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Environmental Assessment MT- (DOI-BLM-MT-L060-2013-21-EA)

Crooked Creek Planning Area Land Health Environmental Assessment
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U.S. Department of the Interior
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1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of improving land health and enhancing habitat conditions on public lands administered by the Bureau of Land Management (BLM) within the Crooked Creek (CC) planning area. This EA analyzes livestock grazing management revisions in addition to analyzing proposals to address forest, shrub, grassland and riparian habitats, as well as water, fish and wildlife resources.

The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative. A Decision Record (DR), including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in the Judith Resource Management Plan (RMP) approved September 1994.

1.2 Background

The BLM Lewistown Field Office completed interdisciplinary planning area assessments for existing resource conditions on BLM administered lands in the CC planning area in 2011. Twenty BLM grazing allotments totaling 108,800 acres were assessed to determine whether or not the five Standards for Rangeland Health are being met. The five standards for rangeland health that apply to public lands in the Lewistown Field Office are presented below:

- Standard #1: Uplands are in proper functioning condition.
- Standard #2: Riparian and wetland areas are in proper functioning condition.
- Standard #3: Water quality meets State standards.
- Standard #4: Air quality meets State standards.
- Standard #5: Provide habitat as necessary, to maintain a viable and diverse population of native plant and animal species, including special status species.

Findings are presented in the *Lower Crooked Creek Renewal Evaluations*. These documents may be reviewed at the Lewistown Field Office or in Appendix A at the end of this document.

1.2 Need for the Proposed Action

The 20 term grazing permits in the CC planning area have expired. The Fundamentals of Rangeland Health and subsequent Land Health Standards require when the BLM initiates management actions (renewing term grazing permits) that they ensure, "Watersheds are in, or are making significant progress toward properly functioning condition, including their upland, riparian-wetland, and aquatic components…"(43 CFR 4180.1(a)). It was determined in the CC planning area evaluations that all allotments were meeting standards. However, during the assessment process, BLM's interdisciplinary (ID) team identified several factors that could improve the biological, physiological, and ecological processes within BLM administered land in the project area. These issues are identified in section 1.8 and include forested habitat, Greater sage-grouse habitat, and riparian-wetland areas.

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

1.3 Purpose(s) of the Proposed Action

The BLM Lewistown Field Office proposes to renew 20 term grazing permits, as well as implement a prescribed fire and grazing changes/structural projects to benefit Greater sage-grouse. Land health would be improved on public lands within the watershed by:

- Improving and/or maintaining density, structure, and species composition of forest and grassland habitats through mechanical treatments and prescribed fire. (Improve Fire Regime Condition Class (FRCC) ratings)
- Improving and/or maintaining upland health and sagebrush habitats (species composition and structure) through existing and/or revised livestock grazing management, structural projects, and prescribed fire.
- Improving and/or maintaining riparian, wetland and aquatic habitats (vegetation composition, structure, streambank stability, channel morphology) through revised livestock grazing management, structural projects, and prescribed fire.

1.4 Conformance with BLM Land Use Plan(s)

The public lands in the CC planning area are managed according to decisions in the Judith Resource Area RMP approved in 1994. The proposed action is in conformance with the RMP and applicable guidance is in the Record of Decision and Approved Judith Resource Area RMP on pages 5 - 29. The Judith RMP was amended by the Standards for Rangeland Health and

Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota, which was approved by the Secretary of the Interior in August 1997. Livestock grazing is managed under Lewistown District (Lewistown and Malta Field Offices) Standards for Rangeland Health and Guidelines for Livestock Grazing Management (BLM 1997) (Appendices B and C). The Fire/Fuels Management Plan/Plan Amendment for the Montana Dakotas (BLM 2003) also amended the Judith RMP. This amendment includes language to bring the RMP up to date with federal wildland fire management policy.

1.5 Relationship to Statutes, Regulations, or other Plans

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

The proposed action is also in conformance with the Federal Land Policy and Management Act, the Taylor Grazing Act, the Standards for Rangeland Health and Guidelines for Grazing Management (43 CFR 4180), and with BLM policies and Federal regulations.

The proposed action is consistent with the Federal Clean Water Act (33 U.S.C. §1251 et seq. (1972)), the Montana Water Quality Act (75-5-301, 302 MCA), and the 2010 Water Quality Memorandum of Understanding between the BLM and the Montana Department of Environmental Quality (MDEQ).

The proposed action is consistent with the goals, objectives and management recommendations in the BLM's National Sage-grouse Strategy and IM 2012-043, Greater Sage-Grouse Interim Management Policies and Procedures. The proposed action is also consistent with guidance in the Management Plan and Conservation Strategies for Sage Grouse in Montana (2005).

1.6 Unique Characteristics of the Geographic Area

Table 1.1 Unique Characteristics of the Geographic Area

Resource	Not Present	Present but Not Affected	Present & May be Affected *	Comments / Addressed in EA Section(s):
Air Quality		X		Discussed under Section 3.5.4
Cultural Resources			X	Discussed under Section 3.5.1
Environmental Justice	X			No low-income populations, minority populations, or Indian tribes identified in the CC Project Area
Floodplains [1]			X	Discussed under Key Issue #3 – Riparian-Wetland-Habitats
Invasive, Non-native Species(Noxious Weeds)			X	Discussed under Resource Concern #1 – Invasive, Non-Native Species(Noxious Weeds)
Threatened, Endangered, Candidate &/or BLM Sensitive Plant Species			X	Discussed under Resource Concern #2 – Special Status Species

Threatened, Endangered, Candidate &/or BLM Sensitive Animal Species			X	Discussed under Resource Concern #2 – Special Status Species
Water Quality (drinking/ground)			X	Drinking water not affected. Surface and ground water discussed under Resource Concern #4 Water Resources
Wetlands/Riparian Zones			X	Discussed under Key Issue #3 – Riparian-Wetland-Habitats
* An "X" in this box means that the resource will be analyzed in affected environment and environmental impacts sections of this EA. (NOTE: This does **not** mean impacts are likely to be significant in any way). [1] Floodplains are part of stream systems. Actions which improve streams and riparian habitats will comply with Executive Order 11988 in that they are designed to restore and preserve the natural and beneficial values served by floodplains.				

1.7 Identification of Issues, Resource Concerns and Associated Objectives

Key Issues

These issues have a direct bearing upon the proposed action and the process of how we achieve the purpose and need. They are used to drive development of alternative ways to achieve the purpose and need. The effects to these issues are analyzed in detail. Differences in these effects are used to measure the trade-offs between alternative actions.

Resource and Social Concerns

Resource concerns do not drive the development of alternatives, but are used to analyze and disclose the effects of various actions. Issues and resource concerns were identified through the Watershed Assessment and scoping process. Not all issues identified below are applicable to all allotments and the unallotted tracts in this EA.

Key Issue #1: Fire Regime Condition Class (FRCC)

Conifer stands in the CC planning area represent the furthest departure from reference conditions (FRCC3). Timber stands are overstocked pole and saplings sized trees are encroaching on adjacent sage and grass lands due to departure from historical fire frequency. (See FRCC worksheets Appendix B) Densely stocked mature and middle-aged pine stands with continuous ladder fuels are overly abundant on the landscape. The understory vegetation in the closed stands is dominated by small-diameter conifer regeneration and juniper, species diversity and herbaceous biomass production is limited. Conifer encroachment is expanding into the edges of rangelands adjacent to forested sites.

The Central Montana Fire Zone (CMFZ) is responsible for fire suppression in the CC planning area. Based on fire staff experience the CC planning area has the highest occurrence of lightning caused fires in the CMFZ. Wildfires in the area are more severe and intense compared to reference conditions, the current fuel loadings increase fire behavior resulting crown fires with high tree mortality. In 2012 wildfires burned approximately16,825 acres of the CC planning area, costing approximately $790,810.45. Early proactive treatments would be more efficient and cost effective if done before the conifer saplings and pole sized trees mature and further depart from historic conditions. Generally speaking prescribed fire is more cost effective per acre than wildfire suppression. Reduced fuel loadings and arrangement would lower the risk of high severity wildfire and improve fire fighter and public safety.

Objectives

- Shift the vegetation structure and composition in the Crooked Creek planning area to fall within the historical fire regime.
- Reduce the available fuel load.
- Reduce the ladder fuels and stand density in conifer stands.
- Re-introduce fire onto the landscape.
- Increase the quantity and quality of deciduous shrubs and desirable herbaceous plants.
- Increase available water in drainages by reducing conifer canopy cover.

Key Issue #2: Greater Sage-grouse Habitats

The western portion of the CC planning area is quality sagebrush/Greater sage-grouse habitat, containing approximately 23,000 acres of preliminary priority habitat occurs in the CC planning area within 8 allotments.. Conifers have been expanding west into these habitats and reducing the quality and functionality for sagebrush obligates. The Natural Resources Conservation Service (NRCS) has been working with private landowners to establish grazing management to benefit greater sage-grouse.

Objectives

- Reduce the amount of conifers encroaching shrub steppe habitats.
- Work with private landowners and NRCS to improve and/or maintain grazing management to benefit Greater sage-grouse.
- Improve visibility of high collision risk fences for Greater sage-grouse.
- Increase the ratio of sagebrush canopy to conifer canopy and FRCC acreages to more historic distribution.
- Maintain existing sagebrush habitat so that 75% or more of potential big sagebrush communities provide vegetative composition and structure for sagebrush obligate species.

Key Issue #3: Riparian-Wetland Habitats

The riparian-wetland areas associated with streams in the planning area (i.e. Crooked Creek) are in proper functioning condition (PFC). This condition meets the requirements for Lewistown BLM standards for rangeland health, and current livestock grazing management was determined to be appropriate for maintenance and improvement of these areas. Currently, stream banks are dominated by herbaceous, stabilizing riparian-wetland vegetation such as three-square bulrush. These plants have tremendous value; however, the potential natural community (PNC) on Crooked Creek would more than likely include sandbar willow and cottonwood communities. Because of the appropriate grazing management on Crooked Creek, the riparian-wetland areas are in an apparent improving trend, but woody species recruitment is often tied to infrequent, episodic flow conditions and time is a key component of recovery. The recovery of sandbar willow and cottonwood could possibly be accelerated by plantings. Elk numbers are well over objective in the CC planning area, and their use on woody species would be a noteworthy obstacle to overcome.

Lentic riparian-wetland areas (those primarily associated with standing water) are mainly tied to man-made water developments such as reservoirs. Nearly all of these developments were created for the purpose of stock water, and they are an important component of maintaining grazing systems that benefit natural riparian-wetland areas. Some of these developments, including Drag Reservoir, can support other values as well such as wildlife habitat, fisheries, and recreation opportunities. The riparian-wetland habitat on all of the water developments, but in particular Drag Reservoir, is at risk because the riparian-wetland habitat is dependent upon water stored by the reservoir, and these man-made structures require maintenance. The lower, drop-outlet structure on the primary spillway at Drag Reservoir is about to fail; therefore, the roughly 25 acres of riparian-wetland habitat and associated wildlife, fishery, and recreational values are at risk of being lost. Maintenance of this structure is scheduled to begin in the fall of 2013, and it is anticipated to be repaired by 2014. The decision was made under a categorical exclusion for maintenance. An effects discussion is included in this analysis because it is reasonably foreseeable action that will be completed.

Marlow and others (2006) found increases in water yield and riparian-wetland vegetation in small order drainages following implementation of prescribed burns in the Missouri River breaks. Because of the canopy coverage of conifer trees in the planning area, which is outside of a condition that would be expected under a natural fire regime, it is possible that the amount of riparian-wetland habitat and water yield has been affected in the small order drainages.

Goals

- Maintain and/or improve the riparian-wetland habitats within the CC planning area and facilitate the rate of recovery toward the potential plant communities that include woody riparian species on Crooked Creek.
- Maintain the riparian-wetland habitat and associated wildlife, fishery, and recreation values at Drag Reservoir.
- Improve fire regime condition class within the planning area to improve water yield and riparian-wetland habitat in small order drainages.

Resource Concern #1: Invasive, Non-native Species (Noxious Weeds)

Noxious and invasive weed species are present on public, private, and state lands within the planning area. These species make efficient use of local natural resources difficult and may interfere with management objectives for the site. An invasive plant attains a "noxious" status by legislation only (see Montana Noxious Weed List; Chapter 2, 2010 for a description of priorities). Noxious weed species known to occur within the planning area include: Canada thistle (*Cirsium arvense*) is commonly found growing on the banks and dam faces of stock water reservoirs. Spotted knapweed (*Centaurea stoebe* or *maculosa*), leafy spurge (*Euphorbia esula*), Russian knapweed (*Centaurea repens*) and whitetop (*Cardaria draba*) have been identified in small isolated patches within the planning area. Noxious weed species of concern based on the soil types and precipitation zones found within the planning area include: saltcedar (*Tamarix spp*.), dalmation toadflax (*Linaria dalmatica*), Russian olive (*Elaeagnus angustifolia*), cheatgrass (*Bromus spp.*), and yellow starthistle (*Centaurea solstitialis*). Other invasive species that are not state listed Noxious weeds that may have an impact on resource conditions within CC include: perennial sowthistle (*Sonchus arvensis*), poison hemlock (*Conium maculatum*), musk thistle (*Carduus nutans*), common burdock (*Artium minus*), and black henbane (*Hyoscyamus niger)*.

Once established, many Noxious and Invasive plant species can invade healthy plant communities and significantly alter healthy plant systems. These aggressive invaders decrease habitat value for wildlife, reduce range productivity for livestock, and increase cost for other land management activities.

Objectives

- Continue control of known noxious weed infestations and all newly identified infestations, with an emphasis on the species listed above.
- Initiate new cooperative weed control agreements with grazing permitees within the planning area as needed.
- Eradicate any new populations of priority 1A and 1B weeds found in the planning area. Manage large infestations of category 2A and 2B weeds for containment. Eradicate new or small size infestations of category 2A and2B weeds where less abundant.

Resource Concern #2: Special Status Species and Migratory Birds

Grazing and fire suppression have altered habitats in the CC planning area, with varying impacts (both positive and negative) to BLM sensitive species and migratory birds.

"Special Status Species" refers to both plants and animals and includes species listed as threatened or endangered (T&E) under the Endangered Species Act (ESA), species proposed for listing under the ESA, candidates for listing under the ESA, state listed species, and BLM Sensitive Species.

There are no Threatened, Endangered or Proposed species known or expected to occur, nor is there any critical habitat designated within the CC planning area. A list of special status species known or expected to occur within the CC planning area and their preferred habitat can be found in Appendix C. Key Issue #2 above specifically addresses Greater sage-grouse.

- Allow or reintroduce fire, an essential ecological process, to help create, maintain and diversify vegetation conditions.
- Maintain or improve native grassland habitats for Sprague's pipit nesting.
- Consider habitat for other special status species expected in the project area.

Also refer to the objectives under Section 1.8 above – Riparian, Wetland, and Aquatic Habitat.

Resource Concern #3: Game Species

Grazing and fire suppression affect vegetation and wildlife use for several game species of particular interest for recreational hunters.

The CC planning area is part of the MFWP Chain Buttes BMA (#32) and hunting district 410, an especially important elk hunting area in the Missouri River breaks. A special draw permit is needed for elk, with over 2500 elk permits issued in 2012. MFWP surveys in 2012 observed 3281 elk in HD 410, which is over the objective of 2300. Mule deer numbers (297) have been below objective (514) since 2008/2009 in Sand Coulee/Carroll Coulee trend area (west of the

project area) within HD 410. Antelope estimates (1050) are also below objective (3000). Estimates for other game species are not available.

Objective

- Objectives in Key Issue #1 would also have desirable effects for game habitat, specifically to: 1) Reduce conifer canopy cover, 2) increase herbaceous vegetation and 3) increase quantity of deciduous woody trees/shrubs.
- Work with MFWP to manage habitat to meet big game objectives, while also providing habitat to meet other Resource Concerns and Key Issues.

Resource Concern #4: Socioeconomics

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

Also, businesses in central Montana profit from recreational uses that occur in the CC planning area. Big game and upland bird hunting activities provide important economic benefits to the Lewistown, Winnett, Roy, and Grass Range economies, due to the relatively close proximity of these communities to popular hunting areas.

Objective

- Continue to contribute to the local economy by providing an opportunity for sustainable uses on public land through livestock grazing, recreational opportunities, and various other utilizations of public lands in the planning area.

Resource Concern #5: Water Resources

The Musselshell River is the only stream in the planning area that is listed as water quality impaired by Montana Department of Environmental Quality (MDEQ). The Musselshell River is listed as impaired because of alterations in stream-side zones and low-flow alterations. Because of the good condition of upland and riparian habitats within the planning area, it is unlikely that BLM activities are contributing to the causes of concern on the Musselshell River.

Water resources are of concern because proposed vegetative treatments could result in changes in water and sediment yield by changing vegetative cover types, and the stream channels in the area can be sensitive to changes in streamflow magnitude/timing and sediment yield. Additionally, the proposed range improvement projects, which include running a pipeline and tanks from a deep groundwater well, could affect the quantity of groundwater in the Eagle Sandstone formation.

A large percentage of the planning area's watershed's mean annual yield is claimed in pits, dams, and reservoirs. This has affected the volume and timing of runoff available to downstream areas. Furthermore, following the exceptional 2011 water year, many pits, dams, reservoirs in the planning area, particularly those located in the Bearpaw Shale Formation, experienced

increases in salinity to levels unusable for livestock or wildlife. As alternative water sources such as wells/pipelines are developed, the continued use and need of pits, dams, reservoirs should be evaluated for removal.

Goals

- Maintain the upland and riparian-wetland habitats to minimize nonpoint source pollutants entering streams.
- Improve fire regime condition class within the planning area to improve water yield and riparian-wetland habitat in small order drainages.
- Evaluate the need for pits, dams, and reservoirs for removal to improve the timing and volume of runoff available to downstream areas.

1.8 Summary

This chapter has presented the purpose and need of the proposed project, as well as the relevant issues, i.e., those elements of the human environment that could be affected by the implementation of the proposed project. In order to meet the purpose and need of the proposed project in a way that resolves the issues, the BLM has developed a range of action alternatives. These alternatives, as well as a no action alternative, are presented in Chapter 2. The potential environmental impacts or consequences resulting from the implementation of each alternative are then analyzed in Chapter 4 for each of the identified issues.

2.0 DESCRIPTION OF ALTERNATIVES

2.1 Introduction

This chapter describes the alternative development process, alternatives considered in detail. The alternatives considered in detail have been designed to address the resource issues identified.

This chapter compares how alternatives address each issue identified. This comparison, along with a disclosure of Environmental Consequences (Chapter 4) identifies the tradeoffs to the Authorized Officer (Field Manager) to make an informed choice between alternatives.

2.2 Process Used to Formulate Alternatives

Alternatives were developed based upon National and State BLM direction and policy, current grazing regulations and law, existing condition and environmental issues. Environmental issues are discussed in section 1.7 of Chapter 1. Other factors that influenced alternative development are discussed in Chapter 3. When developing and considering alternatives, the ID team evaluated them against the purpose(s) of the proposed action. With the exception of the No Action alternative, alternatives that wouldn't make progress toward meeting resource objectives were not considered.

2.3 Alternative A – Continue Current Management (No Action):

Livestock Grazing:

Livestock grazing would be authorized on all CC planning area allotments as currently permitted. No new projects would be constructed and no modifications would be made to existing permits. Livestock numbers and season of use for all allotments are presented in Table 2.1.

Table 2.1 Current Livestock Grazing Allocation and Management within the CC planning area.

Allotment Name	Livestock # & Kind	Grazing Begin	Grazing End	% Public Land	Active AUMs	Grazing System
79 Trail East	305 cattle	May 10	Oct. 10	78	1203	Season-long
Dovetail AMP	72 yearling cattle	May 16	Sept. 30	100	327	Deferred flip-flop
Drag Creek	251 cattle	May 1	Oct. 16	76	1060	Season-long
Dunn Ridge Common	22 cattle	March 1	Feb. 28	100	266	Season-long
Gibbs Coulee	4 horse	March 1	Feb. 28	100	48	Season-long
Hedman	1 cattle	March 1	Feb. 28	100	12	Season-long
Iverson	445 cattle	May 16	Nov. 15	52	1419	Rotation
Iverson Ind.	118 cattle	May 16	Nov. 15	48	343	Rotation
Jackson Place	274 cattle	May 1	Oct. 31	Variable	1138	Rest-rotation*
Meyers	7 cattle	March 1	Feb. 28	100	84	Season-long

Musselshell River	218 cattle	May 1	Nov. 1	70	928	Rotation
Musselshell Trail	750 yearling cattle	May 1	Sept. 30	Variable	1926	Rotation*
Soda Creek	204 yearling cattle	May 15	Sept. 14	46	284	Season-long
Swinging H Dovetail	410 cattle	May 5	Oct 5	41	962	Season-long
Swinging H Ind. B	4 cattle	March 1	Feb. 28	100	58	Season-long
Two Crow R&R	1291 cattle	April 15	Sept. 15	82	5360	Deferred-Rest Rotation
Weaver Ind. A	104 yearling cattle	May 15	Sept. 15	53	225	Season-long
Weaver Ind. B	4 yearling cattle	March 1	Feb. 28	100	57	Season-long
Wild Horse Pasture	13 cattle	March 1	Feb. 28	100	58	Season-long
Upper/Lower 79	9 cattle	March 1	Feb. 28	100	101	Rotation

* These allotments contain various amount of public land in each pasture and will be further delineated in subsequent alternatives.

Noxious Weeds:
Continue management of noxious weeds in cooperation with Fergus and Petroleum Counties, federal and state agencies, private landowners and other partners. Initiate Weed Control Cooperative Range Improvement Agreements with affected permittees to treat invasive species on the Montana state noxious weed list as resources allow. Areas where private landowners actively cooperate, participate, and support the BLM's weed management strategies, are given a higher priority for treatment. Monitoring for new infestations of species of concern will continue. Stipulations designed to reduce the spread of Noxious weeds will be incorporated into any surface disturbing activity during the NEPA process.

Noxious weed infestations will be treated using the principles of Integrated Weed Management (IWM). IWM is defined as "The application of many kinds of technologies in a mutual supportive manner. It involves the deliberate selection, integration, and implementation of effective weed control measures with due consideration to economic, ecological, and sociological consequences." The principles of control through IPM/IWM include:

- Prevention
- Cultural
- Chemical
- Biological
- Mechanical

2.4 Features Common to All Action Alternatives (B & C)

Fuels Treatments:
The proposed action would utilize prescribed fire and/or mechanical methods to improve or maintain Fire Regime Condition Class (FRCC), reduce fuel loadings and improve wildlife habitat. Within the Crooked Creek planning area 133,464 acres (Units A-N see map Appendix B) of federal, state and private lands have been identified for prescribed burning or mechanical vegetation treatments, of that a target of 60,000 acres could be treated during the life of the watershed plan (10 years). Treatments would be implemented in coordination with other resource management program needs such as range, wildlife, cultural resources and Charles M. Russell wildlife refuge employees on interagency units. Treatments would be monitored; maintenance burns and mechanical treatments would be implemented based on post treatment monitoring assessments in years following initial implementation.
Prescribed fire could be used in units A-F, H, and J-M to reduce fuel loadings and maintain or improve condition class by reducing areas of dense pine regeneration while preserving the mature overstory, leaving a mosaic of burned and unburned areas. Current fuel loadings and stand conditions are such that prescribed fire is likely to be an effective and efficient means of maintaining or improving condition classes. Prescribed fire treatments in these units would be implemented when environmental conditions would allow low to moderate fire behavior and intensity (typically spring or fall), and create a mosaic of burned and unburned areas. Small trees and those encroaching on open areas would be reduced while minimizing the risk to the mature overstory. Prescribed fire treatments in units G, I and N would be implemented when environmental conditions would allow moderate to high fire behavior and intensity (probably early summer during green up) and would remove the timber stands along the critical sage brush habitat boundary to decrease the timber encroachment in the sage brush ecosystem, possibly increasing the amount of Greater Sage-grouse habitat and reducing probability for Greater Sage-grouse habitat destruction from potential wildfires. The conditions under which prescribed fire would be used and implemented would be addressed in project-specific burn plans. Units A, J, K, and L encompass Fish and Wildlife Service lands, treatment of these lands will need to be coordinated with Charles M Russell wildlife refuge fire personnel, especially when the burn plans are written, and they will likely participate during implementation.

The prescribed fire objectives for low to moderate intensity burns would be to:

1. Under burn a minimum 75 percent of the ponderosa stands.
2. Top-kill 30-60 percent of conifers less than 3” dbh (diameter at breast height)
3. Limit mortality in trees 8” dbh and larger to 30 percent.

The prescribed fire objectives for moderate to high intensity burns would be to:

1 Under burn a minimum 90% of the ponderosa stands.
2. Top-kill 75-100 percent of all conifers

Control lines would consist of existing roads, natural barriers such as areas of sparse fuels or cow trails, hand lines constructed with hand tools and chainsaws. ATV/UTV's dragging a log, a small v plow or a disc may be used to create control lines. The use of blade lines is not anticipated. Off-road travel by engines and ATV/UTV's would be required during prescribed fire preparation and implementation. All fire operations would be conducted in accordance with Greater sage-grouse policy (IM 2012-043), or when implemented, the Greater sage-grouse Judith RMP amendment.

Existing fences, pipelines, stock tanks, water savers and any other improvements would have fuels removed from around them as necessary prior to implementing prescribed fire operations, and would be protected during the operation.

The primary purpose of mechanical treatment would be to thin overstocked areas where the prescribed fire is not a viable treatment option. Mechanical treatments could be implemented in units A-N. Units Labeled Mech. 1 and 2 will be mechanical only treatments. Mechanical treatments would be implemented when conditions are favorable for minimal soil disturbance. Mechanized equipment will be limited to slopes of 40% or less with an emphasis on reducing dense areas of pine regeneration as a means of removing ladder fuels and promoting a more open stand. Hand treatments would include sawing and piling, lop and scatter treatments, sawing and chipping, or firewood units. All mechanical treatments will be based on the silvicultural prescriptions designed to meet appropriate FRCC for the planning area (see Appendix G). Patches of conifer stands will be left untreated as dictated by terrain and the need to retain security cover for big game. Treatments will be coordinated with the range management specialist, wildlife biologist, the field office archeologist and other appropriate office staff prior to implementation.

All treatments would adhere to the Water Quality Best Management Practices (BMPs) for Montana Forests (MSU Extension, 2001), and as appropriate, required design features (RDF's) for Greater sage-grouse when finalized in the Judith RMP amendment for Greater sage-grouse.

2.5 Alternative B – Preferred Alternative (Action)

2.5.1 Livestock Grazing:

Livestock Grazing in Alternative B is presented by allotment for the Crooked Creek planning area. Specific proposals for each allotment are detailed below. All allotments were determined to be meeting all of the Standards for Rangeland Health. The evaluations can be found in Appendix A.

<u>Flexibility:</u>
With prior approval, more livestock may be grazed for a shorter period, within the authorized dates, so long as the active AUMs are not exceeded.

With prior approval, BLM may authorize flexibility for the season of use on each allotment to address varying local weather and forage conditions on an annual basis. The beginning and ending date may vary up seven days depending on variations in weather and forage. Livestock may need to be removed from a specific pasture prior to the maximum number of days specified in the grazing plans rotation schedule. If this occurs, the grazing dates for the next pasture will be adjusted proportionally. Conversely, if annual production is unusually high, livestock may be allowed to remain in a given pasture for up to five additional days and the remainder of the rotation schedule adjusted accordingly.
The maximum authorized AUMs, as specified in the Term Grazing Permits, cannot be exceeded by allowing this flexibility.

For those allotments that operate on a grazing rotation the grazing sequence may be changed on an annual basis due to drought or other unforeseen natural events after consultation with BLM and written approval.

(1) 79 Trail East #04960

Public Acres – 8344
AUMs – 1203
Public Land – 78%
Livestock No. – 305
Season of Use – 5/10 to 10/10
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
305 cattle	5/10 to 10/10	78	1203	Season-long

(2) Dovetail AMP #04967

Public Acres – 1872
AUMs – 327
Public Land – 100%
Livestock No. – 72 Yearling Cattle
Season of Use – 5/16 to 9/30
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
72 yearling cattle	5/10 to 10/10	100	327	Season-long

(3) Drag Creek #15013

Public Acres – 6315
AUMs – 1063
Public Land – 76%
Livestock No. – 251 cattle
Season of Use – 5/1 to 10/16
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
251 cattle	5/1 to 10/16	76	1060	Season-long

(3) Dunn Ridge common #15013

Public Acres – 1368
AUMs – 266
Public Land – 100%
Livestock No. – 22 cattle
Season of Use – 3/1 to 2/28
Type of Use – Custodial

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
22 cattle	3/1 to 2/28	100	266	Season-long

The control of the base property associated with the Dunn Ridge Common Allotment #02533 has changed. Upon approval of the transfer by the authorized officer, BLM would transfer 48 AUMs of grazing preference to the new leasee of the associated base property.

(5) Gibbs Coulee #02533

Public Acres – 351
AUMs – 48
Public Land – 100%
Livestock No. – 4 horse
Season of Use – 3/1 to 2/28
Type of Use – Custodial

Proposed Action – The current permitted use would be modified as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
4 cattle	3/1 to 2/28	100	48	Season-long

The base property associated with the Gibbs Coulee Allotment #02533 has changed ownership. Upon approval of the transfer by the authorized officer, BLM would transfer 48 AUMs of grazing preference to the new owner of the associated base property. The new base property owner has also requested a change in class of livestock from horses to cattle. The grazing applications are consistent with all mandatory terms and conditions analyzed in this document.

(6) Hedman #15013

Public Acres – 69
AUMs – 12
Public Land – 100%
Livestock No. – 1 cattle
Season of Use – 3/1 to 2/28
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
1 cattle	3/1 to 2/28	100	12	Season-long

(7) Iverson #04957

Public Acres – 9132
AUMs – 1419
Public Land – 52%
Livestock No. – 445 cattle
Season of Use – 5/16 to 11/15
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
445 cattle	5/16 to 11/15	52	1419	Deferred Rest Rotation

Total AUMs will remain 343.

The Iverson and Iverson Ind. Allotments are currently run in a three pasture rotation system. The permittee and NRCS have proposed a deferred rest rotation system which will divide the allotments into nine pastures (from three). Six pastures will be grazed each season allowing three pastures to rest that grazing season. The rested pastures will then be deferred until after the growing season the following year to allow two seasons of rest. The three pastures grazed during the growing season the previous year will be rested the following year. Also, a 8 miles of pipeline, 4 water tanks, and 4.75 miles of fence will be installed on BLM to help provide livestock distribution and reliable water. (See Appendix D for specific pasture locations and rotations)

(8) Iverson Ind. #20715

Public Acres – 8880
AUMs – 343
Public Land – 48%
Livestock No. – 118 cattle
Season of Use – 5/16 to 11/15
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
118 cattle	5/16 to 11/15	48	343	Deferred Rest Rotation

Total AUMs will remain 343.

The Iverson and Iverson Ind. Allotments are currently run in a three pasture rotation system. The permittee and NRCS have proposed a deferred rest rotation system which will divide the allotments into nine pastures (from three). Six pastures will be grazed each season allowing three pastures to rest that grazing season. The rested pastures will then be deferred until after the growing season the following year to allow two seasons of rest. The three pastures grazed during the growing season the previous year will be rested the following year. Also, a 8 miles of pipeline, 4 water tanks, and 4.75 miles of fence will be installed on BLM to help provide livestock distribution and reliable water. (See Appendix D for specific pasture locations and rotations)

(9) Jackson Place #14969

Public Acres – 7978
AUMs – 1138
Public Land – variable
Livestock No. – 274
Season of Use – 5/1 to 10/31
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Pasture	Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
S1/2 Cimarron	37 cattle	5/1 to 10/31	95	213	Rotation
N1/2 Cimarron	55 cattle	5/1 to 10/31	85	286	Rotation
S1/2 Thompson	57 cattle	5/1 to 10/31	63	217	Rotation
N1/2 Thompson	70 cattle	5/1 to 10/31	74	313	Rotation
Crooked Creek	55 cattle	5/1 to 10/31	38	126	Rotation

(10) Meyers #14968

Public Acres – 360
AUMs – 89
Public Land – 100%
Livestock No. – 7 cattle
Season of Use – 3/1 to 2/28
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Pasture	Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
Meyers	3 cattle	3/1 to 2/28	100	36	Rotation
Meyers Ind. B	4 cattle	3/1 to 2/28	100	48	Rotation

(11) Musselshell River #04959

Public Acres – 7282
AUMs – 930
Public Land – 70%
Livestock No. – 218 cattle
Season of Use – 5/1 to 11/1
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
218 cattle	5/1 to 11/1	70	928	Rest-Rotation

(12) Musselshell Trail #15025

Public Acres – 14942
AUMs – 1268
Public Land – variable
Livestock No. – 750 yearling cattle
Season of Use – 5/1 to 9/30
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Pasture	Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
Musselshell River	493 cattle	5/1 to 9/30	60	1488	Rotation
Buckskin	112 cattle	5/1 to 6/15	100	169	Rotation
Buckskin	115 cattle	5/1 to 9/30	100	113	Rotation
Novak	28 cattle	5/1 to 9/30	100	141	Rotation
McArthur Home	2 cattle	5/1 to 9/30	100	10	Rotation

(13) Soda Creek # 04959

Public Acres – 2000
AUMs – 284
Public Land – 46%
Livestock No. – 204 yearling cattle
Season of Use – 5/15 to 9/14
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
204 yearling cattle	5/15 to 9/14	46	379	Season long

(14) Swing H Dovetail #15053

Public Acres – 364
AUMs – 964
Public Land – 41%
Livestock No. – 410 cattle
Season of Use – 5/5 to 10/25
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
410 cattle	5/5 to 10/25	41	962	Season long

(15) Swing H Ind. B #04966

Public Acres – 378
AUMs – 58
Public Land – 100%
Livestock No. – 4 cattle
Season of Use – 3/1 to 2/28

Type of Use – Custodial

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
4 cattle	3/1 to 2/28	100	58	Season long

(16) Two Crow RR #15028

Public Acres – 37625
AUMs – 5360
Public Land – 82%
Livestock No. – 1291 cattle
Season of Use – 4/15 to 9/15
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
1291 cattle	4/15 to 9/15	82	5360	Deferred Rest Rotation

Terms and conditions: The 582 non-renewable AUMs will continue to be available annually for application.

(17) Ind. A #15053

Public Acres – 364
AUMs – 964
Public Land – 41%
Livestock No. – 410 cattle
Season of Use – 5/5 to 10/25
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System

410 cattle	5/5 to 10/25	41	962	Season long

(18) Ind B. #15053

Public Acres – 364
AUMs – 964
Public Land – 41%
Livestock No. – 410 cattle
Season of Use – 5/5 to 10/25
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
410 cattle	5/5 to 10/25	41	962	Season long

(19) Wild Horse Pasture #15053

Public Acres – 364
AUMs – 964
Public Land – 41%
Livestock No. – 410 cattle
Season of Use – 5/5 to 10/25
Type of Use – Active

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
410 cattle	5/5 to 10/25	41	962	Season long

(20) Upper/Lower 79 Trail #04964

Public Acres – 448
AUMs – 101
Public Land – 100%
Livestock No. – 9 cattle
Season of Use – 3/1 to 2/28

Type of Use – Custodial

Proposed Action – The current permitted use would continue as follows:

Livestock # & Kind	Season	% Public Land	Active AUMs	Grazing System
9 cattle	3/1 to 2/28	100	101	Rotation

Noxious Weeds:
Noxious weed management will be in cooperation with Fergus and Petroleum Counties, federal and state agencies, private landowners and other partners. Initiate Weed Control Cooperative Range Improvement Agreements with affected permittees to treat invasive species on the Montana state noxious weed list as resources allow. Areas where private landowners actively cooperate, participate, and support the BLM's weed management strategies, are given a higher priority for treatment. Monitoring for new species of concern will be a priority.

2.8 Alternative C- No grazing

2.8.1 Livestock Grazing:
Under this alternative livestock grazing would no longer be authorized in the CC planning area. The removal of all livestock from public lands would be required and boundary fencing would be required to prevent livestock use on public lands. Range Improvements that do not benefit wildlife and recreational values would be disassembled and removed from public lands.

Noxious Weeds:
With the exclusion of livestock grazing from public land there would no longer be Weed Control Cooperative Range Improvement Agreements with permittees. All weed control efforts would be conducted by the LFO and the respective County Weed Departments.

2.9 Summary Comparison of Alternative Actions:

Table 2.23 Summary Comparison of changes to allotments by Alternative.

Gibbs Coulee	Alternative A	Alternative B	Alternative C
Livestock Number & Kind	4 Horse	4 Cattle	No Livestock Use
Iverson & Iverson Ind.	Alternative A	Alternative B	Alternative C
Livestock Number & Kind	563 Cattle	563 Cattle	No Livestock Use
Grazing Period	5/16-11/15	5/16-11/15	No Livestock Use
Grazing Management	Rotation	Deferred Rest-Rotation	None
Fence (miles)	0	4.75	0
Pipeline (miles)	0	8.5 miles	0
Tanks	0	4	0

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter presents the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources). This chapter provides the baseline for comparison of impacts/consequences described in Chapter 4.

3.2 General Setting

The 216,200 acre Crooked Creek planning area (CC planning area) lies in central Montana, about 40 miles northeast of Winnett, Montana. Public land administered by the BLM accounts for 108,800 acres of the greater planning area, approximately 50% of the total area. The Missouri Breaks occur within a 6-30 miles wide by 185 mile long belt of rugged landscape along the Missouri River in central Montana with much of this area in public land ownership (i.e., Bureau of Land Management, US Fish and Wildlife Service). Elevations range from 1,818 feet to 4,442 feet and erosion is the primary geographic process (Nesser et al. 1997). The "breaks" can be characterized as highly dissected uplands, frequently interspersed with deep coulees and creek bottoms. Big sagebrush (*Artemisia tridentata* Nutt.) and wheatgrasses (*Agropyron* spp.) dominate the vegetation of ridgetops, while ponderosa pine *(Pinus ponderosa*) and Rocky Mountain juniper (*Juniperus scopulorum*) are typical dominants on side slopes of drainages. Soils in the breaks, derived from the underlying Bearpaw formation, are moderately saline and alkaline clays. Mean annual air temperatures range from 31F° to 57F° and 20-30% of mean annual precipitation occurs as snow (Nesser et al. 1997). Average annual precipitation is about 12 inches in most areas the CC planning area.

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

3.3 Key Issues Brought Forward for Analysis

3.3.1 Key Issue #1: Fire Regime Condition Class (FRCC)

Fire is widely recognized as a natural process influencing vegetation patterns in many mountain landscapes of the western United States including the Missouri Breaks area. In recent history, management policy has been the systematic exclusion of fire, which influences vegetation patterns by removing the influence of fire. As crown cover and density increases in the ponderosa pine woodlands, fuel loads also increase and understory vegetation is depleted. Lack of fire also increases the expansion of the ponderosa pine into the sagebrush and mixed grass prairie ecosystems. Increases in woody fuel loads result in a shift from frequent low and mixed intensity fires to less frequent high intensity fires. High intensity fires create a post fire environment that is often exploited by fire dependent species such as cheatgrass. Once

established this species provides fine fuels that increase opportunities for wildfire ignition and spread.

The fire management responsibility for the Crooked Creek olanning area is shared with the BLM Central Montana Fire Zone located in the Lewistown Field Office and local county volunteer fire departments. The project area is within the Lewistown Field Office (LFO) Breaks Fire Management Unit (FMU) with a small portion of the southwest corner of the watershed extending into the Prairie Forest FMU. Goals and objectives for the Breaks and Prairie Forest FMUs are identified in the Lewistown Field Office Fire Management Plan. The Fire/Fuels Management Plan Environment Assessment Plan Amendment for Montana and the Dakotas further categorizes the Breaks FMU into the Breaks Fire Management Zone – C1. The Prairie Forests FMU extends into the Range/Grasslands Fire Management Zone – B2. The B2 designation identifies areas where unplanned ignitions would have negative effects on the ecosystem unless mitigated. The C1 designation identifies areas where fire is desired to manage ecosystems. Both categories allow for the use of fire and non-fire fuels treatments to be used.

The watershed encompasses a fire-adapted ecosystem and restoration of natural fire regimes would be encouraged where practical. However, each fire occurrence would have special consideration and be managed in accordance with the Central Montana Fire Zone Fire Management Plan for the Lewistown Field Office (2004). Obvious concerns focus on human safety and structural developments. Social, environmental and political considerations would dictate management of each fire occurrence. An appropriate management response is initiated for each ignition based on current fire danger, resource availability and predicted weather which would ensure human safety, reduce cost of suppression and provide opportunity to return fire to its natural role in the ecology of the area.

The ecological systems occurring within the Crooked Creek planning area are the Northwestern Great Plains – Black Hills Ponderosa Pine Woodland and Savanna, Intermountain Basins Big Sagebrush Steppe, Northwestern Great Plains Mixed-grass Prairie, and the Northwestern Great Plains Floodplain. For modeling purposes, to complete the Fire Regime Condition Class assessment using FRCC Software Application 3.0.3.0, the Ponderosa Pine – Northern Great Plains Model – R0PIPOnp, Wyoming Big Sagebrush Model – R0SBWYwy,Northern Prairie Grassland Model – R0PGRn, and Riparian – Wyoming – R0RIPA respectively were selected from the 2008 Landfire Rapid Assessment Models. Ecological systems represent recurring groups of biological communities that are found in similar physical environments and are influenced by similar dynamic ecological processes such as fire and flooding.

FIRE REGIMES AND CONDITION CLASSES (FRCC)

FRCC serves as a broad measure of ecological departure and is commonly applied to describe fire regime and vegetation conditions. A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention but including the possible influence of aboriginal fire use (Agee 1993; Brown 1995).

As general examples, some plant communities require frequent, low-severity fire for sustainability, while others require infrequent, stand-replacing fire. Most plant communities

require fire frequencies and burn severities somewhere between these two descriptions. Plant community requirements, with respect to fire frequency and severity, are referred to as fire regimes.

The following table shows five fire regime groups:

Fire Regime Groups and Descriptions			
Fire Regime Group	***Frequency***	***Severity***	***Severity Description***
I	0-35 years	Low / mixed	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory.
II	0-35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation.
III	35-200 years	Mixed / low	Generally mixed-severity; can also include low-severity fires
IV	35-200 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation.
V	200+ years	Replacement / any severity	Generally replacement-severity; can include any severity type in this frequency range.

When a plant community does not burn at adapted intervals or severities (the fire regime), changes occur to the system which can affect species composition, structure, and fuel loading. These changes can further affect fire interval and burn severity, which further contribute to uncharacteristic structural changes in the plant community. These altered conditions can be measured and classified according to the departure of that community relative to its natural fire regime.

The concept of "reference conditions" is central to FRCC evaluation. Reference conditions represent the ecological processes and vegetation conditions for vegetation communities during a specific historic time period. By defining reference conditions, a comparison can be made with current conditions to calculate if any ecological departure is present.

For the purposes of FRCC evaluation, this reference period is prior to Euro-American settlement, and includes anthropogenic disturbances. Reference conditions are comprised of the following:

1. The proportion of seral stages, as characterized be dominate tree species, size and stand structure class, found on the landscape during the reference period;
2. The historic fire frequency (years) describing the mean fire interval between fire events for a given fire type

3. The historic fire severity (percent), which is the degree of replacement of the over-story canopy for a given vegetation type.

Although these FRCC reference conditions may not match desired conditions, they are believed to adequately represent the landscape structures and disturbance processes of functioning, sustainable ecosystems.

Condition classes are described as "a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire exclusion, timber harvesting, grazing, introduction and establishment of exotic species, insects and disease (introduced or native), or other past management activities" (Schmidt et al, 2002).

Three fire regime condition classes are categorized using the following criteria: 1) FRCC 1 represents ecosystems with low (<33 percent) departure from reference conditions; 2) FRCC 2 indicates ecosystems with moderate (33 to 66 percent) departure; and 3) FRCC 3 indicates ecosystems with high (>66 percent) departure (Hann and Bunnell 2001; Hardy and others 2001; Schmidt and others 2002).

The following table provides additional descriptions of the three FRCC classes:

Fire Regime Condition Class (FRCC) Characteristics	
Condition Class	***Description***
1	Less than 33 percent departure from the central tendency of the historical range of variation (HRV): Fire regimes are within the natural or historical range and risk of losing key ecosystem components is low. Vegetation attributes (composition and structure) are well intact and functioning.
2	33 to 66 percent departure: Fire regimes have been moderately altered. Risk of losing key ecosystem components is moderate. Fire frequencies 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.
3	Greater than 66 percent departure: Fire regimes have been substantially altered. Risk of losing key ecosystem components is high. Fire frequencies 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.

The Crooked Creek planning area falls into 2 fire regime groups. The Wyoming Big Sagebrush Steppe and Riparian systems are under fire regime 3 – low/mixed severity with an average fire frequency of 92 - 100 years. The Ponderosa Pine Woodland and Great Plains Mixed Grass Prairie are under fire regime group 1 – low/mixed severity fires with an average fire frequency of 12 - 15 years.

Within the past century reduced fire frequency within the watershed has caused a departure from the natural fire regimes. (see FRCC worksheets Appendix B)

The Ponderosa Pine Woodland has been assessed at Condition Class 3. As compared to reference conditions, open-structured, middle-aged and late stands are under-represented or at trace levels on the landscape. The closed structure stands are overly abundant on the landscape compared to reference conditions.

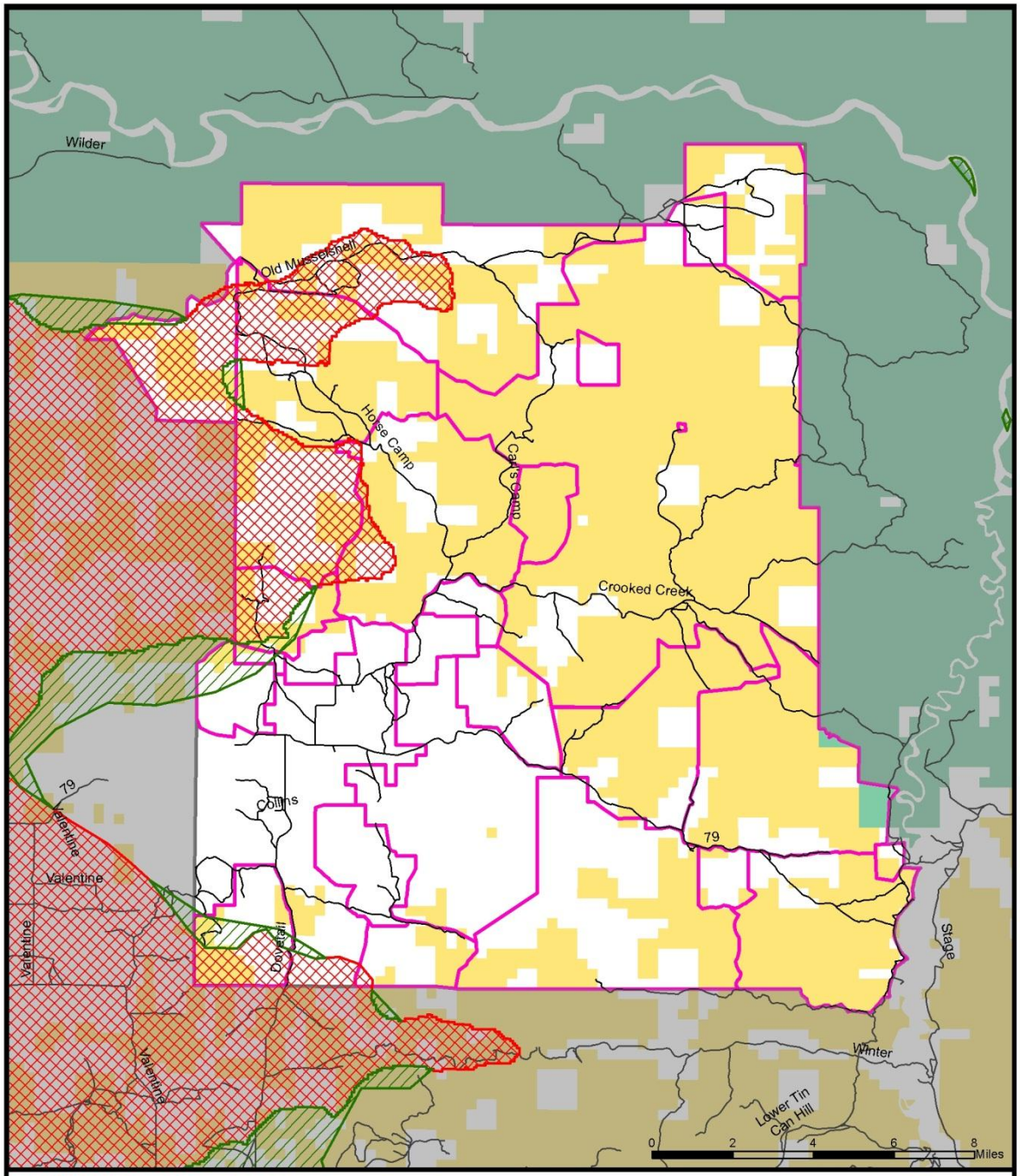
Fire regimes have been substantially altered and risk of losing key ecosystem components is high. Current fire severity has increased compared to reference conditions; and fire frequencies have departed by two return intervals. Vegetation attributes have been significantly altered from their historical range of variability. In the event of an unplanned wildland fire, current conditions could result in dramatic changes in fire size, fire severity, and landscape burn patterns.

The Mixed-grass Prairie has been assessed at Condition Class 2. As compared to reference conditions, there is a high component (estimated at 40% of groundcover) of nonnative yellow sweetclover, and conifer encroachment from adjacent ponderosa pine woodland has increased compared to reference conditions.

The Wyoming Big Sagebrush Steppe and Riparian Systems are both assessed at Condition Class 1. Conifer encroachment into the sagebrush steppe is occurring, if the current trend continues, the strata will transition towards a condition class 2.

3.3.2 Key Issue #2: Sage-Grouse Habitats

Ponderosa pine and juniper are scattered, but increasing in size, area and numbers throughout these sagebrush habitats on the western project area border. Approximately 23,000 acres of sage-grouse preliminary priority habitat occurs in the CC planning area within 8 allotments (Figure 1-2 and Table A), of which approximately 9,500 acres is on BLM lands. There are approximately 79,000 acres of sagebrush steppe habitat within the project area, of which 36,000 acres are on BLM lands (Table B).



Greater Sage-Grouse Habitat

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

- Preliminary General Habitat
- Preliminary Priority Habitat
- Census Roads
- Grazing Allotments
- Bureau of Land Management
- US Fish and Wildlife Service

Lower Crooked Creek Watershed EA Figure 1-2

Table A.
Acres GRSG Preliminary Priority Habitat and Ownership within Allotments.

Allotments	Ownership			
	BLM	Private	State	Total
Iverson	3449	4653	377	8479
Iverson Individual	2133	3534	25	5692
Musselshell Trail	1650	1880	7	3538
Dunn Ridge Common	814	1574	0	2388
Indididual A	858	500	390	1748
Jackson Place	549	551	0	1099
Wild Horse Pasture	0	95	0	95
Individual B	7	0	0	7
Total	9460	12787	800	23047

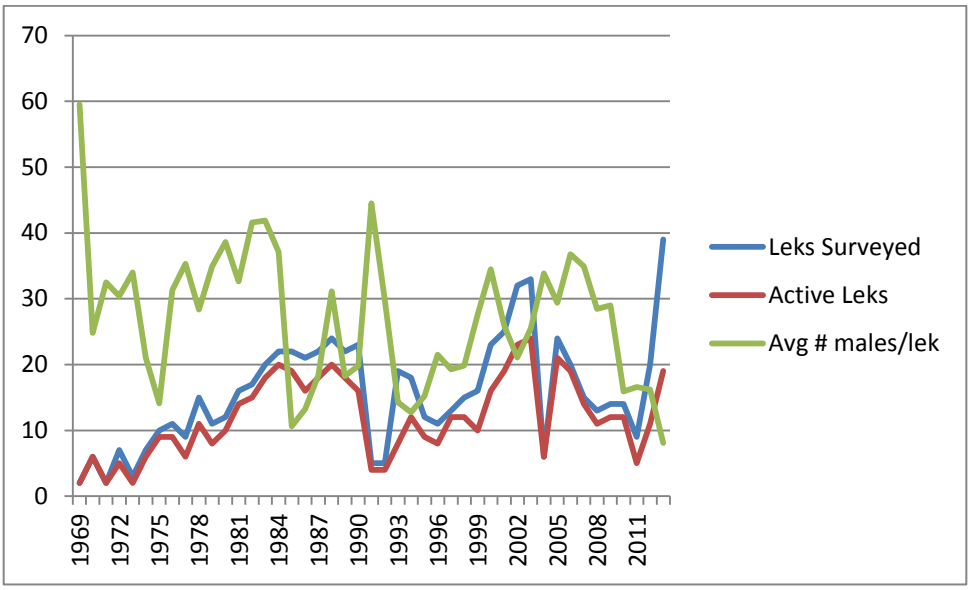
Acres GRSG Preliminary General Habitat and Ownership within Allotments.

Allotments	Ownership			
	BLM	Private	State	Total
Iverson	2	0	0	2
Iverson Individual	332	105	0	438
Dunn Ridge Common	271	576	0	847
Indididual A	221	34	149	404
Individual B	315	689	0	1004
Total	1141	1404	149	2695

There are no known active sage-grouse leks in the CC planning area. Lek R4CC-12 is located less than a mile west of the CC planning area and nesting habitat is expected within the planning area since 64% of nests are within 3.1 miles of a lek (Holloran and Anderson 2005). Fences within 1.25 miles of a lek pose a collision risk (Stevens 2011) since sage-grouse use these areas frequently in the spring and arrive in the dark. Approximately 1.5 miles of the western project area is classified as moderate collision risk for sage-grouse.

The Crooked Creek GRSG survey area is generally north of Highway 191 and Crooked Creek Road from Roy to Horse Camp trail. Thirty-nine leks were surveyed in 2013 with 19 active. Figure 2 shows the trends in survey efforts and males at active leks since surveys began in 1969.

Figure 2
GRSG Survey Effort, Active Leks and Average Male Counts per Active Lek in Crooked Creek Survey Area 1969 – 2013



ReGAP Class 3 Habitat Types – Table B	BLM	FWS	PV	STL	Grand Total
Inter-Mountain Basins Big Sagebrush Steppe	35802	1328	36732	4965	78827
Northwestern Great Plains - Black Hills Ponderosa Pine Woodland and Savanna	27226	6995	12278	2682	49181
Western Great Plains Badland	23171	4075	4809	2136	34191
Northern Rocky Mountain Foothill Conifer Wooded Steppe	17091	3898	7091	2018	30098
Northwestern Great Plains Mixedgrass Prairie	1947	88	3609	249	5892
Inter-Mountain Basins Greasewood Flat	1402	234	583	71	2290
Northwestern Great Plains Riparian	921	73	1603	9	2607
Western Great Plains Wooded Draw and Ravine	882	130	434	98	1544
Western Great Plains Sand Prairie	222		1439	2	1663
Open Water (Fresh)	44	4	15		64
Introduced Upland Vegetation - Perennial Grassland and Forbland	43		3277	12	3332
Western Great Plains Cliff and Outcrop	9				9
Developed, Low Intensity	3		43	2	48
Northwestern Great Plains Shrubland	3				3
Cultivated Cropland	2		6289		6291
Northwestern Great Plains Floodplain	2	99	12		112
North American Arid West Emergent Marsh	2		22		24
Western Great Plains Closed Depression Wetland	0		7		7
Western Great Plains Open Freshwater Depression Wetland			8		8
Western Great Plains Saline Depression Wetland			7	0	7
Grand Total	108772	16925	78256	12244	216197

3.3.3 Key Issue #3: Riparian-Wetland Habitats

The Crooked Creek, Dovetail Creek, and Drag Creek watersheds were chosen for direct, indirect, and cumulative effects analysis of riparian-wetland resources because these are the watersheds that could be affected by the proposed vegetative treatments and changes in livestock grazing management.

Watershed	Watershed Size (acres)
Crooked Creek	228,324
Dovetail Creek	58,553
Drag Creek	30,719

Riparian and stream channel conditions on BLM administered lands in the LCC planning area are in proper functioning condition (PFC). The 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 high-flow events with a high degree of reliability. This resiliency allows an area to then produce desired values, such as fish habitat, neotropical bird habitat, or forage, over time. Riparian-wetland areas that are not functioning properly cannot sustain these values (USDI, 1998).

There are 26.5 miles of Crooked Creek on BLM administered lands that are in PFC, and there are 3.4 miles of Drag Creek that are in PFC. This condition meets the requirements for Lewistown standards for rangeland health, and current livestock grazing management was determined to be appropriate for maintenance and improvement of these areas. Currently, stream banks are dominated by herbaceous, stabilizing riparian-wetland vegetation such as three-square bulrush. These plants have tremendous value; however, the potential natural community (PNC) on Crooked Creek would more than likely include sandbar willow and cottonwood communities. Because of the appropriate grazing management on Crooked Creek, the riparian-wetland areas are in an apparent improving trend, but woody species recruitment is often tied to infrequent, episodic flow conditions and time is a key component of recovery. The recovery of sandbar willow and cottonwood could possibly be accelerated by plantings. Elk numbers are well over objective in the LCC planning area, and their use on woody species would be a noteworthy obstacle to overcome.

Approximately, 9.3 miles of Drag Creek and 12.1 miles of Dovetail Creek were evaluated by an interdisciplinary team, and they were determined to be non-riparian, ephemeral stream channels that only flow in response to snow melt or precipitation events. It is important to point out that the 3.4 miles of Drag Creek that support riparian-wetland conditions are immediately below Drag Reservoir, and the obligate riparian-wetland vegetation is supported by seepage from the dam. A summary of the riparian-wetland and stream channel conditions are shown by allotment in the table below.

Stream	Allotment	Length (miles)	Rating	Designated Monitoring Area(s) (DMA) ID
Crooked Creek	04957	4.8	PFC	CC04957-1
Crooked Creek	14969	6.1	PFC	CC14969-1
Crooked Creek	15028	15.6	PFC	CC15028-1,2,3, and 4
Drag Creek	15052	3.4	PFC	DC15052-1
Drag Creek	15013	1.0	Non-Riparian	None
Drag Creek	04960	8.3	Non-Riparian	None
Dovetail Creek	15053	5.1	Non-Riparian	None
Dovetail Creek	04959	7.0	Non-Riparian	None

Six permanent riparian-wetland monitoring sites were installed at Crooked Creek. The assessment results of Crooked Creek were PFC, and the important attributes for maintaining PFC were determined by an ID team to be maintaining greenline composition of desirable riparian-wetland vegetation and stream channel dimension, pattern and profile. If woody species such as sandbar willow were to establish, the ID team would like to monitor woody species age class, height class, and woody use. Because Crooked Creek is a relatively homogenous riparian complex within the different grazing allotments in regards to channel dimension, pattern, and profile and vegetation characteristics, the monitoring site was randomly chosen by measuring the stream length on BLM land and selecting the starting location with a random number generator.

The table below depicts the results of the riparian and stream channel monitoring sites. Streambank alteration is a short-term indicator of use levels. It is the percentage of the streambanks that are altered because of hoof action or shear. Long-term indicators are more appropriate for determining trend, and the ID team determined that the composition of greenline vegetation and the greenline-to-greenline width were important indicators for maintaining riparian function. The greenline is a linear grouping of perennial vegetation at the water's edge. The greenline-to-greenline width is the average distance between greenlines on both sides of the stream measured perpendicularly. The greenline ecological status rating, site wetland rating, percent hydric plants, and Winward greenline stability rating are quantitative indicators of the condition of the streamside vegetation. An important factor is that these values in themselves should be used as baseline data for trend determination, and they should not be used as a comparison of relative condition between sites.

Some interpretation of the monitoring data is necessary because the results do not appear to

corroborate with the assessment results. The assessments were completed prior to 2011, and the monitoring data was collected after 2011. The reason that this is important is because portions of north-central Montana experienced flood flows exceeding the 100-year return interval event in 2011. The condition of PFC is not expected to provide resilience to 50-year or 100-year type of flow events. It is expected to provide stability during events such as the 10-year or 25-year magnitude flows. Given the exceptional flood events, most areas held up very well. Some locations experienced channel widening, which can be seen in the greenline-to-greenline width data, but the greatest influence on the monitoring data was sediment deposition that buried most streamside vegetation. Because the location of the greenline was pushed farther from the stream channel by sediment deposition, American licorice ended up being a dominant plant on most of the monitoring sites. American licorice has very high stream stability ratings, which is important for stream function. However, it is not a hydric plant, it is an early-seral species, and it has a site wetland rating of 50 out of 100. The expectation in future years is that the percentage of hydric plants would increase and the greenline-to-greenline width would decrease in some cases under appropriate grazing management. Crooked Creek processed flood events in 2013 that were larger than in 2011. Similar physical and biological processes occurred in 2013 that were described for 2011.

	Short-term Indicator	**Long-term Indicators**				
	Streambank Alteration	**Greenline Composition**				**Greenline-to-Greenline Width (GGW)**
DMA ID	**Percent Alteration (CI)**	**Greenline Ecological Status Rating (CI)**	**Site Wetland Rating (CI)**	**Hydric Plants Percent (CI)**	**Winward Greenline Stability Rating (CI)**	**GGW meters (CI)**
CC04957-1	**1% (6)**	**68 (5.75) Late**	**85 (7.4) Good**	**48% (6.2)**	**8.36 (0.16) High**	**9.51 (1.79)**
CC14969-1	**13% (6)**	**5 (5.75) Very Early**	**65 (6) Good**	**35% (6.2)**	**7.92 (0.16) High**	**15.56 (0.70)**
CC15028-1	**0% (6)**	**12 (5.75) Very Early**	**37 (5.1) Poor**	**15% (6.2)**	**6.15 (0.16) High**	**13.06 (1.03)**
CC15028-2	**0% (6)**	**-4 (5.75) Very Early**	**55 (4.6) Fair**	**49% (6.2)**	**8.34 (0.16) High**	**8.26 (0.30)**
CC15028-3	**11% (6)**	**-12 (5.75) Very Early**	**52 (5.1) Fair**	**30% (6.2)**	**8.39 (0.16) High**	**6.78 (0.40)**
CC15028-4	**4% (6)**	**25 (5.75)**	**61 (4.4)**	**42%**	**8.27**	**8.11 (0.44)**

		Early	**Good**	**(6.2)**	**(0.16) High**	

*CI: 95% confidence interval based upon standard deviation of the sample data or observer variation tests completed during the testing of the MIM protocol. The larger of the two values was used. The confidence interval based upon observer variation for percent hydric herbaceous was used for the percent hydric plants because all of the hydric plants on the greenline were herbaceous.

A majority of Drag Creek was evaluated to be non-riparian. However, the reach immediately below Drag Reservoir supports riparian-wetland habitat because of water made available by seepage from the reservoir. This reach was determined to be in PFC by an ID team. Because the riparian-wetland area is supported by seepage from the reservoir and it was PFC, the ID team determined that a photo point was adequate monitoring.

Stream channels and associated riparian-wetland condition are also affected by water availability. A large percentage of the mean annual yield in the watersheds is stored in pits/dams/reservoirs. While not an exact estimate of mean annual yield stored, the following table does give an indication of the level of storage within the watersheds. The actual effect of stored water is a decrease in effective drainage area of a given stream. It is unlikely that the mouth of Dovetail Creek only receives eight percent of the mean annual yield, and the values in the table below should only be used as indicators of the level of storage. However, it is plausible that the level of storage in the watersheds is a contributing factor to the non-riparian conditions present on Dovetail Creek and Drag Creek.

Watershed	Claimed Volume Stored in Pits/Dams/Reservoirs (acre-feet)	Pre-Treatment Mean Annual Yield (acre-feet)	Percent of Pre-Treatment Mean Annual Yield Stored
Crooked Creek	2,087	7,080	29
Dovetail Creek	1,818	1,969	92
Drag Creek	229	1,071	21

While reservoirs do affect the availability of water to downstream areas, they support nearly all of the lentic (non-flowing water) riparian-wetland areas in the LCC planning area. Across all ownerships in the planning area, there are roughly 553 wetlands totaling 517 acres (NWI mapping). The dominant classification is Palustrine Emergent, which is rooted herbaceous vegetation that extends above the water surface (i.e. sedges, rushes). These areas are typically found in the seepage areas below reservoirs and in the depositional areas where water comes into the reservoir.

These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) watershed assessment of the Lower Musselshell subbasin are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management" (Vance and Stagliano, 2007).

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains" (Vance and Stagliano, 2007). The picture below is a good example of outlet works on the verge of failure and the riparian-wetland habitat that is at risk.

3.4 Resource Concerns Brought Forward for Analysis

3.4.1 Resource Concern 1: Invasive, Non-native Species (Noxious Weeds)

Noxious and invasive weed species are present but not abundant within the CC planning area. These infestations include: Canada thistle (*Cirsium arvense*), spotted knapweed (*Centaurea stoebe*), leafy spurge (*Euphorbia esula*), Russian knapweed (*Centaurea repens*) and whitetop (*Cardaria draba*). Several factors such as vehicle traffic, watersheds, and livestock and wildlife movement provide vectors for increased distribution of known noxious weed species as well as

for new invaders such as: saltcedar (*Tamarix spp*.), dalmation toadflax (*Linaria dalmatica*), yellow starthistle (*Centaurea solstitialis*), Russian olive (*Elaeagnus angustifolia*), Cheatgrass (*Bromus tectorum*), and black henbane (*Hyoscyamus niger)*.

Resource Concern #2: Special Status Species and Migratory Birds
Grazing and fire suppression have altered habitats in the CC planning area, with varying impacts (both positive and negative) to BLM sensitive species and migratory birds.
Several surveys have been completed in the project area including:

1. Amphibian Lentic Site
2. Waterbird
3. Fish Lentic Seine
4. Sage Grouse Lek
5. Bird Point Count
6. Bat Accoustic

MNHP species occurrences in the project area (need to define species occurrence):

Wildlife	Fish	Plants
Black-tailed prairie dog	Blue sucker	Double bladderpod
Hoary bat	Iowa darter*	Little Indian breadroot
Brewer's sparrow	Lake trout*	
Burrowing owl	Northern redbelly dace*	
Cassin's finch	Paddlefish*	
Ferruginous hawk	Pallid sturgeon*	
Great blue heron	Sauger	
Greater sage-grouse		
Mountain plover		
Western hog-nosed snake		
Spiny softshell turtle		

*Only found on CMR in the Missouri River.

Of particular interest for the species occurrence are the ferruginous hawk nest, documented Brewer's sparrow breeding (sagebrush obligate as is sage-grouse), and the 3,540 acres in 40 prairie dog towns (both active and inactive) ranging in size from 5 to 305 acres each. The relatively small size of each town, scattered nature across the LCC project area and distance from currently occupied black-footed ferret habitat precludes use by ferrets. These prairie dog towns have provided breeding habitat for mountain plovers and burrowing owls.

Appendix C provides additional information on Federally threatened, endangered or BLM sensitive species that may occur in the CC planning area. Species with potential to occur evaluated in Chapter 4 include those listed in bold under the habitats below.

Sage grouse are further addressed under Key Issue #2.

Habitats

Due to the size of the Analysis Area and the large number (35) of the BLM sensitive species

addressed here with potential habitat, these species have been grouped into "similar habitats" for the effect analysis below. Species often utilize more than one vegetation community as their primary and/or secondary habitat. For example, Great Plains toads utilize riparian areas/habitats for breeding, foraging, and movement corridors while also using adjacent upland habitats for foraging, movement/dispersal, and winter burros. These "other habitats" are also critical to their survival. Virtually all species addressed in this assessment rely upon and utilize riparian habitats to varying degrees at some or major stages of their life or their prey's life, and thus riparian ecosystems are critical to them. Yet many of these species utilize a particular habitat/vegetation community, etc., therefore, for discussion purposes they have been placed in another habitat type – although this does not diminish the importance of riparian habitats. Some species are wide ranging such as the golden eagle that uses almost every vegetation community found in the Analysis Area. Thus, even though a species has been placed in one particular habitat type, other habitats/vegetation communities may also be very important in their life history. For each group, direct, indirect, and cumulative effects under each alternative are discussed. Some species within groups are further discussed individually as well if necessary. The following habitats together with Table B (ReGAP veg data) form the basis of this analysis for each species and allotment. Appendix A (evaluations) discloses additional existing/current habitat conditions for these species, which is also used as a baseline for all alternatives.

Table C. Grouped ReGAP Habitat (Table B) Acres by Surface Ownership within the Crooked Creek Planning Area.

Habitat Group	Acres of Habitat by Surface Ownership[1]				
	BLM	FWS	PV	STL	Grand Total
Riparian	969	176	1674	9	2828
Sagebrush/shrubland	37207	1562	37315	5036	81119
Forest	45199	11024	19803	4798	80824
Grassland	2169	88	5048	251	7555
Badland	23180	4075	4809	2136	34200
Cropland	45	0	9566	12	9623
Developed	3	0	43	2	48
Grand Total	108772	16925	78256	12244	216197

[1]BLM = Bureau of Land Management; FWS = Fish and Wildlife Service; PV = Private; STL = State Lands

Riparian Habitats (969 acres BLM; 2,828 acres total) –Many species addressed here utilize riparian habitats/areas for at least part of their life – for cover, breeding/reproduction, forage/prey, and/or movement. These habitats are particularly sensitive to disturbance and have been impacted throughout the western United States by a variety of activities. As discussed above, livestock use is typically concentrated in these habitats and adverse impacts are compounded by the relatively small area occupied by riparian habitats. As shown in Table C8 above, riparian areas (habitats for these species) comprise a very small portion of each of these allotments (average 1%). Although the total area comprised of riparian habitats is a very small percentage of each allotment, they are extremely important to all species addressed either directly or indirectly.

Sensitive Species associated with Riparian Habitats: Great Plains Toad, Plains

Spadefoot, Northern Leopard Frog, Snapping Turtle, Black Tern, Black-crowned Night Heron and White-faced Ibis

Sagebrush/Shrubland Habitats (37,207 acres BLM; 81, 119 acres total) – These include sagebrush shrublands which primarily occur on the northwestern third of the project area. All ownerships contain approximately 79,000 acres, of which 36,000 acres is on BLM lands. These areas include scattered juniper trees that affect use by species that rely on sagebrush. The sagebrush habitat is the most abundant BLM habitat (33%) within the planning area.

Sensitive Species associated with Sagebrush Habitats: Brewer's Sparrow, Greater Sage-Grouse (GRSG), Sage Thrasher

Forested Habitats (45,199 acres BLM; 80,824 acres total) – These include ponderosa pine forests which primarily occur on the central and eastern portions of the project area. Prescribed burns are primarily planned in the Northwestern Great Plains – Black Hills Ponderosa Pine Woodland and Savanna which occurs on approximately 27,000 of BLM ownership (Table X). Other forested habitats include Northern Rocky Mountain Foothill Conifer Wooded Steppe which occurs on approximately 17,000 of BLM ownership (Table C) and is often scattered junipers mixed with sagebrush.

Sensitive Species associated with Forested Habitats: Northern Goshawk, Long-legged Myotis (Larger trees and more dense stands) **Loggerhead Shrike** (less dense conifers and sagebrush/grasslands)

Grassland Habitats (2,169 acres BLM; 7,555 acres total) – There are approximately 2, 000 acres of grassland habitats on BLM, but wildfires in sagebrush habitats in 2012 increased these numbers from what is currently reflected. In areas of southeastern and central Montana where sagebrush steppe borders the mixed grass prairie, common plant associations include Wyoming big sagebrush-western wheatgrass. Fire and grazing are the primary drivers of this system. Drought can also impact grassland habitats, in general favoring the shortgrass component at the expense of the mid-height grasses. Cool season exotics such as smooth brome and Japanese brome increase in dominance with intensive grazing; both of these rhizomatous species have been shown to markedly decrease species diversity.

Sensitive Species associated with Grassland Habitats: Sprague's Pipit, Baird's Sparrow, Bobolink, Chestnut-collared Longspur, Dickcissel, Long-billed Curlew, Marbled Godwit, McCown's Longspur, Burrowing Owl, Mountain Plover, Black-Tailed Prairie Dog, Swift Fox, Ferruginous Hawk, Swainson's Hawk

Badland Habitats (23,180 acres BLM; 34,200 acres total) --The Western Great Plains Badlands ecological system occurs within the mixed grass and sand prairie regions of eastern and southeastern Montana, where the land lies well above or below its local base level, shaped by the carving action of streams, erosion, and erosible parent material. It is easily recognized by its rugged, eroded, and often colorful land formations, and the relative absence of vegetative cover.

Sensitive Species associated with Badland Habitats: Greater short-horned lizard,

Long-eared Myotis, Townsend's Big-Eared Bat (Caves and Mines)

Generalists—Occur in 2 or more habitats above in addition to Cultivated Lands and Developed areas.

Bald Eagle, Golden Eagle, Fringed Myotis, Milk Snake and Western Hog-nosed Snake

3.4.2 Resource Concern #3: Game Species

Grazing and fire suppression affect vegetation and wildlife use for several game species of particular interest for recreational hunters.

The CC planning area is part of the MFWP Chain Buttes BMA (#32) and hunting district 410, an especially important elk hunting area in the breaks. A special draw permit is needed for elk, with over 2500 elk permits issued in 2012. MFWP surveys in 2012 observed 3281 elk in HD 410, which is over the objective of 2300. In Hunting District (HD) 410, mule deer numbers remain low (43 percent below objective in the Sand Creek/Carroll Coulee Study Area); however, fawn:doe ratios are relatively high at 47 fawns per 100 does. The buck:doe ratio post-2012 hunting season is 30:100, mainly spikes and two- to three-year-old bucks. Antelope estimates (1050) are also below objective (3000) in HD 481 (same area as HD 410, but numbered differently for antelope).White-tailed deer populations also appear to be increasing after 2011's epizootic hemorrhagic disease **(**EHD) outbreak; there were no recorded cases of EHD or bluetongue in this area in 2012 (Sonja Smith MFWP pers. com). Table xxx below shows the acres of mapped game habitat by species that occur in the CC project area.

Wildlife

Table D. Crooked Creek Project Area and Wildlife Habitat Acreages.

Game Species	General Habitat Acres	General/Winter Habitat Acres	Total Habitat Acres
Antelope	65,636	270	65,906
Elk	20	216,157	216,177
Gray (Hungarian) Partridge	193,863	0	193,863
Mountain Lion	126,465	0	126,465
Mule Deer	0	216,177	216,177
Pheasant	830	0	830
Sharp-tailed Grouse	216,177	0	216,177
White-tailed Deer	15,849	6,301	22,151
Wild Turkey*	48,643	142,025	190,667

Wild Turkey general habitat was mapped as potential in 2000 and general/winter is occupied habitat.

3.4.3 Resource Concern 3: Socioeconomics

The CC planning area allotments cumulatively provide seasonal pasture for up to 3,358 cattle, 1,134 yearling cattle and 4 horses annually. CC allotment permittees are currently permitted to harvest 15,593 AUMs of forage from BLM lands annually. Seasons of use vary by allotment

and operator. Current permitted season of use and the associated AUMs are presented by allotment in Table 2-1.

Labor associated with managing cattle on the BLM allotments includes herding and doctoring cattle, supplemental salt/mineral placement and project construction &/or maintenance. Specific costs associated with the managing cattle on the individual BLM allotments are not known and probably vary substantially.

BLM costs associated with the CC allotments include grazing administration (preparing applications, bills, and transfers), grazing compliance inspections, resource inventory and monitoring, project construction, modification or removal, cultural clearances for projects and preparation of reports and environmental documents.

3.4.4 Resource Concern #4: Water Resources

The Crooked Creek, Dovetail Creek, and Drag Creek watersheds were chosen for direct, indirect, and cumulative effects analysis because these are the watersheds that could be affected by the proposed vegetative treatments and changes in livestock grazing management. While the Musselshell River does flow through the east side of the planning area, the watershed size is too large to provide meaningful effects analysis for the scope and scale of the actions proposed in this EA. The Eagle Sandstone formation was selected for groundwater effects analysis because the flow rate and quantity of groundwater removed from the Eagle Sandstone aquifer would be dependent upon actions proposed by the BLM in this EA.

Watershed	Watershed Size (acres)
Crooked Creek	228,324
Dovetail Creek	58,553
Drag Creek	30,719

Crooked Creek is a tributary to Fort Peck Reservoir, and Dovetail Creek and Drag Creek are tributaries to the Musselshell River. Fort Peck Reservoir is listed by MDEQ as water quality impaired because of lead and mercury, and the Musselshell River is listed as water quality impaired because of alteration in stream-side or littoral vegetative covers and low-flow alterations (MDEQ, 2012). The BLM evaluates whether our activities are contributing pollutants to water quality impaired streams on BLM land; or in this case, the BLM evaluates whether our activities are contributing pollutants to a water quality impaired stream that is immediate receiving water from streams that flow on BLM administered land.

Because of the good condition of uplands and riparian areas in the CC planning area, it is unlikely that BLM activities are contributing pollutants of concern to Fort Peck Lake or the Musselshell River. The BLM is considering PFC to be an acceptable level of impacts and an evaluation technique for identifying areas of nonpoint source pollution. This is supported by the Montana Nonpoint Source Management Plan developed by Montana Department of Environmental Quality. MDEQ's goal for sustainable range land management is to support the long term ecological health of grazing resources and meet water body beneficial uses. Their

objective 6.1 is to "support PFC, as a first tier assessment approach for riparian grazing management and monitoring, on private, state, and federal riparian areas in Montana."

Stream	Allotment	Length (miles)	Rating	Designated Monitoring Area(s) (DMA) ID
Crooked Creek	04957	4.8	PFC	CC04957-1
Crooked Creek	14969	6.1	PFC	CC14969-1
Crooked Creek	15028	15.6	PFC	CC15028-1,2,3, and 4
Drag Creek	15052	3.4	PFC	DC15052-1
Drag Creek	15013	1.0	Non-Riparian	None
Drag Creek	04960	8.3	Non-Riparian	None
Dovetail Creek	15053	5.1	Non-Riparian	None
Dovetail Creek	04959	7.0	Non-Riparian	None

It's not that a reach of stream being in PFC implies that water quality is good (i.e. poor water quality in results in poor water quality out). However, it does imply that on that particular reach the condition of streamside vegetation and channel characteristics is adequate to minimize nonpoint source pollutants. Adequate streamside vegetation minimizes erosion and traps sediment. It filters nutrients and fecal coliform entering the stream, and maintains channel widths and depths that dissipate stream energy, decrease temperature and dissolved oxygen, and process sediment. The condition of PFC leads to many water quality values being maintained.

An additional indicator of nonpoint source pollutants being mitigated on the BLM land is the monitoring data on Crooked Creek. Despite the record flood events in 2011, stream stability ratings at all six sights were high. This is important on streams that are dependent upon vegetation for stability. Furthermore, alteration levels, which are a short-term indicator of streamside use, were all less than 20 percent.

A large percentage of the planning area's watershed's mean annual yield is claimed in pits, dams, and reservoirs. This has affected the volume and timing of runoff available to downstream areas. Furthermore, following the exceptional 2011 water year, many pits, dams, reservoirs in the planning area, particularly those located in the Bearpaw Shale Formation, experienced increases in salinity to levels unusable for livestock. Because many of the proposed actions could affect water quantity and quality in the Crooked Creek, Dovetail Creek, and Drag Creek

watersheds, the table below shows the mean annual yield for the watersheds and the volume stored in pits, dams, and reservoirs.

Watershed	Claimed Volume Stored in Pits/Dams/Reservoirs (acre-feet)	Pre-Treatment Mean Annual Yield (acre-feet)	Percent of Pre-Treatment Mean Annual Yield Stored
Crooked Creek	2,087	7,080	29
Dovetail Creek	1,818	1,969	92
Drag Creek	229	1,071	21

A groundwater well has been drilled on private property in NW1/4SW1/4 of section 12 in T20N R26E. The well was completed at a depth of 2012 feet in the Eagle Sandstone formation. While the well was completed on private property, which the BLM has no jurisdiction over, the groundwater environment associated with the Eagle Sandstone is described in this section because the flow rate and quantity of groundwater removed from the formation are affected by actions proposed on BLM land in this analysis.

Located in central and eastern Montana, the Cretaceous Eagle Formation is primarily interbedded sandstone and shale. In many areas, the formation is a confined, artesian aquifer. This means that the potentiometric surface is above the land surface. In layman's terms, because the aquifer is under pressure, a well drilled into the aquifer will often flow at the land surface without pumping.

Across central and eastern Montana, common drilling depths to the Eagle Formation are 100 to 800 feet, but they may exceed 2,000 feet as is the case with this well. Yields are usually 10 to 20 gallons per minute, and total dissolved solids range from 800 to 1500 mg/L (Montana Water Quality Atlas). Water quality is best in central Montana and poor in eastern Montana. At the above mentioned well location, the well had an artesian flow of 5.5 gallons per minute and a shut-in pressure of 60 pounds/square inch. That would mean that the potentiometric surface is roughly 138 feet (60 psi * 2.31 feet/psi) above the ground surface. The aquifer was able to sustain a pumping rate of 36 gallons per minute during a pump test, and a water quality test for total dissolved solids came back with results of 1900 mg/L (personal communication with Grant Petersen, NRCS Rangeland Management Specialist).

3.5 Description of Relevant Resources

3.5.1 Cultural Resources

Cultural resources are discussed in the JVP Final RMP/EIS on page 131. To update and supplement that data in 2010 the BLM completed a Class I Overview of the historic, prehistoric,

and paleontological resources present throughout the Central Montana District. That document is on file at the Lewistown Field Office.

The BLM broadly defines cultural resources as any traditional lifeway belief or cultural property. Cultural properties are defined as distinct evidence in areas of past human occupation, activity, and use. Traditional lifeway beliefs are defined as traditional value systems of religious beliefs, cultural practices, or social exchange that are not closely and tangibly defined or identified with definite locations (Judith-Valley-Phillips Resource Management Plan, 1992).

Early peoples in the study area were mobile hunters and gatherers throughout and up until the historic period. More recently, settlers by the thousands came into the area to live on homesteads. Germans and Scandinavians came from the Midwest, as did eastern European immigrants.

Cultural sites can be considered significant for several reasons; some because information about the past can be learned through methodical study of the sites, while other sites communicate a sense of a particular time period they represent in history. Finally, sites can be considered to be important because of the current use or values associated with the location.

An important consideration for management actions in this area is preserving the values of the cultural properties contained within. In order to preserve the integrity of a cultural property, it is sometimes necessary to preserve the location in which the cultural property is found. This is an important consideration when the management actions have the potential to affect the location of a cultural property, thus affecting the overall integrity of the cultural property.

The Montana Historical Society's State Historic Preservation Office, through funding provided by the BLM for a cultural resource data sharing project, maintains the State Antiquities Database. This database maintains records of all sites recorded and all cultural resource inventories completed on federal, state, and private lands. Fifty-one historic and prehistoric sites have been documented within the analysis area. Site types include homestead remains, but the majority are dispersed lithic scatters. The majority of the sites have not been evaluated for listing on the National Register of Historic Places. Until their eligibility is resolved, they are afforded the same protection as if they were eligible for listing.

One hundred three (103) Class III, or intensive, cultural resource inventories have been completed within the affected parcels. Some of the private land (that had been BLM land) has been inventoried in association with land exchanges that have occurred in the area. Cultural resource inventories in the analysis area have been completed for range improvements (pipelines, stock tanks, and reservoirs), land exchanges, road improvements, and telecommunication projects. Since the majority of the inventories have been for linear projects, the acreage surveyed is relatively low percentage of the overall analysis area.

To date, The BLM, in consultation with tribal authorities, has not identified traditional cultural properties or traditional life-way values of special concern to American Indian groups within the analysis area.

3.5.3 Livestock Grazing /Vegetation

Livestock Grazing

The 19 allotments addressed in Chapter 2 of the plan are all meeting the standards for rangeland health. Total AUMs and acreages grazed will remain the same under the preferred alternative as currently exists.

Vegetation
Rangeland vegetation consists of sagebrush grasslands, grasslands, and lightly vegetated badlands. Mixed shrub and tree (ponderosa pine) communities are common in coulees and benches throughout all of these vegetation types. Common grasses and grasslike species include bluebunch wheatgrass, green needlegrass, needle and thread, western wheatgrass, prairie junegrass, blue grama, prairie sandreed, Sandberg bluegrass, and threadleaf sedge. Introduced grasses are found in some areas intermingled with native species. Introduced annual grasses include cheatgrass and Japanese brome. Common shrubs include big sagebrush, silver sagebrush, saltbush spp., greasewood and rubber rabbitbrush. Other common vegetation includes prickly pear cactus, ponderosa pine and common juniper. There are no known occurrences of threatened, endangered, or sensitive plants in the watershed.

3.5.6 Soils
Soils within the planning area developed primarily from sedimentary rock (shales, siltstone, and sandstone) and from lesser amounts of slope and recent alluvium. Soil patterns are complex and vary in physical and chemical properties, productivity and erodibility. Soluble salts and sodium are present in may soils of the area. Vegetation composition and production are affected where soils have high concentration of salts.

Most of the gently sloping to steep uplands and escarpments are comprised of either clayey soils weathered from fissile shales or sandy soils weathered from sandstone. These sedimentary soils are usually vulnerable to degradation and highly erosive because of extreme physical properties such as high clay content, slow permeability, very high surface runoff, relatively shallow to moderate depth (less than 40 inches) to bedrock, droughty, and sparse vegetative ground cover. Active geologic erosion is observed on these landscapes. Erosion can be accelerated by surface disturbance, especially on steep and very steep slopes when the protective vegetative cover is removed. The major soil groups that dominate the planning area are the Thebo-Neldore, Thebo-Neldore-Absher, Delpoint-Yamac-Marmarth and the Tally-Flasher-Chinook. The Thebo-Neldore and Thebo-Neldore-Absher make up the majority of the planning area. Most of these soils are moderately deep and well drained with clay surface layers. Some of the soil can be affected by high concentrations of salt, which will affect vegetative productivity. Some of the soils have developed from sand and silt stone parent materials will have sandy or silty surface textures and greater potential for vegetative production. Ecological sites associated with these soils include: Clayey, Clay pan and Dense clay 11 to 14 inch Ppt. zone, sedimentary plains, central.

Areas of steep or very steep (>20% slope), barren or nearly barren land are scattered throughout the planning area and are dissected by many drainage channels and have exposures of consolidated sedimentary beds of shale and sandstone.

Complete descriptions for the listed soil series and ecological sites are available on the internet at: http://soils.usda.gov/technical/classification/osd/index.html (soil series) and http://efotg.nrcs.usda.gov/treemenuFS.aspx?Fips=30071&MenuName=menuMT.zip (ecological sites). Included in the series descriptions are taxonomy, horizon descriptions, range of characteristics and other pertinent information.

Description of Relevant Non-Affected Resources

3.5.4 Air Quality

Air quality in the area is generally considered good to excellent, meeting air quality standards set forth by the Clean Air Act, which means that air quality meets or exceeds all National Ambient Air Quality Standards (NAAQS). The LCC planning area is within a Class II airshed; however, one class I airshed, the UL Bend Wilderness Area in the Charles M. Russell National Wildlife Refuge, is east (i.e. downwind) of the LCC planning area. Class I airsheds are established by the Clean Air Act. A Class I airshed is an area of particular esthetic quality where visibility contributes to the esthetic nature of the area.

While air quality is a relevant resource in the LCC planning area, it is not being carried forward for detailed analysis for the following reasons. Grazing allotments are currently achieving land health standards, this helps to mitigate air quality pollutants such as fugitive dust. Under all alternatives, rangeland health would be maintained or improved, so effects to air quality would continue to be mitigated.

Under the action alternatives, prescribed fire is being considered as a tool to achieve desired vegetative communities and fuels conditions in the LCC planning area. Although emissions such as fine particulate matter may be released by the prescribed fire, these emissions would likely be less than that of a wildfire and would help to prevent large releases of these pollutants during future wildfires by decreasing fuel loads. Backing fires that are typically used in prescribed fires release less smoke than forward-moving wildfires.

Furthermore, several mitigation measures would alleviate air quality concerns and keep any impacts minor and short duration. First, prescribed burning would take place in the spring , early summer and fall, which typically have atmospheric conditions that are favorable to smoke dispersal. Second, the BLM is a member of the Montana/Idaho Airshed Group and is in compliance with the Environmental Protection Agency's 1998 Interim Air Quality Policy for Wildland and Prescribed Fires. No burning would occur without approval from the Smoke Monitoring Unit of the Montana/Idaho Airshed Group. If smoke dispersal is inadequate burning would be halted if at all possible.

3.5.4 Climate Change

Ongoing scientific research has identified the potential impacts of anthropogenic "greenhouse gas" (GHG) emissions and their effects on global climatic conditions. These anthropogenic GHGs include carbon dioxide; methane; nitrous oxide; and several trace gases, as identified by the Intergovernmental Panel on Climate Change (IPCC). The general consensus is that as GHG emissions continue to rise, average global temperatures and sea levels will raise, precipitation patterns will change, and climatic trends will change and influence earth's natural resources in a variety of ways.

Potential impacts to natural resources due to climate change are likely to be varied. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Cool season plant species' ranges could potentially move north and due to the potential loss of habitat, or from competition from other species whose ranges shift northward, the population of some animal species could change. While many existing climate prediction models are global or regional in nature, the lack of scientific tools designed to predict climate change on local scales limits the ability to project potential future impacts of climate change on the specific area for this project. It is not possible to predict with any certainty site-specific effects on climate change relative to the proposed action.

The purpose and need of this environmental assessment is to improve rangeland health and habitat conditions. All action alternatives address the purpose and need to varying extents. Improving the condition of rangeland resources and the landscape would have a positive effect on climate change because healthy rangelands provide a sink for greenhouse gases. Liebig et al. (2010) found that net reductions in greenhouse gas emissions can most effectively be achieved by moderate stocking rates on native vegetation in the northern Great Plains. However, given the variability in climate and trends over such a short time frame, considering the term of the grazing permit is for 10 years, the effects of the actions described in this EA on climate change are impossible to predict.

Furthermore, increased forest health as a result of the proposed action may result in a greater capacity to absorb greenhouse gases such as carbon dioxide over the long term. According to the National Center for Atmospheric Research (2010), prescribed fires may help reduce the U.S. carbon footprint. Prescribed fires generally burn underbrush and smaller trees, which give off substantially less emissions than stand-replacing, high-intensity wildfires. Additionally, large trees that sequester a significant amount of carbon remain. For these reasons, climate change will not be carried forward for detailed analysis.

3.5.5 Recreational Opportunities and Public Access/VRM

Recreation

The Crooked Creek planning area is located within the Judith Recreation Management Area (RMA MT060-07).

This extensive recreation management area (RMA) allows for dispersed and unstructured recreational activities on public land in the watershed area. Recreation opportunities include hunting, wildlife photography, wildlife viewing, sightseeing, and some pleasure driving where public land access is available. The majority of use occurs during the summer and the fall hunting season.

Hunting opportunities and access for the general public in the watershed area are good although more ranches are selling hunting rights to outfitters and/or ranches are being sold as recreational or development properties which has led to the reduction of access in some areas.

Additionally, a number of dispersed campsites along the travel routes are used by hunters. These campsites are used most weekends, and sometimes for several weeks by different parties of

hunters from September through November. A fee is not required for the general public, but camping is limited to 14 days. Camps must be moved at least five miles following the 14-day limit.

The Off-Highway Vehicle EIS and Plan Amendment for Montana, North and South Dakota (BLM 2003) does not allow cross-county vehicle travel except for administration of grazing allotments and other permitted activities by agency personnel or permittees.

Permittees are allowed to travel cross-county for administration of their permits. Administration of a grazing permit includes travel to repair range improvements and other tasks directly related to management of a grazing allotment such as the monitoring of livestock and forage conditions, placing salt, moving cattle, etc… .

Visual Resource Management (VRM)

Public land within the watershed area has been assigned a Visual Resource Management (VRM) class based on a process that utilizes scenic quality and sensitivity to changes in the landscape based upon the distance zone from which a project or proposal would be seen by the casual observer. This is accomplished by incorporating the four primary elements found in the environment: form, line, color, and texture, into a proposed project. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

The four VRM classes are numbered I to IV (Visual Resource Management Program, Bureau of Land Management, 1980); the lower the number the more sensitive and scenic the area. Each class has a management objective that prescribes the level of acceptable change in the landscape. The majority of the Crooked Creek planning area is within Class IV, and the areas that lie next to the Charles M. Russell Wildlife Refuge and the Missouri River are rated as Class III. The Class III rating allows for moderate contrasts to the environment, but they should be subordinate to the existing landscape. For Class IV lands, the level of contrast to the landscape from authorized projects could be evident, but should be moderated by using the basic elements of form, line, texture, and color. Visual contrast ratings are at the manager’s discretion for Class III and Class IV lands

4.0 Environmental Consequences

4.1 Introduction

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

4.1.1 Assumptions

- The fuels budget for implementation of projects has declined to a point where it would be likely a fuels project would get implemented every other year during the life of the plan (10 years). However if funds became available it is desired to treat 5-10 thousand acres a year throughout the life of this plan. For analysis purposes it is assumed 60,000 acres could get treated during the life of the plan.
- Range improvements would be implemented within 1 year of the decision.
- Travel management would continue as depicted in the Chain Buttes BMA map.
- Decreases in forest canopy cover because of fire (wild or prescribed) would increase water yield.
- Removal of livestock grazing from public land would result in private lands being fenced from public land.
- Removal of livestock grazing from public land would result in pits/dams/reservoirs being removed from public land or failing over time. Those that support fisheries, important riparian-wetland habitat could remain, but those are a small percentage of the total pits/dams/reservoirs (e.g. less than ten percent).
- Riparian-wetland plantings of willow and other preferred woody species would require some level of protective fencing from ungulates (i.e. elk, deer, and livestock).
- Removal of livestock grazing from public land would result in an increase in the number of large-acre fires because of the increase in fine-fuel loading (Davies et al. 2010).

4.2 Predicted Effects of Alternatives

4.2.1 Predicted Effects of Alternative A – Continue Current Management (No Action)

Key Issue #1: Fire Regime Condition Class (FRCC)

Ponderosa pine stands within the CC planning area display a wide variety of age classes and structure resulting into condition class 3. Fire regimes have been moderately to significantly altered from their historical ranges because: 1) fire return frequencies have departed from historical frequencies by multiple intervals, 2) vegetation attributes such as stand density and structural stage have been significantly altered from their historical ranges, and 3) current fire severity includes more stand-replacement than historical reference severities. With respect to wildfire, these alterations in the landscape could result in increased fire size, intensity, and severity, which would further alter the landscape's structural diversity. The fire regime condition class of conifer stands will continue to decline due to increasingly long fire return

intervals and departure from historic conditions. Postponing treatments would allow the existing ponderosa pine seedlings to increase in size and density, making future treatments more difficult and expensive, with further departure from historic fire return intervals. With continued fire suppression and lack of prescribed fire, vegetation health in the project area would continue to decline due to excessive fuel buildup and departure from historical conditions. Conifer stands would continue increasing in stand density and encroaching into sage/grassland areas, and would be at risk of high severity wildfire. The risk of losing key ecosystem components would increase as stand density increased and encroachment continued, vegetation species and age class diversity would decline. Wildfire severity with vegetation conditions continuing to decline could result in higher loss of sage brush more soil damage and high mature tree mortality throughout the stands. Additionally higher severity wildfires could promote invasive species.

Key Issue #2: Sage-Grouse Habitats

Under this alternative current grazing management would continue on all allotments and the general effects to all wildlife species described above could occur in sage-grouse habitats. Rangeland health standards, which include needs for wildlife species would be expected to continue to be met for all allotments. This does not mean that there are no sage-grouse concerns within allotments, but current issues are relatively small (i.e. some stock tanks do not have wildlife escape ramps, some fences near leks are not marked and pose a collision risk, small areas with concentrated use such as stock tanks, reservoirs and proximate to minerals have noxious weeds, etc.) and do not require changes in timing or stocking rates in the permits.

Conifer encroachment is currently occurring in sagebrush habitats in most allotments within sage-grouse preliminary priority habitat (PPH). Sage-grouse lek CC-12 is less than 1 mile west of the project area. Table A (sage-grouse pph acres within allotments from Ch 3) shows the allotments that contain sage-grouse pph. Six of these eight allotments are expected to support sage-grouse year-round given the close proximity to active leks and more than 1,000 acres in sage-grouse pph. As conifers continue to expand west these sagebrush and pph areas will be used less since sage-grouse avoid areas with trees.The GRSG Conservation Objectives Final Report (FWS 2013) recommends to “reduce juniper cover in sage-grouse habitats to less than 5%, but preferably eliminate entirely”.

Wildfires would be expected to occur in sagebrush habitats similar to the last decade. From 2007-2012 there were 4 fires in all PPH habitat within the LFO burning nearly 2,000 acres. The majority of this acreage occurred in 2012 within the CC planning area with the Wolf Creek fire (1244 acres PPH) and 15 Mile fire (194 acres PPH). Grazing substantially decreases the amount of fine fuels (Davies et al. 2010), which enables more effective fire suppression and retention of Wyoming big sagebrush habitats that occur in the planning area.

There would be no changes in the stock reservoirs or potential for mosquitos that transmit West Nile virus (WNv), which is highly lethal to sage-grouse

No changes in sage-grouse use or abundance would be expected short-term (<1 year). Reductions in sagebrush habitat from conifer encroachment long-term (10+ years) would be expected to reduce available sage-grouse habitat and continue the decline observed at lek CC-12

since 2006.

Based on the rationale above, Alternative A ***"may impact individuals or habitat, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing"*** for Greater sage-Grouse.

This Alternative would minimally meet the management direction listed in WO IM 2012-043.

Key Issue #3: Riparian-Wetland Habitats

Direct, Indirect, and Cumulative Effects: Under Alternative A, current management would continue. The riparian-wetland conditions on Crooked Creek and Drag Creek would remain in PFC. The rate of recovery toward the potential natural community on Crooked Creek would not be increased through plantings of willow and other preferred woody species.

Prescribed fire would not be used to improve fire regime condition class ratings and decrease conifer cover in the CC planning area. Water yield in small order drainages, which affects the amount and kind of riparian-wetland vegetation, would continue to be limited by conifer forest that is outside of the range expected under a natural fire regime.

Resource Concern #1: Invasive, Non-native Species (Noxious Weeds)
Under current management weed control efforts in the CC will remain permitee based. Weed Control Cooperative Range Improvement Agreements will be established for any current or new infestations of noxious weed species found on allotments. The BLM LFO will provide chemical and/or biological control methods to the affected permitees and the permitees will provide the labor for chemical application. Records of application will be provided to the BLM LFO after each successful application prior to receiving any additional control measures. New species of concern will be monitored for and any infestations found reported to the BLM LFO.

Resource Concern #2: Special Status Species and Migratory Birds
Grazing and wildfires would occur as described in Key Issue #2. Grazed pastures would increase available habitat for species needing short or recently grazed grasses such as chestnut-collared longspur. Habitats available for species needing taller grasses such as Baird's sparrow would be the same as what has occurred over the last decade. Continued fire suppression would maintain sagebrush, but would not address conifer encroachment into shrublands and grasslands. Sagebrush and grasslands associates, such as long-billed curlew and Brewer's sparrow would continue to have less available habitat. These small incremental reductions would have no noticeable change short-term or locally, but contribute to the long-term cumulative declines these and many other grassland/shrubland bird species have experienced (NABCI 2011, NABCI 2013).

Stock ponds would be maintained as they are currently and provide riparian habitats for amphibians and shorebirds.

No changes would occur to Badland Habitats. Current conditions in forested and riparian habitats are discussed in Key Issues #1 and #3.

Appendix C is the BLM sensitive species determination summary for all alternatives in the CC planning area.

Resource Concern #3: Game Species
General effects from grazing would occur as described in the general effects section above. Rangeland health standards would continue being met and grazing and wildfires would occur as described in Key Issue #2. Elk continue to be over objective, but increased cow permits should help reduce the population. Elk surveys in HD 410 are conducted by MFWP on even years and current population/harvest levels will be reassessed in 2014. As the elk population trend has increased since 2004, the mule deer population trend has decreased. The mule deer general season in HD 410 has resulted in very few mature bucks (very vulnerable to hunting during the rut). Recruitment and buck to doe ratios are average. Most of the last decade has had adequate moisture to support game population levels and livestock grazing. With the high elk population, any periods of dry weather or extended drought should be monitored closely to ensure adequate resources are available.

Resource Concern #4: Socioeconomics
The economy in Fergus and Petroleum County is highly dependent on agriculture, primarily the livestock industry. The jobs and tax revenue generated by livestock associated activities plays a major role in fueling the economy of central Montana. The inter-mixed lands including private, BLM administered and State of Montana creates a woven ownership pattern on which many livestock producers have been dependent for decades to effectively run a livestock operation. Under Alternative A the seasons of use and AUMs would remain the same, which would allow BLM lands to continue to contribute to the local economies. Individual permittees may suffer some hardships due to projects not being approved and implemented.

Resource Concern #5: Water Resources

Direct, Indirect, and Cumulative Effects: Upland and riparian conditions within the LCC planning area would remain in proper functioning condition. This would continue to mitigate non-point source pollutants, and allotments would continue to meet BLM land health standards. The added water quality protection from planting willow, thereby increasing streambank stability, would not occur.

Prescribed fire would not be used to improve fire regime condition class ratings and decrease conifer cover in the CC planning area. Water yield in small order drainages, which affects the amount and kind of riparian-wetland vegetation, would continue to be limited by conifer forest that is outside of the range expected under a natural fire regime.

4.2.2 Predicted Effects Common to All Action Alternatives(B&C)

Key Issue #1: Fire Regime Condition Class (FRCC)

The fire regime/condition class of conifer stands and adjacent sagebrush/grasslands would improve with treatment, which would move parts of the landscape toward historic vegetation patterns and fire severity. Reduced fuel loadings and arrangement would lower the risk of high severity wildfire and improve fire fighter and public safety. Maintaining areas of FRCC1 or FRCC2 will be more efficient and effective than allowing continued departure from historic fire regimes. Private residences adjacent to treatments would be better protected from severe wildfire. Early proactive treatments would be more efficient and cost effective if done before the conifer saplings and pole sized trees mature and further depart from historic conditions. Generally speaking prescribed fire is more cost effective per acre than wildfire suppression.

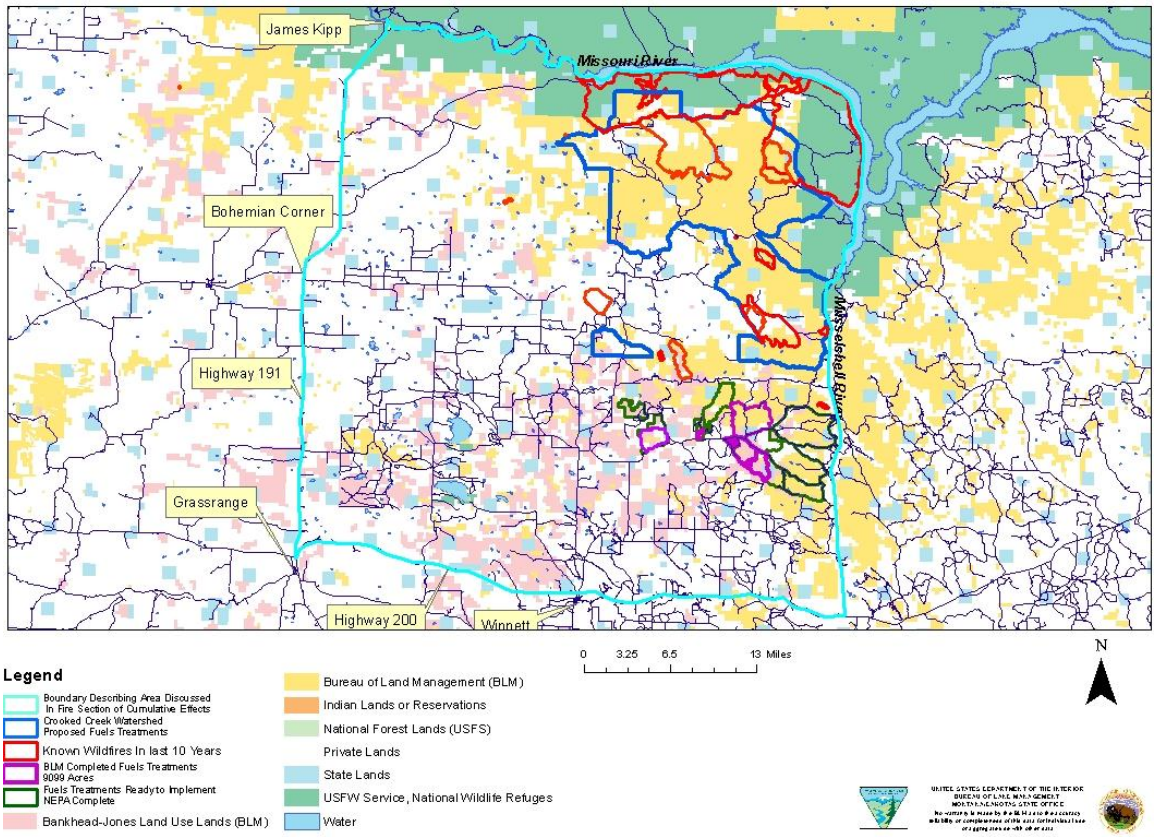
Cumulative Effects: Historically the project area was likely open mixed grass prairie and sagebrush rangelands with some areas of ponderosa pine savannah and woodland (fire regime condition class 1). Open pine stands would have been maintained by naturally occurring wildfires and pine encroachment of rangelands would have been minimal. Increasing density of pine stands and percent conifer cover is likely a result of fire exclusion and past management practices.

The Musselshell Breaks Fuels Treatment project area is adjacent to the CC project area, and has had four successful prescribed fires implemented in the recent past with positive results, meeting objectives. The action alternatives have the same objectives as the Musselshell Breaks prescribed fires. Implementation of the proposed action would reduce fuel loadings and improve or maintain condition class of conifer stands. Existing pine savannah would be maintained and pine encroachment of open rangelands would be reduced. Large scale wildfires have also occurred in the treatment area recently, which sustained high severity and conifer mortality. Reduced fuel loading would result in a lowered risk of high severity wildfire.

Looking at a larger area of approximately 1,003,498 acres as described in the map below, an estimated eight percent (84,997 acres) has been burned by wildfire in the last 10 years. Currently within that block approximately 12,000 acres have had fuels treatments between BLM and Charles M Russell National Wildlife Refuge (CMR). The proposed action of Musselshell Breaks Fuels Treatments, Crooked Creek Resource Activity Plan, and past fuels treatments, an estimated fourteen percent (144,666 acres) would be treated with in that large block. This area has the heaviest wildfire load (highest frequency of starts and most acres burned) for the Central Montana Fire Zone. Continuing treatments could lower costs of wildfire suppression efforts, and increase safety to residence, public land users and fire fighters.

Note that CMR fuels treatments are not on the map.

Fuels Treatments and Wildfire
In and Adjacent to Analysis Area



As forest/rangeland health improves there would be an increase in healthy soils, vegetative diversity and production of shrubs, forbs, and grasses which may initially result in increased use from wildlife such as elk and mule deer. As additional projects are completed in the area resulting improvements in herbaceous cover and composition over a larger portion of the landscape could potentially spread out the grazing pressure from wildlife. Noxious weed infestations have the potential to expand throughout the past, current and future prescribed burn areas through ground and vegetative disturbance. Monitoring for new infestations and applying appropriate treatments as described in the proposed action will minimize the cumulative impacts of noxious weeds. An increase in soil nutrients as short term result from low to moderately intense fires may cause increased production of noxious weeds within the project areas.

Mitigation Measures: The following mitigation measures would be applied to prevent significant effects if actions common to the action alternatives are selected.

- A prescribed fire burn plan will be written to address environmental conditions, resource mitigations and control measures to ensure that an escape is less likely to occur.
- All mechanical treatments will follow a silvicultural prescription and follow resource mitigations.

Key Issue #2: Sage-Grouse Habitats, Resource Concern #2: Sensitive Species and Migratory Birds and Resource Concern #3: Game Species
General Grazing Effects for Reference/Context in Subsequent Sections

The following discussion focuses on the potential impacts of grazing activities on the wildlife species addressed (e.g., habitat, vegetation type, individual species, and species composition). As such, it focuses on potential impacts of grazing since this informs a risk analysis and highlights opportunities for improvement of our processes and management. The following discussion forms a basis of how livestock grazing (or lack thereof) under each alternative has and can affect wildlife species, habitats, and ecosystems they depend upon.

General Discussion

Livestock grazing has affected 70% of land in the western United States" (Krausman et al. 2009, Connelly et al. 2011c). Livestock grazing has been extant in sagebrush plant communities for more than a century (Crawford et al. 2004). Livestock grazing may affect sage-grouse habitat by altering structural habitat or plant community composition, or indirectly by altering abiotic processes and changing sagebrush communities' susceptibility to invasive species. The impact of grazing on these communities varies with site potential, ecological condition, and climate (Crawford et al. 2004). The main aspects of livestock grazing controlled by management are the timing and intensity of plant use.

The Great Plains region has a long history of use by large grazers (bison historically) (Milchunas 2006). The beginning and increase of livestock in the latter 1800s changed the diversity of dominant herbivores, and the timing, and selection pressures associated with large animal herbivores (Miller et al. 1994). Although the Great Plains ecosystems evolved under grazing pressures from hoofed ungulates, the seasonality and intensity of bison and elk grazing differ from current systems. If not managed optimally or effectively, cattle and sheep grazing can cause soil compaction, nutrient enrichment, vegetation trampling and removal, habitat disturbance, and, depending on the season and intensity of use, reproductive failure for native plants and animals. Grazing in riparian areas can cause stream and river bank destabilization, loss of riparian shade, and increased sediment and nutrient loads in the aquatic ecosystem (George et al. 2002).

In general, livestock can influence habitat by modifying: 1) plant biomass; 2) structural components such as plant height and cover; and 3) plant species composition among others. As a result, livestock grazing under these alternatives could cause changes in habitat that alter species abundances and composition in avian, other wildlife, or their prey depending on the grazing pressure/utilization. Changes could occur in varying degrees in plant composition and change in vegetative structure. Grazing under these alternatives could also alter fire regimes (Davies et al. 2010) to varying degrees, which may have positive or negative effects to wildlife species. Studies in grasslands have concluded that birds and many other wildlife species do not respond to grazing per se, but rather to habitat changes.

Since the early 1900's, livestock use on public lands have declined. Simultaneous with reduced stocking of public rangelands has been measurable improvements in range condition during the

latter half of the 1900s (Box 1990, Laycock et al. 1996). The focus of rangeland management on livestock production has been shifting since the 1960s-70s towards conservation, ecosystem integrity and services, sustainable use of resources for multiple purposes, the restoration of degraded rangelands, and benefits for wildlife (Connelly et al. 2004a, Vavra 2005, Briske et al. 2011, Knick et al. 2011).

Livestock grazing may indirectly affect forest habitats/species by influencing forest density. The effect of livestock grazing on forest density is complex, being influenced by forest type, grazing intensity, and other management actions such as fire suppression. A commonly held view is that livestock, particularly cattle, maintain forests in a more open condition as a result of herbivory, trampling, and rubbing against understory trees. However, livestock may also contribute to greater forest density by encouraging tree seed germination through removing competing vegetation and disturbing the soil, providing a seedbed for tree seed germination. Ponderosa pine forests are believed to have become much denser in part due to livestock grazing (Belsky and Blumenthal 1997, Cooper 1960, Rummell 1951). Heavy grazing in the early 20th century and soil disturbance combined with fire suppression resulted in widespread tree seed germination, leading over time to the overstocked stands present today. Thus, livestock grazing may lead to more open or dense stands, depending on a number of factors.

Perennial grasses and forbs in sagebrush communities can be maintained by moderate or less livestock grazing in mid to late summer, fall or winter (Miller et al. 1994). Cool season herbaceous species are most common in sagebrush communities and are vulnerable to defoliation during late spring and early summer. Heavy grazing (approximately 60% or greater utilization by weight) during this time results in reduced vigor, production and cover of late-seral grasses and forbs; annual grasses and forbs may increase; sagebrush canopy and density tends to increase; and ecological status of the sagebrush communities declines (Laycock 1967, Laycock 1987).

Reduced utilization or rest may help restore sites in poor ecological condition (Holechek et al. 1999). Sagebrush dominated communities' tolerance to grazing improves in periods of above average precipitation and declines during drought periods (Westoby et al. 1989).

Cattle in sagebrush habitat eat grass-dominated diets in all seasons of the year and minimal sagebrush unless snow is deeper than eight inches (Harrison and Thatcher 1970) (Ngugi et al. 1992). In response to increased utilization of grasses and forbs, sagebrush cover normally increases (Laycock 1967, Bork et al. 1998). Once sagebrush cover reaches an upper threshold, cessation of livestock grazing is unlikely to reverse the trend. Over long time periods, as understory grass and forb species increase, sagebrush populations may decrease (Anderson and Inouye 2001). In areas with substantial annual grass populations, reducing livestock grazing may accelerate further habitat degradation if ungrazed fuel loads increase large area wildfires (Peters and Bunting 1994, West 1999b).

Timing of grazing influences effects on meadows and riparian areas in meadows and riparian areas. These sites are most vulnerable in the late summer (Kovalchik and Elmore 1992), Meadow and riparian areas within sagebrush habitat in good condition can withstand moderate spring, early summer or winter use (Shaw 1992, Clary et al. 1996, Mosley et al. 1997). The length of time livestock access meadows may be more important than the level of utilization (Mosley et al.

1997). Rest from grazing may be necessary to restore degraded riparian and meadow habitat (Clary and Webster 1989).

Sage-grouse habitat structure and composition may be affected positively or negatively by livestock grazing (Crawford et al. 2004). Grazing plans designed to improve fair and poor condition range with rest periods may increase herbaceous cover, and concurrently sage-grouse habitat (Adams et al. 2004). In Central Montana hens preferred to nest in in areas with taller grass heights. Changing the timing of grazing to promote grass and forb growth and residual matter may benefit sage-grouse habitat as well (Woodward 2006). Grazing in light intensities may produce mosaics in sagebrush communities and increase grass and forb production needed for nesting and brood-rearing (Adams et al. 2004). On the other hand, areas with excessive utilization for a number of years has negatively impacted sage-grouse habitat by creating conditions that favor annual grass dominance and reduce perennial grasses used as nesting and escape cover (Beck and Mitchell 2000). Heavy use of riparian meadows reduces the availability of succulent forbs and may cause sage-grouse to avoid these habitats (Klebenow 1982, 1985). Livestock may also trample nests and disturb sage-grouse behavior (NTT 2011, p.14).

The effects of grazing on each species addressed in this assessment are difficult to determine due to lack of adequate information, the large number of wildlife species addressed, and varying habitat requirements of each. Individual species have their own habitat requirements and are affected differently directly or indirectly by livestock grazing. In general, as grazing intensity increases so does the effect on vegetative structure, composition, etc., altering species' habitat. While many species are impacted by grazing, some have shown preference for more heavily grazed areas with reduced vegetation; however, the vast majority of species do not. Specifically, direct results of grazing include removal of vegetative cover (e.g., plants – grasses, forbs, shrubs, and trees), which affects habitat structure and prey availability, and trampling of grass and brush. Indirect or delayed effects include altered species composition, reduced fine fuels and probability of wildfire, increased stock reservoirs and associated lentic habitat, affecting many of these species.

Key Issue #3: Riparian-Wetland Habitats

Direct and Indirect Effects: Under the action Alternatives B and C, the BLM would attempt to accelerate the recovery of cottonwood and willow on Crooked Creek through riparian plantings. While the condition of Crooked Creek is currently proper functioning condition, the addition of streambank willow would increase streambank stability ratings. Plant communities of multiple species of riparian-wetland vegetation have higher stability ratings than the individual plants themselves. Furthermore, additional riparian-wetland species decrease the risk of a stream losing its functionality if one plant species dies because of insect, disease, drought, etc. Multi-layered riparian-wetland vegetation would also provide greater aquatic and terrestrial wildlife habitat values.

The repair of Drag Reservoir outlet structure would maintain the water dependent riparian-wetland area associated with the reservoir as well as the fishery and recreational values. No change in the capacity of the reservoir would occur. The water used for those purposes would not be made available for riparian-wetland development downstream on Drag Creek. Repair of Drag Reservoir outlet would maintain roughly 25 acres of lentic riparian-wetland habitat and

lacustrine open-water habitat. Maintenance of this structure is scheduled to begin in the fall of 2013, and it is anticipated to be repaired by 2014. The decision was made under a categorical exclusion for maintenance. An effects discussion is included in this analysis because it is reasonably foreseeable action that will be completed.

Under Alternatives B and C, the BLM would use prescribed fire and mechanical treatments to achieve FRCC goals. Changes in vegetative cover types and the removal of protective vegetation could affect the quantity and timing of runoff as well as increase erosion and subsequent sedimentation in downstream areas. A detailed effects analysis regarding water quantity can be found below under the Resource Concern #4 Water Resources section. However, studies conducted in the Missouri River Breaks (Marlow and others, 2006) found positive effects on water yield and riparian process in small order drainages following implementation of prescribed fire and vegetative treatments. There was a shift from upland plant species to riparian-wetland plant species in the small order drainages below the vegetative treatments because of the increase in water availability. The reason that this is important is because riparian-wetland plant species have much higher stability ratings than upland species and they are more resistant to erosion. This could help mitigate the indirect effects of erosion and sedimentation.

Removal of reservoirs that are no longer needed or functional would not allow for lentic riparian-wetland habitat development at that site. Not all stock reservoirs support riparian-wetland habitat because of fluctuating water levels, etc. The quantity of runoff available to downstream areas would increase. There would be a short-term effect of sediment delivery to downstream areas as sediment that had been stored behind the reservoir is mobilized; however, the long-term effect of returning to a natural water and sediment yield would benefit downstream riparian-wetland habitats.

Cumulative Effects: The Crooked Creek, Dovetail Creek, and Drag Creek watersheds were chosen for cumulative effects analysis of riparian-wetland habitats because these are the watersheds that contain the proposed vegetative treatments and structural projects.

The riparian and stream channel conditions within the analysis area were in proper functioning condition. Streams in functioning condition are better able to process minor disturbance than nonfunctioning streams that are sensitive to disturbance. In regards to the interaction of livestock grazing and the proposed vegetative treatments, Fuhlendorf and Engle (2004) found that livestock spent 75% of their grazing time in areas that had been burned the previous year. This would imply that the proposed vegetative treatments would result in less livestock grazing in riparian areas leading to a small, cumulative effect on already functioning riparian and stream channel conditions. A similar assumption could be made for elk use on woody plantings. The proposed vegetative treatments (i.e. prescribed burns) would attract large ungulate use. Cumulatively, this may help decrease elk use on riparian plantings.

As previously mentioned, a detailed effects analysis of water yield is described below under the Resource Concern #4 Water Resources section. However, the features common to the action alternatives could increase water yield. The key message is that smaller order streams would likely see some increases in water yield and riparian conditions, but the larger streams such as

Crooked Creek, Dovetail Creek, and Drag Creek would likely see any effect because of the size of the watersheds as well as the amount of water stored in pits/dams/reservoirs in the watersheds.

Mitigation Measures: The following mitigation measures would be applied to prevent significant effects if actions common to the action alternatives are selected.

- Any pits/dams/reservoirs deemed no longer necessary and removed during the life of this plan would have all embankment material removed from areas that could experience surface water flow. Remaining embankment material would be pulled back to a stable angle of repose and reseeded with native vegetation.
- The secondary, drop-outlet pipe at Drag Reservoir would be installed at the historic spillway elevation.

Resource Concern #4 Water Resources

Direct and Indirect Effects: Under the action Alternatives B and C, the BLM would use prescribed fire and mechanical treatments to achieve FRCC goals. Changes in vegetative cover types and the removal of protective vegetation could affect the quantity and timing of runoff as well as increase erosion and subsequent sedimentation in downstream areas.

In order to evaluate direct effects of the proposed actions, a watershed was selected from within the proposed vegetation treatment units for analysis that had relatively heavy forest canopy cover compared to the rest of the project area. The reason for choosing one with heavy forest canopy cover was that the effects of prescribed fire and tree removal on similar watersheds or watersheds with less forest cover within the project area would either be similar or less. This provides an estimate of the effects for a worst-case scenario so to speak. Also, the watershed chosen for analysis does not contain substantial storage (pits/dams/reservoirs), so the effect of the prescribed fire within the watershed could be separated from other effects, such as the runoff hydrograph being routed through a reservoir.

A 2-year, 24-hour precipitation event (1.3 inches) was chosen for analysis because a storm event of this frequency would be the most likely to possibly occur while the immediate effects of the burn are present on the ground. These estimates provide peak flows and runoff associated with a 2-year storm event (calculated using the NRCS curve number approach). An analysis of change in mean annual yield (calculated using Omang and Parrett, 1984) was completed to give an idea of the possible changes in the amount of water yield available on an annual basis.

Variables that remained constant include the watershed size (1,179 acres), watershed hydrologic length (15,240’), average watershed slope (15.3 %), and the hydrologic soil group within the watershed (D). For the curve number approach, changes include the amount of acres in vegetative cover types of pine/juniper and woods-grass combination as well as post fire curve numbers calculated using a ratio of pre-fire to post-fire curve numbers based upon the level of wildfire hydrologic impact, which are low, moderate, or severe (Livingston and others, 2005). Because the fire would be a prescribed fire, a low wildfire hydrologic impact was chosen. This generally shifted curve numbers from a good condition to poor condition. For the change in vegetative cover, the analysis assumed a 70% kill on trees in the woods-grass combination cover

type and a 50% kill on the pine-juniper cover type. The high end of the burn objectives were chosen to provide a worst-case scenario, and anticipated effects would likely be less than those disclosed.

The immediate post-burn scenario assumes the change in vegetative cover, with a decrease in forest on the pine/juniper and woods-grass combination cover types as well as a shift in curve numbers from a good to poor condition. The two years post-burn scenario assumes recovery of the curve numbers from poor to good condition, but 50 percent of the pine/juniper cover-type and 70 percent of the tree cover in the woods-grass combination has shifted to an herbaceous cover type.

For evaluating the changes in mean annual yield, the variable changed for analysis was the percent forest cover within the watershed.

Curve Number Approach	Existing Conditions	Immediate Post-Burn	2 Years Post-Burn (percent increase from existing conditions)
Peak Flow (cfs)	51	134	93 (82)
Runoff (in)	0.15	0.27	0.22 (47)
Runoff (acre-feet)	14.74	26.52	21.62 (47)
Omang and Parrett, 1984	Existing Conditions		2 Years Post-Burn (percent increase from existing conditions)
Mean Annual Yield (cfs)	0.020		0.026 (30)
Mean Annual Yield (acre-feet)	14.48		18.82 (30)

While the direct impacts are disclosed above, the indirect impacts are relatively inconsequential because the existing fire regime condition class and percent forest cover are outside of the range appropriate for the landscape, and the vegetative treatments are intended to return the landscape to conditions found historically. Furthermore, studies conducted in the Missouri River Breaks (Marlow and others, 2006) found positive effects on water yield and riparian process in small order drainages following implementation of prescribed fire and vegetative treatments. There was a shift from upland plant species to riparian-wetland plant species in the small order drainages below the vegetative treatments because of the increase in water availability. The reason that this is important is because riparian-wetland plant species have much higher stability ratings than upland species and they are more resistant to erosion. This could help mitigate the indirect effects of erosion and sedimentation.

Riparian plantings of willow and cottonwood would benefit water resources. While the condition of Crooked Creek is currently proper functioning condition, the addition of streambank willow would increase streambank stability ratings. Plant communities of multiple species of riparian-wetland vegetation have higher stability ratings than the individual plants themselves.

Furthermore, additional riparian-wetland species decrease the risk of a stream losing its functionality if one plant species dies because of insect, disease, drought, etc. Multi-layered riparian-wetland areas with a woody component also increase stream shading, which can decrease stream temperature and increase dissolved oxygen concentration.

The repair of Drag Reservoir outlet structure would maintain the water dependent riparian-wetland area associated with the reservoir as well as the fishery and recreational values. No change in the capacity of the reservoir would occur. The water used for those purposes would not be made available for riparian-wetland development downstream on Drag Creek. Saline conditions would continue to be present downstream of the reservoir. Reservoirs increase the groundwater elevation in surrounding soils, which leaches salts from the soil that are not typically made available to water moving through the soil profile. The effect is similar to saline seeps below agriculture fields. Maintenance of this structure is scheduled to begin in the fall of 2013, and it is anticipated to be repaired by 2014. The decision was made under a categorical exclusion for maintenance. An effects discussion is included in this analysis because it is reasonably foreseeable action that will be completed.

Removal of reservoirs that are no longer needed or functional would benefit water resources. The quantity and timing of runoff available to downstream areas would improve. Saline seeps in the vicinity of the reservoir would decrease. There would be a short-term effect of sediment delivery to downstream areas as sediment that had been stored behind the reservoir is mobilized; however, the long-term effect of returning to a natural water and sediment yield would benefit water resources.

Cumulative Effects: The Crooked Creek, Dovetail Creek, and Drag Creek watersheds were chosen for cumulative effects analysis because these are the watersheds that could be affected by the proposed vegetative treatments and structural projects. The cumulative effects analysis was also completed as a worst-case scenario evaluation of effects. The total number of acres treated within the watersheds was evaluated for changes in mean annual yield based upon the percent change that occurred for the heavily forested watershed in the direct/indirect analysis (30 percent). One, not all of the acres proposed for treatment would be burned, and two the percent forest cover is often less than the watershed chosen for the direct/indirect analysis. The effect on peak flow was not considered for the cumulative effects analysis because the vegetative treatments would be carried out over a number of years allowing for substantial recovery, and the effect of any individual burn on watersheds the size of Crooked Creek, Dovetail Creek, and Drag creek would be immeasurable.

Watershed	Watershed Size (acres)	Acres within Watershed Proposed for Treatment	Treated Acres Mean Annual Yield		Watershed Mean Annual Yield	
			Pre-Treatment	Post-Treatment	Pre-Treatment	Post-Treatment
Crooked	228,324	24,219	1.18 cfs	1.53 cfs	9.78 cfs	10.33 cfs

Creek			(854 acre-feet)	(1,108 acre-feet)	(7,080 acre-feet)	(7,479 acre-feet)
Dovetail Creek	58,553	5,030	0.27 cfs (196 acre-feet)	0.35 cfs (253 acre-feet)	2.72 cfs (1,969 acre-feet)	2.85 cfs (2,063 acre-feet)
Drag Creek	30,719	8,772	0.46 cfs (333 acre-feet)	0.60 cfs (434 acre-feet)	1.48 cfs (1,071 acre-feet)	1.68 cfs (1,216 acre-feet)

The cumulative effects are attenuated by the percent of water stored in the watersheds. Furthermore, the existing vegetative conditions are outside of an appropriate range considering percent forest cover and fire regime condition class. The key message is that smaller order streams would likely see some positive effects in water yield and riparian conditions, but the larger streams such as Crooked Creek, Dovetail Creek, and Drag Creek would unlikely see any effect because of the size of the watersheds as well as the amount of water stored in the watersheds.

Watershed	Claimed Volume Stored in Pits/Dams/Reservoirs (acre-feet)	Pre-Treatment Mean Annual Yield (acre-feet)	Percent of Pre-Treatment Mean Annual Yield Stored	Post-Treatment Mean Annual Yield (acre-feet)	Percent of Post-Treatment Mean Annual Yield Stored
Crooked Creek	2,087	7,080	29	7,479	28
Dovetail Creek	1,818	1,969	92	2,063	88
Drag Creek	229	1,071	21	1,216	19

In 2012, roughly 16,825 acres burned in the LCC planning area, most of which were in the Crooked Creek watershed. Those areas that burned in wildfires would be prioritized last for treatment, which would allow for recovery and mitigation of direct and indirect effects. There have been are a two wildfires in the planning area in the last 10 years; the Soda Creek Fire in the Crooked Creek watershed and the Drag Fire in the Drag Creek watershed. These fires changed vegetative conditions on those sites. The sizes of those wildfires in the watershed (<2,000 acres) compared to the watershed sizes and the sizes of the proposed vegetative treatments is small, and the cumulative effects would likely be immeasurable.

The riparian and stream channel conditions within the analysis area were in proper functioning condition. Streams in functioning condition are better able to process minor disturbance than nonfunctioning streams that are sensitive to disturbance. In regards to the interaction of livestock grazing and the proposed vegetative treatments, Fuhlendorf and Engle (2004) found that livestock spent 75% of their grazing time in areas that had been burned the previous year. This would imply that the proposed vegetative treatments would result in less livestock grazing

in riparian areas leading to a small, cumulative effect on already functioning riparian and stream channel conditions.

The removal of unneeded reservoirs could cumulatively benefit water resources by improving the volume and timing of water being made available to downstream areas. Actions proposed by the BLM would have the most cumulative effect in the Drag Creek watershed, where BLM administers 17 out of 27 total reservoirs, and the Crooked Creek watershed, where BLM administers 175 out of 456 reservoirs. The BLM only administers 15 out of 97 reservoirs on Dovetail Creek, and the potential to affect change would be smaller than on the other two watersheds.

Mitigation Measures: The following mitigation measures would be applied to prevent significant effects if actions common to the action alternatives are selected.

- Any pits/dams/reservoirs deemed no longer necessary and removed during the life of this plan would have all embankment material removed from areas that could experience surface water flow. Remaining embankment material would be pulled back to a stable angle of repose and reseeded with native vegetation.
- The secondary, drop-outlet pipe at Drag Reservoir would be installed at the historic spillway elevation.

4.2.3 Predicted Effects of Alternative B – Preferred Alternative

Key Issue #1: Fire Regime Condition Class (FRCC)

The fire regime/condition class of conifer stands and adjacent sagebrush/grasslands would improve with treatment, which would move parts of the landscape toward historic vegetation patterns and fire severity. Reduced fuel loadings and arrangement would lower the risk of high severity wildfire and improve fire fighter and public safety. Maintaining areas of FRCC1 or FRCC2 will be more efficient and effective than allowing continued departure from historic fire regimes. Private residences adjacent to treatments would be better protected from severe wild fire. Early proactive treatments would be more efficient and cost effective if done before the conifer saplings and pole sized trees mature and further depart from historic conditions. Generally speaking prescribed fire is more cost effective per acre than wildfire suppression.

Key Issue #2: Sage-Grouse Habitats

Direct, Indirect, and Cumulative Effects

Under this alternative grazing would continue as described in Alternative A, with two important exceptions—the Iverson and Iverson Individual Allotments. The Iverson and Iverson Ind. Allotments are currently run in a three pasture rotation system. The permittee and NRCS have proposed a deferred rest rotation system as part of the Sage Grouse Initiative (SGI) which will divide the allotments into nine pastures (from three). Six pastures will be grazed each season allowing three pastures to rest that grazing season. The rested pastures will then be deferred

until after the growing season the following year to allow two seasons of rest. The three pastures grazed during the growing season the previous year will be rested the following year. (See Appendix D for specific pasture locations and rotations) These two allotments account for 62% (14,173 acres) of the sage-grouse PPH in the CC planning area. 4.75 miles of fence, 8.5 miles of pipeline and 4 tanks are needed on BLM/total to implement the proposed grazing system. New fences and existing fences near the lek that pose a collision risk for sage-grouse would be marked to minimize fence strikes. The rested and deferred pastures are expected to increase sage-grouse nest success in the Iverson and Iverson Individual Allotments by increasing residual grass height and improving nest concealment (Taylor et al. 2010). The increased grass height would increase the amount of fine fuels, but would not be expected to noticeably change the amount burned by wildfires since these allotments comprise less than 3% of the project area.

Mechanical conifer removal treatments in sage-grouse PPH and adjacent PGH sagebrush habitats would increase and improve available sage-grouse habitat. Prescribed burning would move forested habitats toward historic conditions and reduce the chance of a wildfire spreading into adjacent sagebrush habitats.

There would be no changes in the stock reservoirs or potential for mosquitos that transmit WNv, which is highly lethal to sage-grouse.

Changes in sage-grouse use and increased abundance would be expected the year following SGI rest rotation grazing in the Iverson and Iverson Individual allotments. Additional increases are expected to occur as mechanical conifer removal treatments increase the amount of suitable sage-grouse habitat. These improvements to sage-grouse habitat should stabilize and improve observed lek attendance at CC-12 in the long-term.

Based on the rationale above, Alternative B would have a ***"beneficial impact"*** for Greater Sage-Grouse.

This Alternative best meets the management direction listed in WO IM 2012-043.

Key Issue #3: Riparian-Wetland Habitats

Direct, Indirect, and Cumulative Effects: Under Alternative B, livestock management in allotment 04957 would be adjusted to decrease the amount of time livestock spend in the riparian pasture on Crooked Creek. Currently, allotment 04957 is run in a three-pasture rotation system. Under Alternative B, there would be nine pastures (from three). Six pastures would be grazed each season, thereby allowing three pastures to rest that grazing season. The rested pastures would then be deferred until after the growing season the following year to allow two growing seasons of rest. While the reach of Crooked Creek within this allotment is currently PFC, this would facilitate the rate at which this stream moves toward its potential natural plant community.

Resource Concern #1: Invasive, Non-native Species (Noxious Weeds)
Under Alternative B weed control efforts in the CC will remain permitee based. Weed Control Cooperative Range Improvement Agreements will be established for any current or new

infestations of noxious weed species found on allotments. The BLM LFO will provide chemical and/or biological control methods to the affected permitees and the permitees will provide the labor for chemical application. Records of application will be provided to the BLM LFO after each successful application prior to receiving any additional control measures. New species of concern will be monitored for and any infestations found reported to the BLM LFO.

Resource Concern #2: Special Status Species and Migratory Birds

Continued grazing would be similar to that described in Alternative A Key Issue #2 and Resource Concern #2, except the Iverson and Iverson Individual Allotments would change to a rest rotation system. Rested pastures would increase available habitat for species needing taller grasses such as Baird's sparrow, with a similar decrease in habitats available for species needing short or recently grazed grasses such as chestnut-collared longspur.

Mechanical conifer removal treatments in sagebrush habitats would increase and improve this habitat. Prescribed burning would move forested habitats toward historic conditions and reduce the chance of a wildfire spreading into adjacent sagebrush habitats. Objectives for the prescribed burn are to reduce ponderosa pine understory and regeneration, while maintaining most overstory trees. The prescribed burn would reduce competition for the remaining ponderosa pine, increasing growth rate and vigor. Reduced canopy cover and needle cast would also increase herbaceous vegetation production (until the canopy begins to close again (15-20 years)) and nutrition (approximately 3 years). Wyoming sagebrush would not be targeted for treatment, but small acreages (<20 acres) could be consumed incidentally adjacent to ponderosa pine treatments. Silver sagebrush occurs adjacent to forested habitat in many of the drainages and unlike Wyoming sagebrush, responds favorably to disturbance.

Resident wildlife species would be displaced short-term during implementation until suitable habitat establishes. Similar habitats exist in immediate proximity to the project area that will remain unburned following the project and the outlying areas contain a larger amount of similar habitats. Approximately 3,000 to 4,000 acres are prescribed burned annually in the Malta and Lewistown Field Offices and UMRBNM, so species preferring habitat conditions that exist currently would still have the opportunity to select those habitats. Additionally, all areas within the project area would not be treated; unburned pockets would remain and the targeted areas only cover ~50 -70% of the forested areas. Mortality could result from treatment activities, especially if burns are initiated later in the spring when migratory birds are nesting With the decline in several bird species over the last 40 years, treatments should not occur during the breeding season, if possible. Prescribed burning windows and opportunities are extremely limited in central Montana. Given the current fuels conditions within the project area, prescribed fires are desired, even if they can only be completed after April 15. The detrimental impacts would be short-term and would be mitigated by the long-term benefits to the habitat and species drawn to the habitat created by prescribed fire.

Birds and bats would be temporarily displaced during spring burning operations and for that year's nesting season. There may be mortality of less mobile individuals. These are short-term impacts and will not affect the populations of any species. The detrimental impacts would be mitigated by the long-term benefits to the species using the habitat and species drawn to the habitat created by the prescribed fires (remaining snags). Some greater short-horned lizard

individuals would be subject to loss during burning operations. These short-term impacts would not affect the stability of the local population for this species. The proposed action would remove and open up more of the timber habitat providing minor increases in habitat for this species. The impacts from the proposed project would not affect the state or regional populations of any of these species or contribute to the need for listing under the Endangered Species Act.

Appendix C is the BLM sensitive species determination summary for all alternatives in the CC planning area.

Migratory Birds: Excerpt from Saab et. al 2007
The effect of fire on birds can be beneficial, neutral, mixed, or adverse depending on the species, length of time since fire, and burn severity. Generalizing the effect of fire on birds in western forests is challenging:short-term responses may differ from long-term responses, responses by resident bird species may differ from migratory species, and effects observed at the stand scale may differ from those at the regional or landscape scale. Also, fire that benefits one species may harm another. Ultimately, managing for particular fire conditions—including wildland fire, prescribed fire, or fire exclusion—entails ecological tradeoffs among selected wildlife species and habitats. In the combined study areas (NW and SW), all but one of the eight resident species had a positive or neutral response to burning treatments. The one exception, the pygmy nuthatch (in the SW study area), showed a negative response the year of burning, but showed a neutral response the following year. Migrants showed mixed responses. Some, like western bluebirds, experienced positive changes in density, whereas others, such as yellow-rumped warblers, showed declines in response to fire treatments. Overall, at both study sites, a greater percentage of birds, both migrants and residents, showed some decline during the same year as the fire, but were back to prefire abundances (i.e., neutral to prescribed burns) 1 year after the fire. These preliminary results suggest that the effects of prescribed fire on birds may be short term. However, monitoring for additional years after treatments is needed to fully address this issue of short-term losses for long-term gains (Saab et al. 2006b). This is particularly important because we also observed several migratory species that showed no response during the year of prescribed fire, but showed a decline in the year after treatment. These were the gray flycatcher (in the SW), and the red-breasted nuthatch and Townsend's solitaire (in the NW).

Figure 6—Example of bird species associated with burn severity in dry coniferous forests of the interior Western United States (photos by Evelyn Bull, Catherine Raley, and Charlie Chrisafulli).

Table 1—Preliminary results for species population density responses to prescribed fire at the Birds and Burns Network northwest sites

Species	Year of burning	One year after burning	Guild		
			Foraging	Nest layer	Nest type
Migrant					
Northern flicker (short-distance migrant)	+	0	OM	CA	C
Hammond's flycatcher	-	-	AI	CA	O
Gray flycatcher	0	+	AI	SH	O
Dusky flycatcher	+	+	AI	SH	O
Cassin's vireo	0	0	FI	CA	O
Red-breasted nuthatch	0	-	BI	CA	C
Western bluebird	+	0	AI	CA	C
Townsend's solitaire	0	-	AI	GR	O
American robin	+	0	GI	CA	O
Yellow-rumped warbler	-	-	FI	CA	O
Western tanager	0	0	FI	CA	O
Chipping sparrow	0	0	OM	SH	O
Dark-eyed junco	0	0	OM	GR	O
Brown-headed cowbird (short-distance migrant)	+	0	OM	Various	P
Cassin's finch	0	0	OM	CA	O
Pine siskin	-	0	OM	CA	O
Resident					
Hairy woodpecker	0	+	BI	CA	C
Mountain chickadee	0	0	FI	CA	C
White-breasted nuthatch	+	0	BI	CA	C

Note: Statistically significant changes in population densities are indicated by the signs + (positive) or – (negative). All zeros indicate no statistical change in population densities from pre- to posttreatment. Columns represent foraging guild (AI = aerial insectivore, GI = ground insectivore, FI = foliage insectivore, OM = omnivore, BI = bark insectivore), nest layer (CA = canopy, SH = shrub, GR = ground), and nest type (C = closed, O = open, P = parasitic). Species are listed in taxonomic order, an order that reflects the evolutionary relationships among birds.

Resource Concern #3: Game Species
Mechanical and prescribed fire treatments would occur as described in Key Issue #1. With the maximum amount of treatments (60,000 acres over 10 years) adequate big game security cover would remain. The seasonal road closures (to reduce open road density during hunting season in East Indian Buttes and Chain Buttes BMAs) remaining conifers following treatments and topography would continue to provide adequate security cover for big game. Grasses and forbs would increase both short and long-term following treatments, which would benefit elk and mule deer. This is especially important given the high elk population and dry conditions that occurred in the summer of 2012. Prescribed burns would also increase deciduous woody shrubs (chokecherry, sumac, snowberry, etc.) which would improve mule deer and sharp-tailed grouse habitat. Increased available water as a result of fires would occur as described in Key Issue #3 and would provide additional water or forage opportunities that don't currently exist. Treatments could help attract ungulate use away from riparian areas short-term, but these areas need to be monitored closely for livestock and wildlife grazing pressure. Any riparian willow plantings would need to be protected from wildlife browsing pressure to increase reestablishment success.

Increased miles of fences associated with the Iverson and Iverson Individual allotments would be built to wildlife friendly specifications and have no measurable effect on big game use in the area. Sage-grouse are addressed separately in Key Issue #2.

Alternative B is the most desirable alternative for hunting and game opportunities.

Resource Concern #4: Socioeconomics
Under Alternative B, forage availability and the number of authorized AUMs are expected to continue at current levels and economic contributions attributed to livestock use of BLM-administered lands would continue at current levels. Livestock grazing on 108800 acres of public lands would provide 15593 AUM's of forage on 20 grazing allotments in Fergus and Petroleum County. The dependency of livestock operators on BLM forage would remain unchanged. Forage on BLM administered land often provides a critical element of the livestock producer's matched complement of grazing, forage, and hay production. Since there would be no change in the authorized level of grazing use, this would not contribute to changing the real estate value of base properties.

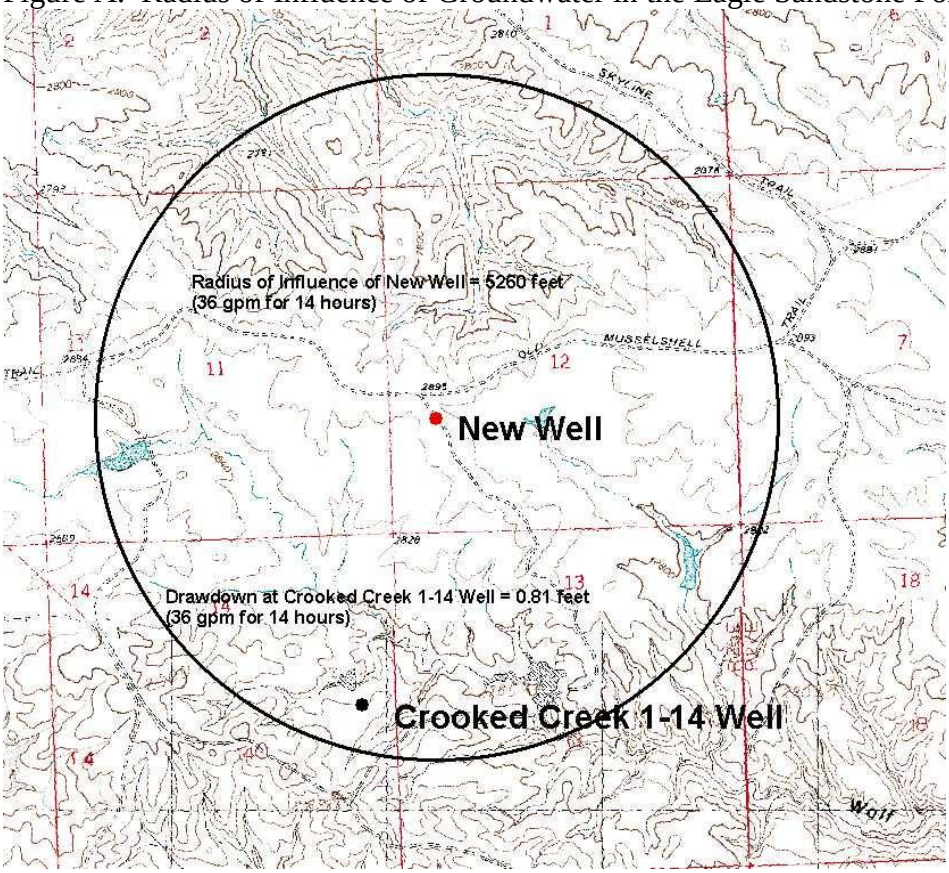
Resource Concern #5 Water Resources

Direct and Indirect Effects: Under the preferred alternative, a pipeline and water distribution system would be developed as described in Chapter 2. A groundwater well has been drilled on private property in NW1/4SW1/4 of section 12 in T20N R26E. The well was completed at a depth of 2012 feet in the Eagle Sandstone formation. While the well was completed on private property, which the BLM has no jurisdiction over, the effect on groundwater in the Eagle Sandstone is described in this section because the flow rate and quantity of groundwater removed from the formation are affected by actions proposed on BLM land in this EA.

At the above mentioned well location, the well had an artesian flow of 5.5 gallons per minute and a shut-in pressure of 60 pounds/square inch. That would mean that the potentiometric surface is roughly 138 feet (60 psi * 2.31 feet/psi) above the ground surface. The aquifer was able to sustain a pumping rate of 36 gallons per minute during a pump test, and a water quality test for total dissolved solids came back with results of 1900 mg/L (personal communication with Grant Petersen, NRCS Rangeland Management Specialist).

Cooper-Jacob distance drawdown relations were used to estimate the radius of influence using transmissivity and storativity values for the aquifer and time of groundwater pumping (or artesian flow). Estimates of aquifer hydraulics were conservative to provide a worst-case scenario disclosure of effects. Large transmissivity values and small storativity values will increase the radius of influence of a well. Transmissivity can be calculated by multiplying the hydraulic conductivity times the aquifer thickness. A large hydraulic conductivity value for sandstone of 0.0006 cm/s (Weight and Sonderegger, 2001) was used, and an aquifer thickness of 125 feet was estimated from Feltis (1982). A storativity of 10^{-5} was used, which is a reasonable value for confined aquifers (Weight and Sonderegger, 2001). The largest and longest pumping rate (or artesian flow) would occur during the filling of the storage tanks. At 36 gpm pumping rate, it would take roughly 13.9 hours to fill 30,000 gallons. During this time, the radius of influence of the well would extend approximately 5,260 feet. The radius of influence is mapped in the figure below.

Figure A. Radius of Influence of Groundwater in the Eagle Sandstone Formation



One other well is completed in the Eagle Sandstone formation within the radius of influence. The well is named Crooked Creek 1-14 well, and it is located on private property. It is roughly 4,500 feet from the new well. A Cooper-Jacob straight-line plot was used to estimate drawdown at well Crooked Creek 1-14. During filling of the storage tanks, well Crooked Creek 1-14 would experience roughly 0.81 feet of drawdown. This is a hypothetical drawdown because the potentiometric surface is above the land surface at this location, but it would translate to a decrease in pressure of 0.35 PSI at well Crooked Creek 1-14. A decrease in pressure of 0.35 PSI would unlikely affect the ability to put water to beneficial use at well Crooked Creek 1-14.

The new well would serve roughly 3,444 AUMs. Assuming a livestock consumptive use of 30 gallons per day, that would result in approximately 9 and ½ acre-feet of water removed from the Eagle Sandstone aquifer per year.

Under Alternative B, livestock management in allotment 04957 would be adjusted to decrease the amount of time livestock spend in the riparian pasture on Crooked Creek. Currently, allotment 04957 is run in a three-pasture rotation system. Under Alternative B, there would be nine pastures (from three). Six pastures would be grazed each season, thereby allowing three pastures to rest that grazing season. The rested pastures will then be deferred until after the growing season the following year to allow two growing seasons of rest. While the reach of Crooked Creek within this allotment is currently PFC, this would facilitate the rate at which this stream moves toward its potential natural plant community.

Cumulative Effects: There could be an additional, cumulative decrease in pressure where the radius of influence of Crooked Creek 1-14 well overlaps the radius of influence from the new well. However, no additional wells or springs which originate from the Eagle Sandstone aquifer are present within the estimated radius of influence of the new well. There would be no additional, cumulative effects beyond the direct and indirect effects disclosed above.

Mitigation Measures: The following mitigation measures would be applied to prevent significant effects if Alternative B is selected.

- An appurtenance remark would be added to the water right permit for the new well which identifies the deeded private land that the water right is associated with (i.e. the base property description for allotment 04957). Because there is place of use from the new well that is located on BLM land, this would alleviate issues that arise in water rights transfer if the base property changes ownership.
- All stock water tanks would be equipped with shut-off valves to prevent the waste of groundwater.
- The pipeline would be installed across Crooked Creek at low water or dry conditions.
- Any pits/dams/reservoirs deemed no longer necessary and removed during the life of this plan would have all embankment material removed from areas that could experience surface water flow. Remaining embankment material would be pulled back to a stable angle of repose and reseeded with native vegetation.

4.2.4 Predicted Effects of Alternative C – No Grazing

Key Issue #1: Fire Regime Condition Class (FRCC)

The fire regime/condition class of conifer stands and adjacent sagebrush/grasslands would improve with treatment, which would move treatment areas in the landscape toward historic vegetation patterns and fire severity. Reduced fuel loadings and arrangement would lower the risk of high severity wildfire and improve fire fighter and public safety. Maintaining areas of FRCC1 or FRCC2 will be more efficient and effective than allowing continued departure from historic fire regimes. Private residences adjacent to treatments would be better protected from severe wildfire. Early proactive treatments would be more efficient and cost effective if done before the conifer saplings and pole sized trees mature and further depart from historic conditions. Generally speaking prescribed fire is more cost effective per acre than wildfire suppression. However removing grazing from the landscape will increase fine fuel loadings (grass). An increase in fine fuel loadings across the landscape could result in larger wildfires outside of the ponderosa pine stands, and prescribed fires would be more difficult to implement. Increasing fine fuel loadings will also increase suppression costs of wildfires and implementation costs of prescribed fires.

Key Issue #2: Sage-Grouse Habitats

Direct, Indirect, and Cumulative Effects

Under this alternative, no livestock grazing would occur on BLM lands within any of the allotments assessed, which could alter habitat conditions for these species. See *General Effects* above (Section 4.2.2 above in Key Issue #2) for further discussion of the general impacts from the lack of livestock grazing within suitable habitats. To completely exclude livestock grazing on BLM lands would require fencing on private lands. This could indirectly result in approximately 550 miles of additional fence, approximately 60 miles of which occurs in sage-grouse PPH. Removing grazing would likely result in additional indirect effects on private lands of either 1) increased agricultural production to compensate for the loss of grazing forage on BLM lands, or 2) increased development and habitat fragmentation if private ranches are unable to support a viable cattle operation. Despite the low population in Petroleum County currently, the area is highly desirable for elk hunters and the Weaver Ranch subdivision along the west central boundary of the planning area is an example of what could be expected.

Removing grazing would result in increased residual grass heights, which would increase sage-grouse nest success on BLM lands in GRSG PPH short-term (until sagebrush habitats were reduced due to increased wildfire probability—see below). Mechanical and prescribed fire treatments would be similar to Alternative B. Wildfires would be expected over a greater portion of the project area as a result of increased fine fuels (Davies et al. 2010) and number of natural ignitions (lightning) that occur. The increase in fine fuels would make fire suppression less effective and would result in the reduction of sagebrush habitats in the long-term.
Removal of reservoirs that are no longer needed or functional would benefit water resources. The quantity and timing of runoff available to downstream areas would improve. Saline seeps in the vicinity of the reservoir would decrease. The removal of unneeded reservoirs could cumulatively benefit water resources by improving the volume and timing of water being made available to downstream areas. The number of stock ponds with potential for West Nile Virus would decrease, but not be eliminated due to the mixed ownership and ponds remaining for other

resource values and private land. Brood rearing and sagebrush habitats would also increase as the stock ponds are removed.

The project area occurs in the northeastern most portion of sage-grouse PPH in the LFO and most of the CC planning area is not potential sage-grouse habitat because of the forested areas and breaks. There are no known leks currently in the project area.

COT report threats for sagebrush elimination, agricultural conversion and fire would not be addressed due to indirect effects as a result of this alternative.

Based on the location of the project area, current sage-grouse use, potential sage-grouse use and other rationale listed above, Alternative C ***"may impact individuals or habitat, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing"*** for Greater sage-Grouse.

This Alternative would **not** meet the management direction listed in WO IM 2012-043.

Key Issue #3: Riparian-Wetland Habitats

Direct, Indirect, and Cumulative Effects: Under Alternative C, livestock grazing would be removed from public land. Directly, this would facilitate the rate at which riparian-wetland habitats within the CC planning area move toward their potential natural community or their capability.

Removal of livestock grazing would increase the amount of fine fuels. The assumption is that this would increase the size and amount of wildfire on the landscape. The rationale is that more continuous fuel loadings that are uninterrupted by periodic used areas would allow for larger, potential fire growth. This would increase water yield, which indirectly increases riparian-wetland vegetation in downstream areas. The indirect increases in water yield and riparian-wetland vegetation would not likely be discernible because of the effect of removing livestock grazing and its change on fire frequency.

Removal or failure of reservoirs that are no longer needed for livestock grazing would increase the amount of available water to downstream areas and associated riparian-wetland habitats.

Resource Concern #1: Invasive, Non-native Species (Noxious Weeds)
Under alternative C there will be no permitees available for weed control and monitoring. All control efforts for noxious and invasive species would be conducted by LFO personnel and the respective County Weed Department. Existing patch sizes are expected to increase and new infestations would likely become established. New species of concern would likely become established. Early detection and rapid response techniques on these new invaders would be delayed without permitees on site; leading to patch sizes that make eradication of these new invaders unlikely.

Resource Concern #2: Special Status Species and Migratory Birds
Refer to Key Issue #2 for general effects to sagebrush, grassland and riparian habitats.

Mechanical and prescribed fire treatments would be similar to what is described in Alternative B Resource Concern #2. This alternative would increase habitat the most for grassland associates, with a subsequent reduction in sagebrush/shrubland habitats, resulting from increased wildfires (Davies et al. 2010). Indirect effects of fragmentation resulting from increased agriculture or development (as described in Alternative C Key Issue #2) would increase habitat for species such as brown-headed cowbird, American crow and red fox, which are often drawn to these changes.

Increased wildfires that occur in forested habitats under current conditions would result in more stand replacing events similar to the Soda Creek Fire in 2006. These stand replacing conditions benefit woodpeckers and similar species that move in short-term post fires. Woodpecker abundance typically peaks within three years following fires and decreases thereafter with the wood boring insect abundance. Large stand replacing fires also increase the potential for noxious weed spread.

Appendix C is the BLM sensitive species determination summary for all alternatives in the CC planning area.

Resource Concern #3: Game Species

Mechanical and prescribed fire treatments and effects to game species would be similar to what is described in Alternative B Resource Concern #3. Three primary distinctions occur for game species between Alternatives B and C:

1. Increased fences on private lands could alter ungulate use patterns, especially if wildlife friendly designs are not used. Pronghorn antelope and young animals have the greatest risk of mortality from fences.
2. Increased stand replacing wildfires would lead to increased visibility and alter use patterns by deer and elk during hunting seasons. Unburned or other areas providing security habitat would be sought during daylight hours for the hunting season.

More forage would be available for ungulates and the general effects associated with livestock grazing as described above would not occur. There would be less concern with stocking rates and available forage during drought conditions, even with elk numbers substantially higher than objectives. Alternative C is the least desirable alternative for big game.

Resource Concern #4: Socioeconomics

Under Alternative C, forage availability and the number of authorized AUMs would be eliminated. Livestock grazing on 108,800 acres of public lands providing 15593 AUM's of forage on 20 grazing allotments in Fergus and Petroleum County would not occur. This would lead to increased costs for livestock operators in the form of increased fencing, feed, water, and supplements. Operations may be forced to sell of cattle to reduce herd sizes to levels that could be run on the associated deeded lands and other state and federal lease/permit lands, this could change the values of real estate in Petroleum and Fergus counties.

Resource Concern #5 Water Resources

Direct, Indirect, and Cumulative Effects: Under Alternative C, livestock grazing would be removed from public land in the CC planning area. Directly, this would facilitate the rate at which stream channels and their associated riparian-wetland habitats within the CC planning area move toward their potential natural community or their capability.

Removal of livestock grazing would increase the amount of fine fuels. The assumption is that this would increase the size of wildfire on the landscape. The rationale is that more continuous fuel loadings that are uninterrupted by periodic used areas would allow for larger, potential fire growth. An increase in fire frequency in the planning area would increase water yield.

Removal or failure of reservoirs that are no longer needed for livestock grazing would increase the amount of available water to downstream areas and associated riparian-wetland habitats.

4.2.5 Other Resources Affected

Cultural Resources

Based on existing information there fifty-one (51) cultural resource sites located within the analysis area Based on the landforms, settlement patterns, and the sites that have been documented in Fergus and Petroleum counties, historic and prehistoric resources could be expected throughout the area.

Regardless of the alternative that will be selected site monitoring of know sites will continue, and proposed projects will still need to receive cultural resource inventories prior to implementation.

Selecting the No Action alternative would not impose adverse effects to cultural resources. Based on site records and site monitoring data, we do not have information that shows current grazing management actions are adversely affecting historic properties (those sites that are eligible or unevaluated for listing on the National Register of Historic Places).

The proposed action includes prescribed burning and mechanical treatment of vegetation, as well as the installation of water pipelines and tanks. Prior to implementation a cultural resource inventory will be conducted to determine the presence of historic properties, the potential to affect these properties, and any mitigation that may be required to insure the effects are not adverse. The majority of the documented sites are in open, sagebrush and grass areas; these areas will not be targeted for the vegetation treatments, thus reducing the likelihood of resource conflict. Areas proposed for pipeline installation tend to be previously disturbed, so the likelihood of impacting a significant site that retains integrity is reduced. Mitigation for projects such as these (i.e. vegetation treatments and linear range improvements) is simplified due to the flexibility associated with the placement of these undertakings.

Selecting the no grazing alternative would have less potential to affect historic properties than if the proposed action alternative were selected. Effects from prescribed burning and mechanical vegetation treatments could have a more intense effect than grazing as it is currently managed, but those effects should be mitigated through project redesign as required to protect historic properties.

Specific mitigation measures, including, but not limited to possible site avoidance or excavation and data recovery would have to be determined when site specific development proposals are received. If a conflict were to exist between the proposed action and the presence of cultural resources, mitigation measures would be factored into the project's design. Such measures could include complete documentation of the site to exhaust its information potential, evaluating the site and making a determination that the site is not eligible for inclusion on the National Register of Historic Places, avoiding the site through project redesign or implementing protective measures to prevent impacts to the characteristics of the site that make the site eligible. Such measures could include installing fences or barriers to protect sites, placing mats or other pads to prevent erosion or soil compaction if a site needed to be crossed, installing sections of jack-leg fence in areas where subsurface disturbance would be a concern, rerouting pipelines and relocating water tanks, or modifying fuel treatment methods (i.e. hand cutting and scattering instead of mechanical or burning).

4.3 Cumulative Effects for All Alternatives

Cumulative effects are those that result from adding the anticipated direct and indirect effects of the proposed action, to impacts from other past, present and reasonably foreseeable future actions. These additional impacts are considered regardless of what agency or person undertakes such actions. The Cumulative Impacts Area for this EA includes all lands within the CC planning area (see Appendix E – Map 1). The temporal boundary when analyzing cumulative impacts is 10 years.

4.3.1 Past and Present Actions

Past or ongoing actions that affect the same components of the environment as the proposed action are:

- Exclusion of fire from the landscape (e.g. removal of fine fuels by livestock, coupled with fire suppression over the past century), has resulted in the increase in accumulation of fuel loads and reduced forest health.
- There has been pole cutting, Christmas tree cutting, and firewood collecting in the past throughout the watershed.
- Elk populations in central Montana have increased over the past 20-25 years, primarily as a result of light snow conditions during fall and winter. Currently in the LCC [project area elk numbers are above objectives.
- Livestock and wildlife impacts on lands upstream from BLM-administered land may contribute sediment to streams and subsequently may adversely affect downstream water quality on public land.
- The economic situation of the grazing permittees is affected by changes in livestock prices, hay prices, fuel prices, interest rates, land prices, labor costs, labor inputs, equipment costs, equipment maintenance costs, facilities maintenance costs, costs of feed supplements, irrigation costs and availability of irrigation water, livestock loss, private land lease rates, veterinary costs, local weather and other miscellaneous factors. Cumulative economic impacts to permittees could add pressure to permittees to subdivide private land to maintain a cash flow.

4.3.2 Reasonably Foreseeable Action Scenario (RFAS)

The following RFAS identifies reasonably foreseeable future actions that would cumulatively affect the same resources in the cumulative impact area as the proposed action and alternatives.

- The risk of wildfire on all ownerships will continue. Fire suppression efforts, utilizing resource benefit objectives, will continue on federally-administered lands in the watershed.
- Fencing on other land ownerships and on BLM boundaries may lessen the benefit of fence modification efforts on public lands to improve wildlife movements.
- Recreation, especially hunting, is expected to increase in the CC project area in the future. Impacts expected from this increased use are new camp sites, spreading of weed seed, more use of roads and increased wildlife disturbance.
- Sub-dividing of private land within the watershed is currently occurring on a very small scale. Although not expected to be extensive, subdivision may expand in the foreseeable future. Sub-dividing and development cause's habitat fragmentation and increases traffic, soil and vegetation disturbance, spread of noxious and invasive species, and other human uses in the area, and may increase the demand for water.

5.0 CONSULTATION AND COORDINATION:

5.1 List of Preparers:

Core IDT members:

Robert Thompson, Rangeland Management Specialist – Team Lead
Matt Comer, Wildlife Biologist
Josh Barta, Fuels Specialist
Chad Krause, Hydrologist

Support members of the team include:

Cathy Barta, Fire Ecologist
Steve Smith, Weeds Specialist
Adam Carr, Supervisory Natural Resources Specialist
Zane Fulbright, Archaeologist
Hilary Rigby, GIS Specialist
Rich Byron, Forester

5.2 Consultation/Coordination:

5.2.1 Persons and Agencies Consulted:

Grant Peterson	Natural Resources Conservation Service
Sonja Smith	Montana Fish, Wildife, and Parks

GLOSSARY OF TERMS

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

allopatric: (of biological species or speciation) occurring in areas isolated geographically from one another

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- Dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality;
- Filter sediment, capture bedload, and aid floodplain development;
- Improve flood-water retention and ground-water recharge;
- Develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses;
- Support greater biodiversity

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

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

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

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

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

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

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

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

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

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

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

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Appendix A

Evaluations--Standards for Rangeland Health and Conformance with Guidelines for Livestock Grazing Management

1. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: 79 Trail East #04960	
Public land Acres: 8344	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 1203 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 305**
Total Permitted Use: 1204	**Season of Use: 05/10-10/10**
Number of Pastures: 1	**Grazing System: Season-long**
Type Use: Active	**Percent Public Land: 78**

III. Preliminary Indication of Standards:

Standard	Meeting	Not Meeting	Not meeting but making significant progress	Current Livestock mgmt. is a significant factor	Current livestock mgmt. is not a significant factor
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desirable bunchgrasses and decreaser species are present in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): Drag Creek is located within the allotment (8.26 miles); however, it was evaluated by an interdisciplinary team to be an ephemeral, non-riparian stream. There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show

there are 10 wetlands (9 reservoirs) within the allotment comprising approximately 8 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): There is no MDEQ water quality determination for Drag Creek, but the immediate receiving water, Musselshell River, is listed as water quality impaired because of alteration in stream-side zones and low flow alterations. BLM lands within the allotment are not likely contributing to the listed causes of impairment because of the good range condition; therefore, the allotment is meeting the BLM water quality standard.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

2. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Dovetail #04967	
Public land Acres: 1872	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 327 AUMs	**Livestock Type: yearling cattle**
Suspended or Non Use: 0	**Livestock Number: 72**
Total Permitted Use: 327	**Season of Use: 05/16-09/30**
Number of Pastures: 2	**Grazing System: Deferred flip-flop**
Type Use: Active	**Percent Public Land: 100**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desirable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions. Use by livestock is limited evidenced by abundant residual forage and light utilization of decreaser species.

Standard 2 (riparian): There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 12 reservoirs within the allotment comprising approximately 5 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by

grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): Based on the good condition of rangelands within this allotment, management of BLM lands is not contributing to the impairment of any water quality impaired streams.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

3. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Drag Creek #15013	
Public land Acres: 6315	**Streams on Public Land (name and length)**: Drag Creek (2 miles)

II. Livestock Grazing Use

Active Permitted Use: 1063 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 251**
Total Permitted Use: 1060	**Season of Use: 05/01-10/16**
Number of Pastures: 1	**Grazing System: Season-long**
Type Use: Active	**Percent Public Land: 76**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desirable bunchgrasses and decreaser species are present in all age classes, desirable/decreaser species appear to be increasing in numbers from the previous assessments. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): The allotment is meeting the riparian standard. Drag Creek was evaluated by an interdisciplinary team to be in proper functioning condition. Drag Creek is located within the allotment (4.16 miles); however, half of it (2.16) was evaluated by an interdisciplinary team to be an ephemeral, non-riparian stream. It is important to note that this riparian-wetland area is supported by seepage from Drag Reservoir. Existing NWI and provisional GIS data show there

are 56 reservoirs within the allotment comprising approximately 40 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): There is no MDEQ water quality determination for Drag Creek, but the immediate receiving water, Musselshell River, is listed as water quality impaired because of alteration in stream-side zones and low flow alterations. Because of the good condition of rangelands, management of BLM lands within the allotment is not likely contributing to the listed causes of impairment; therefore, the allotment is meeting the BLM water quality standard.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

4. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Dunn Ridge Common	
Public land Acres: 1368	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 266 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 22**
Total Permitted Use: 266	**Season of Use: 03/01-02/28**
Number of Pastures: 2	**Grazing System: Flip-flop**
Type Use: Custodial	**Percent Public Land: 100**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desirable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions. Use by livestock is limited evidenced by abundant residual forage and light utilization of decreaser species.

Standard 2 (riparian): There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 3 wetlands (3 reservoirs) within the allotment

comprising approximately 2 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): Based on the good condition of rangelands within this allotment, management of BLM lands is not contributing to the impairment of any water quality impaired streams.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Sage grouse preliminary general habitat is located along the southern third of the allotment. Management to improve grouse habitat including: 1) increasing residual grass height in sagebrush, 2) marking/removing fences, 3) increasing available forbs during spring, 4) removing conifer encroachment should be considered. Prescribed burns within the allotment, outside of sagebrush habitats, would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Dan Brunkhorst: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

5. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Gibbs Coulee #02533	
Public land Acres: 351	**Streams on Public Land (name and length)**: Musselshell River (0.80 miles)

II. Livestock Grazing Use

Active Permitted Use: 48 AUMs	**Livestock Type: horse**
Suspended or Non Use: 0	**Livestock Number: 4**
Total Permitted Use: 48	**Season of Use: 03/01-02/28**
Number of Pastures: 1	**Grazing System: Season-long**
Type Use: Custodial	**Percent Public Land: 100**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. The allotment is in late seral with a strong upward trend. Desirable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions. Use by livestock is limited evidenced by abundant residual forage and light utilization of decreaser species.

Standard 2 (riparian): The allotment is meeting the riparian standard. The reach of Musselshell River within the allotment (0.80 miles) is in proper functioning condition. This reach of river is

located on the outside meander bend of the river; therefore, the potential for development of riparian plant communities is limited. During drought years, riparian plant communities consisting of cottonwood/willow and herbaceous sedge/rush communities develop near the edge of the active channel. These plant communities were removed by record flood events in 2011.

Standard 3 (water quality): The Musselshell River is listed by MDEQ as water quality impaired because of alteration in stream-side zones and low flow alterations. Based on the good condition of rangelands, management of BLM lands within the allotment is not likely contributing to the listed causes of impairment; therefore, the allotment is meeting the BLM water quality standard.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. High road density in the area increases the spread of noxious weeds and other undesirable exotic grasses, fragments habitat and limits biodiversity potential. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

6. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Hedman #04845	
Public land Acres: 69	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land
Permittee: Lazy 4J, Inc.	

II. Livestock Grazing Use

Active Permitted Use: 12 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 1**
Total Permitted Use: 12	**Season of Use: 03/01-02/28**
Number of Pastures: 1	**Grazing System: Season-long**
Type Use: Custodial	**Percent Public Land: 100**

III. Preliminary Indication of Standards:

Standard	Meeting	Not Meeting	Not meeting but making significant progress	Current Livestock mgmt. is a significant factor	Current livestock mgmt. is not a significant factor
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. The allotment is in mid to late seral condition with an even trend. Desirable bunchgrasses and decreaser species are present. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 1 reservoir within the allotment comprising

approximately 0.25 acres of wetland habitats. This wetland had evidence of grazing and provided quality emergent vegetation and structure. Adult leopard frogs and a female mallard with ducklings were observed on the pond.

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): Based on the good condition of rangelands within this allotment, management of BLM lands is not contributing to the impairment of any water quality impaired streams.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

7. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Iverson # 04957	
Public land Acres: 8880	**Streams on Public Land (name and length)**: Crooked Creek (3.74 miles)

II. Livestock Grazing Use

Active Permitted Use: 1419 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 445**
Total Permitted Use: 1419	**Season of Use: 05/16-11/15**
Number of Pastures: 2	**Grazing System: Rotation**
Type Use: Active	**Percent Public Land: 52**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desirable bunchgrasses and decreaser species are present and vigorous in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): The allotment is meeting the riparian standard. Crooked Creek was evaluated by an interdisciplinary team to be in proper functioning condition. Streambanks are dominated by riparian-wetland plant communities, and stream channel dimensions and pattern are appropriate for the landscape. Flood events in 2011 did result in channel widening and an increase in disturbance species on the stream's banks, but the expectation is that narrowing and

an increase in riparian-wetland vegetation would occur in future years with appropriate livestock grazing management.

Existing NWI and provisional GIS data show there are 52 wetlands (32 reservoirs) within the allotment comprising approximately 56 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): There is no MDEQ water quality determination for Crooked Creek, but the immediate receiving water, Musselshell River, is listed as water quality impaired because of alteration in stream-side zones and low flow alterations. Based on the good condition of rangelands, management of BLM lands within the allotment is not likely contributing to the listed causes of impairment; therefore, the allotment is meeting the BLM water quality standard.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Sage grouse preliminary priority habitat is located along the northwest corner and southern half of the allotment. Management to improve grouse habitat including: 1) increasing residual grass height in sagebrush, 2) marking/removing fences, 3) increasing available forbs during spring, 4) removing conifer encroachment should be considered. Prescribed burns within the allotment, outside of sagebrush habitats, would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. High road density in the area increases the spread of noxious weeds and other undesirable exotic grasses, fragments habitat and limits biodiversity potential. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

8. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Iverson Ind.	
Public land Acres: 1783	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 343 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 118**
Total Permitted Use: 343	**Season of Use: 05/16-11/15**
Number of Pastures:1	**Grazing System: Rotation**
Type Use: Active	**Percent Public Land: 48**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desireable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions. Use by livestock is limited evidenced by abundant residual forage and light utilization of decreaser species.

Standard 2 (riparian): There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 37 wetlands (25 reservoirs) within the allotment comprising approximately 45 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program

(MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): Based on the good condition of rangelands within this allotment, management of BLM lands is not contributing to the impairment of any water quality impaired streams.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Sage grouse preliminary priority habitat is located throughout the allotment. Management to improve grouse habitat including: 1) increasing residual grass height in sagebrush, 2) marking/removing fences, 3) increasing available forbs during spring, 4) removing conifer encroachment should be considered. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. High road density in the area increases the spread of noxious weeds and other undesirable exotic grasses, fragments habitat and limits biodiversity potential. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Dan Brunkhorst: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

9. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Jackson Place #14969	
Public land Acres: 7978	**Streams on Public Land (name and length)**: Crooked Creek (2.41 miles)

II. Livestock Grazing Use

Active Permitted Use: 1138 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 274**
Total Permitted Use: 1138 AUMs	**Season of Use: 05/01-10/31**
Number of Pastures: 5	**Grazing System: Rest-Rotation**
Type Use: Custodial	**Percent Public Land: variable**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. The allotment is in early late seral condition with an upward trend. Desirable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): The allotment is meeting the riparian standard. Crooked Creek was evaluated by an interdisciplinary team to be in proper functioning condition. Streambanks are dominated by riparian-wetland plant communities, and stream channel dimensions and pattern are appropriate for the landscape. Flood events in 2011 did result in channel widening and an increase in disturbance species on the stream's banks, but the expectation is that narrowing and an increase in riparian-wetland vegetation would occur in future years with appropriate livestock

grazing management.

Existing NWI and provisional GIS data show there are 57 wetlands (48 reservoirs) within the allotment comprising approximately 62 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): There is no MDEQ water quality determination for Crooked Creek, but the immediate receiving water, Musselshell River, is listed as water quality impaired because of alteration in stream-side zones and low flow alterations. Based on the good condition of rangelands, management of BLM lands within the allotment are not likely contributing to the listed causes of impairment; therefore, the allotment is meeting the BLM water quality standard.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Sage grouse preliminary priority habitat is located along the western edge of the allotment. Management to improve grouse habitat including: 1) increasing residual grass height in sagebrush, 2) marking/removing fences, 3) increasing available forbs during spring, 4) removing conifer encroachment should be considered. Prescribed burns within the allotment, outside of sagebrush habitats, would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. High road density in the area increases the spread of noxious weeds and other undesirable exotic grasses, fragments habitat and limits biodiversity potential. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:
Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

10. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Meyers #14968	
Public land Acres: 360	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 84 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 7**
Total Permitted Use: 89	**Season of Use: 03/01-02/28**
Number of Pastures: 2	**Grazing System: Flip-flop**
Type Use: Active	**Percent Public Land: 100**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. The allotment is in late seral condition with an upward trend. Desirable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 7 wetlands (5 reservoirs) within the allotment comprising approximately 8 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been

negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): Based on the good condition of rangelands within this allotment, management of BLM lands is not contributing to the impairment of any water quality impaired streams.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws along the western portion of the allotment. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

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11. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Musselshell River #04959	
Public land Acres: 7282	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 928 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 218**
Total Permitted Use: 930	**Season of Use: 05/01-11/01**
Number of Pastures: 3	**Grazing System: Deferred rotation**
Type Use: active	**Percent Public Land: 70**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. The allotment is currently in mid-seral condition with an upward trend. A three pasture deferred rotation was recently implemented. Desirable bunchgrasses and decreaser species are present and increasing. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): Dovetail Creek is located within the allotment (7.71 miles); however, it was evaluated by an interdisciplinary team to be an ephemeral, non-riparian stream. There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 12 wetlands (8 reservoirs) within the allotment comprising approximately 8 acres of

wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): There is no MDEQ water quality determination for Dovetail Creek, but the immediate receiving water, Musselshell River, is listed as water quality impaired because of alteration in stream-side zones and low flow alterations. Based on the good condition of rangelands, management of BLM lands within the allotment is not likely contributing to the listed causes of impairment; therefore, the allotment is meeting the BLM water quality standard.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Russian knapweed was identified in the allotment in the previous watershed assessment and current eradication efforts are unknown. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

12. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Musselshell Trail #15025	
Public land Acres: 14942	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 1926 AUMs	**Article I. Livestock Type: yearlings**
Suspended or Non Use: 0	**Livestock Number: 750**
Total Permitted Use: 1926 AUMs	**Season of Use: 05/01-09/30**
Number of Pastures: 5	**Grazing System: Rotation**
Type Use: Active	**Percent Public Land: variable**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desirable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 57 wetlands (50 reservoirs) within the allotment comprising approximately 77 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are

in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): Based on the good condition of rangelands within this allotment, management of BLM lands is not contributing to the impairment of any water quality impaired streams.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Sage grouse preliminary priority habitat is located along the southwest corner of the allotment. Management to improve grouse habitat including: 1) increasing residual grass height in sagebrush, 2) marking/removing fences, 3) increasing available forbs during spring, 4) removing conifer encroachment should be considered. An increase in Canada thistle occurred following the 2010 Raven Rat fire. Native grass and browse recruitment/production and sagebrush seedings in the burn area appear to be doing well. Additional prescribed burns within the allotment would help maintain the high production and increased biodiversity. Prescribed burns within the allotment, outside of sagebrush habitats, would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. High road density in the area increases the spread of noxious weeds and other undesirable exotic grasses, fragments habitat and limits biodiversity potential. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:
Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

13. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Soda Creek #02559	
Public land Acres: 2000	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 284 AUMs	**Livestock Type: yearling cattle**
Suspended or Non Use: 0	**Livestock Number: 204**
Total Permitted Use: 284 AUMS	**Season of Use: 05/15-09/14**
Number of Pastures: 1	**Grazing System: Season-long**
Type Use: Active	**Percent Public Land: 46**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. The allotment is in late seral condition with an upward trend. Desireable bunchgrasses and decreaser species are present and abundant in all age classes. These desirable species are increasing due to the recent occurrence of fire on the landscape. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions. Exotic plant species are present, including noxious weeds and a large amount of yellow sweetclover.

Standard 2 (riparian): There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 26 reservoirs within the allotment comprising approximately 22 acres of wetland habitats. These wetlands were not individually assessed, but

results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): Based on the good condition of rangelands within this allotment, management of BLM lands is not contributing to the impairment of any water quality impaired streams.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. An increase in Canada thistle occurred following the 2006 Soda Creek fire. Native grass and browse recruitment/production, especially in the burn area appears to be doing well. Additional prescribed burns within the allotment would help maintain the high production and increased biodiversity. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. High road density in the area increases the spread of noxious weeds and other undesirable exotic grasses, fragments habitat and limits biodiversity potential. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

14. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Swinging H Dovetail #15053	
Public land Acres: 3644	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 1060 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 410**
Total Permitted Use: 1060 AUMs	**Season of Use: 05/05-10/25**
Number of Pastures: 1	**Grazing System: Season-long**
Type Use: Active	**Percent Public Land: 41**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desireable bunchgrasses and decreaser species are present and abundant in all age classes. A large native form component also exists in the uplands. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): Dovetail Creek is located within the allotment (5.22 miles); however, it was evaluated by an interdisciplinary team to be an ephemeral, non-riparian stream. There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 35 wetlands (29 reservoirs) within the allotment comprising approximately 30 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those

listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): There is no MDEQ water quality determination for Dovetail Creek, but the immediate receiving water, Musselshell River, is listed as water quality impaired because of alteration in stream-side zones and low flow alterations. Based on the good condition of rangelands, management of BLM lands within the allotment is not likely contributing to the listed causes of impairment; therefore, the allotment is meeting the BLM water quality standard.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

15. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Swining H Ind. B #04966	
Public land Acres: 378	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 58 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 4**
Total Permitted Use: 58 AUMs	**Season of Use: 03/01-02/28**
Number of Pastures: 1	**Grazing System: Season-long**
Type Use: Custodial	**Percent Public Land: 100**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**n/a**				
3. Water Quality	**n/a**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desireable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): n/a

Standard 3 (water quality): n/a

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Browse species present are in excellent condition.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer:Wildlife Biologist
Chad Krause: Hydrologist

16. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Two Crow R&R	
Public land Acres: 37625	**Streams on Public Land (name and length)**: Crooked Creek (23.8 miles)

II. Livestock Grazing Use

Active Permitted Use: 5360 AUMs	**Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 1291**
Total Permitted Use: 5360	**Season of Use: 04/15-09/15**
Number of Pastures: 6	**Grazing System: deferred rest rotation**
Type Use: Active	**Percent Public Land: 82**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. The allotment is in mid to late seral with a strong upward trend. Desirable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions.

Standard 2 (riparian): The allotment is meeting the riparian standard. Crooked Creek was evaluated by an interdisciplinary team to be in proper functioning condition. Streambanks are dominated by riparian-wetland plant communities, and stream channel dimensions and pattern are appropriate for the landscape. Flood events in 2011 did result in channel widening and an increase in disturbance species on the stream's banks, but the expectation is that narrowing and

an increase in riparian-wetland vegetation would occur in future years with appropriate livestock grazing management.

Existing NWI and provisional GIS data show there are 87 wetlands (59 reservoirs) within the allotment comprising approximately 97 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

The 4 acre wetland below the Drag reservoir dam is a perfect example of the paragraph above. The picture below shows some of the damage that needs to be repaired to maintain the function of the wetland and dam.

Standard 3 (water quality): There is no MDEQ water quality determination for Crooked Creek, but the immediate receiving water, Musselshell River, is listed as water quality impaired because of alteration in stream-side zones and low flow alterations. Based on the good condition of rangelands, management of BLM lands within the allotment is not likely contributing to the listed causes of impairment; therefore, the allotment is meeting the BLM water quality standard.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. High road density in the area increases the spread of noxious weeds and other undesirable exotic grasses, fragments habitat and limits biodiversity potential. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited. Observed use in August 2011 around Drag Reservoir had high negative impacts on riparian vegetation and associated wildlife.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

17. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Upper/Lower 79 Trail	
Public land Acres: 448	**Streams on Public Land (name and length)**: Drag Creek (.25 miles)

II. Livestock Grazing Use

Active Permitted Use: 101 AUMs	**Article II. Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 9**
Total Permitted Use: 101	**Season of Use: 03/01-02/28**
Number of Pastures: 2	**Grazing System: Flip-flop**
Type Use: Custodial	**Percent Public Land: 100**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desirable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions. Use by livestock is limited evidenced by abundant residual forage and light utilization of decreaser species.

Standard 2 (riparian): The allotment is meeting the riparian standard. Drag Creek was evaluated by an interdisciplinary team to be in proper functioning condition. It is important to note that this riparian-wetland area is supported by seepage from Drag Reservoir. A majority of Drag Creek below this allotment is an ephemeral, non-riparian stream.

Existing NWI and provisional GIS data show there are 9 wetlands (12 reservoirs) within the allotment comprising approximately 12 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): There is no MDEQ water quality determination for Drag Creek, but the immediate receiving water, Musselshell River, is listed as water quality impaired because of alteration in stream-side zones and low flow alterations. Based on the good condition of rangelands, management of BLM lands within the allotment is not likely contributing to the listed causes of impairment; therefore, the allotment is meeting the BLM water quality standard.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

18. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Weaver Ind. A #14955	
Public land Acres: 120	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 225 AUMs	**Livestock Type: yearling cattle**
Suspended or Non Use: 0	**Livestock Number: 104**
Total Permitted Use: 225 AUMs	**Season of Use: 05/15-09/15**
Number of Pastures: 1	**Grazing System: Season-long**
Type Use: Active	**Percent Public Land: 53**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desireable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions. Use by livestock is limited evidenced by abundant residual forage and light utilization of decreaser species.

Standard 2 (riparian): There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 5 wetlands (4 reservoirs) within the allotment comprising approximately 4 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been

negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): Based on the good condition of rangelands within this allotment, management of BLM lands is not contributing to the impairment of any water quality impaired streams.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Sage grouse preliminary priority habitat is located along the western 3/4 of the allotment. Management to improve grouse habitat including: 1) increasing residual grass height in sagebrush, 2) marking/removing fences, 3) increasing available forbs during spring, 4) removing conifer encroachment should be considered. Prescribed burns within the allotment, outside of sagebrush habitats, would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Dan Brunkhorst: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

19. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Weaver Ind. B #04965	
Public land Acres: 234	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 57 AUMs	**Article III. Livestock Type: yearlingcattle**
Suspended or Non Use: 0	**Livestock Number: 4**
Total Permitted Use: 17	**Season of Use: 03/01-02/28**
Number of Pastures: 1	**Grazing System: Season-long**
Type Use: Custodial	**Percent Public Land: 100**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock mgmt. is a significant factor**	**Current livestock mgmt. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desireable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions. Use by livestock is limited evidenced by abundant residual forage and light utilization of decreaser species.

Standard 2 (riparian): There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 28 wetlands (22 reservoirs) within the allotment comprising approximately 23 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program (MNHP) report are expected. "Although several reservoirs and stock ponds have been

negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): Based on the good condition of rangelands within this allotment, management of BLM lands is not contributing to the impairment of any water quality impaired streams.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Prescribed burns within the allotment would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

20. Allotment Information

Field Office: LFO	**Watershed Name/Number:** Lower Crooked Creek
Allotment Name and Number: Wild Horse Pasture #14970	
Public land Acres: 847	**Streams on Public Land (name and length)**: No perennial or intermittent streams on public land

II. Livestock Grazing Use

Active Permitted Use: 149 AUMs	**Article IV. Livestock Type: cattle**
Suspended or Non Use: 0	**Livestock Number: 13**
Total Permitted Use: 149 AUMs	**Season of Use: 03/01-02/28**
Number of Pastures: 1	**Grazing System: Season-long**
Type Use: Custodial	**Percent Public Land: 100**

III. Preliminary Indication of Standards:

Standard	**Meeting**	**Not Meeting**	**Not meeting but making significant progress**	**Current Livestock 131gmt.. is a significant factor**	**Current livestock 131gmt.. is not a significant factor**
1. Upland	**X**				
2. Riparian	**X**				
3. Water Quality	**X**				
4. Air Quality	**X**				
5. Biodiversity	**X**				

IV. Guidelines:

Conforms to guidelines for grazing management: Yes

Discussion:

Standard 1 (uplands): The allotment is meeting the upland health standard. Desirable bunchgrasses and decreaser species are present and abundant in all age classes. There is slight to no deviation from the expected soil/site stability, hydrologic, or biological conditions. Use by livestock is limited evidenced by abundant residual forage and light utilization of decreaser species.

Standard 2 (riparian): There are no perennial or intermittent streams on public land. Existing NWI and provisional GIS data show there are 7 wetlands (6 reservoirs) within the allotment comprising approximately 4 acres of wetland habitats. These wetlands were not individually assessed, but results similar to those listed in the 2007 Montana Natural Heritage Program

(MNHP) report are expected. "Although several reservoirs and stock ponds have been negatively impacted by grazing, our field surveys indicated rangelands across the study area are in generally good condition, and reflect good grazing management."

Following the above average precipitation and subsequent flooding in 2011, many dams and man-made reservoirs failed or experienced increased erosion. Many reservoirs are approaching the end of their functional life and will need to be maintained or abandoned. "Because stock ponds, reservoirs and road-berm wetlands are all dependent on human initiative to maintain them, we considered them all to be functioning at risk, even though most have vegetation typical of shallow, aquatic bed, semi-permanently flooded depressional wetlands in the western Great Plains." MNHP 2007

Standard 3 (water quality): Based on the good condition of rangelands within this allotment, management of BLM lands is not contributing to the impairment of any water quality impaired streams.

Standard 4 (air quality): The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Standard 5 (biodiversity): The allotment is meeting the biodiversity standard. Sage grouse preliminary priority habitat is located along the southwest corner of the allotment. Management to improve grouse habitat including: 1) increasing residual grass height in sagebrush, 2) marking/removing fences, 3) increasing available forbs during spring, 4) removing conifer encroachment should be considered. Prescribed burns within the allotment, outside of sagebrush habitats, would improve FRCC and composition within ponderosa pine draws. Herbaceous and browse production, water yield and biodiversity would improve also. Although noxious weeds are not widespread, exotic grasses are. Smooth brome is especially common in and around riparian areas, and the grasslands host numerous introduced grass species like timothy, Japanese brome, Kentucky bluegrass, yellow sweetclover, and cheatgrass. Quality emergent vegetation around reservoirs/wetlands benefits numerous native flora and fauna—these areas are most beneficial when livestock use is limited.

Evaluation Prepared by:

Robert Thompson: Rangeland Management Specialist
Matt Comer: Wildlife Biologist
Chad Krause: Hydrologist

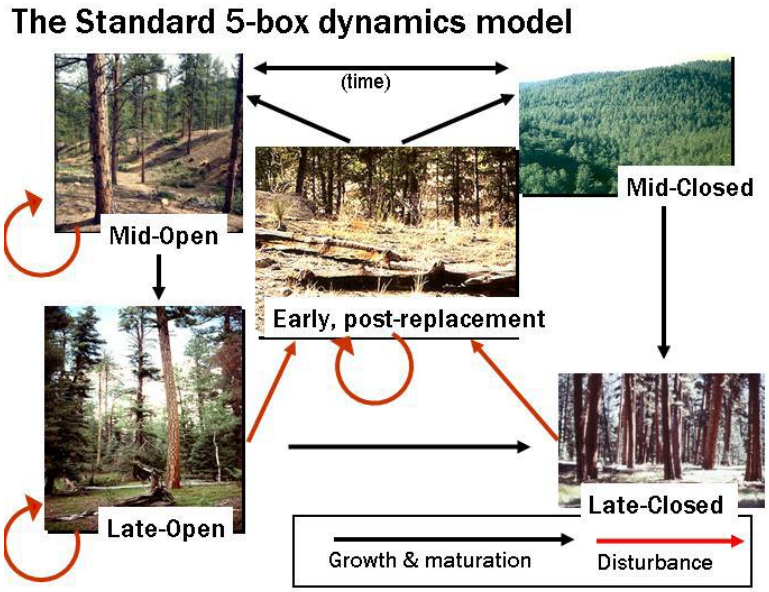
Appendix B

FRCC Worksheets

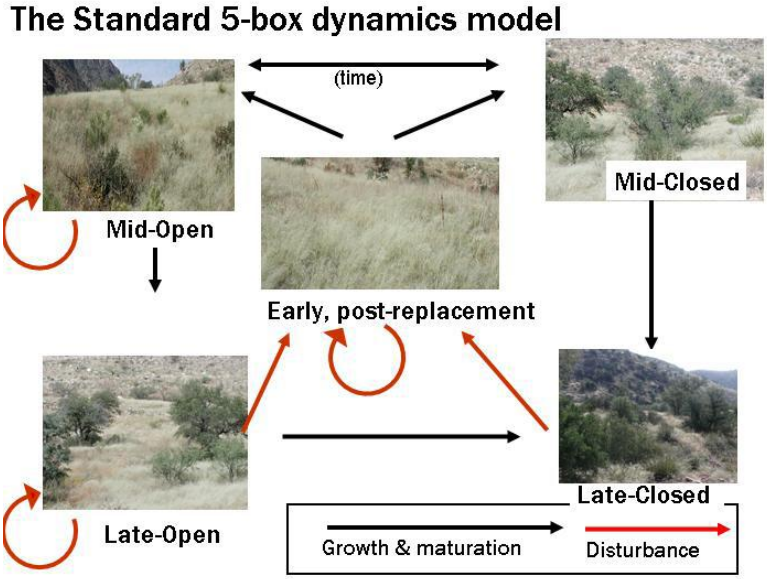
Crooked Creek Watershed Composition

Sagebrush Steppe (R0SBWYwy) 50%
Ponderosa Pine Woodland (R0PIPOnp) 40%
Northwestern Great Plains Mixed-grass Prairie (R0PGRn) 5%
Wyoming Riparian (R0RIPA) 5%

Succession Classes for a forest ecosystem.



Succession Classes for a rangeland ecosystem.



Bps		Project % Composition	Reference Conditions	Current Values
R0SBWYwy	**Sagebrush Steppe**	**50%**	%	%
	AESP: Early, post-replacement		20	**3**
	BMSC: Mid-development, closed		30	**40**
	CMSO: Mid-development, open		25	**11**
	DLSO: Late-development, open		25	**11**
	ELSC: Late-development, closed		0	**0**
	Uncharacteristic/invasive			**35**
	(Yellow sweetclover - MEOF)		100	**100**
R0PIPOnp	**Ponderosa Pine Woodland**	**40%**		
	AESP: Early, post-replacement		6	**10**
	BMSC: Mid-development, closed		2	**65**
	CMSO: Mid-development, open		20	**15**
	DLSO: Late-development, open		70	**5**
	ELSC: Late-development, closed		2	**0**
	Uncharacteristic/invasive			**5**
	(Succession, lack of fire effects)		100	**100**
R0PGRn	**Northwestern Great Plains Mixedgrass Prairie**	**5%**		
	AESP: Early, post-replacement		15	**2**
	BMSC: Mid-development, closed		1	**4**
	CMSO: Mid-development, open		4	**13**
	DLSO: Late-development, open		15	**13**
	ELSC: Late-development, closed		65	**28**
	Uncharacteristic/invasive		0	**40**
	(Yellow sweetclover - MEOF)		100	**100**
R0RIPA	**Wyoming Riparian**	**5%**		
	AESP: Early, post-replacement		2	**0**
	BMSC: Mid-development, closed		10	**10**
	CMSO: Mid-development, open		10	**20**
	DLSO: Late-development, open		78	**70**
	ELSC: Late-development, closed		0	**0**
	Uncharacteristic/invasive - MEOF			**0**
			100	**100**

Fire Regime Condition Class
Landscape Report

version 3.0.3.0

Landscape

Registration Code: BLMC Landscape Code: Crooked Characterization Date: 12/19/2011

Examiner: cathy_barta@blm.gov Landscape Name: Crooked Creek Water Area: 100000 Acres

Lat: 47.420600 Lon: -108.202450 Datum: WGS84

Comment:

Biophysical Stratification

Num	Life-form	BpS	Species			Land-form	Slope Class	Insol Class	Elevation Low	Elevation High	Stratum Comp (%)	Ref Freq	Curr Freq	Ref Sev	Curr Sev	Strata Depart	Strata FRCC
1	HU	R0PGRn	AGROP2	STIPA	BOUTE	PLA	GENTL	MOD	2500	2900	5	12	30	55	65	45	2
2	BW	R0RIPA	ABILD	SALIX	BETUL						5	100	100	0	5	30	1
3	CF	R0PIPOnp	PIPO			BRK	MOD	HIGH	2700	3100	40	15	30	5	65	72	3
4	SU	R0SBWYwy	ARTRW8			PLA	GENTL	MOD	2500	2900	50	92	92	63	65	23	1
											100						

Fire Regime Condition Class
Landscape Report - Stratum Data

Registration Code: BLMC Landscape Code: Crooked Characterization Date: 12/19/2011

Stratum Num: 1 Biophysical Setting: ROPGRn Stratum Name: Northern Prairie Grassland

Stratum Composition (% of area): 5 BpS Lifeform: HU Landform: PLA Avg Slope Class: GENTL Insol Class: MOD

Stratum Area: 5000 Acres Species: AGROP2 STIPA BOUTE Low Elevation: 2500 High Elevation: 2900 Feet

Reference Frequency: 12 Current Frequency: 30 Latitude: 47.4014666 Longitude: -108.2211166 Datum: WGS84

Reference Severity: 55 Current Severity: 65 Reference Composition Source: B Current Composition Source: R

Comments:

Uncharacteristic S Class Codes	Uncharacteristic S Class Descriptions
UINP	Uncharacteristic: Invasive Plants, Yellow sweetclover is well established.
UFUS	Uncharacteristic: Fuel/Sucn/Lack Fire Effects, conifer encroachment into the grassland.

Succession Classes

Code	Upper Layer Lifeform	Majority Size	Dominant Species				Ref Comp	Curr Comp	Acres	Sim	Diff	Relative Amount	Stand FRCC	Stand Depart	S-Class Acres Departed from Reference
A		NNNN	AGROP2	STIPA	BOUTE	ANDRO2	15	2	100	2	-87	TRACE	1	0	-650
B		NNNN	GUSA2	ARIST	FEOC3	OPPO	1	4	200	1	75	OVER REP	2	75	150
C		NNNN	AGSM	BOGR2	KOMA	POSE	4	13	650	4	69	OVER REP	2	69	450
D		NNNN	AGROP2	STIPA	BOUTE	ANDRO2	15	13	650	13	-13	SIMILAR	1	0	-100
E		NNNN	AGROP2	STIPA	BOUTE	ANDRO2	65	28	1400	28	-57	UNDER REP	1	0	-1850
U			MEOF				0	40	2000	0	100	ABUNDANT	3	100	2000
						Total	100	100		48					

Stratum Vegetation Departure: 52 Stratum Fire Frequency Departure: 60 Stratum Regime Departure: 37

Stratum Vegetation Condition Class: 2 Stratum Fire Severity Departure: 15 Stratum Regime Condition Class: 2

Stratum Fire Regime: I - Frequent Surface and Mixed Stratum Departure: 45 Stratum Fire Regime Condition Class: 2

Fire Regime Condition Class
Landscape Report - Stratum Data

Registration Code: BLMC Landscape Code: Crooked Characterization Date: 12/19/2011

Stratum Num: 2 Biophysical Setting: RORIPA Stratum Name: Riparian--Wyoming

Stratum Composition (% of area): 5 BpS Lifeform: BW Landform: Avg Slope Class: Insol Class:

Stratum Area: 5000 Acres Species: ABILD SALIX BETUL Low Elevation: High Elevation:

Reference Frequency: 100 Current Frequency: 100 Latitude: Longitude: Datum: WGS84

Reference Severity: 0 Current Severity: 5 Reference Composition Source: D Current Composition Source: R

Comments:

Succession Classes

Code	Upper Layer Lifeform	Majority Size	Dominant Species				Ref Comp	Curr Comp	Acres	Sim	Diff	Relative Amount	Stand FRCC	Stand Depart	S-Class Acres Departed from Reference
A		NNNN	ABILD	JUNCU	POA		2	0	0	0	-100	TRACE	1	0	-100
B		NNNN	ABILD	JUNCU		POA	10	10	500	10	0	SIMILAR	1	0	0
C		NNNN	SALIX	RIBES	BETUL	ALNUS	10	20	1000	10	50	OVER REP	2	50	500
D		NNNN	SALIX	BETUL	POPUL		78	70	3500	70	-10	SIMILAR	1	0	-400
E		NNNN					0	0	0	0	N/A				0
						Total	100	100		90					

Stratum Vegetation Departure: 10 Stratum Fire Frequency Departure: 0 Stratum Regime Departure: 50

Stratum Vegetation Condition Class: 1 Stratum Fire Severity Departure: 100 Stratum Regime Condition Class: 2

Stratum Fire Regime: III - Infrequent Mixed and Surface Stratum Departure: 30 Stratum Fire Regime Condition Class: 1

Fire Regime Condition Class
Landscape Report - Stratum Data

Registration Code: BLMC Landscape Code: Crooked Characterization Date: 12/19/2011

Stratum Num: 3 Biophysical Setting: ROPIPOnp Stratum Name: Ponderosa Pine-Northern Great Plains

Stratum Composition (% of area): 40 BpS Lifeform: CF Landform: BRK Avg Slope Class: MOD Insol Class: HIGH

Stratum Area: 40000 Acres Species: PIPO Low Elevation: 2700 High Elevation: 3100 Feet

Reference Frequency: 15 Current Frequency: 30 Latitude: 47.4206 Longitude: -108.20245 Datum: WGS84

Reference Severity: 5 Current Severity: 65 Reference Composition Source: B Current Composition Source: R

Comments:

Uncharacteristic S Class Codes	Uncharacteristic S Class Descriptions
UFUS	Uncharacteristic: Fuel/Sucn/Lack Fire Effects

Succession Classes

Code	Upper Layer Lifeform	Majority Size	Dominant Species		Ref Comp	Curr Comp	Acres	Sim	Diff	Relative Amount	Stand FRCC	Stand Depart	S-Class Acres Departed from Reference
A		NNNN	NAM	PASY	6	10	4000	6	40	OVER REP	2	40	1600
B		NNNN	PIPO		2	65	26000	2	97	ABUNDANT	3	97	25200
C		NNNN	PIPO		20	15	6000	15	-25	SIMILAR	1	0	-2000
D		NNNN	PIPO		70	5	2000	5	-93	TRACE	1	0	-26000
E		NNNN	PIPO		2	0	0	0	-100	TRACE	1	0	-800
U					0	5	2000	0	100	ABUNDANT	3	100	2000
				Total	100	100		28					

Stratum Vegetation Departure: 72 Stratum Fire Frequency Departure: 50 Stratum Regime Departure: 71

Stratum Vegetation Condition Class: 3 Stratum Fire Severity Departure: 92 Stratum Regime Condition Class: 3

Stratum Fire Regime: I - Frequent Surface and Mixed Stratum Departure: 72 Stratum Fire Regime Condition Class: 3

Fire Regime Condition Class
Landscape Report - Stratum Data

Registration Code: BLMC Landscape Code: Crooked Characterization Date: 12/19/2011

Stratum Num: 4 Biophysical Setting: ROSBWYwy Stratum Name: Wyoming Big Sagebrush

Stratum Composition (% of area): 50 BpS Lifeform: SU Landform: PLA Avg Slope Class: GENTL Insol Class: MOD

Stratum Area: 50000 Acres Species: ARTRW8 Low Elevation: 2500 High Elevation: 2900 Feet

Reference Frequency: 92 Current Frequency: 92 Latitude: 47.4351166 Longitude: -108.20375 Datum: WGS84

Reference Severity: 63 Current Severity: 65 Reference Composition Source: B Current Composition Source: R

Comments:

Uncharacteristic S Class Codes	Uncharacteristic S Class Descriptions
UINP	Uncharacteristic: Invasive Plants, yellow sweetclover is well established
UFUS	Uncharacteristic: Fuel/Sucn/Lack Fire Effects, conifer encroachment into the sagelands

Succession Classes

Code	Upper Layer Lifeform	Majority Size	Dominant Species				Ref Comp	Curr Comp	Acres	Sim	Diff	Relative Amount	Stand FRCC	Stand Depart	S-Class Acres Departed from Reference
A		NNNN	STCO4	ORHY	AGSM	BOGR	20	3	1500	3	-85	TRACE	1	0	-8500
B		NNNN	ARTRW8	OPUNT	STCO4	AGSM	30	40	20000	30	25	OVER REP	2	25	5000
C		NNNN	ARTRW8	STCO4	AGSM	ORHY	25	11	5500	11	-56	UNDER REP	1	0	-7000
D		NNNN	ARTRW8	STCO4	AGSM	OPUNT	25	11	5500	11	-56	UNDER REP	1	0	-7000
E		NNNN					0	0	0	0	N/A				0
U							0	35	17500	0	100	ABUNDANT	3	100	17500
						Total	100	100		55					

Stratum Vegetation Departure: 46 Stratum Fire Frequency Departure: 0 Stratum Regime Departure: 1

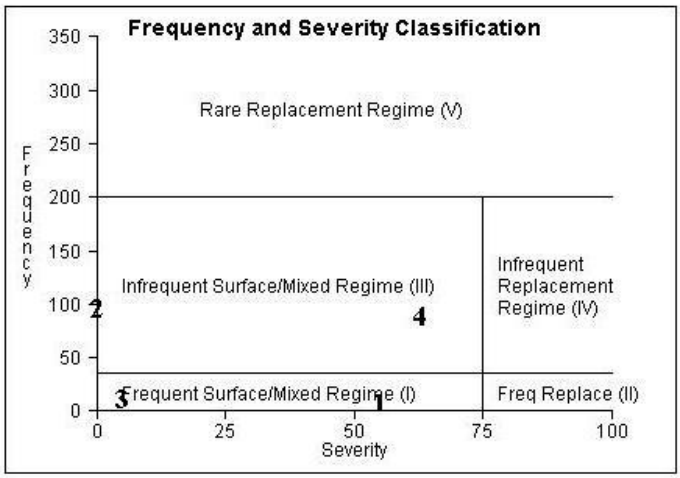
Stratum Vegetation Condition Class: 2 Stratum Fire Severity Departure: 3 Stratum Regime Condition Class: 1

Stratum Fire Regime: III - Infrequent Mixed and Surface Stratum Departure: 23 Stratum Fire Regime Condition Class: 1

Fire Regime Condition Class
Landscape Report - Reference Fire Regime Summary

Registration Code: BLMC Landscape Code: Crooked Char Date: 12/19/2011

Stratum #	Reference Frequency	Reference Severity	Fire Regime Group
1	12	55	I
2	100	0	III
3	15	5	I
4	92	63	III



Fire Regime Condition Class
Landscape Report - FRCC Summary

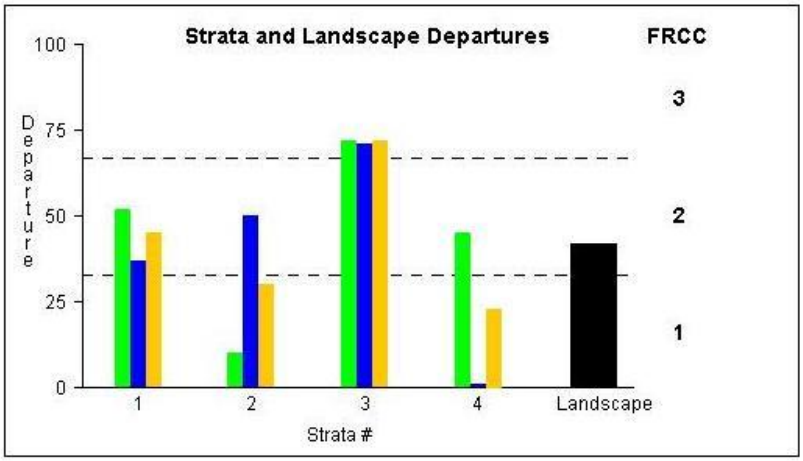
Registration Code: BLMC Landscape Code: Crooked Char Date: 12/19/2011

Stratum #	Stratum Depart (%)	Stratum Comp (%)	Weighted Depart (%)
1	45	5	2
2	30	5	1
3	72	40	28
4	23	50	11
Sum		100	42

Landscape Departure: 42

Landscape FRCC: 2 (34-66%)

Legend	
Vegetation Departure	
Regime Departure	
Stratum Departure	
Landscape Departure	
No Departure	*



FRCC Landscape Report for Crooked Creek Water						
Biophysical Setting (BpS Code)		FRG (I-V)	Condition Class 1 (Acres)	Condition Class 2 (Acres)	Condition Class 3 (Acres)	Total Acres
Northern Prairie Grassland	(R0PGRn)	I	2150	850	2000	5000
Riparian--Wyoming	(R0RIPA)	III	4000	1000	0	5000
Ponderosa Pine-Northern Great Plai...	(R0PIPOnp)	I	8000	4000	28000	40000
Wyoming Big Sagebrush	(R0SBWYww)	III	12500	20000	17500	50000
Total Acres			26650	25850	47500	100000

Fire Regime Condition Class
Landscape Report - Code Summary

Stratum Biophysical Land Unit(BpS)

ROPGRn	Northern Prairie Grassland
RORIPA	Riparian--Wyoming
ROPIPOnp	Ponderosa Pine-Northern Great Plains
ROSBWYW	Wyoming Big Sagebrush

Lifeforms

HU	Herbaceous dominated upland -- grasslands, bunchgrass
BW	Broadleaf wetland or riparian forest -- Tupelo, cypress
CF	Coniferous upland forest -- Pine, spruce, hemlock
SU	Shrub dominated upland -- Sagebrush, bitterbrush

Landform

PLA	Plains - rolling plains - plains w/breaks
	Plains - rolling plains - plains w/breaks
BRK	Breaklands - river breaks - badlands

Average Slope

GENTL	Gentle (0-10 degrees)
MOD	Moderate (11-30 degrees)

Reference Composition Source

B	IDT consensus from lit. review/modeling workshop
D	coarse-scale default values from lit. review/modeling workshops

Current Composition Source

R	walk through and visual estimate

Species

AGROP2	Agropyron (wheatgrass)
STIPA	Stipa (Stipa)
BOUTE	Bouteloua (grama)
ANDRO2	Andropogon (bluestem)
GUSA2	Gutierrezia sarothrae (broom snakeweed)
ARIST	Aristida (threeawn)
FEOC3	Festuca octoflora (Festuca octoflora)
OPPO	Opuntia polyacantha (plains pricklypear)
AGSM	Agropyron smithii (Agropyron smithii)
BOGR2	Bouteloua gracilis (blue grama)
KOMA	Koeleria macrantha (prairie Junegrass)
POSE	Poa secunda (Sandberg bluegrass)
MEOF	Melilotus officinalis (yellow sweetclover)
ABILD	Abildgaardia (sedge)
JUNCU	Juncus (rush)
POA	Poa (bluegrass)
SALIX	Salix (willow)
RIBES	Ribes (currant)
BETUL	Betula (birch)
ALNUS	Alnus (alder)
POPUL	Populus (cottonwood)
NAVI	Navarretia viscidula (sticky pincushionplant)
PASY	ERROR-No description found
PIPO	Pinus ponderosa (ponderosa pine)
STCO4	Stipa comata (Stipa comata)
ORHY	Oryzopsis hymenoides (Oryzopsis hymenoides)
BOGR	Boerhavia gracillima (slimstalk spiderling)

Appendix C

Threatened, endangered, candidate/proposed, and BLM sensitive wildlife and fish species with the potential to occur within the Analysis Area on the Lewistown Field Office (FO). NOTE: The U.S. Fish and Wildlife Service species list (US Fish and Wildlife Service 2013), Montana and Dakotas sensitive species list (BLM 2009) were reviewed.

[1]**Status Codes**: **E**=federally listed endangered; **T**=federally listed threatened; **C**=federally proposed/candidate for listing; and **S**=BLM sensitive

[2]**Exclusion Rationale Codes**: **ODR**=outside known distributional range of the species; **HAB**=no habitat present in Analysis Area; **SEA**=species not present/affected during season.

SPECIES COMMON AND SCIENTIFIC NAME	STATUS[1]	POTENTIAL TO OCCUR?	RATIONALE FOR EXCLUSION[2]	BRIEF HABITAT DESCRIPTION AND RANGE IN MONTANA
INVERTEBRATES				
Dakota skipper *Hesperia dacotae*	S		ODR	Native tallgrass prairie in Eastern Dakotas
FISH				
Arctic grayling *Thymallus arcticus montananus*	S		ODR	small, cold, clear lakes with tributaries suitable for spawning. They do not coexist well with other fishes except cutthroat trout and others with which they evolved. Sun River along Rocky Mtn. Front.
Bull trou t*Salvelinus confluentus*	T		ODR	Sub-adult and adult fluvial bull trout reside in larger streams and rivers and spawn in smaller tributary streams, whereas adfluvial bull trout reside in lakes and spawn in tributaries. They spawn in headwater streams with clear gravel or rubble bottom
Northern redbelly dace x Finescale dace *Phoxinus eos x Phoxinus neogaeus*	S		HAB	Northern redbelly dace prefer quiet waters from beaver ponds, bogs and clear streams. The finescale dace likes similar habitat but is also found in larger lakes. Known in Big Coulee Ck in Judith Basin Co.
Paddlefish *Polyodon spathula*	S		HAB	slow or quiet waters of large rivers or impoundments. They spawn on the gravel bars of large rivers during spring high water. Paddlefish tolerate, or perhaps seek, turbid water
Pallid Sturgeon *Scaphirhynchus albus*	E		HAB	large turbid streams including the Missouri and Yellowstone rivers. They use all channel types, primarily straight reaches with islands. They primarily use areas with substrates containing sand (especially bottom sand dune formations) and fines (93% of observations)
Pearl dace *Margariscus margarita*	S		ODR	small cool streams, either clear or turbid (Brown 1971). They spawn in clear water at depths of 1 to 2 feet over a gravel or sand bottom. N/E MT.

Sauger *Stizostedion canadense*	S		HAB	larger turbid rivers and the muddy shallows of lakes and reservoirs. They spawn in gravelly or rocky areas in shallow water and seem to prefer turbid water.
Sturgeon chub *Macrhybopsis gelida*	S		HAB	turbid water with moderate to strong current over bottoms ranging from rocks and gravel to coarse sand
Westslope cutthroat trout *Oncorhynchus clarki lewisi*	S		ODR	gravel substrate in riffles and pool crests for spawning habitat. Cutthroat trout have long been regarded as sensitive to fine sediment
Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri*	S		ODR	relatively clear, cold streams, rivers, and lakes. Optimal temperatures have been reported to be from 4 to 15 degrees C., with occupied waters ranging from 0 to 27 degrees C.
AMPHIBIANS AND REPTILES				
Coeur d'Alene salamander *Plethodon idahoensis*	S		ODR	primary habitats are seepages and streamside talus; W. MT near Libby, MT
Great Plains toad *Bufo cognatus*	S	✓		sagebrush-grassland, rainwater pools in road ruts, in stream valleys, at small reservoirs and stock ponds, and around rural farms; breeding has been documented in small reservoirs and backwater sites along streams appears to prefer stock tanks and roadside ponds rather than floodplains. Eggs and larvae develop in shallow water, usually clear or slightly turbid, but not muddy.
Northern leopard frog *Lithobates pipiens*	S	✓		wetland habitats of relatively fresh water with moderate salinity, including springs, slow streams, marshes, bogs, ponds, canals, flood plains, beaver ponds, reservoirs, and lakes, usually in permanent water with rooted aquatic vegetation.
SPECIES COMMON AND SCIENTIFIC NAME	**STATUS[1]**	**POTENTIAL TO OCCUR?**	**RATIONALE FOR EXCLUSION[2]**	**BRIEF HABITAT DESCRIPTION AND RANGE IN MONTANA**
Plains spadefoot *Spea bombifrons*	S	✓		soft sandy/gravelly soils near permanent or temporary bodies of water. lives largely inactive in burrows of its own construction or occupies rodent burrows, and enters water only to breed. Following heavy rains, adults have been reported in water up to 30 centimeters deep in flooded wagon wheel ruts, temporary rain pools formed in wide flat-bottom coulees, water tanks, and badland seep ponds, and tadpoles and toadlets have been observed in stock ponds and small ephemeral reservoirs, usually in sagebrush-grassland habitats
Western toad *Anaxyrus boreas boreas*	S		ODR	utilize a wide variety of habitats, including desert springs and streams, meadows and woodlands, mountain wetlands, beaver ponds, marshes, ditches, and backwater channels of rivers where they prefer shallow areas with mud bottoms
REPTILES				

Greater short-horned lizard *Phrynosoma hernandesi*	S	✓		ridge crests between coulees, and in sparse, short grass and sagebrush with sun-baked soil. limestone outcrops in canyon bottoms of sandy soil with an open canopy of limber pine-Utah juniper, and are also present on flats of relatively pebbly or stony soil with sparse grass and sagebrush cover
Milk snake *Lampropeltis triangulum*	S	✓		open sagebrush-grassland habitat and ponderosa pine savannah with sandy soils, most often in or near areas of rocky outcrops and hillsides or badland scarps, sometimes within city limits.
Snapping turtle *Chelydra serpentine*	S	✓		backwaters along major rivers, at smaller reservoirs, and in smaller streams and creeks with permanent flowing water and sandy or muddy bottoms
Spiny softshell *Apalone spinifera*	S		HAB	primarily a riverine species, occupying large rivers and river impoundments, but also occurs in lakes, ponds along rivers, pools along intermittent streams, bayous, irrigation canals, and oxbows. open sandy or mud banks, a soft bottom, and submerged brush and other debris. Spiny Softshells bask on shores or on partially submerged logs. They burrow into the bottoms of permanent water bodies, either shallow or relatively deep (0.5 to 7.0 meters), where they spend winter. Eggs are laid in nests dug in open areas in sand, gravel, or soft soil near water
Western hog-nosed snake *Heterodon nasicus*	S	✓		apparent preference for arid areas, farmlands, and floodplains, particularly those with gravelly or sandy soil, has been noted. They occupy burrows or dig into soil, and less often are found under rocks or debris, during periods of inactivity
BIRDS				
Baird's sparrow *Ammodramus bairdii*	S	✓		nest in native prairie, but structure may ultimately be more important than plant species composition. (nesting has been observed in crested wheat, while smooth brome is avoided) areas with little to no grazing activity are required.
Bald eagle *Haliaeetus leucocephalus*	S	✓		near open water including rivers, streams & lakes, nesting & roosting in large ponderosa pine, Douglas-fir, or cottonwood trees in proximity to open water and rivers.
Black tern *Chilodonias niger*	S	✓		wetlands, marshes, prairie potholes, and small ponds. 30%-50% of the wetland complex is emergent vegetation. Vegetation within known breeding colonies includes alkali bulrushes, canary reed-grass, cattail spp., sedge spp., rush spp., reed spp., grass spp., *Polygonum* spp., *Juncus* spp. and *Potamogeton* spp., indicating a wide variety of potential habitats are usable by Black Terns. Water levels range from about 0.5 m to greater than 2.0 m with most having depths between 0.5 m and 1.0 m (MTNHP 2003).
Black-backed woodpecker *Picoides arcticus*	S		HAB	early successional, burned forest of mixed conifer, lodgepole pine, Douglas-fir, and spruce-fir, although they are more numerous in lower elevation Douglas-fir and pine forest habitats than in higher elevation subalpine spruce forest habitats
Black-crowned night heron *Nycticorax nycticorax*	S	✓		shallow bulrush or cattail marshes, most often within a grassland landscape. also nest in cottonwoods, willows, or other wetland vegetation that allows them to nest over water or on islands that may afford them protection from mammalian Most colonies are located in large wetland complexes, typically with a one-to-one ratio of open water and emergent vegetation

Species Common and Scientific Name	Status[1]	Potential to Occur?	Rationale for Exclusion[2]	Brief Habitat Description and Range in Montana
Blue-gray gnatcatcher *Polioptilia caerulea*	S		ODR	brush, scrub, or chaparral are intermixed with taller vegetation (e.g., forest edge, riparian corridors); nesting often occurs near water. Nests are built on branches or forks of trees or shrubs, usually 1 to 25 meters above ground—S. Central MT
Bobolink *Dolichonyx orysivorus*	S	✓		Nests built in tall grass and mixed-grass prairies. Prefers "old" hay fields with high grass-to-legume ratios.
Brewer's sparrow *Spizella breweri*	S	✓		Sagebrush, mountain meadows, and mountain shrub habitats. nested in sagebrush averaging 16-inches high. The cover (concealment) for the nest provided by sagebrush is very important
Burrowing owl *Athene cunicularia*	S	✓		open grasslands, where abandoned burrows dug by mammals such as ground squirrels, prairie dogs and badgers are available. Black-tailed Prairie Dog and Richardson's Ground Squirrel colonies provide the primary and secondary habitat for Burrowing Owls in the state
Chestnut-collared longspur *Calcarius ornatus*	S	✓		Species prefers short-to-medium grasses that have been recently grazed or mowed. Prefers native pastures.
Common loon *Gavia immer*	S		HAB	13+ acre lake <5000 feet in elevation. Small islands preferred for nesting, but herbaceous shoreline areas, also selected. Nursery areas are very often sheltered, shallow coves with abundant small fish and insects. relatively oligotrophic and have not experienced significant siltation or other hydrological changes.
Dickcissel *Spiza americana*	S	✓		grasslands, meadows, savanna, cultivated lands, and brushy fields. nest on ground in grass or rank herbage, or raised a little above ground, in grass tufts or tall weeds, or in low shrubs or trees, up to about 2 meters above the ground but usually low. prefer habitat with dense, moderate to tall vegetation (particularly with some forbs) and moderately deep litter. moderately grazed and idle prairie. A high abundance of forbs provides perches, nesting cover, nest support, and possibly increased invertebrate abundance.
Ferruginous hawk *Buteo regalis*	S	✓		mixed-grass prairie, shrub-grasslands, grasslands, grass-sagebrush complex, and sagebrush steppe.
Flammulated owl *Otus flammeolus*	S		HAB	old-growth or mature ponderosa pine, ponderosa pine, & Douglas-fir forests, often mixed with mature aspen, nesting in cavities, feeding on insects.
Franklin's gull *Larus pipixcan*	S		HAB	Preferring large, relatively permanent prairie marsh complexes, the Franklin's Gull builds its nests over water on a supporting structure of emergent vegetation. Nesting is noted to occur in cattails and bulrushes
Golden eagle *Aquila chrysaetos*	S	✓		nest on cliffs and in large trees (occasionally on power poles), and hunt over prairie and open woodlands. Cliff nests selected for south or east aspect, less than 200 in. snowfall, low elevation, availability of sagebrush/grassland hunting areas

Great gray owl *Strix nebulosa*	S		ODR	dense coniferous and hardwood forest, especially pine, spruce, paper birch, poplar, and second-growth, especially near water. forage in wet meadows, boreal forests and spruce-tamarack bogs in the far north, and coniferous forest and meadows in mountainous areas. nest in the tops of large broken-off tree trunks in old nests of other large birds, or in debris platforms from dwarf mistletoe, frequently near bogs or clearings. Nests are frequently reused and the same pair often nests in the same area in successive years.
Greater sage-grouse *Centrocercus urophasianus*	S/C	✓		tall dense stands of sagebrush; 6 to 18 inch high sagebrush covered benches in June to July (average 213 acres); move to alfalfa fields (144 acres) or greasewood bottoms (91 acres) when forbs on the benches dry out; and move back to sagebrush (average 128 acres) in late August to early September (Peterson 1970).
Harlequin duck *Histrionicus histrionicus*	S		ODR	fast moving, low gradient, clear mountain streams. birds in streams on the Rocky Mountain Front were seen in pole-sized timber.
Least tern *Sternula antillarum*	E		HAB	nest on unvegetated sand-pebble beaches and islands of large reservoirs and rivers in northeastern and southeastern Montana, specifically the Yellowstone and Missouri river systems.
LeConte's sparrow *Ammodramus leconteii*	S		ODR	wet meadows within peatlands, often with a strong sedge (*Carex*) component
SPECIES COMMON AND SCIENTIFIC NAME	**STATUS[1]**	**POTENTIAL TO OCCUR?**	**RATIONALE FOR EXCLUSION[2]**	**BRIEF HABITAT DESCRIPTION AND RANGE IN MONTANA**
Loggerhead shrike *Lanius ludovicianus*	S	✓		open riparian areas, montane meadows, agricultural areas, grasslands, shrublands, & piñon/juniper woodlands
Long-billed curlew *Numenius americanus*	S	✓		Nests primarily in short-grass or mixed-prairie habitat with flat to rolling topography. Taller, denser grass used during brood-rearing when shade and camouflage from predators are presumably more important for chicks, but may also reflect decline in availability of shorter habitats with season.
Marbled godwit *Limosa fedoa*	S	✓		Breeds in short, sparsely to moderately vegetated landscapes that include native grassland and wetlands. ephemeral ponds, as well as temporary ponds and alkali wetland. Semi permanent ponds used as well. Upland habitat during breeding season primarily idle grassland and pastures
McCown's longspur *Calcarius mccownii*	S	✓		breeding habitat is a matrix of perennial shortgrass species (e.g., *Bouteloua gracilis*, *Buchloe dactyloides*) interspersed with cactus, and limited cover of midgrasses (e.g., *Aristida longiseta*, *Agropyron smithii*, *Stipa comata*) and shrubs (e.g., *Gutierrezia sarothrae*, *Chrysothamnus nauseosus*, *Artemesia frigida*).
Mountain plover *Charadrius montanus*	S	✓		prairie dog colonies and other shortgrass prairie sites are confirmed as preferred breeding habitat. Strong preference was also given to sites with slopes less than 5% and grass height of less than 6 cm (3 inches)
Nelson's sparrow *Ammodramus nelson*	S		ODR	freshwater wetlands with dense, emergent vegetation or damp areas with dense grasses in extreme NE Montana

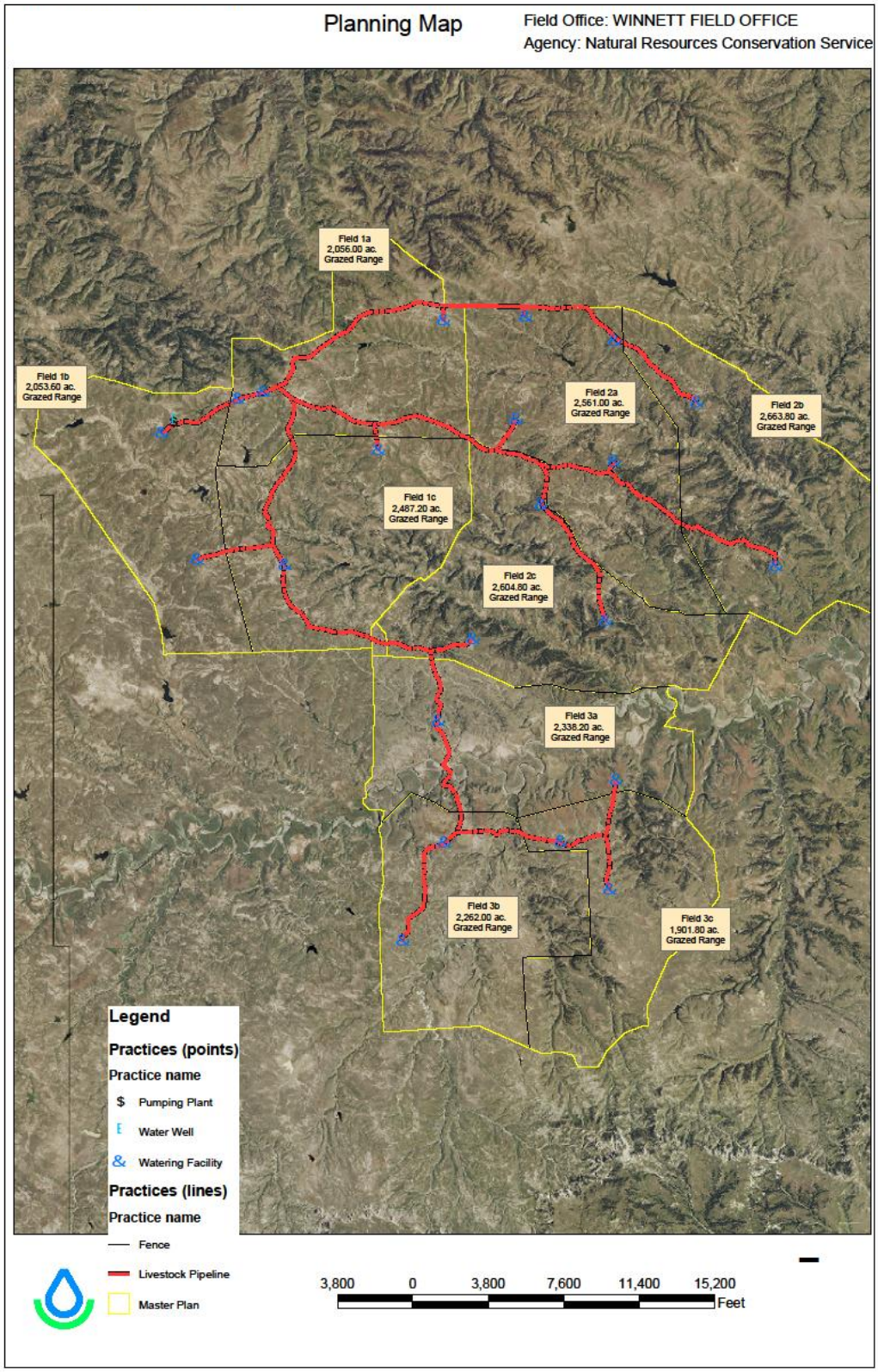
Northern goshawk *Accipiter gentilis*	S	✓		primarily forest habitat, especially in mountains, nesting in lower portions of mature Douglas-fir, ponderosa pine, lodgepole pine, or aspen canopies; prefers mature or old-growth forest structure.
Peregrine falcon *Falco peregrinus anatum*	S		HAB	wide variety of habitats, selects cliff ledges or rock outcroppings for nesting, preferring high, open cliff faces that dominate the surrounding area.
Red-headed woodpecker *Melanerpes erythrocephalus*	S		HAB	along major rivers having riparian forest. open savannah country w/ ground cover, snags and canopy cover. Large burns also utilized. nest in holes excavated 2 to 25 meters above ground by both sexes in live trees, dead stubs, utility poles, or fence posts. Individuals nest in the same cavity in successive years.
Sage sparrow *Amphispiza belli*	S		ODR	Prefers semiopen habitats with evenly spaced shrubs 1–2 m high. Vertical structure, habitat patchiness, and vegetation density may be more important in habitat selection than specific shrub species, but this sparrow is closely associated with big sagebrush throughout most of its range. Historical records w/i FO 20+ years old. Extreme S. Central MT
Sage thrasher *Oreoscoptes montanus*	S	✓		sagebrush obligate in Montana. abundance is generally positively correlated with the amount of sage cover and negatively correlated with grass cover.
Sedge wren *Cistorthorus platensis*	S		ODR HAB	areas that are highly susceptible to flooding and drying caused by annual and seasonal variation in rainfall.
Sprague's pipit *Anthus spragueii*	S/C	✓		native, medium to intermediate height prairie and in a short grass prairie landscape, can often be found in areas with taller grasses. more abundant in native prairie than in exotic vegetation; area sensitive, requiring relatively large areas of appropriate habitat; the minimum area requirement in a Saskatchewan study was 470 acres. known to utilize and breed in alkaline meadows and around the edges of alkaline lakes
Swainson's hawk *Buteo swainsoni*	S	✓		nest in river bottom forests, brushy coulees, and shelterbelts. hunt in grasslands and agricultural land, especially along river bottoms.
Three-toed woodpecker *Picoides dorsalis*	S		ODR	mature or old-growth spruce-fir forest, but also occurs in ponderosa pine, Douglas-fir, & lodgepole pine forests with abundant snags and insect populations are present due to outbreaks from disease or fire.
Trumpeter swan *Cygnus buccinators*	S		HAB	Along the Rocky Mountain Front the breeding habitat is small pothole lakes, generally with sufficient water to maintain emergent vegetation through the breeding season. Habitat requirements for breeding include room to take off (~100 m), shallow, unpolluted water with sufficient emergent vegetation and invertebrates, appropriate nest sites (i.e. Muskrat lodges), and areas with little human disturbance
SPECIES COMMON AND SCIENTIFIC NAME	**STATUS[1]**	**POTENTIAL TO OCCUR?**	**RATIONALE FOR EXCLUSION[2]**	**BRIEF HABITAT DESCRIPTION AND RANGE IN MONTANA**

White-faced ibis *Plegadis chihi*	S	✓		freshwater wetlands, including ponds, swamps and marshes with pockets of emergent vegetation. also use flooded hay meadows and agricultural fields as feeding locations. nest in areas where water surrounds emergent vegetation, bushes, shrubs, or low trees. use old stems in cattails (*Typha* spp.), hardstem bulrush (*Scirpus acutus*) or alkali bulrush (*S. paludosus*) over shallow water as their nesting habitat
Yellow rail *Coturnicops noveboracensis*	S		ODR	Breeding habitat consists of wet sedge meadows and other wetlands containing grasses, rushes and bulrushes. Presence of the Yellow Rail is most commonly dictated by water depth, specifically one that fluctuates throughout the breeding season, i.e. wet in the early part of the breeding season and relatively dry (no standing water) by July or September. NE MT and Flathead Valley.
Yellow-billed cuckoo *Coccyzus americanus*	S		HAB	tall cottonwood and willow riparian woodlands. Nests are found in trees, shrubs or vines, an average of 1 to 3 meters above ground. Western subspecies require patches of at least 10 hectares (25 acres) of dense, riparian forest with a canopy cover of at least 50 percent in both the understory and overstory. Nests are typically found in mature willows
MAMMALS				
Black-footed ferret *Mustela nigripes*	E		HAB	intimately tied to prairie dogs and only found in association with prairie dogs. limited to habitat used by prairie dogs: grasslands, steppe, and shrub steppe. rely on abandoned prairie dog burrows for shelter. Only large complexes (several thousand acres of closely spaced colonies) can support and sustain a breeding population. estimated that 40 to 60 hectares of prairie dog colony is needed to support one Black-footed Ferret, and females with litters have never been found on colonies less than 49 hectares
Black-tailed prairie dog *Cynomys ludovicianus*	S	✓		colonies are found on flat, open grasslands and shrub/grasslands with low, relatively sparse vegetation. The most frequently occupied habitat in Montana is dominated by western wheatgrass, blue grama and big sagebrush. Colonies are associated with silty clay loams, sandy clay loams, and loams and fine to medium textured soils are preferred, presumably because burrows and other structures tend to retain their shape and strength better than in coarse, loose soils.
Canada lynx *Lynx canadensis*	T		HAB	dense spruce-fir, Douglas-fir, early seral lodgepole pine, mature lodgepole pine with developing understory of spruce-fir & aspen in subalpine zone & timberline, using caves, rock crevices, banks, logs for denning, closely associated with snowshoe hare.
Fisher *Martes pennanti*	S		HAB ODR	When inactive, they occupy dens in tree hollows, under logs, or in ground or rocky crevices, or they rest in branches of conifers (in the warmer months). Fishers occur primarily in dense coniferous or mixed forests, including early successional forests with dense overhead cover. Optimal conditions for Fishers are forest tracts of 245 acres or more, interconnected with other large areas of suitable habitat.
Fringed myotis *Myotis thysanodes*	S	✓		rocky outcroppings in mid-elevation ponderosa pine, piñon/juniper, oak, & mixed conifer woodlands, grasslands, deserts, & shrublands;
Fringe-tailed myotis *Myotis thysanodes pahasapensis*	S		ODR	occurs primarily in caves in the Black Hills and Badlands. occurs only in certain montane (mountainous) areas of South Dakota and Wyoming

Gray wolf *Canis lupis*	S		ODR	no particular habitat preference except for the presence of native ungulates within its territory on a year-round basis. Gray Wolves establishing new packs in Montana have demonstrated greater tolerance of human presence and disturbance than previously thought characteristic of this species.
Great Basin pocket mouse *Perognathus parvus*	S		ODR	arid and sometimes sparsely vegetated. They include grassland-shrubland with less than 40% cover, stabilized sandhills, and landscapes with sandy soils, more than 28% sagebrush cover, and 0.3 to 2.0 meters shrub height. Extreme SW MT.
Grizzly bear *Ursus arctos horribilis*	T		ODR	primarily use meadows, seeps, riparian zones, mixed shrub fields, closed timber, open timber, sidehill parks, snow chutes, and alpine slabrock habitats. Habitat use is highly variable between areas, seasons, local populations, and individuals. Historically, the Grizzly Bear was primarily a plains species occurring in higher densities throughout most of eastern Montana.
SPECIES COMMON AND SCIENTIFIC NAME	**STATUS[1]**	**POTENTIAL TO OCCUR?**	**RATIONALE FOR EXCLUSION[2]**	**BRIEF HABITAT DESCRIPTION AND RANGE IN MONTANA**
Long-eared myotis *Myotis evotis*	S	✓		found in wooded and rocky areas. It has been located hibernating in a mine in riverbreaks habitat in northeastern Montana
Long-legged myotis *Myotis volans*	S	✓		typically occupy mountainous or relatively rugged areas. They often live in coniferous forest, although they are sometimes found in oak or streamside woodlands, and even deserts. They feed mostly on moths, but are opportunistic, eating whatever soft-bodied insects are most abundant.
Meadow jumping mouse *Zapus hudsonius*	S		ODR	dense, tall and lush grass and forbs in marshy areas (sometimes with standing water), riparian areas, woody draws, and grassy upland slopes, sometimes within or near forested sites of ponderosa pine. E/SE MT.
Northern myotis *Myotis septentrionalis*	S		ODR	located hibernating in an abandoned mine in riverbreaks habitat in Richland County. prefers cooler hibernacula than *Myotis lucifugus* and selects narrow crevices in which to hibernate. NE MT.
Pallid bat *Antrozous pallidus*	S		ODR	arid deserts, juniper woodlands, sagebrush shrub-steppe, and grasslands, often with rocky outcrops and water nearby. arid and semi-arid regions throughout northern Mexico and the western United States. Pallid bats eat beetles, grasshoppers, and moths, and they forage for slow-moving prey, such as scorpions, flightless arthropods, and sometimes lizards, at and near ground level. visit flowers in their hunt for insects, and are natural pollinators of several species of cactus. S. Central MT.
Pygmy rabbit *Brachylagus idahoensis*	S		ODR	shrub-grasslands on alluvial fans, floodplains, plateaus, high mountain valleys, and mountain slopes, where suitable sagebrush cover and soils for burrowing are available. Some occupied sites may support a relatively sparse cover of sagebrush and shallow soils, but these usually support patches of dense sagebrush and deeper soils. Big sagebrush was the dominant shrub at all occupied sites, averaging 21.3 to 22.6% coverage; bare ground averaged 33% and forbs 5.8%. SW MT.
Swift fox *Vulpes velox*	S	✓		open prairie and arid plains, including areas intermixed with winter wheat fields in north-central Montana. They use burrows when they are inactive; either dug by themselves or made by other mammals (marmot, prairie dog, badger). The burrows are usually located in sandy soil on high ground such as hill tops in open prairies, along fencerows, or occasionally in a plowed

				field. Suitable habitat generally extensive in size (preferably over 100,000 acres), with relatively level topography, and with greater than 50% of the area undisturbed by agriculture. A total of 8,000,000 suitable acres were identified in Montana
Townsend's big-eared bat *Plecotus townsendii*	S	✓		associated with caves & abandoned mines for day roosts & hibernacula, will also use abandoned buildings in western shrubland, piñon/juniper woodlands, & open montane forests in elevations up to 9,500 ft.
White-tailed prairie dog *Cynomys leucurus*	S		ODR	xeric sites with mixed stands of shrubs and grasses. habitats dominated by two types of vegetation: areas with Nuttall saltbrush with lesser amounts of big sage, and areas with poverty sumpweed and winter fat. Extreme S. Central MT
Wolverine *Gulo gulo*	S/C		HAB	alpine & subalpine mature/intermediate timbered areas around natural openings, including cliffs, slides, basins, & meadows, dependant on ungulates, range extending the length of the Rocky Mts.

Appendix D


Planning Map
Field Office: WINNETT FIELD OFFICE
Agency: Natural Resources Conservation Service
Field 1a
2,056.00 ac.
Grazed Range
Field 1b
2,053.60 ac.
Grazed Range
Field 1c
2,487.20 ac.
Grazed Range
Field 2a
2,561.00 ac.
Grazed Range
Field 2b
2,663.80 ac.
Grazed Range
Field 2c
2,604.60 ac.
Grazed Range
Field 3a
2,338.20 ac.
Grazed Range
Field 3b
2,262.00 ac.
Grazed Range
Field 3c
1,901.80 ac.
Grazed Range
Legend
Practices (points)
Practice name
$ Pumping Plant
Water Well
& Watering Facility
Practices (lines)
Practice name
Fence
Livestock Pipeline
Master Plan
3,800 0 3,800 7,600 11,400 15,200
Feet

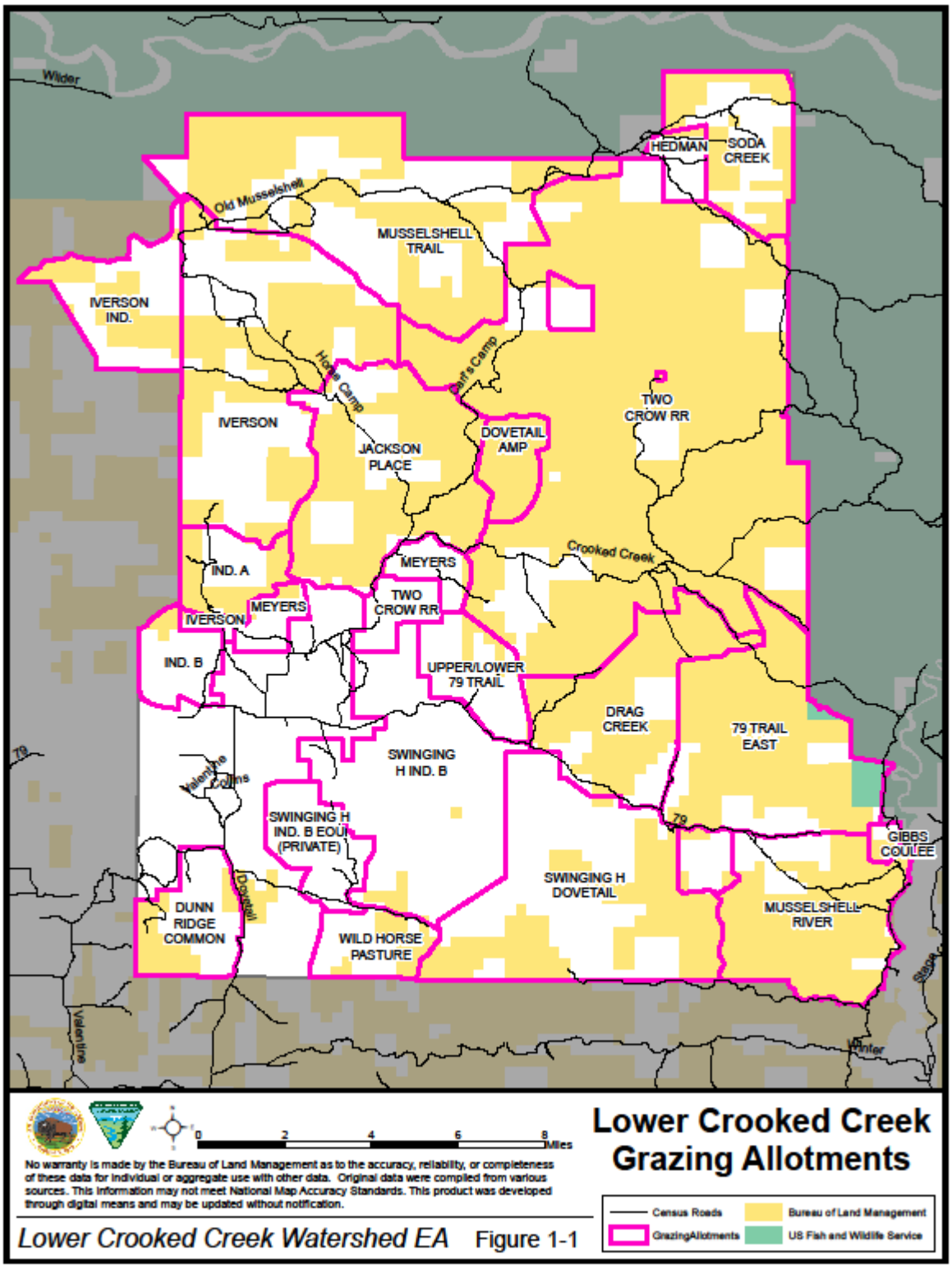
Grazing Rotation

Year 1
Wartzanloft 1c
Wartzanloft 1b
Wartzanloft 1a
Blacktail 2a
Blacktail 2b
Blacktail 1c
Rest Pastures: Cook1a,1b,1c

Year 2
Cooke 3c
Cooke 3b
Cooke 3a
Wartzanloft 1c
Wartzanloft3b
Wartzanloft 1a
Rest Pastures: Blacktail1a,1b,1c

Year 3
Blacktail 2c
Blacktail 2a
Blacktail 2b
Cooke 3a
Cooke 3b
Cooke 3c
Rest Pastures: Warzanlaft1a,1b,1c

Appendix E



Lower Crooked Creek Watershed EA Figure 1-1

Appendix F
Standards for Rangeland Health

Standards are statements of physical and biological condition or degree of function required for health sustainable rangelands. Achieving or making significant and measurable progress towards these functions and conditions is required of all uses of public rangelands. Historical data, when available, should be used when assessing progress towards these standards.

Standard #1: Uplands Are In Proper Functioning Condition

This means that soils are stable and provide for capture, storage and safe release of water appropriate to soil type, climate and landform. The amount and distribution of ground cover (i.e., litter, live and standing dead vegetation, microbiotic crusts, and rock/gravel) for identified ecological site(s) or soil-plant associations are appropriate for soil stability.

Evidence of accelerated erosion in the form of rills and/or gullies, erosional pedestals, flow patterns, physical soil crusts/surface scaling and compaction layers below the soil surface is minimal. Ecological processes including hydrologic cycle, nutrient cycle and energy flow are maintained and support healthy biotic populations. Plants are vigorous, biomass production is near potential and there is a diversity of species characteristic of and appropriate to the site. Assessing proper functioning conditions will consider use of historical data.

As indicated by:

Physical Environment

- erosional flow patterns
- surface litter
- soil movement by water and wind
- soil crusting and surface sealing
- compaction layer
- rills
- gullies

Biotic Environment

- cover distribution
- community richness
- community structure
- exotic plants
- plant status
- seed production
- recruitment
- nutrient cycle

Standard #2: Riparian And Wetland Areas Are In Proper Functioning Condition

This means that the functioning condition of riparian-wetland areas is a result of the interaction among geology, soil, water and vegetation.

Riparian-wetland areas are functioning properly when adequate vegetation, landform or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood water retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water

depth, duration, and temperature necessary for native fish production, waterfowl breeding, and other uses appropriate for the area that will support greater species richness.

The riparian-wetland vegetation is a mosaic of species richness and community structure serving to control erosion, shade water, provide thermal protection, filter sediment, aid floodplain development, dissipate energy, delay flood water, and increase recharge of groundwater where appropriate to landform.

The stream channels and flood plain dissipate energy of high water flows and transport sediment appropriate for the geomorphology (e.g., gradient, size, shape, roughness, confinement, and sinuosity), climate, and landform.

Soils support appropriate riparian-wetland vegetation, allowing water movement, filtering sediment, and slowing ground water movement for later release. Stream channels are not entrenching beyond natural climatic variations and water levels maintain appropriate riparian-wetland species.

Riparian areas are defined as land directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and streambanks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil. Assessing proper functioning conditions will consider use of historical data.

As indicated by:

Article V. Hydrologic

- floodplain inundated in relatively frequent events (1-3 years)
- amount of altered streambanks
- sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region); and upland watershed not contributing to riparian degradation.

Article VI. Erosion/Deposition

- plain and channel characteristics; i.e., rocks, coarse and/or woody debris adequate to dissipate energy
- point bars are being created and older point bars are being vegetated
- lateral stream movement is associated with natural sinuosity
- system is vertically stable
- stream is in balance with water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

Vegetation

- reproductive and diverse age class of vegetation
- diverse composition of vegetation
- species present indicate maintenance of riparian soil moisture characteristics
- streambank vegetation is comprised of those plants or plant communities that have deep binding root masses capable of withstanding high streamflow events
- utilization of trees and shrubs
- riparian plants exhibit high vigor
- adequate vegetative cover present to protect banks and dissipate energy during high flows
- where appropriate, plant communities in the riparian area are an adequate source of woody debris

Standard #3: Water Quality Meets Montana State Standards

This means that surface and ground water on public lands fully support designated beneficial uses described in the Montana Water Quality Standards. Assessing proper functioning conditions will consider use of historical data.

As indicated by:

- dissolved oxygen concentration
- pH
- turbidity
- temperature
- fecal coliform
- sediment
- color
- toxins
- others: ammonia, barium, boron, chlorides, chromium, cyanide, endosulfan, lindane, nitrates, phenols, phosphorus, sodium, sulfates, etc.

Standard #4: Air Quality Meets Montana State Standards

This means that air quality on public lands helps meet the goals set out in the State of Montana Air Quality Implementation Plan. Efforts will be made to limit unnecessary emissions from existing and new point or non-point sources.

Article VII.

The BLM management actions or use authorizations do not contribute to air pollution that violates the quantitative or narrative Montana Air Quality Standards or contributes to deterioration of air quality in selected class area.

As indicated by:

Section 176(c) Clean Air Act which states that activities of all federal agencies must conform to the intent of the appropriate State Air Quality Implementation Plan and not:

- cause or contribute to any violations of ambient air quality standards
- increase the frequency of any existing violations
- impede the State's progress in meeting their air quality goals

Standard #5: Habitats are provided to maintain healthy, productive and diverse populations of native plant and animal species, including special status species (federally threatened, endangered, candidate or Montana species of special concern as defined in BLM Manual 6840, Special Status Species Management)

This means that native plant and animal communities will be maintained or improved to ensure the proper functioning of ecological processes and continued productivity and diversity of native plant lifeforms. Where native communities exist, the conversion to exotic communities after disturbance will be minimized. Management for indigenous vegetation and animals is a priority. Ecological processes including hydrologic cycle, and energy flow, and plant succession are maintained and support healthy biotic populations. Plants are vigorous, biomass production is near potential, and there is a diversity of plant and animal species characteristic of and appropriate to the site. The environment contains

components necessary to support viable populations of a sensitive/threatened and endangered species in a given area relative to site potential. Viable populations are wildlife or plant populations that contain an adequate number of reproductive individuals distributed on the landscape to ensure the long-term existence of the species. Assessing proper functioning conditions will consider use of historical data.

As indicated by:

- plants and animals are diverse, vigorous and reproducing satisfactorily noxious weeds are absent or insignificant in the overall plant community
- spatial distribution of species is suitable to ensure reproductive capability and recovery
- a variety of age classes are present
- connectivity of habitat or presence of corridors prevents habitat fragmentation
- species richness (including plants, animals, insects and microbes) are represented
- plant communities in a variety of successional stages are represented across the landscape.

Appendix G
Guidelines for Livestock Grazing Management

Guideline #1:

Grazing will be managed in a manner that will maintain the proper balance between soils, water, and vegetation over time. This balance varies with location and management objectives, historic use, and natural fluctuations, but acceptable levels of use can be developed that are compatible with resource objectives.

Guideline #2:

Manage grazing to maintain watershed vegetation, species richness, and floodplain function. Maintain riparian vegetative cover and structure to trap and hold sediments during run-off events to build streambanks, recharge aquifers, and dissipate flood energy. Grazing management should promote deep-rooted herbaceous vegetation to enhance streambank stability. Where non-native species are contributing to proper functioning conditions, they are acceptable. Where potential for palatable woody shrub species (willows, dogwood, etc.) exists, promote their growth and expansion within riparian zones.

Guideline #3:

Pastures and allotments will be managed based on their sensitivity and suitability for livestock grazing. Where determinations have not been previously documented, suitability for grazing will be determined by: topography, slope, distance from water, vegetation habitat types, and soil types must be considered when determining grazing suitability. Unsuitable areas should be excluded from grazing.

Guideline #4:

Management strategies for livestock grazing will ensure that long-term resource capabilities can be sustained. End of season stubble heights, streambank moisture content, and utilization of herbaceous and woody vegetation are critical factors which must be evaluated in any grazing strategy. These considerations are essential to achieving long-term vegetation or stream channel objectives and should be identified on a site-specific basis and used as terms and conditions.

Guideline #5:

Grazing will be managed to promote desired plants and plant communities of various age classes, based on the rate and physiological conditions of plant growth. Management approaches will be identified on a site-specific basis and implemented through terms and conditions. Caution should be used to avoid early spring grazing use when soils and streambanks are wet and susceptible to compaction and physical damage that occurs with animal trampling. Likewise, late summer and fall treatments in woody shrub communities should be monitored closely to avoid excessive utilization.

Guideline #6:

The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect the ecological functions and processes of those sites.

Guideline #7:

Locate facilities (e.g., corrals, water developments) away from riparian-wetland areas.

Guideline #8:

When provided, supplemental salt and minerals should not be placed adjacent to watering locations or in riparian-wetland areas so not to adversely impact streambank stability, riparian vegetation, water quality, or other sensitive areas (i.e., key wildlife wintering areas). Salt and minerals should be placed in upland sites to draw livestock away from watering areas or other sensitive areas and to contribute to more uniform grazing distribution.

Guideline #9:

Noxious weed control is essential and should include: cooperative agreements, public education, and integrated pest management (mechanical, biological, chemical).

Guideline #10:

Livestock management should utilize practices such as those referenced by the NRCS published prescribed grazing technical guide to maintain, restore or enhance water quality.

Guideline #11:

Grazing management should maintain or improve habitat for federally listed threatened, endangered, and sensitive plants and animals.

Guideline #12:

Grazing management should maintain or promote the physical and biological conditions to sustain native populations and communities.

Guideline #13:

Grazing management should give priority to native species. Non-native plant species should only be used in those situations where native seed is not readily available in sufficient quantities, where native plant species cannot maintain or achieve the standards, or where non-native plant species provide an alternative for the management and protection of native rangelands.

Guideline #14:

Allotment monitoring determines ho on-going management practices are affecting the rangeland. To do so, the evaluations should be based on: measurable management objectives; permanent and/or repeatable monitoring locations; and short-term and long-term data.

Appendix H
Land Use Plan Guidance

- **Energy Mineral Resources:** No surface occupancy restrictions will be used to protect critical paleontology sites and archeology sites. Seasonal and distance restrictions will be included in oil and gas leases to mitigate impacts to wildlife habitat **(JVP)**.

- **Non-energy Mineral Resources:** Federal minerals are available for exploration and development unless withdrawn **(JVP)**.

- **Paleontology:** Major paleontological resources of scientific interest will be protected **(JVP)**

- **Soils:** Soil productivity will be maintained or improved by increasing vegetation cover and reducing erosion **(JVP, Standards and Guidelines)**.

- **Water Resource Management:** Surface and ground water quality will be maintained to meet or exceed state and federal water quality standards **(JVP, Standards and Guidelines)**.

- **Vegetation Management:** The ecological status will be improved or maintained to achieve a plant community of good (late seral) to excellent (potential natural community) on 80% of the public lands within 15 years of implementation of activity plans **(JVP)**.

Public lands that are in satisfactory (good and excellent) ecological condition will be maintained. Public lands with unsatisfactory (poor and fair) ecological condition will be managed according to multiple use objectives based on ecological site potential for specific uses **(Standards and Guidelines)**.

About 40% of the vegetation will continue to be allocated to livestock grazing and about 60% will continue to be allocated to watershed protection and wildlife forage and cover **(JVP)**.

The quality and quantity of summer wildlife forage will be improved by improving the reproduction and availability of palatable forbs for deer and antelope. Deer and antelope winter range (especially woody species) will be maintained and/or improved. Existing sagebrush stands will be maintained at a canopy cover of 15 to 50% with an effective height over 12 inches **(JVP, Standards and Guidelines)**.

The quality and quantity of nesting, brood rearing and winter habitat for upland game birds and waterfowl nesting habitat will be improved by providing residual upland grass and forb cover **(JVP, Standards and Guidelines)**.

Land will be managed for succulent vegetation production, including a variety of forbs, and big and silver sagebrush will be maintained on sage grouse wintering and nesting areas with a canopy coverage of 15 to 50% and an effective height of 12 inches. Woody vegetation will be maintained or improved for sharp-tailed grouse cover **(JVP, Standards and Guidelines)**.

- **Riparian and Wetland Management:** Riparian-wetland areas will be maintained or improved based on proper functioning condition and desires plant community. Riparian-wetland objectives will be initially accomplished through livestock grazing methods at current stocking levels. If grazing

methods are not successful in meeting management objectives, necessary actions will be taken to meet those objectives **(JVP, Standards and Guidelines)**.

All manageable riparian areas will have management plans implemented to maintain, restore or improve riparian areas to achieve a healthy and productive ecological condition for maximum long-term benefits and values **(Standards and Guidelines)**.

- **Land Treatments:** Land treatments will be used to meet watershed, grazing management and wildlife objectives but will be applied only where grazing management alone will not accomplish the desired result **(JVP)**.

- **Noxious Plants:** Noxious plants will be controlled or eradicated through integrated pest management in order to maintain native rangelands **(JVP, Standards and Guidelines)**.

- **Wildlife and Fisheries Management:** Suitable habitat for all wildlife species will be maintained or enhanced. The emphasis for habitat maintenance and development will be on present and potential habitat for sensitive, threatened and/or endangered species, nesting waterfowl, crucial wildlife winter ranges, non-game habitat and fisheries **(JVP, Standards and Guidelines)**.

- **Prairie Dog Management:** Prairie dog towns will be maintained or managed based on the values or problems encountered **(JVP)**.

- **Elk and Bighorn Sheep Management:** Habitat will be provided for elk in the Musselshell Breaks consistent with the MT Dept of FWP Elk Management Plan. **(JVP)**.

- **Recreation:** The recreational quality of public land and resources will be maintained and/or enhanced to ensure enjoyable recreational experiences. Recreation emphasis will be to develop and maintain opportunities for dispersed recreational activities such as hunting, scenic and wildlife viewing and driving for pleasure.

- **Off-Highway Vehicle Use:** BLM will restrict OHV use on BLM land year-long or seasonally to designated roads and trails or close specific areas to protect resource values, i.e., protect vegetation and soils to maintain watersheds and water quality, reduce user conflicts, and reduce harassment of wildlife and provide habitat security. **(JVP)**.

- **Visual Resource Management:** Activities will be managed to comply with VRM policies **(JVP)**.

- **Cultural:** Cultural resources will be properly managed through a systematic program of identification and evaluation. The level of conflict between cultural resources and other land and resource uses will be reduced in compliance with existing laws/regulations **(JVP)**.

- **Fire Management:** Fire will managed in the manner most cost effective and responsive to resource management objectives **(JVP)**.

  Prescribed fire will be utilized only under specific conditions and may be administered on an individual basis in grassland, sagebrush and/or conifer types to improve wildlife habitat and vegetation production **(JVP)**.

Intensive suppression of wildfire will be applied to areas with high resource values, improvements, recreation sites, administrative sites, sagebrush and juniper, fire sensitive woody riparian species, and/or

cultural values and may also be used to prevent fire from spreading to adjoining private property and structures **(JVP)**.

Conditional suppression will be applied to areas with low resource values or to areas not warranting intensive suppression actions and costs. Conditional suppression actions will be used in grass/shrub fuel types, Missouri Breaks fuel types and mountain timber fuel types **(JVP)**.

- **Forest Management:** Minor forest products may be harvested from the Breaks on a selected sustained yield basis with wildlife habitat objectives in mind **(JVP)**.

- **Lands:** Resource values will be protected or enhanced when considering applications or requests for Rights of Ways, leases and permits. Acquisitions will be pursued as opportunities arise through exchange or purchase with willing proponents and/or sellers. **(JVP)**

- **Access to BLM Land:** Access will be pursued to BLM land where no legal public access exists or where additional access to major blocks of BLM land is needed. **(JVP)**

- **Signing:** Appropriate signs and posters will be used to promote safety and convenience for visitors and users, define boundaries, identify management practices, provide information about geographic and historic features and protect vulnerable land areas and resources from misuse. **(JVP)**

Appendix I

Determination Summary for the Lower Crooked Creek Project

Species	Alt A (No Action)	Alt B (Proposed Action)	Alt C (No Grazing)
Great Plains toad	NI	MIIH	MIIH
Northern leopard frog	NI	MIIH	MIIH
Plains spadefoot	NI	MIIH	MIIH
Greater short-horned lizard	NI	MIIH	MIIH
Milk snake	NI	MIIH	MIIH
Snapping turtle	NI	NI	MIIH
Western hog-nosed snake	NI	NI	NI
Baird's sparrow	MIIH	MIIH	BI
Bald eagle	NI	NI	NI
Black tern	MIIH	MIIH	MIIH
Black-crowned night heron	MIIH	MIIH	MIIH
Bobolink	MIIH	MIIH	MIIH
Brewer's sparrow	MIIH	BI	MIIH
Burrowing owl	NI	NI	MIIH
Chestnut-collared longspur	MIIH	MIIH	MIIH
Dickcissel	NI	MIIH	MIIH
Ferruginous hawk	NI	MIIH	MIIH
Golden eagle	NI	MIIH	MIIH
Greater sage-grouse	MIIH	BI	MIIH
Loggerhead shrike	NI	MIIH	MIIH
Long-billed curlew	NI	MIIH	BI
Marbled godwit	NI	MIIH	BI
McCown's longspur	NI	MIIH	BI
Mountain plover	NI	NI	MIIH
Northern goshawk	MIIH	MIIH	MIIH
Sage thrasher	MIIH	BI	MIIH
Sprague's pipit	MIIH	MIIH	BI
Swainson's hawk	NI	MIIH	MIIH
White-faced ibis	MIIH	MIIH	MIIH
Black-tailed prairie dog	NI	NI	NI
Fringed myotis	NI	NI	MIIH
Long-eared myotis	NI	MIIH	MIIH
Long-legged myotis	NI	MIIH	MIIH
Swift fox	NI	MIIH	MIIH
Townsend's big-eared bat	NI	NI	MIIH

Sensitive Species

NI – No Impact

MIIH – May Impact Individuals or Habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species

***WIFV –** Will Impact Individuals or habitat that is likely contribute to a trend toward federal listing or cause a loss of viability to the population or species

BI – Beneficial Impact

Appendix J
Riparian and Stream Channel Monitoring Plan

Six permanent riparian-wetland monitoring sites were installed at Crooked Creek. The assessment results of Crooked Creek were PFC, and the important attributes for maintaining PFC were determined by an ID team to be maintaining greenline composition of desirable riparian-wetland vegetation and stream channel dimension, pattern and profile. If woody species such as sandbar willow were to establish, the ID team would like to monitor woody species age class, height class, and woody use. Because Crooked Creek is a relatively homogenous riparian complex within the different grazing allotments in regards to channel dimension, pattern, and profile and vegetation characteristics, the monitoring site was randomly chosen by measuring the stream length on BLM land and selecting the starting location with a random number generator.

	Long-term Indicators (Current Condition)		
	Greenline Composition		Greenline-to-Greenline Width (GGW)
DMA ID	Hydric Plants Percent (CI)	Winward Greenline Stability Rating (CI)	GGW meters (CI)
CC04957-1	48% (6.2)	8.36 (0.16) High	9.51 (1.79)
CC14969-1	35% (6.2)	7.92 (0.16) High	15.56 (0.70)
CC15028-1	15% (6.2)	6.15 (0.16) High	13.06 (1.03)
CC15028-2	49% (6.2)	8.34 (0.16) High	8.26 (0.30)
CC15028-3	30% (6.2)	8.39 (0.16) High	6.78 (0.40)
CC15028-4	42% (6.2)	8.27 (0.16) High	8.11 (0.44)

*CI: 95% confidence interval based upon standard deviation of the sample data or observer variation tests completed during the testing of the MIM protocol. The larger of the two values was used. The confidence interval based upon observer variation for percent hydric herbaceous was used for the percent hydric plants because all of the hydric plants on the greenline were herbaceous.

DMA ID	Monitoring Objectives
CC04957-1	• **Maintain the percent hydric plants on the greenline at 50 percent.** • **Maintain a high stability rating (i.e. greater than 6) on the greenline.** • **Maintain a GGW less than 10 meters.**
CC14969-1	• **Increase the percent hydric plants on the greenline to 50 percent by 2023.** • **Maintain a high stability rating (i.e. greater than 6) on the greenline.** • **Decrease the GGW to less than 10 meters by 2023.**
CC15028-1	• **Increase the percent hydric plants on the greenline to 50 percent by 2023.** • **Maintain a high stability rating (i.e. greater than 6) on the greenline.**

	• **Decrease the GGW to less than 10 meters by 2023.**
CC15028-2	• **Maintain the percent hydric plants on the greenline at 50 percent.** • **Maintain a high stability rating (i.e. greater than 6) on the greenline.** • **Maintain a GGW less than 10 meters.**
CC15028-3	• **Increase the percent hydric plants on the greenline to 50 percent by 2023.** • **Maintain a high stability rating (i.e. greater than 6) on the greenline.** • **Maintain a GGW less than 10 meters.**
CC15028-4	• **Increase the percent hydric plants on the greenline to 50 percent by 2023.** • **Maintain a high stability rating (i.e. greater than 6) on the greenline.** • **Maintain a GGW less than 10 meters.**