mineral resources. The only other mineral activity in the PA is some minor placer mining activity along the Jefferson River at the very south end of the PA.

Livestock Grazing

Sixteen (16) individual operators have grazing permits/leases on approximately 24,000 acres (19 allotments) of public lands administered by the BLM within the Jefferson County South East project area. BLM administered lands within the project area provide an important source of late spring, summer, fall, and winter livestock forage. The BLM currently permits 2,363 Active AUMs on the allotments included in this project area.

Table 1. Current Grazing Management within JCSE PA Allotments.

Allotment Name	Allotment Number	Livestock Kind	Season of Use	Current Grazing System
Black Sage	20216	Cattle	6/21-9/8	Deferred
Boulder River	20212	Cattle	4/1-12/31 (East Pasture) 3/1-5/25 & 10/15- 2/28 (Towhy Pasture)	Deferred
Bull Mountain	20220	Cattle	6/1-9/30	Deferred
Cottonwood	10285	Cattle	5/17-6/15 (North Pasture) 5/17-5-31 (South Pasture)	Rest Rotation
Cottonwood Springs	11025	Cattle	6/1-10/31	Deferred
County Line	20210	Cattle	5/16-11/15 (East, Dunn, Sheehy Basin, Big Mountain Pastures)	Rest Rotation on the East Pasture. Deferred on the other pastures.
Dry Hollow	20299	Cattle	5/1-10/31	Custodial Grazing
Fitz Creek	20308	Horses	10/1-02/28	Continuous (winter)
Huller Springs	10264	Cattle	5/1-10/30	Deferred
Lower Butte	11175	Horse	3/1-2/28 (yearlong)	Custodial Grazing
McKenna	20302	Cattle	5/15-7/16	Deferred
North Doherty	20211	Cattle	5/15-6/15 11/15-12/30	Rest Rotation
Sappington	20271	Cattle	7/1-8/15	Deferred
Shoddy Springs	11024	Cattle or Horses	7/1-9/30	Deferred
South Doherty	20217	Cattle	6/5-9/5 (Harris Pasture) 9/6-10/31 (Knucky Pasture)	Rest Rotation
T4N, R2W, Sec 21	20262	Cattle	5/1-11/1	Custodial Grazing
3 East Pastures	20375	Cattle	5/1-11/1	Deferred
Wickham Field	20260	Cattle	6/1-10/15	Custodial Grazing
Willow Spring Road	20280	Cattle	6/1-11/30	Deferred

Current authorized stocking rates on BLM lands within the project area averages 10 acres/Animal Unit Month (AUM) and varies from 3.3 to 23.3 acres/AUM (Table 2). AUMs are the amount of forage needed to sustain one animal unit for one month. An animal unit is one mature cow of approximately 1,000 pounds and her calf up to 6 months of age, or their equivalent. The wide variation in stocking rate is directly related to the difference in soils, vegetation, topography (aspect, elevation, and slope), and distance from water throughout the project area.

Table 2. Grazing Allocation and Stocking Rates within JCSE PA Allotments.

Allotment Name	BLM Acres	BLM AUMs	BLM Stocking Rate (acres/AUM)
Black Sage	1829	158	11.6
Boulder River	2177	163	13.4
Bull Mountain	5299	654	8.1
Cottonwood	1305	88	14.8
Cottonwood Springs	612	118	5.2
County Line	4123	192	21.5
Dry Hollow	120	12	10
Fitz Creek	1733	136	12.7
Huller Springs	1680	72	23.3
Lower Butte	138	14	9.9
McKenna	40	10	4
North Doherty	1482	274	5.4
Sappington	474	29	16.3
Shoddy Springs	160	36	4.4
South Doherty	1629	170	9.6
T4N, R2W, Sec 21	40	12	3.3
Three East Pastures	1280	184	7
Wickham Field	140	31	4.5
Willow Spring Road	50	10	5
Totals	24,311	2363	10.0 AVG

The following is a description of the livestock grazing allotments in the JCSE PA, including the standard Authorized Officer's Determination of pre - 2012 Land Health Assessments:

Black Sage Allotment

The Black Sage Allotment consists of approximately 1,829 acres of BLM managed land and 70 acres of private land. The majority of this allotment lies east of Highway 69, and a 160 acre tract lies west of Highway 69. This 160 acre tract is referred to as the Fox Place Pasture. The main Black Sage Allotment is grazed from the 3rd week in June to early September each year. Livestock grazing is distributed with the Black Sage water system. This is a pipeline system that has water pumped to a storage tank onto higher elevations on the allotment and then water gravity flows to, two stock water tanks at different locations on the allotment. The 160 acre tract is grazed with adjacent private land for approximately 30 to 45 days each year on an alternating basis. The first year the Fox Place Pasture is grazed during the early summer and the next year the pasture is grazed in late summer to about the beginning of the fall season.

All standards of the 2007 Land Health Assessment (LHA) were met.

There is one trend study located in the allotment. Black Daub # 1 was established in 2006 and read again in 2011. Grasses and forbs appear static. Black sagebrush (*Artemisia nova*)

frequency has increased from 5% to 15%. Cover of litter has increased from 42% to 73%. Bare ground canopy coverage has decreased from 18% to 8%. Upland trend can be characterized as static. A longer time period and more readings are needed for a more reliable evaluation of this study.

Boulder River Allotment

The Boulder River Allotment consists of approximately 2,177 acres of BLM managed land and 5,000 acres of private land. This allotment has four pastures that contain BLM managed land, and private land in each pasture that is grazed in conjunction with the BLM managed lands. A number of additional private land pastures are also used in the rotation throughout the grazing season with these four pastures. The allotment's authorization only shows two pastures; in reality one of the pastures, the East Pasture, is divided into three separate pasture areas. Each of the four pastures contains both public and private lands. The private property receives the majority of the livestock grazing in each pasture. This land contains most of the livestock forage and stock water in the allotment. Many of the pastures have some private lands that have been planted into crested wheatgrass and provide early season forage. The Ida Mine Pasture has some private land acreage, which has been planted into Bizosky wild rye, a subspecies of Russian wild rye (*Elymus junceus*), to provide late season grazing.

All standards of the 2006 Land Health Assessment (LHA) were met.

There is one (1) trend study located in the allotment. The Boulder River Daub # 1 was established in 1988 and has been read three times. Composition of grasses, forbs, and shrubs is relatively unchanged. Broom snakeweed (*Gutierrezia sarothrae*), an increaser under livestock grazing pressure, has decreased from 8% to 2%. Bare ground frequency has remained unchanged. Upland trend can be characterized as static.

Bull Mountain Allotment

The Bull Mountain Allotment consists of approximately 5,299 acres of BLM managed land and 330 acres of private land. The allotment has four pastures.

All standards of the 2003 Land Health Assessment were met with the exception of the riparian standard. Three riparian reaches were found to be Functioning at Risk (FAR). The steep topography of this allotment funnels livestock into the riparian bottoms creating some stream bank trampling. An Environmental Assessment (EA) (MT-070-04-06) was completed in early 2004 with the purpose to address these riparian concerns and begin making progress towards attaining properly functioning riparian areas and meeting the riparian standard. The grazing system was changed, through this EA, to spend a shorter period of grazing time in each pasture, and therefore less time would be spent on the riparian areas. The enclosure fence was expanded at Microwave Spring and the spring's headbox and pipeline were redeveloped to improve this rangeland development.

There are three trend studies located in the allotment. Bull Mountain Daubenmire # 1 (Conrow Pasture) and # 2 (Pipeline Pasture) were both established in 1979 and have both been read seven times. The last readings occurred in 2009 and 2008, respectively. Overall, the trend of grasses and forbs in Daubenmire #1 are static. There is a decline in frequency of needle and thread (*Stipa comata*), 20% to 2%. Big sagebrush (*Artemisia tridentata*) frequency has also declined from 50% to 5%. Bare ground has been reduced, 95% to 40%, and litter canopy coverage has increased, from 58% to 85%. Upland trend of Daubenmire #1 can be characterized as static.

After a decline of needle and thread in the 1980s, the species has become more abundant on Daubenmire #2. Composition was recorded at 12% in 1979, 1.5% in 1985, and 19% in 2009. All the other grass species on the study are static. Composition of Broom snakeweed has declined from 30% to 2%. Percent canopy coverage of litter has increased from 14% to 57%. Composition of Fringed sagewort (*Artemisia frigida*) has increased from 3% to 5%. Upland trend of Daubenmire #2 can be characterized as upward.

Bull Mountain Daubenmire #3 (St. Paul Pasture) was established in 1988 and has been read four times. The last reading was in 2008. Bare ground has declined on this study, from 49% to 14%. The composition of blue grama (*Bouteloua gracilis*) decreased between 2003 and 2008, from 14% to 4%. Bluebunch wheatgrass (*Pseudoroegneria spicata*) composition has increased from 9% to 13%, and Fringed sagewort, a species that increases with disturbance, has increased from 14% to 5%. There was no broom snakeweed found in 2008, which demonstrates effectiveness of grazing management to increase composition of native species. There is less cover of litter in 2008, compared with the amount observed in 1988, 20% to 14%, respectively. Upland trend can be characterized as upward.

Cottonwood Allotment

The allotment consists of approximately 1,305 acres of BLM managed land, 500 acres of private land, and 220 acres of state land. This allotment has two pastures. The North Cottonwood Pasture is grazed every other year, and rested on non-grazed years. The South Cottonwood Pasture is grazed two years in a row and rested the third year. The public land in this pasture is grazed with adjacent State of Montana lands and private property. The state land and private property receive the majority of the livestock grazing in each pasture. The state land and private property has more even terrain and contains most of the stock water in the pasture.

All standards of the 2005 Land Health Assessment (LHA) were met. There are no monitoring studies on this allotment.

Cottonwood Springs Allotment

The allotment consists of approximately 612 acres of BLM managed land and 960 acres of private land. The public lands sit at a slightly higher elevation than the grazing permittee's adjacent private property. Livestock tend to stay on the private property more during the summer months and utilize the public land during the late summer and early fall. The permittee's private property contains the majority of the stock water on the allotment and the terrain is more even than the public lands, making the livestock prefer this area during most of the grazing season. The public lands are accessible to the livestock throughout the grazing season; however, they are used more when temperatures are cooler.

All standards of the 2009 Land Health Assessment (LHA) were met. There are no monitoring studies on this allotment.

County Line Allotment

The allotment consists of approximately 4,123 acres of BLM managed land, 18,827 acres of private land, and 640 acres of state land. This allotment has five pastures; however the East Pasture is used as two pastures. The East Pasture is divided into the NE and SW portions and managed under a two pasture rest rotation grazing system. Each pasture contains private property. The private property receives the majority of the livestock grazing in each pasture. The private property contains most of the livestock forage and stock water in the allotment area.

Each pasture has some private lands that have been planted into crested wheatgrass (*Agropyron cristatum*) and provide early season forage. The public lands are primarily used by livestock later in the grazing season.

All standards of the 2002 Land Health Assessment (LHA) were met. There are no monitoring studies on this allotment.

Dry Hollow Allotment

The allotment consists of approximately 120 acres of BLM managed land and 4,360 acres of private land. The majority of the livestock grazing in this area occurs on this adjacent private property. The private lands hold the majority of the forage and all the stock water of the area. The private lands have less topography and are more accessible to livestock than BLM lands within the allotment.

All standards of the 2009 Land Health Assessment (LHA) were met. There are no monitoring studies on this allotment.

Fitz Creek Allotment

The Fitz Creek Allotment consists of approximately 1,733 acres of BLM managed lands and 487 acres of private lands. Allotted AUMS are: BLM-136, private-63. Historically, this allotment was managed under a summer cattle permit. Beginning in 1996, the permit was changed to winter horse grazing.

Though the allotment can be fenced into a North and a South Pasture, it is currently being grazed as one pasture during the winter months. Provisions have been made for the grazing operator to build a pasture division fence. If, in the future, this fence is built and the allotment is used as a two pasture rotation system, then the end grazing date would be extended to March 30 each year.

The 1998 Land Health Assessment indicated that all the standards were met, and improvements to the uplands and riparian standards were observed, mostly due to the change in grazing management to a winter horse permit.

There are two Daubenmire studies and two utilization studies on this allotment. Daubenmire #1, in the southern half of the allotment, has been read eight times since 1985, and the trend of native upland grasses and forbs has been mostly static.

Daubenmire #2, in the northern half of the allotment, has been read nine times since 1982, and, overall, the native grasses and forbs have been static at this site. From 1982 to 2008, Bluebunch wheatgrass, an important native grass, has increased from 70% to 90% in frequency (how often it occurs in the study), from 8% to 21% in cover (how much ground is covered by vertical plant canopy), and from 16% to 30% in composition (the percent each plant species makes up in the total 100% plant composition in the study).

Utilization Study #1 in the South Pasture indicates, since the winter horse grazing has been in effect, average utilization of the key species, bluebunch wheatgrass, has been lower: 24% by cattle compared with 16% by horses. Conversely, an increase of overall average use on needle and thread grass has been observed since the allotment was converted to horse grazing: 21% by cattle and 45% by horses.

Utilization Study #2 in the North Pasture also shows decreased average use on the key species bluebunch wheatgrass by horses: 35.3% by cattle vs. 21.8% by horses.

Huller Springs Allotment

The allotment consists of approximately 1,680 acres of BLM managed land. Use on this allotment is light, typically only four or five days in the spring and approximately one week in the fall when livestock cross the allotment to reach other private pastures.

The upland and riparian standards of the 2006 Land Health Assessment (LHA) were not met, because of conifer encroachment and noxious weeds common throughout the allotment. The other standards were met on the allotment. The LHA determined that existing levels of grazing use on the allotment promotes achievement or significant progress toward the SW Montana Standards for Rangeland Health.

There is one trend study located in the allotment. Huller Daub # 1 was established in 2006 and read again in 2011. Grasses and forbs appear static. Big sagebrush frequency increases between readings from 30% to 60%. Upland trend can be characterized as static.

Lower Butte Allotment

The allotment consists of approximately 138 acres of BLM managed land, 840 acres of private property, and 480 acres of state land.

All standards were met in the 2007 Land Health Assessment. There are no monitoring studies on this allotment.

McKenna Allotment

The allotment consists of approximately 40 acres of BLM managed land, 3828 acres of private land, and 643 acres of state land. Livestock grazing on this allotment occurs primarily on adjacent private property. This 40 acre tract of public land lies over one mile away from stock water sources in this pasture. This pasture is rested when the weather allows the livestock to stay in other pastures longer.

All standards of the 2007 Land Health Assessment (LHA) were met. There are no monitoring studies on this allotment.

North Doherty Allotment

The allotment consists of approximately 1,482 acres of BLM managed land, 3,572 acres of private land, and 640 acres of state land. Livestock grazing on this allotment occurs primarily on adjacent private property. There is little stock water on public lands in this allotment. Major stock water sources are all located on this adjacent private property.

All standards of the 2007 Land Health Assessment (LHA) were met. There are no monitoring studies on this allotment.

Sappington Allotment

The allotment consists of approximately 474 acres of BLM managed land and 633 acres of private land. The Sappington Allotment contains a spring source, approximately 0.5 acres in size, on public land. Sappington Spring is a developed source of stock water, lying near the southern boundary of the public land in the allotment. The other stock water sources are developed and undeveloped, and are on adjacent private land that is grazed in conjunction with

public land. The majority of the livestock grazing occurs on adjacent private property, which contains most of the stock water, more even terrain, and has the majority of the forage in the allotment compared with the BLM lands. The adjacent private property managed for grazing with the public lands in the Sappington Allotment have been planted in a number of grass and forb species that benefit wildlife and livestock.

All standards of the 2006 Land Health Assessment (LHA) were met except the riparian and water quality standards, as attributed to the condition of Sappington Spring. The Sappington Spring development was rebuilt and an enclosure was built around the spring source and riparian reach in 2007. Trampling of the spring source and the saturated soil on the stream channel below the spring source is no longer accessed by livestock; this previously impacted riparian area has healed, and is now rated as Proper Functioning Condition.

Shoddy Springs Allotment

The allotment consists of approximately 160 acres of BLM managed land and 960 acres of private land. The private property receives the majority of the livestock grazing in each pasture. The private property contains most of the livestock forage and all of the available stock water in the allotment.

All standards of the 2009 Land Health Assessment (LHA) were met. There are no monitoring studies on this allotment.

South Doherty Allotment

The allotment consists of approximately 1,629 acres of BLM managed land and 320 acres of private land. The allotment has two pastures, the Knucky and Harris Pastures. The current permitted use is 170 AUMs.

The Knucky Pasture receives little livestock grazing, because the pasture contains limited sources of stock water. The Harris Pasture receives three to four weeks of grazing during the pasture's authorized time period, and is rested when the weather allows the livestock to stay in other pastures longer.

All standards of the 2007 Land Health Assessment (LHA) were met. It was noted that a new riparian reach was identified in the Harris Pasture in 2007. It was rated as FAR with an upward trend. This rating meets the riparian standard of the LHA.

There is one trend study located in the allotment, in the Harris Pasture. South Doherty Daub # 1 was established in 2008 and read again in 2011. Grasses and forbs appear static. Big sagebrush frequency slightly increases between readings. This is a positive response for sagebrush dependent animal species. Upland trend can be characterized as static.

T4N, R2W, Section 21 Allotment

The Section 21 Allotment consists of approximately 40 acres of BLM managed land and 600 acres of private land. The terrain is predominantly characterized by hillsides, escarpments, ridges, knolls, and strath terraces. The plant community primarily consists of a sagebrush-grassland with encroaching juniper.

Under the grazing permit for Section 21 Allotment, livestock numbers will not be regulated if use is not detrimental to the condition of public land; however, the permittee must stay within the

permitted grazing dates. Current and past BLM involvement with this allotment has been largely limited to administrative functions.

Montana Standards for Rangeland Health were assessed at Section 21 Allotment in 2007. The upland, air quality, and biological diversity standards were met. The riparian and water quality standards were not applicable.

According to the 2007 assessment of standards for rangeland health at Section 21 Allotment, areas with conifer encroachment and high sagebrush densities are present and appeared to reduce watershed function and production of desirable grasses and forbs; however, desirable range vegetation (e.g. needle-and-thread) was a predominant component of the landscape. Cheatgrass (*Bromus tectorum*), leafy spurge (*Euphorbia esula*), common mullein (*Verbascum Thapsus*), annual mustards, and other invasive/noxious weed species were scattered throughout the allotment but were mostly localized to the drainages being used as travel/trailing corridors. There are no established monitoring sites within this allotment.

Three East Pastures Allotment

The allotment consists of approximately 1,280 acres of BLM managed land and 6,200 acres of deeded land. The BLM lands are rated at 184 AUMs and the deeded lands are rated at approximately 1,450 AUMs.

Ironically, the allotment is fenced into four (4) pastures; the Windmill, Black Butte, Middle East and Lower East Pastures. The approximate acreage of each pasture is as follows;

- Windmill Pasture – 1,740 acres (100% deeded land)
- Black Butte Pasture – 1,280 acres (640 acres of BLM land and 640 acres of deeded land)
- Middle East Pasture – 2,340 acres (320 acres of BLM land and 2,020 acres of deeded land)
- Lower East Pasture – 2,120 acres (320 acres of BLM land and 1,800 acres of deeded land)

The BLM grazing permit is currently issued as follows:

Cattle usually graze the BLM lands within the allotment in late May or June. Each pasture is grazed for a maximum period of 10-14 days. The permittee uses this allotment prior to moving the cattle north onto additional private, BLM and USFS lands for the summer.

Vegetation common throughout the allotment includes, but is not limited to; needle and thread (*Hesperostipa comata*), bluebunch wheatgrass, threadleaf sedge (*Carex filifolia*) and Sandberg bluegrass (*Poa secunda*), Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), and Rocky Mountain juniper.

The Black Butte Pasture does not have a developed water source for livestock. Cattle water from Black Butte Creek if it is available, and also from troughs that are located on private land in T2N, R4W, SE¼SE¼ Sec. 11. The permittee must haul water to these troughs daily when cattle are in the Black Butte Pasture.

A 2003 assessment determined that all five (5) of the Standards for Rangeland Health were being met and/or significant progress was being made toward attainment. However it was noted that “One riparian area J-89 flows intermittently on the northern edge of Black Butte within this allotment. It was rated as Functioning at Risk with an upward trend. Most of the reach had

substantial coverage of riparian vegetation. Some watering points exhibited trampling; however, these were rare. Juniper encroachment is becoming problematic throughout the reach. Current livestock management appears to be contributing to the improvement of this stream.” (Due to a change in the naming convention associated with riparian reaches, J-89 is now identified as WTLT-1.)

Wickham Field Allotment

The allotment consists of approximately 140 acres of BLM managed land and 120 acres of private land. The terrain is predominantly characterized by hillsides, escarpments, knolls, and strath terraces. The plant community primarily consists of a shrub-steppe with encroaching juniper and one riparian zone.

Under the grazing permit for Wickham Field Allotment, livestock numbers will not be regulated if use is not detrimental to the condition of public land; however, the permittee must stay within the permitted grazing dates. Current and past BLM involvement with this allotment has been largely limited to administrative functions.

Montana Standards for Rangeland Health were assessed at Wickham Field Allotment in 2007. The upland, air quality, and biological diversity standards were met. The riparian and water quality standards were not met. There did not appear to be significant progress and trend was unknown. Livestock were not considered a contributing factor.

According to the 2007 assessment of standards for rangeland health at Wickham Field Allotment, blue grama is predominant and conifers are encroaching. Invasive species were common throughout the allotment and included Dalmatian toadflax (*Linaria genistifolia ssp. Dalmatica*), cheatgrass, broom snakeweed, common mullein, and various annual mustard species. Invasive species, conifers, and blue grama appeared to have reduced the reproduction capability of desirable native rangeland species such as bluebunch wheatgrass; however, other native perennial bunchgrasses were present, such as needle-and-thread, to provide forage and help maintain biotic integrity. It was unknown whether invasive species will continue to increase under the current grazing system or whether a change in current grazing management will produce an upward trend in range condition without significant restoration efforts (e.g. herbicide treatment and reseeding). Even though the upland vegetation has transitioned into a less than desired state, the uplands still appeared to be functioning. There are no established monitoring sites within this allotment.

Wickham Field Allotment is within the Elkhorns Cooperative Management Area.

Willow Spring Road Allotment

The allotment consists of approximately 50 acres of BLM managed land and 1,840 acres of private land. The private property contains the majority of the livestock forage and all the stock water, and has had some of this acreage planted into crested wheatgrass to provide additional forage for cattle.

All standards of the 2010 Land Health Assessment (LHA) were met.

Process

This assessment was done in accordance with the BLM regulations regarding Rangeland Health Standards (Standards) and other applicable guidance.

- BLM Manual H-4180-1, Rangeland Health Standards Handbook and Guidance for Conducting Watershed-Based Land Health Assessments.
- Code of Federal Regulation 43 CFR, Subpart 4180
- Record of Decision (ROD) - Standards for Rangeland Health and Guidelines for Livestock Grazing Management (S&Gs) for Montana, North Dakota and South Dakota.
- Healthy Forest Initiative
- Healthy Forests Restoration Act
- National Fire Plan

Rangeland Health Standards are described in detail in the ROD Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota- Western Montana Standards.

The preamble of the Western Montana Standards states: “The purpose of the Standards and Guidelines are to facilitate the achievement and maintenance of healthy, properly functioning ecosystems within the historic and natural range of variability for long-term sustainable use.” Standards are statements of physical and biological condition or degree of function required for healthy sustainable lands. Achieving or making significant progress towards these functions and conditions is required of all uses of public lands as stated in 43 CFR 4180.1.

The Butte Resource Advisory Council (BRAC) has developed standards for rangeland health and guidelines for grazing management for use on the Butte District of the Bureau of Land Management (BLM).

This assessment will report condition and/or function for the following five standards:

- Standard #1 Upland Health
- Standard #2 Riparian /Wetland Health
- Standard #3 Water Quality
- Standard #4 Air Quality
- Standard #5 Biodiversity

In addition, this assessment will report condition and/or function for forest health and fuels. Forest health can affect each of the five standards, but in this assessment will be reflected under Standard #5 Biodiversity, along with other factors that affect biodiversity. These assessments are made on an allotment scale.

The BRAC determined that the following considerations were very important in adoption of these Standards and Guidelines:

1. For implementation, the BLM should emphasize a watershed approach that incorporates both upland and riparian standards and guidelines.
2. The standards are applicable to rangeland health, regardless of use.

3. The social and cultural heritage of the region and the viability of the local economy, are part of the ecosystem.
4. Wildlife is integral to the proper function of rangeland ecosystems.

Condition/function statements regarding the Standards are made as either meeting (Yes) or not meeting (No). Land Health Standards are met when conditions across an allotment are achieving or making significant progress towards the appropriate physical and biological conditions or degree of function required for healthy sustainable rangelands. This is dependent on scope and scale and determined by the Authorized Officer.

Available trend monitoring data, existing inventories, historical photographs and standardized methodology are used by an IDT to assess condition and function. Trend monitoring data, riparian assessment data and historic photographs used for this assessment are available at the Butte Field Office.

Format

The Upland, Riparian, Air Quality, Water Quality, and Biodiversity Standards will follow the following format:

- **Affected Environment** - This section briefly describes the area and resources that were assessed.
- **Findings, Analysis and Recommendations** - This section lists the findings and discloses recommendations developed by the IDT during the field assessments.

Uplands

Western Montana Standard #1: *“Uplands are in Proper Functioning Condition.”*

Procedure to determine conformance with Standard:

The uplands were assessed on an allotment basis according to Interagency Technical Reference 1734-6 “Interpreting Indicators of Rangeland Health.” This qualitative process evaluates 17 “indicators” (e.g., soil compaction, water flow patterns, plant community composition) to assess three interrelated components or “attributes” of rangeland health: soil/site stability, hydrological function, and biotic integrity. The Natural Resource Conservation Service (NRCS) has developed Ecological Site Descriptions based on specific soil types, precipitation zones, and location. They describe various characteristics and attributes including what vegetative species and relative percentage of each are expected to be present on the site. The IDT refers to these site descriptions while completing the upland evaluation matrix.

The IDT reviewed the long term trend study data, conducted extensive field surveys, and used the Indicators of Upland Health assessment process to assess the functionality of the upland habitat in the JCSE PA.

The JCSE PA was also evaluated for weed infestations using treatment records and inventories from the Butte Field Office, Jefferson County Weed District, and the IDT’s collective observations during the field assessments.

Affected Environment

Soils

Soils in the Jefferson County Southeast Planning Area (JCSE) are primarily affected by climate (temperature and precipitation), topography (slope and aspect), and parent material (geology and geomorphology). The soils in this watershed are mostly in the Frigid soil temperature regime. Lands administered by BLM within the JCSE receive about 8 to 19 inches of average annual precipitation and fall into the Aridic and Ustic soil moisture regimes. Within the planning area boundary, elevations range from about 4,600 feet, on the Cottonwood Allotment, to above 7,000 feet on the Bull Mountain Allotment.

The soils within the watershed formed in alluvium, colluvium, residuum, and glacial till mainly from quartzite, limestone, sandstone, andisite, rhyolite, and granitic rock sources. Major landforms include flood plains, stream terraces, outwash terraces, alluvial fans, escarpments, hills, moraines and mountain slopes. Slopes range from nearly level and undulating (1 to 8 percent), rolling and hilly (8 to 30 percent), to steep and very steep (25 to more than 45 percent). Soil textures are mainly Loamy-skeletal and coarse loamy; soil depths generally vary from shallow (less than 20 inches to a root restrictive layer) to moderate (more than 60 inches to a restrictive layer); the calcium carbonate equivalent within 40 inches ranges from none to 50 percent.

Soil classifications and ecological sites within the assessment area reflect these soil physical and chemical properties and variables. The main soil Orders encountered within the assessment area include: Entisols, Inceptisols, and Mollisols. The Major Ecological Sites associated within the upland areas include: Limy and Silty.

Vegetation

Shrubland and grassland areas are considered uplands for purposes of this report. According to satellite imagery, 72% of the watershed is classified as sagebrush-steppe and grassland uplands (55% shrubland, 17% grasslands). Forest and woodland habitats are discussed under Forest Health and Fuels Management.

The variety and distribution of plant communities and seral stages in the watershed area is a function of climate, geology, and soil combined with:

- Historic uses (e.g., grazing, mining, etc.)
- Short term weather patterns
- Disturbance regimes (e.g., drought, fire, floods, and herbivory)

Current vegetative cover was calculated using satellite imagery. Acres are approximate and minor discrepancies may exist due to mapping errors.

Table 3. Summary of Acres by General Cover Type within the JCSE PA.

Cover Type	BLM Acreage	% of BLM Acreage	Total Watershed Acreage	% of Total Acreage
Agriculture	0	0%	20295	9%
Barren	518	2%	4577	2%
Conifer	6191	25%	29400	13%
Grassland	4075	17%	43222	19%
Hardwood	7	<1%	78	<1%
Curleaf Mountain Mahogany	163	<1%	603	<1%
Open Water	6	<1%	290	<1%
Riparian	16	<1%	1200	<1%
Shrubland	13414	55%	128212	55%
Other	62	0%	3453	1%
Totals	24452	100%	231330	100%

Most of the watershed's public land uplands are dominated by either grasslands (17%) or shrubland (55%), including mountain big sagebrush, Wyoming big sagebrush, and basin big sagebrush. Winterfat (*Krascheninnikovia lanata*) is also found on many alkaline sites in the watershed. Some of the prominent herbaceous species included in the grasslands are bluebunch wheatgrass, western wheatgrass (*Pascopyrum smithii*), Sandberg's bluegrass (*Poa secunda*), needle and thread, prairie junegrass (*Koeleria macrantha*), and Idaho fescue (*Festuca idahoensis*). These same cool season grasses are prominent understory vegetation in the shrubland cover types. Rubber rabbitbrush (*Ericameria nauseosa*), green rabbitbrush (*Chrysothamnus viscidiflorus*), fringed sagewort, and broom snakeweed are common native shrubs found on numerous ecological sites throughout the watershed. If any of these shrubs have greater than 5% canopy cover on a site, it usually indicates that site has been subject to some kind of past disturbance.

Forested habitats occupy 30% of BLM administered land in the JCSE PA, primarily at higher elevations and on north-facing slopes. A wide elevation variance promotes a diverse mixed conifer forest. Species include Douglas-fir, lodgepole pine (*Pinus contorta*), ponderosa pine (*Pinus ponderosa*), limber pine, and Rocky Mountain juniper. Also, numerous quaking aspen (*Populus tremuloides*) stands and two species of cottonwoods, black cottonwood (*Populus trichocarpa*) and narrowleaf cottonwood (*Populus angustifolia*) contribute to structural diversity and canopy cover.

Scattered, isolated patches of curleaf mountain mahogany are found on rocky slopes and ridges throughout the watershed. It provides year-round cover and forage for deer and is a crucial source of winter forage for many wildlife species.

Findings, Analysis, and Recommendations

Members of the IDT visited all the grazing allotments, as well as the unallotted public land in the JCSE PA during 2012 and completed 19 *Rangeland Health Indicator Evaluation Matrices* on various ecological sites and plant associations. In addition, Daubenmire trend studies and permanent photo plots were evaluated to determine vegetative trend. The data collected were

summarized and compared to baseline and interim data providing supporting information for interpreting the upland indicators (Table 4).

The vast majority of the uplands in the watershed are functioning properly and meeting the Standard for Upland Health. Conifer expansion into sagebrush/grasslands is affecting Upland Health, and is discussed under the Forest Health and Fuels Management section. Table 4 outlines the findings at sites throughout the watershed where the IDT completed the Indicators of Rangeland Health evaluation matrix. Upland sites that were found to be in the none-to-slight or slight-to-moderate departure from expected conditions category generally show that the Standard is being met. A moderate to severe departure from expected conditions may show that the Standard is not being met. Table 5 outlines the final evaluation of each allotment.

Table 4. Upland Qualitative Assessment Summary for the Jefferson County SE Planning Area.

ALLOTMENT NAME, NUMBER, PASTURE	ECOLOGICAL SITE	PLANT ASSOCIATION	DEGREE OF DEPARTURE FROM EXPECTED		
			SOIL SITE STABILITY	HYDROLOGIC FUNCTION	BIOTIC INTEGRITY
Black Sage, 20216, Fox Place	Silty Droughty, 15-19" Precipitation Zone (PZ)	Idaho Fescue / Bluebunch Wheatgrass	None - Slight	None - Slight	None - Slight
Boulder River, 20212, East	Silty, 9-14" PZ	Bluebunch Wheatgrass/Western Wheatgrass	None - Slight	Slight - Moderate	Slight - Moderate
Boulder River, 20212, Ida Mine	Sandy, 9-14" PZ	Prairie Sandreed/Bluebunch Wheatgrass	None - Slight	None - Slight	None - Slight
Boulder River, 20212, Twohy	Shallow, 9-14" PZ	Bluebunch Wheatgrass/Needle & Thread	Slight - Moderate	Slight - Moderate	Moderate
Bull Mountain, 20220, Sheep Gulch	Shallow Limey Droughty, 9-14" PZ	Bluebunch Wheatgrass/Needle & Thread	None - Slight	None - Slight	None - Slight
Bull Mountain, 20220, Pipeline	Silty Droughty Steep, 15-19" PZ	Idaho Fescue / Bluebunch Wheatgrass	None - Slight	None - Slight	None - Slight
Cottonwood, 10285, South	Limey, 9-14" PZ	Bluebunch Wheatgrass/Needle & Thread	None - Slight	None - Slight	Slight - Moderate
Cottonwood, 10285, North	Silty Steep, 9-14" PZ	Bluebunch Wheatgrass/Needle & Thread	None - Slight	None - Slight	Slight - Moderate
Cottonwood Springs, 11025, Cottonwood Springs	Very Shallow, 9-14" PZ	Bluebunch Wheatgrass/Needle & Thread	Slight - Moderate	Slight - Moderate	Slight - Moderate
County Line, 20210, East	Limy, 9-14" PZ	Bluebunch Wheatgrass/Needle & Thread	None - Slight	None - Slight	None - Slight
County Line, 20210, East	Silty, 9-14" PZ	Bluebunch Wheatgrass/Green Needlegrass	None - Slight	None - Slight	None - Slight
Fitz Creek, 20308, North	Silty, 15-19" PZ	Bluebunch Wheatgrass/Idaho Fescue	None - Slight	None - Slight	Slight - Moderate

ALLOTMENT NAME, NUMBER, PASTURE	ECOLOGICAL SITE	PLANT ASSOCIATION	DEGREE OF DEPARTURE FROM EXPECTED		
			SOIL SITE STABILITY	HYDROLOGIC FUNCTION	BIOTIC INTEGRITY
Fitz Creek, 20308, South	Silty Droughty, 9-14" PZ	Bluebunch Wheatgrass/Needle & Thread	None - Slight	None - Slight	Slight - Moderate
Huller Springs, 10264, Huller Springs	Douglas-fir/Idaho Fescue, 15-19" PZ	Big Sagebrush/Bluebunch Wheatgrass	None - Slight	None - Slight	Moderate
North Doherty, 20211, North Doherty	Fine Loamy, 15-19" PZ	Bluebunch Wheatgrass/Green Needlegrass	None - Slight	None - Slight	Slight - Moderate
Sappington Spring, 20271, Sappington Spring	Sandy Loam, 15-19" PZ	Bluebunch Wheatgrass/Idaho Fescue	None - Slight	None - Slight	Slight - Moderate
South Doherty, 20217, Knucky	Limey, 9-14" PZ	Bluebunch Wheatgrass/Needle & Thread	None - Slight	Slight - Moderate	Slight - Moderate
South Doherty, 20217, Harris	Silty Droughty, 10-14" PZ	Big Sagebrush/Bluebunch Wheatgrass	Slight - Moderate	Slight - Moderate	Slight - Moderate
Three East Pastures, 20375, Upper	Silty, 15-19" PZ	Big Sagebrush/Bluebunch Wheatgrass	None - Slight	None - Slight	None - Slight

Table 5. Upland Qualitative Assessment Summary for the JCSE PA.

Allotment Name	Allotment Number	Meeting Upland Standard (Y/N)
Black Sage	20216	Y
Boulder River	20212	Y
Bull Mountain	20220	Y
Cottonwood	10285	Y
Cottonwood Springs	11025	Y
County Line	20210	Y
Dry Hollow	20299	Y
Fitz Creek	20308	Y
Huller Springs	10264	N
Lower Butte	11175	Y
McKenna	20302	Y
North Doherty	20211	Y
Sappington Spring	20271	Y
Shoddy Springs	11024	Y
South Doherty	20217	Y
T4N, R2W, Section 21	20262	Y
Three East Pastures	20375	Y
Wickham Field	20260	Y
Willow Spring Road	20280	Y

On the sites rated as meeting the Upland Standard (Y), the quantitative monitoring data supports the findings of the IDT (Table 4 & 5). The ecological condition at these upland sites is stable or improving. Evidence of erosion appears to be remnant of historical impacts, and generally matches what is expected for that ecological site. Tall cool season bunchgrasses, specifically bluebunch wheatgrass, are moderately reduced in many sites throughout the PA in comparison to the Ecological Site Guides. This is likely due to long-term spring and summer cattle grazing in these areas. Conifer encroachment was also observed throughout the PA and was present to some degree in all of the allotments. Invasive and noxious plants were present in all allotments and depending on abundance, did contribute to a slight-moderate departure in some allotments.

The Boulder River Allotment met the Upland Standard, but some departures worth noting were observed during LHA's. Conifer encroachment and invasive/noxious weeds were noticed in all pastures. Increased amounts of clubmoss and other slight deviations of plant communities were also noted throughout the allotment. The Towhy Pasture also had some departures due to historic overgrazing, which included pedestals, terracettes, increased erosion, soil surface loss, and deviation in plant communities and composition.

On the Cottonwood Springs Allotment, the Upland Standard was met but departures in soil and site stability, hydrologic function, and biotic integrity were all observed. Most departures were contributed to historic use. Water-flow patterns, pedestals and terracettes, increase in bare ground, reduction of the soils resistance to erosion, soil surface loss and degradation, and changes in plant communities were all contributing factors.

The Huller Springs Allotment was the only allotment which did not meet the Upland Standard. The main contributing factors were Douglas-fir and Rocky Mountain Juniper encroachment, which was affecting nearly all the plant communities and multiple species of weed infestations throughout the allotment. Some of the largest patches of weeds are located in a historic burn.

The North Doherty Allotment met all standards and had very few departures, but Douglas-fir and Rocky Mountain Juniper encroachment and an increase in sagebrush were observed.

The South Doherty Allotment has two pastures, Harris and Knucky, which are topographically separated from each other. There is approximately 3 miles between pastures. Few departures were observed, but terracettes, an increase in clubmoss, reduction of soil surface resistance to erosion, changes in plant communities, and weeds were all noted in the Harris Pasture. Departures in the Knucky Pasture included club moss and weeds.

Noxious Weed and Cheatgrass Infestations

Scattered locations of weed infestations are found in the uplands of the Jefferson County SE (JCSE) Planning Area (PA) along roads and in disturbed sites on the landscape. Such sites are along pipelines, around stock watering tanks, old fires, and old mining claims. BLM parcels found along the Jefferson River corridor also have leafy spurge, which is a large problem in southern Jefferson County.

Huller Spring area has the largest amount of weed infestations, because of a past burn in the area. Transportation of weed seeds is greatly reduced, because of the low amounts of motorized traffic in the area, however, weed locations are still found along roadways and corridors.

Bull Mountain has one of the highest percentages of weed locations in the planning area, including, but not limited to, dalmation toadflax, leafy spurge, spotted knapweed, houndstongue,

whitetop and thistle. The southwestern face of Bull Mountain has the highest amount of weed infestations compared to the rest of the mountain.

In the southern border of Doherty Mountain runs Cottonwood Canyon, which has numerous spotted knapweed, Canada thistle, and houndstongue locations along the road and the creek bottom. Past disturbed areas have some of the highest percentages of contiguous cheat grass infestations in the JCSE.

Black Sage area has the lowest amounts of weed locations in the planning area, but the BLM parcels to the north have numerous locations of leafy spurge, dalmation toadflax, and spotted knapweed. The low amount of roads in the area helps the amount of weed transportation along the open corridors.

Special Status Plants

Only one special status plant occurs within the JCSE PA. That plant is the Parry's fleabane (*Erigeron parryi*). There are no known occurrences of Parry's fleabane on BLM administered lands within JCSE. Two populations are known on adjacent private and state lands.

“*Erigeron parryi* occurs on skeletal, limestone-derived soils of ridge crests, slopes and outcrops at 4,500-7,000 feet. Associated vegetation is sparse and dominated by cushion plants, other low forbs and bluebunch wheatgrass. Dominant vegetation in nearby areas with more developed soils is sagebrush steppe or juniper woodland.” (Montana Field Guide)

“At least two populations of Parry's fleabane occur in historic mining districts (Grasshopper Creek, Silver Star). Road construction and other mining-related activities could pose future threats. All known populations are subject to livestock grazing; however, it is unlikely that these small forbs are palatable, and the sparsely vegetated habitat is probably not frequented by livestock” (Montana Field Guide)

Recommendations for Upland Health

1. Continue treating weed infestations throughout the PA.
2. Reduce Douglas-fir and Rocky Mountain Juniper encroachment into sagebrush and grassland upland sites where necessary to improve upland health.

Riparian and Wetland Areas

Western Montana Standard #2: *"Riparian and wetland areas are in proper functioning condition."*

Procedure to determine conformance with Standard:

Lotic and Lentic Riparian Area Management Assessment Methodologies (TR 1737-15 and TR 1737-16), also known as PFC Assessment Methodologies, were used to evaluate riparian systems.

PFC is a methodology for assessing the physical functioning of riparian-wetland areas. The term PFC is used to describe both the assessment process, and a defined, on the ground condition of the riparian-wetland area. In either case, PFC defines a minimum level or starting point for assessing riparian-wetland areas.

The PFC assessment provides a consistent approach for assessing the physical functioning of riparian-wetland areas through consideration of hydrology, vegetation, and soil/landform attributes. The PFC assessment synthesizes information that is foundational to determining the overall health of a riparian-wetland area.

The on the ground condition term PFC refers to how well the physical processes are functioning. PFC is a state of resiliency that will allow a riparian-wetland area to hold together during a high flow event, sustaining that system's ability to produce values related to both physical and biological attributes.

BLM personnel reviewed existing data; re-read established transects and established monitoring in several areas that were identified by the ID team prior to and during the 2012 evaluations. All available data were evaluated and considered by the ID team prior to a functionality call being made on each reach.

Affected Environment

The JCSE PA contains both lotic (e.g., streams) and lentic (e.g., wet meadows) systems.

There were 10.27 miles of perennial and intermittent stream reaches identified and inventoried during the 2012 land health assessments. These reaches are identified in Table 6, below. In addition to the name and identification number, the table includes whether the stream was classified as perennial or intermittent by the ID team, Rosgen stream type and length of the reach.

Table 6. Riparian (Lotic) Resources in the Jefferson County SE Planning Area.

Reach	Name	Perennial or Intermittent System	Rosgen Channel Type	Length (miles)
BDLW-2	Middle Fork	Intermittent	B-3	0.90
BDLW-2-1	Middle Fork	Perennial-interrupted	B-3 w/A inclusions	1.02
BDLW-3	Conrow Creek	Perennial	B-3	0.92
BDLW-4	Harris Spring	Perennial	B-3	0.19
BDLW-9	Boulder River	Perennial	C	0.14
JFLW-1	Cottonwood Springs	Intermittent	B	0.89
JFLW-3	Sappington Spring Enclosure	Perennial	B-2 w/lentic inclusion	0.23
JFLW-5	Dry Creek	Intermittent	B-3/5	0.54
JFLW-6	Huller Spring	Perennial-interrupted	B-3/4	1.09
JFLW-7	Jefferson River Tributary	Intermittent-interrupted	B-3	0.25
JFLW-8	Jefferson River Tributary	Intermittent	B-3/5	0.62
JFLW-10,11,12	Jefferson River	Perennial	C	1.07
JFMD-2	Sheep Gulch	Intermittent	B	0.72
WTLT-1	Black Butte	Intermittent	B-4	0.80
WTLT-2	Fitz Creek	Perennial	B-4 w/lentic inclusions	0.89

Two (2) small lentic areas were identified and assessed in 2012. Despite the fact that both areas are <1.0 acre in size, the ID team felt that they warranted being rated separately from the lotic portions of their respective reaches. These small wetlands are located within reaches BDLW-2-1 and JFLW-6. Both were delineated and mapped.

In addition, there were several small lentic areas that were identified, but due to their small size (<0.5 acres) they were not broken out and assessed separately. These lentic areas are located within reaches JFLW-3 and WTLT-2.

Many of the resources within the BFO stream and wetland database have been identified based upon mapped information, aerial photos, and USGS Quads. As part of the JCSE PA assessment process, the resource inventory has been updated based upon field notes, photographs and ground surveys.

Developed Springs

Federal protection of wetlands and riparian systems became official policy under the authority of two Executive Orders issued in 1977. The majority of developed springs in the JCSE PA were developed prior to the issuance of these orders, other federal laws, directives, or regulations for the management and protection of wetlands (Mitch 1986). Current management direction requires minimization of wetland loss or degradation as well as preservation and enhancement of natural and beneficial values. This includes maintenance of hydrology. Alternatives analyses are conducted to determine whether it is feasible to develop springs and where spring boxes might be best located to maintain resource values. Management, restoration, and conservation of springs are resource management objectives for the BLM.

The developed springs within the JCSE PA work to various degrees of efficiency and success. Much of this depends upon the amount of water the spring supplies that particular year, which is often directly related to the amount of annual precipitation that is received. Developed spring sources typically improve livestock management. In most cases, livestock will use developed water and stock tanks over undeveloped water such as streams, springs, or seeps.

Well managed springs have the potential to support rare plants, macroinvertebrates, insects, fish, springsnails, amphibians and migratory birds as well as to provide water for wildlife and livestock.

However, when spring sources are not properly developed or regularly maintained, they can result in reduced wetland function due to soil compaction, the loss of desirable vegetation, and the loss of the potential for diversity of life forms.

Findings, Analysis and Recommendations

Riparian condition of streams, springs, ponds, potholes and wet meadows were placed into one of five categories: Proper Functioning Condition (PFC), Functioning At Risk with an Upward trend (FAR Up), Functioning At Risk with a static trend or no apparent trend (FAR), Functioning At Risk with a Downward Trend (FAR Down), or Non Functional (NF) using the lentic and lotic methodologies described above. The functional ratings of riparian (lotic) and wetland (lentic) areas are shown in Tables 7-8.

Table 7. Current PFC Ratings of Riparian (Lotic) Resources in the JCSE PA.

Reach	Name	Allotment	2012 Rating	Length (miles)	Previous Rating
BDLW-2	Middle Fork	Bull Mountain	PFC	0.90	FAR
BDLW-2-1	Middle Fork	Bull Mountain	FAR Down	1.02	FAR
BDLW-3	Conrow Creek	Bull Mountain	PFC	0.92	FAR
BDLW-4	Harris Spring	South Doherty	FAR	0.19	FAR UP
BDLW-9	Boulder River	Wickham Field	FAR	0.14	FAR
JFLW-1	Cottonwood Springs	Cottonwood Springs	FAR Down	0.89	PFC
JFLW-3	Sappington Spring Exclosure	Sappington Spring	PFC	0.23	FAR
JFLW-5	Dry Creek	Huller Spring	PFC	0.54	FAR DOWN
JFLW-6	Huller Spring	Huller Spring	PFC	1.09	FAR DOWN
JFLW-7	Jefferson River tributary	Huller Spring	PFC	0.25	FAR DOWN
JFLW-8	Jefferson River tributary	Huller Spring	FAR	0.62	FAR DOWN
JFLW-10,11,12	Jefferson River	N/A	PFC	1.07	PFC
JFMD-2	Sheep Gulch	Bull Mountain	PFC	0.72	FAR
WTLT-1	Black Butte	3 East Pastures	FAR	0.80	FAR UP
WTLT-2	Fitz Creek	Fitz Creek	PFC	0.89	NF

Table 8. Current PFC Ratings of Wetland (Lentic) Resources in the JCSE PA.

Reach	Name	Allotment	2012 Rating	Size (acres)
BDLW-2-1	Middle Fork	Bull Mountain	PFC	1
JFLW-6-1	Huller Spring	Huller Spring	PFC	1

Across the JCSE PA, 64% (6.61 miles) of the lotic resources were rated PFC, 17% (1.75 miles) were rated FAR and 19% (1.91 miles) were rated FAR Down. 100% of the lentic resources that were assessed in 2012 were rated PFC.

The following is not an all-encompassing list of conditions found by the IDT during the assessment, but describes some of the issues and general resource concerns that prevented certain reaches from meeting Western Montana Standard #2.

- Alteration of stream morphology which includes; channel shape, gradient, sinuosity and width to depth ratio.
- Excessive erosion or deposition in at least a portion of the reach.
- Composition, cover, structure and vigor of riparian vegetation differing from what is expected for the reach.

Noxious Weed Infestations

Huller Springs has the greatest amount of weed locations in the planning area. The close proximity of Huller Springs to a past fire has exasperated a weed problem that was already present on the landscape. Weed species found in the area include, but are not limited to, spotted knapweed, dalmation toadflax, houndstongue and Canada thistle.

Special Status Plants

There were no populations of special status or sensitive riparian plants observed during the 2012 land health assessments, and none are known to exist on BLM lands within the JSCE PA. However, there are two (2) species of riparian plants that may occur on BLM lands within the JCSE PA that are designated as sensitive by the BLM. These species are annual Indian paintbrush (*Castilleja exilis*) and mealy primrose (*Primula incana*).

Castilleja exilis is the only annual *Castilleja* spp. that occurs in Montana. It is associated with moist alkaline meadows in the valley zone. In Montana, *Primula incana* appears to be restricted to wet meadow habitats with relatively stable water tables.

Recommendations for Riparian Health

1. Modify grazing management in the Cottonwood Springs Allotment to improve riparian conditions within JFLW-1. Management options include, but are not limited to, modifying terms and conditions of the grazing permit, building a livestock enclosure fence, and/or directionally falling conifers along the reach.
2. Modify grazing management in the Bull Mountain Allotment to improve riparian conditions within BDLW-2 and BDLW-2-1. Management options include, but are not limited to, reconstructing water developments and/or and enclosure fence, modifying terms and conditions of the grazing permit, and/or directionally falling conifers along the reach.
3. Modify grazing management in the South Doherty Allotment to improve riparian conditions within BDLW-4. Management options include, but are not limited to, modifying terms and conditions of the grazing permit, building a livestock enclosure fence, building stock water developments, and/or modifying the season of use within the Harris Pasture.
4. Modify grazing management within the Black Butte Allotment to improve riparian conditions within WTLT-1. Management options include, but are not limited to, modifying the season of use within the Black Butte Pasture, providing additional source(s) of off-site livestock water, modifying the terms and conditions of the grazing permit, and/or directionally falling conifers along the reach.

Water Quality

Western Montana Standard #3: “*Water quality meets State standards*”

Procedure to determine conformance with Standard:

Montana DEQ is responsible for making calls on water quality and is in the process of assessing the condition of streams, establishing reference sites and developing water quality restoration plans. The Butte Field Office shares assessment findings with DEQ to support their efforts.

The foundation for Montana Water Quality Law is the Federal Clean Water Act. The goal of the Clean Water Act is to “restore and maintain the chemical, physical and biological integrity of the Nation’s waters.” To meet that goal, waters of Montana are required to support beneficial uses.

According to Montana's 2006 Integrated 303d/305b Water Quality Report, several of the streams and rivers in the JCSE PA assessment area are not supporting their beneficial uses because of non-point source pollution. Non-point source pollution accounts for 90% of the stream impairments statewide. For Montana's streams, pollutants resulting from land uses are responsible for most non-point source pollution.

Affected Environment

According to Montana's 2012 Final Water Quality Integrated Report, several of the streams and rivers in the JCSE PA assessment area are not supporting their beneficial uses because of non-point source pollution. Non-point source pollution accounts for 90% of the stream impairments statewide. For Montana's streams, pollutants resulting from land uses are responsible for most non-point source pollution.

Findings, Analysis and Recommendations

Fitz Creek (WTLT-2)

Fitz Creek is currently listed as impaired by the State of Montana. According to the 2012 305(b) list, the cause for impairment is "alteration in stream-side or littoral vegetative covers, phosphorous (total) and sedimentation/ siltation. The source is listed as "grazing in riparian or shoreline zones."

During the 2012 assessment, the ID determined that Fitz Creek was rated PFC and therefore meeting Standard #2. The ID team noted;

- Aspen, willows, and red-osier dogwood are regenerating throughout the reach.
- A diverse composition of riparian-wetland vegetation (for maintenance/recovery) including but not limited to; sedges, aspen, willows, red-osier dogwood, and chokecherry.
- There was adequate riparian-wetland vegetative cover present to protect banks and dissipate energy during high flows.
- The stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition).

The ID team determined that Fitz Creek is meeting Standard #3. There was no evidence of excessive erosion or deposition, and there is no source of phosphorous on BLM lands within Fitz Creek and none is known to exist on USFS lands upstream.

Phosphorous is an essential nutrient for plant growth that is found naturally in soils and streams, but exists in much higher levels in fertilizers and in human and other animal waste. It enters streams in waste water or in runoff polluted with fertilizers or animal wastes, including from leaking sewer pipes or septic drain fields. Stream vegetated buffers are typically effective at short-term control of phosphorous that is bound to sediment particles-they are less effective at filtering out phosphorous that is dissolved in water, or (2) providing long-term storage of phosphorous (Wenger 1999). Increased levels of phosphorous can contribute to eutrophication.

Cottonwood Springs (JFLW-1), Harris Spring (BDLW-4), Black Butte Creek (WTLT-1) and Middle Fork Creek (BDLW-2-1)

Despite not being listed as impaired by the State of Montana, the IDT determined these reaches were not meeting Standard #3. The primary reason for this determination was the presence of excessive erosion and/or deposition due to livestock trailing and trampling in the riparian zones.

Boulder River (BDLW-9)

The Boulder River is considered by the State of Montana to be impaired and is on the 303(d) list. The length of the Boulder River from its headwaters to the confluence with the Jefferson River is approximately 83.63 miles.

The causes for impairment are listed as; “alteration in stream-side or littoral vegetative cover, copper, iron, lead, low flow alteration, sedimentation/siltation, silver, water temperature and zinc.” The sources of these causes are; “acid mine drainage, contaminated sediments, grazing in riparian or shoreline zones, habitat modification, impacts from abandoned mine lands (inactive), impacts from hydrostructure flow, regulation/modification, irrigated crop production and loss of riparian habitat.”

Reach BDLW-9 is estimated to be 0.14 miles in length, which is less than 0.16% of the entire length of the Boulder River. For this reason, the ID team determined that the factors affecting water quality of BDLW-9 are outside of the control of BLM managers.

Jefferson River (JFLW-10, 11, 12)

The Jefferson River is considered by the State of Montana to be impaired. The total length of the river is approximately 119.9 miles.

The causes for impairment are listed as; “copper, lead, low flow alterations, physical substrate habitat alterations, sedimentation/siltation, solids (suspended/bedload), and water temperature.” The sources of these causes are; “dam or impoundment, impacts from abandoned mine lands (inactive), impacts from hydrostructure flow, regulation/modification, irrigated crop production, loss of riparian habitat, natural sources, and streambank modifications/destabilization.”

The total length of all three (3) BLM reaches is approximately 0.89 miles which is 0.74% of the entire length of the Jefferson River. For this reason, the ID team determined that the factors affecting the water quality of JFLW-10, 11, and 12 are outside of the control of BLM managers.

The ID team determined that all other reaches within the JCSE PA met Standard #3.

Table 9. Reaches Identified in the JCSE PA not Meeting Water Quality Standard.

Allotment Name	Allotment Number	Reach	Comments
Cottonwood Springs	11025	Cottonwood Springs; JFLW-1	Excessive sedimentation due to trailing/trampling.
South Doherty	20217	Harris Spring; BDLW-4	Excessive sedimentation due to trailing/trampling.
Three East Pastures	20375	Black Butte Creek; WTLT-1	Excessive sedimentation due to trailing/trampling.
Wickham Field	20260	Boulder River; BDLW-9	303(d) list
Bull Mountain	20220	Middle Fork; BDLW-2-1	Excessive sedimentation due to trailing/trampling.
N/A	N/A	Jefferson River; JFLW-10-12	303(d) list

Table 10. Water Quality Qualitative Assessment Summary for the JCSE PA.

Allotment Name	Allotment Number	Meeting Water Quality Standard (Y/N)
Black Sage	20216	NA
Boulder River	20212	NA
Bull Mountain	20220	N
Cottonwood	10285	NA
Cottonwood Springs	11025	N
County Line	20210	NA
Dry Hollow	20299	NA
Fitz Creek	20308	Y
Huller Springs	10264	Y
Lower Butte	11175	NA
McKenna	20302	NA
North Doherty	20211	NA
Sappington Spring	20271	Y
Shoddy Springs	11024	NA
South Doherty	20217	N
T4N, R2W, Section 21	20262	NA
Three East Pastures	20375	N
Wickham Field	20260	N
Willow Spring Road	20280	NA

Recommendation for Water Quality

1. In areas where water quality is not meeting Standard #3, and the factors that are contributing to unacceptable conditions are within the control of BLM managers, management will be modified. Changes in management may include, but are not limited to, modifying grazing management through the construction of range improvement projects or revising the associated grazing permit.

Air Quality

Western Montana Standard #4: “*Air quality meets State standards*”

Procedure to determine conformance with Standard:

The Clean Air Act of 1990 as amended (42 U.S.C. 7401 et seq) requires the BLM to protect air quality, maintain Federal and State designated air quality standards, and abide by the requirements of State Implementation Plans.

The Environmental Protection Agency has delegated the authority to implement the provisions of the Clean Air Act to the State of Montana. Determination of compliance with air quality standards is the responsibility of the State of Montana. All of southwest Montana is in

attainment, meaning that the air resource meets or exceeds all National Ambient Air Quality Standards.

Affected Environment

The state of Montana is divided into ten airsheds by the Montana Air Quality Bureau (DEQ 2011b) and monitored by the Idaho/Montana Airshed Group. Each airshed in Montana is designated as “Class 1” or “Class 2”, with “Class 1” having the strictest standards. Air Quality Standards are set by the state. The project area lies within Airshed 7, having a “Class 2” air quality designation. The Anaconda- Pintler Wilderness Area, which has a “Class 1” designation, is located approximately 15 miles northwest of the project area. In addition to monitoring, the ID/MT Airshed Group has established Smoke Impact Zones. These zones surround cities where prescribed burning emissions could adversely affect air quality. Butte is the closest Smoke Impact Zone and is located approximately 30 miles west of the project area. This Smoke Impact Zone coincides with a State and Environmental Protection Agency (EPA) designation for Butte as a particulate nonattainment zone. Existing air quality within the airshed and project area is affected by smoke, dust, and motor vehicle exhaust. Smoke is produced from wildland fires, prescribed burning, residential wood burning, and agricultural field burning. Additional smoke is blown into the area from fires outside the area, including western Montana, Idaho, the Pacific Northwest, and Canada. Sources of dust primarily result from wind erosion of cropland and vehicle traffic on gravel roads.

Findings, Analysis and Recommendations

As shown below, in Table 11, the ID team determined that all of the allotments within the JCSE PA met the air quality standard. No adverse impacts to air quality were observed during Land Health Assessments, dust from roads is localized and temporary.

Table 11. Air Quality Qualitative Assessment Summary for the JCSE PA.

Allotment Name	Allotment Number	Meeting Air Quality Standard (Y/N)
Black Sage	20216	Y
Boulder River	20212	Y
Bull Mountain	20220	Y
Cottonwood	10285	Y
Cottonwood Springs	11025	Y
County Line	20210	Y
Dry Hollow	20299	Y
Fitz Creek	20308	Y
Huller Springs	10264	Y
Lower Butte	11175	Y
McKenna	20302	Y
North Doherty	20211	Y
Sappington Spring	20271	Y
Shoddy Springs	11024	Y
South Doherty	20217	Y

Allotment Name	Allotment Number	Meeting Air Quality Standard (Y/N)
T4N, R2W, Section 21	20262	Y
Three East Pastures	20375	Y
Wickham Field	20260	Y
Willow Spring Road	20280	Y

Recommendation for Air Quality

1. Continue to follow Burn Plans and coordinate with the Smoke Monitoring Unit of the Montana/Idaho State Airshed Group.

Biodiversity

Western Montana Standard #5: *“Provide habitat as necessary, to maintain a viable and diverse population of native plant and animal species, including special status species.”*

Procedure to determine conformance with standard:

This Standard is an overall assessment of biodiversity and wildlife habitat. The present state of each allotment and habitat type was compared to the natural and historic condition. The indicators described under the definition of Standard #5, as well as condition/function of the other standards, specifically uplands and riparian, were considered to determine whether or not the Biodiversity Standard was met.

The IDT considered the range of natural variation within this ecosystem as well as the species composition, condition of available habitat, and forest health to determine the condition/function of biodiversity. The wildlife habitat niches expected are: grasslands (short and mid grasses), bare ground, small streams, riparian/wetlands, sagebrush steppe, conifer forests, aspen stands, and various mixes of these components. Providing habitat for special status plant and animal species is key to meeting the biodiversity standard.

Affected Environment

Upland and riparian habitats, which are used to assess the biodiversity finding, are described in the affected environments of those respective sections above.

Wildlife in the planning area is typical of southwestern Montana. The primary big game animals are elk and mule deer. Much of the JCSE PA is winter range for these species. Pronghorn antelope, moose, and whitetail deer also use much of the planning area during summer, but have a limited winter presence here. Bighorn sheep do not inhabit the area.

Several species listed under the Endangered Species Act (ESA) could disperse through the planning area but are unlikely to be permanent residents. The grizzly bear and lynx (both Threatened), and wolverine (Candidate for listing) are wide-ranging species and could cross through BLM land in the planning area, but are very unlikely to be permanent residents due to lack of appropriate habitat parameters. The Upper Missouri River Distinct Population Segment

of the arctic grayling is a Candidate species for listing and is considered a rare resident of the Jefferson River. BLM land borders the north shore of this river for about 0.9 miles between the river and the Lewis and Clark Caverns State Park. The Sprague’s pipit, another Candidate for listing, could occur in grassland habitats in the area but has not been documented.

Many species of birds inhabit the planning area. A few common species include: mountain bluebird, common raven, Townsend’s solitaire, chipping sparrow. A number of bird species that are considered BLM Sensitive or MT Species of Concern have been documented in the planning area, including: mountain plover, pinyon jay, Clark's nutcracker, long-billed curlew, sage thrasher, Brewer's sparrow, burrowing owl, veery, Bobolink, loggerhead shrike, ferruginous hawk, peregrine falcon, golden eagle, and bald eagle. Most of these species have been documented around the periphery of the planning area where access for researchers is easier to obtain, but they also likely occur where appropriate habitat exists for their species in the interior of the planning area.

Sensitive mammal species known to occur in the planning area include Townsend’s big-eared bat, hoary bat, fringed myotis, and black-tailed prairie dogs. The bat species do occur on BLM land but the prairie dogs do not.

Prairie rattlesnake, rubber boa, and garter snakes are typical reptiles of the area. The only sensitive herpetological species that likely occurs in the planning area is the western toad. Fish-bearing waters are a very minor component of BLM land in the planning area; about 0.14 miles of the Boulder River flows through BLM land, and 0.9 miles of the Jefferson River flows by BLM on the north shore. There are no other fish-bearing streams on BLM in the planning area.

Findings, Analysis, and Recommendations

Table 12. Biodiversity Qualitative Assessment Summary for the JCSE PA.

Allotment Name	Allotment Number	Meeting Biodiversity Standard (Y/N)
Black Sage	20216	Y
Boulder River	20212	Y
Bull Mountain	20220	Y
Cottonwood	10285	Y
Cottonwood Springs	11025	Y
County Line	20210	Y
Dry Hollow	20299	Y
Fitz Creek	20308	Y
Huller Springs	10264	Y
Lower Butte	11175	Y
McKenna	20302	Y
North Doherty	20211	Y
Sappington Spring	20271	Y
Shoddy Springs	11024	Y
South Doherty	20217	Y
T4N, R2W, Section 21	20262	Y

Allotment Name	Allotment Number	Meeting Biodiversity Standard (Y/N)
Three East Pastures	20375	Y
Wickham Field	20260	Y
Willow Spring Road	20280	Y

As shown above (Table 12), all allotments within the JCSE PA meet the Biodiversity Standard. A more detailed listing of the degree of departure from what was expected by pasture is given in Table 4. A Slight-Moderate or Moderate rating for pastures evaluated does not preclude the allotment as a whole from meeting this Standard. The surrounding landscape is also taken into account when considering whether Standard 5 is met. BLM land is actually a minor component of the PA as a whole; no BLM parcel is sufficient in itself to sustain a biologically healthy and diverse community. Some individuals of smaller species such as rodents may spend their entire lives on BLM land, but most species need to move through the entire landscape. All BLM allotments evaluated provide native forage and cover for a variety of wildlife species, including special status species. No allotment is isolated from, or restricts movement to, adjacent habitat.

Recommendations for Biodiversity

1. Biodiversity health is a function of all components of an ecosystem. Therefore, the first recommendation for biodiversity would be to analyze, modify if necessary, and implement the recommendations previously made for the other Standards.
2. Ensure all fences are maintained and meet BLM and state wildlife-friendly specifications. Remove down or unneeded fences. This will prevent entanglement of wildlife and any hindrance of movement.
3. Aggressively treat noxious and nonnative weed species.
4. Consider vegetation treatments in upcoming NEPA analysis to restore more historic habitat conditions.

Forest Health and Fuels Management

Affected Environment

Forest and Woodland Condition

The Butte RMP separates forests and woodlands into two main conifer cover types, Dry Forest Types and Cool and Moist Forest Types. Both types occur throughout the JCSE PA, but the Dry Forest Types are the most prevalent. Conifer cover types comprise approximately 13% of all ownerships, and approximately 25% of BLM-administered lands within the JCSE PA (Table 3).

In broad terms, a healthy forest is one that maintains desirable ecosystem functions and processes. Aspects of forest health include biological diversity; soil, air, and water productivity; ability to withstand natural disturbances; and the capacity of the forest to provide a sustaining flow of goods and services for people.

Low-elevation and Mid-elevation forest/woodlands within the PA are typically Dry Forest Types that contain Douglas-fir, limber pine, curleaf mountain mahogany, and Rocky Mountain juniper. Conifer expansion into openings and sagebrush/grassland is most evident at the low to mid-elevations of the assessment area. Douglas-fir and Rocky Mountain Juniper colonization has affected many of the allotments within the PA.

At higher elevations, the Dry Forest Types transition into more Cool and Moist Forest Types. These forested habitats are limited within the PA and mainly found on US Forest Service ground. They contain mixed conifer communities of subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*), Douglas-fir, and lodgepole pine.

As a result of fire exclusion, conifer densities have increased within forested stands. The recent drought and increased densities have resulted in forest susceptibility to insect and/or disease infestations and subsequent mortality.

Spruce budworm (*Choristoneura occidentalis*) activity is present and increasing throughout most areas of the JCSE PA. Defoliation caused by spruce budworm is most evident on Douglas-fir, but also affects subalpine fir and spruce species. While spruce budworm does not usually cause direct tree mortality, it will predispose trees to attacks by other insects or diseases. Budworms grow more vigorously in stressed trees, and budworm populations can increase dramatically during drought conditions. Densely stocked and/or multi-storied stands with predominantly Douglas-fir or subalpine fir are at high risk to budworm infestation (Forest Health Protection, 2006). Defoliation from spruce budworm was noted throughout the watershed, but is at endemic levels throughout most of the PA.

Mountain pine beetle (MPB) (*Dendroctonus ponderosae*) is present throughout the JCSE PA and is causing mortality in lodgepole and limber pine. At endemic levels, the beetle typically survives in stressed, weakened, or previously damaged trees, and causes minimal mortality. However, MPB populations can build and spread quickly under favorable conditions. At epidemic levels, MPB can decimate mature forests, often killing virtually all trees over extensive areas (Worrall, 2000). Mountain pine beetle activity is highly variable throughout the JCSE PA due to a wide range of suitability in stand conditions. The majority of the mortality seen is in the lodgepole pine stands, of which very little is on BLM.

Douglas-fir beetle (*Dendroctonus pseudotsugae*) activity has been observed in the JCSE PA but is at endemic levels. Douglas-fir most susceptible to bark beetle attack are larger than 14 inches DBH; older than 120 years; growing in dense stands; weakened by drought, root disease, or defoliation; or are located near existing beetle-infested trees (Forest Health Protection, 2006).

Findings, Analysis and Recommendations

Fire exclusion, caused primarily by fire suppression and the removal of fine fuels by livestock grazing in the area since the 1860's, has changed the structure, density, and plant species composition within the lower grassland and the upland communities.

The 2009 Butte RMP states that all fire management activities will use Fire Regime Condition Class (FRCC) to determine levels of fuel treatment. FRCC assessments determine how similar a landscape's fire regime is to its natural or historical state. Fire regime condition classes are broken down into three categories: 1, 2, and 3. Landscapes determined to fall within the category

of FRCC 1 contain vegetation, fuels, and disturbances characteristic of the natural regime; FRCC 2 landscapes are those that are moderately departed from the natural regime; and FRCC 3 landscapes reflect vegetation, fuels, and disturbances that are uncharacteristic of the natural regime. A landscape in FRCC 1 has key ecosystem components, such as large old trees and soil characteristics that would naturally be found on that site, intact. A landscape with an FRCC rating of 3 indicates that the land is not very similar to its natural regime in terms of its vegetation or disturbance or both. (Table 13)

Table 13. A Simplified Description of the FRCC Classes (Hann and Bunnell 2001).

FRCC	DESCRIPTION
Condition Class 1	Less than 33 percent departure from the central tendency of the historical range of variation. Fire regimes are within the natural or historical range, and the risk of losing key ecosystems components is low. Vegetation attributes are well intact and functioning.
Condition Class 2	33-66 percent departure. Fire regimes have been moderately altered. Risk of losing key ecosystems components may have departed by one or more return intervals (either increased or decreased). This departure may result in moderate changes in fire and vegetation attributes.
Condition Class 3	Greater than 66 percent departure. Fire regimes have been substantially altered. Risk of losing key economical components is high. Fire frequency may have departed by multiple return intervals. This may result in dramatic changes in fire size, fire intensity and severity and landscape patterns. Vegetation attributes have been substantially altered.

To determine the existing vegetation, 231,330 acres were delineated using both BLM and FS stand data across three - 4th code hydrological unit's code (HUC) watersheds. Through a GIS exercise, 28,615 acres were identified as water, barren, agriculture and/or developed and were removed from the FRCC analysis. The project area accounts for 24,448 acres of BLM-administered lands. The historical reference condition was determined for the landscape by using the LANDFIRE Biophysical Setting Model (USGS 2007).

The JCSE landscape was distributed among the seven major Biophysical Settings (BpS) for analysis of the FRCC. BpS is described as a way of grouping ecologically similar vegetation types modeled with characteristic disturbance inputs and uses for FRCC assessments. The eight BpS for the JCSE PA area were selected through a GIS exercise that allowed evaluation of all the BpS habitat types on the landscape. The smaller BpS polygons were grouped into one of the eight BpS that closely represents the habitat type through referencing the vegetation descriptions of the BpS. Table 1 shows how far out of departure or the percentage of difference between current and reference acres for each seral state on the JCSE landscape. Acres labeled as Other account for agriculture, open water, developed areas, and barren sites. Riparian acres were inadequately mapped. Based on our observations riparian acres were historically overestimated, due to mapping errors, and currently underestimated, mainly attributed to conifers overtopping and encroaching into riparian areas. (Table 14)

Table 14. Existing Vegetation Conditions Compared to Historic Reference Condition for JCSE PA.

Biophysical Settings (Bps)	Seral Stage	Existing Condition (Acres)	Historic Reference Condition (Acres)	Departure (Acres) (-) Shortage (+) Abundance
Douglas-fir	Early	878	5466	- 4588
	Mid Open	5705	4099	+ 1606
	Mid Closed	5267	8198	- 2931
	Late Open	2414	5466	- 3052
	Late Closed	7680	4099	+ 3581
	Total	21944	27328	- 5384
Lodgepole Pine	Early	298	934	- 636
	Mid Open	1939	2803	- 870
	Mid Closed	1789	934	+ 855
	Late Open	820	311	+ 509
	Late Closed	2610	1246	+ 1364
	Total	7456	6228	+ 1228
Inter-Mountain Basins Big Sagebrush	Low Cover	12821	29910	- 17089
	Mod. Cover	21797	44865	- 23068
	High Cover	80774	74774	+ 6000
	Uncharacteristic	12821	0	+ 12821
	Total	128212	149549	- 21337
Grassland	Early	20747	851	+ 19896
	Mid	6483	4258	- 2224
	Late	432	11921	- 11489
	Uncharacteristic	15560	0	+ 15560
	Total	43222	17030	+ 26192
Aspen Forest and Woodland	Early, Mid and Late Development	78	8	+ 70
	Total	78	8	- 70
Riparian Systems	Early, Mid and Late Development	1080	27785	- 26705
	Uncharacteristic	120	0	+ 120
	Total	1200	27785	- 26585
Mountain Mahogany	Total	603	1991	- 1388
Other**	**	28615	0	+ 28615
	Total	231330	** 231160	
FRCC Calculation	Total Minus Other	202715		

** A difference of 170 acres exists between the existing and historic conditions due to the GIS exercise and discrepancy in mapping.

With the use of the LANDFIRE FRCC Software Application, 3.0, the current vegetation condition was compared to the reference condition of the landscape. Table 15 shows the summary report from the FRCC software program. The Fire Regime Groups for the BpS and acres of the BpS breakdown in regards to Condition Class are included. The landscape was calculated to have an overall departure of 28%, which equates to a rating of Condition Class 1, a condition that is within the natural range of variability compared with historic reference values. With a FRCC rating of 28%, this landscape is approaching the Condition Class 2 (33-66%) that represents a departure that may result in moderate changes in fire and vegetation attributes. Maintenance in these vegetative types is encouraged to continue to keep these areas in a Condition Class 1. A complete FRCC report can be found in the Project Administration Record.

Table 15. FRCC Landscape Report for the JCSE PA.

FRCC Landscape Report for JeffCoSE						
Biophysical Setting (BpS Code)	FRG (I-V)	Condition Class 1 (Acres)	Condition Class 2 (Acres)	Condition Class 3 (Acres)	Total Acres	
Rocky Mountain Montane Riparian Sy... (1911590)	III	385	1439	203	2027	
Inter-Mountain Basins Curl-leaf Mo... (1910620)	III	608	1419	0	2027	
Inter-Mountain Basins Big Sagebrus... (1910800)	IV	33934	79180	12568	125683	
Rocky Mountain Subalpine Dry-Mesic... (1910550)	III	1216	4054	2838	8109	
Middle Rocky Mountain Montane Doug... (1911661)	I	9142	5352	7805	22299	
Northern Rocky Mountain Lower Mont... (1911390)	II	6487	0	34056	40543	
Rocky Mountain Aspen Forest and Wo... (1910110)	I	1014	0	1014	2027	
Total Acres		52787	91445	58483	202715	

Recommendations for Forest Health and Fuels Management

1. Analyze the use of mechanical treatments and/or prescribed fire to reduce fuel loading and improve forest health in areas affected by insects/disease.
2. Analyze the use of mechanical treatments and/or prescribed fire to reduce fuel loading and improve forest health in areas affected by conifer encroachment.

Interdisciplinary Team Composition

Core IDT members for the JCSE PA Assessment include:

Michael O'Brien, Forester-(ID Team Leader, Forest Resources)
John Sandford, Natural Resource Specialist-(Rangeland Resources)
Erik Broeder, Rangeland Management Specialist-(Rangeland Resources, Riparian, Water Quality)
Scot Franklin, Wildlife Biologist
Brad Colin, Outdoor Recreation Planner-(Travel/VRM)
Roger Olsen, Rangeland Management Specialist-(Soil, SS Plants)
Greg Campbell, Fire Management Specialist

Support IDT members include:

Lacy Decker, Range Technician (Weeds)
Vickie Anderson, Range Technician-(Rangeland Resources)
Brad Matthews, GIS
Carrie Kiely, Archeologist
Dave Williams, Geologist (Air Quality)

Other Specialists Involved:

Mike Philbin, Hydrologist-Montana State Office
Katie Lucas, Geology Tech
Anna Courtney, Soils Tech
Erin Smith, Range Tech

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