U.S. Department of the Interior
Bureau of Land Management
Environmental Assessment: MT066-08-09
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Gallatin Rapids Prescribed Fire

Lewistown Field Office
Upper Missouri River Breaks National Monument
920 NE Main Street
Lewistown, MT 59457
Phone: 406-538-1900
Fax: 406-538-1904

LOCATION:
Unit A - T23N R17E Sec 36; T23N R18E Sec 31-32; T22N R18E Sec 5-6
Unit B - T23N R18E Sec 32-33; T22N R18E Sec 4-5
Unit C - T23N R18E Sec 33-34; T22N R18E Sec 3-4
Unit D - T23N R17E Sec 36; T22N R17E Sec 1-3, 11-12; T22N R18E Sec 6-7
Unit E - T23N R18E Sec 25-26, 35-36; T23N R19E Sec 30-31; T22N R18E Sec 1-2; T22N R19E Sec 6
Unit F - T23N R19E Sec 29-33; T22N R18E Sec 1; T22N R19E Sec 4-7

Additional Project Area (not in designated burn units)
T23N R18E Sec 27

Team Leader	Title	Assignment	
John Seemann	Fuels Specialist	Completion	
Reviewers	**Title**	**Assignment**	**Date/Initials**
Jennifer Walker	Fire Ecologist	FRCC Analysis	1/19/10 JW
Jody Peters	Wildlife Biologist	Wildlife Resources	1/21/10 JP
Vinita Shea	Rangeland Management Specialist	Range Resources	1/20/10VRS
Adam Carr	Rangeland Management Specialist	Range Resources	1/15/10 AC
Zane Fulbright	Archaeologist	Cultural Resources	1/13/10 ZF
Kenny Keever	Natural Resource Specialist	Invasive Species	1/20/10 KK
Lowell Hassler	Natural Resource Specialist	Invasive Species, Oil & Gas	lh 1-11-10
Chad Krause	Hydrologist	Riparian/Water Resources	1/8/10 CRK
Rod Sanders	Outdoor Recreation Planner	Recreation/VRM Resources	1/19/10/RS
Josh Sorlie	Soil Scientist	Soils	1/11/2010/JS
Gary Kirpach	Central Montana Zone FMO	Review	1/11/10 GRK
Willy Frank	Lewistown Field Office Manager	Review	1/8/10 WF
Gary Slagel	UMRBNM Manager	Review	2/5/10 GS

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ENVIRONMENTAL COORDINATOR **DATE**

US Department of the Interior
Bureau of Land Management
Lewistown Field Office
Upper Missouri River Breaks National Monument

Montana Department of Natural Resources and Conservation
Northeastern Land Office

ENVIRONMENTAL ASSESSMENT
For
GALLATIN RAPIDS PRESCRIBED FIRE
EA NUMBER: MT066-08-09

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

INTRODUCTION

Proposed Action

The Bureau of Land Management (BLM) is proposing to utilize prescribed fire to improve or maintain Fire Regime Condition Class (FRCC), reduce fuel loadings, and improve rangeland and wildlife habitat in the Missouri River Breaks north of Winifred, MT. The Montana Department of Natural Resources and Conservation proposes to cooperate in the proposed action through the inclusion of state land located within the project area boundary. Prescribed burning operations may commence in Spring 2010.

Project Area

The project area is located in northern Fergus County 14 miles north of Winifred, Montana (Figure 1 – Vicinity map). The size of the project area is approximately 10,140 acres. This includes 6,629 acres of public land within the Upper Missouri River Breaks National Monument (UMRBNM), 1,792 acres of public land within the Lewistown Field Office, 911 acres of State land, and 808 acres of private land (Figure 2 – Gallatin Rapids Prescribed Burn map). Within the entire project area we are proposing to treat six units which total 7,007 acres. Treatment of state lands within the project area has been reviewed by the Montana Department of Natural Resources and Conservation (DNRC) and approved by the unit manager in Lewistown, Montana. Treatment of private lands will be coordinated with individual landowners.

All units are typical of the Missouri River Breaks country and are characterized by a mixture of forested drainages, and grass and sagebrush rangelands in open parks. Slopes and drainages contain mature ponderosa pine and Douglas-fir stands with juniper, grass, and forb surface vegetation. The project area is highly

fragmented by bare slopes and sparsely vegetated ridges. The Douglas-fir dominated stands occur on steeper, north-facing slopes. Understory fuels of juniper and small-diameter conifer regeneration occur in various densities throughout the mixed conifer stands. Dead and down fuels on the surface include occasional jackpots of dead trees accompanied by scattered dead branches and dense conifer needle accumulations.

Unit A is located at T23N R17E Sec 36; T23N R18E Sec 31, 32; T22N R18E Sec 5, 6 (allotment #20066 Iron City Island, #20046 River, and #20081 Stulc) and is 607 acres. It includes 50 acres of state land and 1 acre of private land.

Unit B is located at T23N R18E Sec 32, 33; T22N R18E Sec 4, 5 (allotment #20046 River) and is 550 acres. It includes 44 acres of private land.

Unit C is located at T23N R18E Sec 33, 34; T22N R18E Sec 3, 4 (allotment #20046 River) and is 457 acres. It includes 29 acres of private land.

Unit D is located at T23N R17E Sec 36; T22N R17E Sec 1, 2, 3, 11, 12; T22N R18E Sec 6, 7 (allotment # 20081 Stulc) and is 1,217 acres. It includes 10 acres of state land and 61 acres of private land.

Unit E is located at T23N R18E Sec 25, 26, 35, 36; T23N R19E Sec 30, 31; T22N R18E Sec 1, 2; T22N R19E Sec 6 (allotment #20046 River, #20045 Mattuschek, and #20010 Blind Canyon) and is 2,185 acres. It includes 640 acres of state land.

Unit F is located at T23N R19E Sec 29, 30, 31, 32, 33; T22N R18E Sec 1; T22N R19E Sec 4, 5, 6, 7 (allotment #20010 Blind Canyon and #10085 Mees Cabin Trail) and is 1,991 acres. It includes 160 acres of state land and 256 acres of private land.

PURPOSE AND NEED FOR ACTION

Prescribed fire would be used to improve or maintain FRCC ratings, reduce fuel loadings, and improve rangeland and wildlife habitat in the project area. Treatment in forested vegetation types would target juniper, ladder fuels including small-diameter conifers and seedlings, and dead and down woody fuels. Treatment in adjacent rangelands would target conifer encroachment and would increase species diversity in herbaceous cover. Prescribed fire would be applied in a manner that creates low to moderate fire intensity which would burn understory fuels, with isolated torching and occasional crown runs into the tree canopy. Some areas within treatment units would be left unburned so that a mosaic of burned and unburned vegetation would be achieved. It is proposed to treat approximately 50-70 percent of the target fuels in individual units.

The UMRBNM Resource Management Plan identifies four fire management units (FMU): Wild and Scenic River, Wilderness Study Areas, North Monument and South Monument. The project area includes the Wild and Scenic River and South Monument fire management units. Prescribed fire could be used in the Wild and Scenic River FMU based on public safety (fuel hazard reduction) and resource issues (range improvement, wildlife habitat). Prescribed fire would be used in the South Monument FMU based on FRCC and the goal to return fire to a natural role on the Monument landscape with very few constraints.

Resource Objectives

1. Reduce hazardous fuel loadings to lessen risks to firefighters and improve public health and safety.

2. Restore the natural fire regime by converting Condition Class 3 (CC3) to Condition Class 2 or 1 (CC2 or CC1).

3. Reduce ladder fuels and live and dead fuel loadings to lessen the risk of high severity wildfire.

4. Improve rangeland and wildlife habitat by reducing conifer and juniper encroachment into shrub and grassland areas.

5. Improve rangeland and wildlife habitat by increasing herbaceous and shrub cover in the understory of conifer stands.

6. Improve rangeland and wildlife habitat by increasing forage and browse species.

Fire Regimes and Condition Classes

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 type of fire regime which sustains a community can be used to provide reference information for that community; and the plant community is called a biophysical setting.

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.

Fire Regime Condition Class measures the landscape in two parts: 1) the current versus reference fire frequency and severity; and 2) the current versus reference vegetation structures across the landscape. 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.

Within the past century in the project area, reduced fire frequency in forested settings and in adjacent conifer-encroached sagebrush/grasslands has caused a departure from the natural fire regimes. Possible causes of this departure include (but are not limited to) fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, and introduced insects and disease (Schmidt and others 2002).

Approximately 4,056 acres of the 10,140 acre project area are occupied by ponderosa pine or mixed conifer. These forested settings within the project area have been assessed at Condition Class 3. As compared to reference conditions, open-structured, middle-aged and late stands, as well as early succession stands, are under-represented or at trace levels on the landscape. Closed structure stands are overly abundant on the landscape compared to reference conditions. Current fire severity has increased compared to reference conditions; and about five fire cycles have likely been missed. The understory vegetation in the closed stands is dominated by small-diameter mixed conifer regeneration and juniper, and species diversity and herbaceous biomass production is limited. Conifer encroachment is expanding into the edges of rangelands adjacent to forested sites.

Implementing prescribed fire in the project area would decrease conifer encroachment and increase the acres of open-structured forest stands to levels that are similar to reference conditions. With the reduction in natural fuel loadings and stand densities, fire severity would also become similar to reference conditions. This would change the project area FRCC rating from a CC3 to a CC2 or even a CC1. The biomass and species diversity of herbaceous and deciduous understory vegetation would likely increase. Reducing natural fuel loadings and ladder fuels may decrease the severity of a wildfire in the future and improve fire fighter and public safety.

Prescribed Fire Objectives

1. Treat 50-70 percent of target fuels with an underburn while leaving unburned patches.

2. Top-kill 40-60 percent of conifers less than 3" dbh (diameter at breast height)

3. Remove 50-70 percent of juniper.

4. Limit mortality in trees 8" dbh and larger to 30 percent.

CONFORMANCE WITH BLM LAND USE PLAN(S)

The proposed action is in conformance with the following Land Use Plans:

Upper Missouri River Breaks National Monument (UMRBNM) Resource Management Plan (December 2008). Fire Management decisions are found in Chapter 2 of the approved plan. On page 59, Table 2.6 – Options for Wildland Fire Suppression and Prescribed Fire, the Description of Prescribed Fire Option states that: 1) "Prescribed fire could be used based on public safety (fuel hazard reduction) and resource issues (range improvement, wildlife habitat); and 2) "Prescribed fire would be used based on FRCC and the goal to return fire to a natural role on the Monument landscape with very few constraints."

Fire/Fuels Management Plan Environmental Assessment/Plan Amendment for Montana and the Dakotas (July 2003) states in the Description of Treatments on pages 24-25 that:

1. "In some cases, prescribed fire could be used to thin small-diameter timber and remove dead and down woody vegetation."
2. "The primary objective of treating grasslands and shrublands with mechanical treatments and/or prescribed fire would be to remove encroaching conifers."
3. "Prescribed fire may also be used to meet resource objectives, such as restoring fire-adapted grass and shrublands, or increasing variation of age classes in shrublands."
4. "In general, fuels treatments would focus on improving CC2 or CC3 attributes, and would be refined for the project/watershed level."

Judith/Valley/Phillips (JVP) Resource Management Plan & Environmental Impact Statement (September 1994). – On page 18 under Land Treatments the EIS states that "Burning will be done on a limited basis to improve wildlife and livestock forage in dense pine-juniper stands throughout the Missouri Breaks and to improve vegetation productivity on other upland sites including sagebrush." Under Fire Management on page 28, the JVP states that "Prescribed fire will be allowed to burn only under specific conditions. Planned fires will be used in accordance with approved activity plans.

Prescribed burning will be administered on an individual basis in grassland, sagebrush and/or conifer types to improve wildlife habitat and vegetation production."

CHAPTER 2 – DESCRIPTION OF ALTERNATIVES

This EA focuses on Alternative 1 – Proposed Action and Alternative 2 – No Action.

The No Action Alternative is considered and analyzed to provide a baseline for comparison of the impacts of the Proposed Action.

Alternatives Eliminated from Further Analysis

Mechanical/Hand Treatment

Mechanical and hand treatment methods were both considered as alternatives for the project but were dropped from further analysis. Following is a description of each alternative method, an explanation of their advantages and disadvantages, and rationale for eliminating them from further consideration.

Mechanical and hand treatments are generally used to remove trees of a specific age class or size in order to promote species variability and reduce wildland fire spread and intensity. Mechanical treatment involves the use of wheeled and/or tracked machines with cutter or masticator attachments designed to cut down or grind individual trees. Hand treatment is the cutting of trees with chainsaws or brush cutters. In cutting units, trees are either cut, piled and burned on site or marketable timber is hauled from the project site and non-merchantable wood and debris is piled and burned. In grinding units, woody material is ground up and left in place to decay.

Mechanical or hand fuels treatments are commonly used in areas where there are too many trees per acre to burn, resulting in undesirable tree mortality, or the treatment area is adjacent to homes or other improvements. These treatments can be labor intensive and may not be commercially viable due to the lack of a market for small diameter trees that have been removed. Such treatments are also limited by steep or rough terrain and remote locations.

ALTERNATIVE 1 – PROPOSED ACTION:

The BLM would apply prescribed fire to treatment units A – F of the project area. Project implementation would occur over the course of several years in coordination with other resource management program needs such as range, wildlife, and cultural resources.

Prescribed burning operations would generally occur in the spring or fall when temperatures are cooler and soil moistures are higher than those that occur

during wildfire season in summer months. Time of year could vary beyond spring or fall as long as desirable burning conditions are present.

Prescribed fire operations would be conducted under specific conditions in order to produce low to moderate fire intensity and create a mosaic pattern of burned and unburned vegetation. Juniper, small diameter conifers and seedlings, and dead and down woody fuels would be reduced. Desirable fire behavior would also produce occasional crown runs into the tree canopy. Isolated pockets or patches of conifer stands would be left untreated as conditions allow in order to create a mosaic of treated and untreated stands.

Conditions under which prescribed fire can be applied would be addressed in a project-specific burn plan. Treatments in all units would be coordinated with the appropriate resource specialists prior to/during implementation.

Ignition operations would be conducted using hand crews with drip torches, an ATV (all-terrain vehicle) powertorch, aerial ignition with a helicopter, or any combination of the three.

Power lines, fences, pipelines, stock tanks, etc. would be protected from fire as necessary by removing fuels from around the improvements prior to prescribed fire operations and protecting the improvements during burning operations.

Control lines would consist of existing roads/trails, natural barriers including bare soil and sparsely vegetated areas, and hand lines constructed with hand tools and chain saws. Control lines requiring heavy equipment would not be used during normal prescribed fire operations. Off-road travel with engines and ATV/UTVs (Utility Terrain Vehicle) would be required during prescribed fire operations. Any temporary routes created by burning operations would be closed with signing and/or natural materials as necessary.

ALTERNATIVE 2 - NO ACTION:

No prescribed fire treatments would be implemented.

CHAPTER 3 - AFFECTED ENVIRONMENT/ENVIRONMENTAL IMPACTS

AFFECTED ENVIRONMENT:

Fire and Fuels Management

The fire regime condition class of ponderosa pine and Douglas-fir stands in the project area has been assessed at Condition Class 3. Fire regimes have been substantially altered and risk of losing key ecosystem components is high. Fire frequencies have departed by multiple 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.

Invasive/Non-native Species

A field inventory in 2008 found that the area has a few small sporadic infestations of Canada thistle, field bindweed, and bull thistle. Cheatgrass (bromus spp.) occurs in large patches in the grassy areas outside of the timber. Many of the access roads to the project area are also lined with field bindweed.

Grazing Administration and Livestock Grazing

All proposed treatment areas are permitted for livestock grazing.

Allotment Name and Number	Dates of Use
Mattuschek 20045	Uplands: 06/01 to 10/31 River: 05/06 to 06/05 and 09/10 to 10/31
River	05/10 to 09/15
Blind Canyon 20010	05/01 to 10/31
Mees Cabin Trail	06/15 to 09/15
Stulc 20081	Rotation: 05/10 to 11/15 Winter: 03/01 to 02/28
Iron City Island	06/01 to 09/30

Livestock use following the prescribed fire would be adjusted depending on climatic factors. Generally, use would be deferred until after the first growing season. At a minimum, grazing use would be deferred following the prescribed fire until after seed ripe of perennial bunchgrasses. In the years following the fire, grazing use could be adjusted to allow for grazing deferment until seed ripe or later if needed. To accommodate the prescribed fire, allotments and pastures could be used outside their current dates of use and with more or less livestock numbers, but the total permitted animal unit months would not be exceeded.

Cultural Resources

For an overview of the cultural history of the area refer to Appendix A of this document.

Cultural resource inventories were conducted for this project under two contracts issued in 2007 and 2008. The first contract covered 2,200 acres in the western half of the analysis area, and the second covered 1,077 acres in the eastern half. The first was an intensive (Class III) inventory, and the second was a sample (Class II) inventory. The parcels selected for the 2008 inventory included low,

moderate, and high probability areas based on slope, vegetation, and proximity to water.

Archaeologists conducted a pedestrian survey of 2,200 acres of the project area between June 5 and June 23, 2007, and of 1,077 acres between August 4 and August 22, 2008, in accordance with accepted professional standards and the guidelines. Archaeologists walked transects spaced no more than 30 meters apart except when exceptionally steep slopes necessitated widening survey transects somewhat to accommodate the terrain. In all cases, survey coverage was adequate to locate all cultural resources or hazardous materials visible on the land surface.

Archaeologists recorded one new site and three isolated finds, and monitored one previously-recorded site. A description of each cultural resource follows.

24FR1076 is a historic site consisting of a historic reservoir for livestock with earthen dam. The site retains good integrity of location, design, setting, materials, workmanship, and association. The site appears on the 1954 7.5' topographic map, which is the only documentation indicating that the site is historic. The site is not associated with significant events or individuals, does not represent distinctive design characteristics, and is not likely to yield important historical information. Therefore the site has been determined as not eligible for listing in the National Register of Historic Places.

Isolated Find 1 is a historic isolate consisting of a bottle neck and finish (i.e. the top part of the neck of a bottle or jar made to suit the cap, cork, or other closure) and fragments of an aqua glass soda bottle. The finish has no seam. The glass is thick and originally would have had a "lightning" cork stopper. This stopper style was used between 1875 and 1915.

Isolated Find 2 consists of two pieces of caramel colored chert or petrified wood. One measures 5 cm by 3 cm by 1.5 cm. This artifact has cortex on 2/3 of the surface and one flake scar on it with bulb of percussion, giving it the appearance of a tested cobble. The other piece is a large broken flake of the same material. This is a primary flake as half of the flake is covered with cortex. This piece measures 3 cm by 3 cm by 1 cm.
Isolated Find 3 is the basal half of a bi-facially pressure flaked dart point manufactured from fibrous-crystalline silica commonly referred to as chalcedony. The lithic material is translucent milky-white to opal in color with an opaque white band or inclusion within its crystalline structure. The morphology of the point is best described as a contracting stemmed corner-notched dart that exhibits retouch along both margins. The maximum basal width is 24.16 mm and the contracting stem extends 10.67 mm beyond the base. The dart exhibits an impact fracture of the proximal 1/3 of the blade. The bending fracture follows the opaque white banding of the lithic material and this inclusion is probably why the dart fractured at this location. The chalcedony lithic material from which the dart

was manufactured does not naturally occur within the area, therefore the point was an import and likely represents prehistoric land use of this upland environment for hunting. The morphological attributes of the projectile point indicate that it was a dart point used in conjunction with an atlatl and not an arrow point used with later bow and arrow technology.

Sugarloaf Rock (24FR0120) is a naturally occurring geologic feature made from Eagle Formation sandstone that juts up out of the Judith River Formation to the south. It is a prominent feature on the landscape and is a landmark for anyone traveling along the Upper Missouri River. Sugarloaf Rock is a mere 291 meters southeast of the existing edge of the Missouri River. As a prominent naturally occurring feature along the Upper Missouri Breaks landscape it has in the past and continues to attract people to climb its summit and in some cases mark their visit through carvings in the soft sandstone surface of its easily accessible east face. A close inspection of the east face revealed dates, initials, and names that mark well over one hundred years of site use. Some patterning is evident as to where on the east face certain decades are recorded. Readily identifiable earlier inscriptions include; “1887”, “1915”, “1924”, “G.Y. MAY 1936”, and “J. M. 53”. These dates are further up the rock wall. At the base of the rock, closest to the Missouri River, were found later inscriptions. In all likelihood earlier inscriptions have been replaced with later marks at the more accessible northeast base. Sugarloaf Rock’s inscriptions provide a historic chronicle of some who have traveled through the area. Its location is at a natural ford along the river as evidenced by nearby McClelland-Stafford Ferry Crossing originally built in 1897. The earliest date inscribed from this cursory inspection is 1887, ten years older than the historic McClelland-Stafford Ferry Crossing. While there is no historical or physical evidence registering the Lewis and Clark Expedition at Sugarloaf Rock, this party and many others undoubtedly would have observed this prominent sandstone outcrop on their Upper Missouri River journey.

Recreation

Recreation in the Gallatin Rapids project area is primarily big game and upland bird hunting. Hunters are required to have private permission to access most of the public lands within the project area during the fall big game season, and there are two local outfitters who guide hunting clients in the area during this time period as well. Local landowners also hunt in this area and use the public lands during the spring and summer for horseback riding and hiking. Other recreation activities that occur by the general public on county roads within the proposed project area are driving for pleasure and sightseeing.

Soils

Soils were identified from the Natural Resources Conservation Service’s

(NRCS) Soil Survey Geographic (SSURGO) dataset and the Soil Data Mart (SDM) website (http://soildatamart.nrcs.usda.gov/). Soil surveys were performed by the NRCS according to National Cooperative Soil Survey (NCSS) standards. Pertinent information for review and analysis is from the SDM and the National Soils Information System (NASIS) database for the area.

The soils within the project area are derived from clayey or loamy residuum over semi-consolidated or consolidated sedimentary rock; and, loamy alluvium. Soil depths are mostly shallow or moderately deep. Surface textures are commonly loam or clay loam. There are areas of exposed bedrock.

The primary soil map units (SMU) within the project area are: Map unit: 4 - Abor-Yawdim silty clay loams, 4 to 15 percent slopes; Map unit: 62 - Delpoint-Yawdim complex, 4 to 8 percent slopes; Map unit: 64 - Dilts-Julin-Rock outcrop complex, 15 to 50 percent slopes; Map unit: 65 - Dilts-Thebo-Neldore clays, 4 to 60 percent slopes; Map unit: 174 - Neldore-Thebo clays, 4 to 25 percent slopes; Map unit: 176 - Neldore-Rock outcrop complex, 15 to 60 percent slopes; Map unit: 190 - Rock outcrop; Map unit: 223 - Tanna-Abor complex, 2 to 8 percent slopes; Map unit: 279 - Yamac-Delpoint-Yawdim complex, 4 to 25 percent slopes; Map unit: 281 - Yawdim-Abor-Rentsac complex, 8 to 60 percent slopes; and, Map unit: 282 - Yawdim-Delpoint-Rock outcrop complex, 25 to 50 percent slopes.

Appendix B provides a description of the major soils that occur in an SMU. Descriptions of non-soil (miscellaneous areas) and minor SMU components are not included.

Major Soil Map Units in each Unit.

	Unit A	**Unit B**	**Unit C**	**Unit D**	**Unit E**	**Unit F**
Soil Map Unit (acres)[1]	**190** (469) **279** (122)	**4** (27) **190** (429) **279** (10) **281** (58)	**190** (58) **279** (70) **281** (195) **282** (125)	**62** (86) **190** (680) **279** (333) **281** (88)	**176** (1277) **190** (328) **223** (30) **279** (33) **282** (517)	**64** (375) **65** (27) **174** (222) **176** (257) **190** (241) **282** (853)

1. Numbers in parentheses represent the number of acres of each SMU.

Summary of Soil Map Unit Ratings and Interpretations (USDA-NRCS, 1998).

Soil Map Unit	Water Erosion Hazard[1]	Potential for Damage to Soil by Fire[2]		Potential for Seedling Mortality[3]	
		Rating Class	Limiting Feature(s)	Rating Class	Limiting Feature(s)
4	Slight to Moderate	Low		Low to Moderate	Soil Reaction
62	Slight	Low		Low	
64	Moderate to Severe	Low to High	Texture Slope Surface Depth	Low	
65	Slight to Severe	Low to High	Texture Slope Surface Depth	Low	
174	Slight to Severe	Low to Moderate	Texture Surface Depth Rock Fragments	Low	
176	Moderate to Severe	Low		Low	
190	Not Rated	Not Rated		Not Rated	
223	Slight	Low		Low to Moderate	Soil Reaction
279	Slight to Severe	Low		Low	
281	Slight to Severe	Low		Low to Moderate	Soil Reaction
282	Severe	Low to Moderate	Texture Slope Surface Depth Rock Fragments	Low	

1. The water erosion hazard for bare, non-compacted, soil is estimated by using the formula: Water Erosion Hazard = Kw factor x Slope. The soil erodibility factor (Kw) quantifies soil detachment by runoff and raindrop impact. This erodibility factor is an index used to predict the long-term average soil loss, from sheet and rill erosion. The Kw factor applies to the whole soil, which includes rock fragments. Kw is based primarily on percentage of silt, sand, and organic matter, soil structure, saturated hydraulic conductivity, and rock fragments (USDA-NRCS, 2007).
2. Ratings in the column "potential for damage to soil by fire" are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The soils are described as having a low, moderate, or high potential for this kind of damage. The ratings indicate an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer. Rating class terms indicate the potential for fire damage. "Low" indicates that the soil has features that reduce its potential for fire damage. Good performance can be expected, and little or no maintenance is needed. "Moderate" indicates that the soil has features that result in a moderate potential for fire damage. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. "High" indicates that the soil has one or more properties that result in a high potential for fire damage. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration (USDA_NRCS, 1998).
3. Ratings in the column "potential for seedling mortality" are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality. Rating class terms indicate the potential for seedling mortality. "Low" indicates that the soil has features that reduce its potential for seedling mortality. Good performance can be expected, and little or no maintenance is needed. "Moderate" indicates that the soil has features that result in a moderate potential for seedling mortality. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. "High" indicates that the soil has one or more properties that result in a high potential for seedling mortality. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration

Rangeland Vegetation

Rangeland vegetation consists of sagebrush grasslands, grasslands and lightly vegetated badlands. Mixed shrub communities occur in woody draws and flats. Common grasses and grass-like species are bluebunch wheatgrass, green needlegrass, western wheatgrass, prairie junegrass, blue grama, prairie sandreed, Sandberg bluegrass, and threadleaf sedge. Shrubs include big sagebrush, silver sagebrush, saltbush, greasewood, and rabbitbrushes. Prickly pear cactus is also present. Snowberry, chokecherry, hawthorne, rose, buffaloberry, and gooseberry are found in woody draws. There are no known occurrences of threatened, endangered, or special status plants in the project area.

Visual Resource Management

The Gallatin Rapids project area contains 8,421 acres of Class I and Class II Visual Resource Management (VRM) scenic quality lands. Of these, 1,470 acres are Class I and within the Upper Missouri National Wild and Scenic River (UMNWSR) corridor and Monument boundary. Class I scenery objectives require preservation of the existing character of the landscape. However, very limited management activities are not precluded if the level of change is low and does not attract attention. The project area also contains 5,159 acres of VRM Class II which are both inside and outside of the UMNWSR boundary but within the Monument, and 1,792 acres of VRM Class II within the Lewistown Field Office. The objective in Class II VRM areas is to retain the existing character of the landscape. The level of change to the environment from management activities in a Class II area may be seen but should not attract the attention of the casual observer. Any changes to the environment in either Class I or II areas must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Wildlife

Threatened, Endangered, and Species Proposed for Listing, BLM Designated Sensitive Species, Migratory Birds and Fisheries:

Wildlife - General:
Wildlife species within the project area include species typically associated with the Missouri River Breaks habitat. Mule deer, elk, raptors, furbearers, reptiles and amphibians are common throughout the analysis area. The project area is within identified elk and mule deer winter range. The area encompasses bighorn sheep year-round habitat and is within a known bighorn sheep lambing area. There is a known turkey roost site within the project area.

Threatened, Endangered and Species Proposed for Listing:
There are no threatened, endangered or wildlife species proposed for listing present in the area of the proposed action. There is no designated critical habitat for any species within the project area.

Designated Sensitive Species:
Northern goshawk, golden eagle, long-legged and long-eared myotis and Townsends big-eared bats all have habitat and could occur within available habitat; however, there are no documented roosting or nesting sites within the project area. The greater short-horned lizard occupies open sagebrush grassland habitat and badland habitat and is likely present within the project area.

Migratory Birds:
The sagebrush/grassland and ponderosa pine/Douglas-fir habitats are minor components of larger adjacent habitat for Neotropical Migratory Birds. The species present are those common to these habitat types within north central Montana.

Fisheries:
There are no fisheries present in the area of the proposed action.

Riparian/Water Resources

The proposed actions are primarily located within unnamed tributaries of the Missouri River. Given the ephemeral characteristics of these streams, they flow only in response to snowmelt or intense precipitation events. Their immediate receiving water is the Missouri River, which is listed by Montana Department of Environmental Quality (MDEQ, 2008) as water quality impaired because of alteration in streamside or littoral vegetative covers, copper, lead, and physical substrate habitat alterations. Probable sources include agriculture, grazing in riparian or shoreline zones, and unknown for the copper and lead. Riparian conditions and water resources through this reach of the Missouri are affected by flow regulation from upstream dams, invasive species such as leafy spurge and knapweed, and livestock grazing. The ephemeral tributaries in the project area do not exhibit riparian-wetland conditions; however, season fluctuation in water availability may lead to microsites of hydrophytic vegetation. Water yield in these smaller order drainages may be decreased by the increased canopy cover, patch size, and density of ponderosa pine and Douglas-fir relative to historic conditions.

Air Quality

Air quality in the project area is good to excellent. The Upper Missouri River Breaks National Monument is part of an area designated as a Prevention of Significant Deterioration (PSD) Class II area by the State of Montana under the 1977 Amendments to the Clean Air Act. Class II limits allow for moderate, well-

controlled growth. The BLM's goal is to maintain the Monument as a Class II airshed. Management will minimize or prevent air quality degradation. The BLM will comply with National Ambient Air Quality Standards and Montana Ambient Air Quality Standards.

All prescribed burning operations conducted by the BLM are under a Montana Air Quality Open Burning permit issued from the Montana Department of Environmental Quality with support of the Montana/Idaho Airshed Group.

The project area is sparsely populated with few smoke receptors. County roads exist within the project area boundary.

ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE 1 – PROPOSED ACTION

This section analyzes the impacts of the proposed action to those resources described in the affected environment.

Fire and Fuels Management

The use of prescribed fire would mimic the natural role of fire in the project area by creating a mosaic of burned and unburned vegetation. Prescribed burning would move FRCC ratings in the forest settings from a CC3 to a CC2 or even a CC1. This would reduce fuel loadings in the understory by removing small diameter conifer seedlings, juniper, dead and down woody fuels, and conifer needle accumulations. Treated sites would likely experience increased herbaceous and deciduous species diversity, biomass production, and structural variation; and would become similar to reference vegetation characteristics. Reducing fuel loadings would likely lower the risk of high severity wildfire and improve fire fighter and public safety.

Invasive/Non-native Species

Invasive plants usually expand their populations when they occur in areas where the soil and/or vegetative components of an area are disturbed. The proposed action would cause a short term disturbance to the current vegetative community and open up the potential for the existing invasive species to spread.

Post burn monitoring and treatment of infestations would mitigate the spread of invasive species. No new travel routes would be created during post burn monitoring and treatment of infestations. Using clean vehicles and equipment during the proposed action would also help reduce potential spread. Assuming the proposed action meets its objectives and that all mitigation is successful, the long term vegetative community in the area would be improved and less susceptible to further invasion.

Grazing Administration and Livestock Grazing

Livestock use following the prescribed fire would be adjusted depending on climatic factors, burn severity, and vegetative response. Generally, use would be deferred until after the first growing season. At a minimum grazing use would be deferred following the prescribed fire until after seed ripe of perennial bunchgrasses (bluebunch wheatgrass and green needlegrass). To accommodate the prescribed fire, allotments and pastures may be used outside their current dates of use and with different livestock numbers, but total permitted animal unit months would not be exceeded. There could be short-term impacts to some untreated pastures and allotments due to livestock use to facilitate rest or deferred use in treated pastures or allotments. In the short term, the treated pastures would be lacking in forage until there is opportunity for plants to colonize and produce biomass. In the long term, there would be increased forage for livestock and other ungulates

Cultural Resources

Vegetation treatment projects have the potential to affect historic properties. Prehistoric sites can have their setting modified, subsurface artifacts can suffer from compaction, surface artifacts can be broken, displaced, and affected by intense heat (cracking, spalling, discoloration). Historic sites, particularly wooden buildings and associated features, can be lost during burning activities. To prevent such effects from occurring, cultural resource inventories of the analysis area have been initiated, and will continue in a phased approach through the life of the project.

The proposed action includes completing cultural resource inventories: to define the area of potential effect (APE), to identify cultural resources within the APE, to determine which cultural resources are eligible for listing in the National Register of Historic Places (NRHP), and to assist in redesigning the project if the protection of eligible historic properties warrants such action. The west half of the analysis area has been intensively inventoried, resulting in the documentation of one previously unknown historic site. The historic site is ineligible for listing in the NRHP. Cultural resource inventories completed in the east half of the analysis area identified one previously-recorded site (Sugarloaf Rock), but it is outside the area proposed for action. It would not be affected by prescribed burning or activities associated with the implementation of the project.

This project would have no effect on historic properties.

Recreation

The prescribed burn would have no long term negative impacts to recreation use in the project area or on adjacent Monument lands. River recreationists/hunters would likely not hike this far into the uplands due to the rugged terrain separating

them from the project area. Motor vehicle use by hunters or sightseers on temporary routes used for the prescribed burn would be prohibited. Hunters may avoid the treated areas until after re-vegetation begins to occur on burned areas. In the longer term, the clearing/thinning of dense timber stands with prescribed fire would improve hunter opportunity for mule deer, elk, and bighorn sheep by increasing foraging habitat and eventually, the numbers and quality of mule deer, elk, and bighorn sheep available for harvest.

Soils

Prescribed fire would expose mineral soil and have the potential to alter chemical and biological soil properties, disrupt nutrient cycles, and displace soil. These actions impact overall soil quality. In time, organic matter would gradually re-accumulate from litter, woody debris, forbs, and grasses. Nutrients would gradually accumulate due to inputs (precipitation, dry deposition, weathering of parent material, and nitrogen fixation) and retention.

Prescribed fire has not only physical effects on soils, but also chemical and biological effects (Hungerford et al. 1991). Physical changes include reduction in soil cover, loss of duff and litter layers, loss of organic matter from mineral soil, and erosion. These changes influence texture, bulk density, and porosity of soils. Chemical changes occur as nutrients are volatilized (nitrogen, phosphorus, and sulfur), ashed, and redistributed. Some nutrients are lost or reformed, pH is changed (typically increased due to ash), cation exchange capacity is changed (generally the greater the heating, the greater the chances of ion deficiencies), and displaced hydrocarbons may coat soil particles causing water repellency. Biological effects include microorganism population increases or decreases (typically a decrease due to heating, loss of moisture, and reduced gas exchange followed by an increase attributed to an improved environment with respect to soil physical characteristics over time) and changes in activity which can influence nutrient cycling. Generally, the greater the burn severity the greater the negative impacts to soils. Low intensity burning, as proposed, may cause short-term increases in the availability of plant nutrients, reduction in disease or pathogens, and thinning of over-crowded stands of trees, all of which can promote healthy systems (Neary et al. 1999).

Erosion modeling using the Forest Service Water Erosion Prediction Project (FSWEPP) Interface (Erosion Risk Management Tool (ERMiT) and Disturbed WEPP) was used to predict estimated erosion. ERMiT is a web-based application that uses WEPP technology to estimate erosion, in probabilistic terms, on burned and recovering forest, range, and chaparral lands with and without the application of erosion mitigation treatments. User inputs for ERMiT are: climate, soil texture, soil rock content, vegetation type, hillslope gradient and horizontal length, and soil burn severity class (Robichaud and other, 2007). Model output is in tons per acre on a storm event basis, not average annual. Disturbed WEPP is an interface to the WEPP soil erosion model to allow users to

easily describe numerous disturbed forest erosion conditions. Disturbed WEPP allows the user to specify the characteristics of the site in terms of climate; soil texture, local topography (slope gradient and length), plant community, and surface residue cover (Elliot and others, 2000).

At best, any predicted runoff or erosion value, by any model, would be within only plus or minus 50 percent of the true value. Erosion rates are highly variable, and most models can predict only a single value. Replicated research has shown that observed values vary widely for identical plots, or the same plot from year to year (Elliot and others, 1994; Elliot and others, 1995; Tysdal and others, 1999). Also, spatial variability and variability of soil properties add to the complexity of erosion prediction (Robichaud, 1996).

Estimated post prescribed fire erosion for years one and five for each unit are shown in the table below and compared to baseline erosion. Wildfire erosion values for year one and five after a wildfire are also shown in the table below. Erosion potential is greatest the 1st year after a wildfire. The amount of erosion would decrease as vegetation recovers.

WEPP results for each treatment unit.

Unit	**Baseline Erosion (ton/acre/year)**	**Prescribed Fire**		**Wildfire**	
		Event Sediment Delivery Range (tons/acre)			
		Year Following Fire			
		1st year	**5th year**	**1st year**	**5th year**
A	<0.1	1.5 - 2.3	0.5 - 0.7	2.5 - 4	0.5 - 0.7
B	<0.1	0.7 - 2.1	0.2 - 0.7	1.3 - 3.7	0.2 - 0.7
C	<0.1	1.6 - 3.2	0.5 - 1	2.6 - 5.7	0.5 - 1
D	<0.1	1.3 - 2.8	0.3 - 0.9	2.1 - 5.1	0.3 - 0.9
E	<0.1	1.4 - 2.6	0.4 - 0.8	2.4 - 4.6	0.4 - 0.8
F	<0.1	1.3 - 2.8	0.3 - 0.9	2.1 - 5.1	0.3 - 0.9

Rangeland Vegetation

In the treated areas, grasses and forbs would increase following the prescribed fire. There would be increased perennial grasses, but some may take a year or more to fully establish. Over time, shrubs such as chokecherry, rabbitbrush, greasewood, and sagebrush should increase in areas where trees and juniper are burned. Shrub recovery would be somewhat dependant on wildlife and livestock browse, burn severity and climatic conditions.

Visual Resource Management

Of the 10,140 acres of proposed prescribed burning, 8,393 public acres would require implementing Class I and II VRM management objectives. Approximately 1,470 acres are Class I view shed within the UMRBNM and the Wild and Scenic River corridor where surface disturbing activities that disturb irreplaceable visual resources should be slight (Upper Missouri National Wild and Scenic River

Management Plan Update; Pg. 29; February 1993). Resource objectives include limiting mortality of mature conifer trees, and leaving large existing snags within this area. Natural re-vegetation of shrubs, sagebrush, and grasses would begin to occur immediately after the burn, and because a mosaic pattern of burning would be implemented under this alternative, the view shed of the Monument/Wild Scenic River Corridor would remain seamless and unbroken to the casual observer. The project would not affect outstanding, remarkable values within the UMNWSR corridor. Temporary routes created by vehicles would be closed with signing and/or natural materials found in the area.

Wildlife

Threatened, Endangered, and Species Proposed for Listing, BLM Designated Sensitive Species, Migratory Birds and Fisheries:

Deer, elk, and sheep would benefit from the use of prescribed fire. Forage would increase in the burned areas by removing accumulated duff and litter which is currently inhibiting new growth of grasses and forbs. Removal of litter would stimulate early spring “green-up.” The proposed action would rejuvenate shrub species which are important for winter range browse for elk, bighorn sheep, and mule deer. Winter browse is not currently limiting populations of any big game species within the project area.

In the past there have been concerns with fire treatments on big game winter range and the temporary loss of thermal cover. Because the specific prescription is to conduct burning in the spring or fall when temperatures are cooler and fuel moistures are higher, it is anticipated only 50 to 70 percent of the area would be burned at low to moderate fire intensities. This would create a mosaic of burn intensities and some of the protective cover would be maintained after the treatment. It is also important to realize the prescribed burn would only temporarily impact a small percentage of the existing winter range in the Missouri River Breaks. Winter habitat is not a limiting factor for any big game species within the project area.

Resident wildlife species would be displaced during the implementation of this project and there may be individual mortality among smaller species. If the proposed action occurs later in the spring, additional impact through stress to young of the year or pregnant bighorn sheep, elk, or mule deer could result from the project implementation. Through use of vehicles, aircraft, and people on the ground, some young of year may be abandoned or directly killed by the proposed burning. The detrimental impacts could be mitigated by the long term benefits to the species using the habitat and species drawn to the habitat created by prescribed fire.

Several smaller species would benefit directly from the proposed action which would leave standing dead or fire weakened trees in some areas. Remaining

dead or weakened trees would benefit many insect species and the bird and bat species which may utilize them. Several species of sapsucker, woodpecker, and other cavity nesting birds would benefit from this new habitat.

BLM Designated Sensitive Species:

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. 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). This alternative would help prevent the total loss of this habitat due to more severe burning conditions present with a summer wildfire. Some greater short-horned lizard individuals would be subject to loss during burning operations if the fire were to burn into sagebrush/grassland plant communities. Losses could also occur from incidental mortality from vehicle use during follow-up monitoring. The proposed action would remove and open up more of the timber habitat providing minor increases in habitat for this species. This project would not cause any species to be considered for listing under the Endangered Species Act.

Migratory Birds:

Migratory birds would be temporarily displaced during spring burning operations and for that year's nesting season. 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). This alternative would help prevent the total loss of this habitat due to more severe burning conditions present with a summer wildfire. Several smaller species would benefit directly from the proposed action which would leave standing dead or fire weakened trees in some areas. This would benefit the birds which may utilize these trees and the insect species using them. Several species of sapsucker, woodpecker, and other cavity nesting birds would benefit from this new habitat. If the proposed action were to occur later in the spring, nesting birds may be forced to abandon the nest and some young may be lost.

<u>Riparian/Water Resources</u>

The potential would exist for increases in runoff and sediment following implementation of the prescribed burn. Increases would be small, temporary, and cease following revegetation. Hydrologic response from the decrease in canopy cover and density of trees following implementation of the proposed action would have the potential for a small positive effect on the rehabilitation of riparian processes of small order drainages within the project area. Increases in groundwater and relative abundance of wetland indicators were evident following prescribed burning in other areas of the Missouri River Breaks in central Montana (Marlow et al., 2006).

The proposed action would unlikely affect the cause of impairment on the Missouri River. Through the project area, the reach of the Missouri has a decreased sediment yield because of upstream storage. The Missouri easily has the hydraulic transport capacity to process a minor pulse if sediment were to reach the Missouri. The riparian-wetland areas on the constrained reach of the Missouri are dependent upon dynamic flow and sediment pulses at tributary junctions for the establishment and recruitment of preferred woody species and functionality of physical river processes.

Air Quality

Emissions from prescribed burning under the proposed action would be greater than the No Action Alternative. However, impacts from prescribed burning would be short term due to the size of the project area and the number of acres treated in a given year. Burning would be conducted during favorable weather conditions that increase smoke dispersion.

ALTERNATIVE 2 – NO ACTION

Fire and Fuels Management

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 into sage/grassland areas, and would be at risk of high severity wildfire. The risk of losing key ecosystem components would increase and vegetation species and age class diversity would decline.

Invasive/Non-native Species

There would probably be little to no short term impact to the area from invasive plants unless natural fire or other events create a disturbance to the soil or vegetation component. These species would persist and spread more slowly in the absence of a disturbance. However, in the long term, the vegetative community would trend toward undesirable species and production.

There is anecdotal evidence that cheatgrass is invading intact vegetative communities in this area of Montana. Given these observations, there is some potential for the current populations to expand.

Grazing Administration and Livestock Grazing

Livestock grazing would continue as currently permitted. Available forage could possibly decrease over time as more areas become occupied with trees and shrubs.

Cultural Resources

Not introducing prescribed fire in the analysis area would have no direct effect on cultural resources. Indirect effects could include a change in the setting (i.e. change in vegetation patterns). In the long term, fuel buildups and vegetation changes can lead to higher intensity and longer duration fires than what may have occurred historically. Sites that have withstood naturally-occurring fires may be more affected by fires outside the norm.

Recreation

There would be no impacts to recreation from the No Action Alternative.

Soils

Prescribed fire would not occur; therefore, effects described above in Alternative 1 would not occur. If the proposed units and surrounding areas were to be burned by wildfire in the future, a mix of burn severities would be anticipated depending on topography, fuels and climatic conditions. High and moderate soil burn severities would likely result where there is heavy fuel buildup. This would result in an increased amount of bare soil, accelerated erosion, slow recovery of effective vegetative cover and loss of soil nutrients and soil microbes. Areas of low soil burn severity may benefit from a short term release of nutrients available to plant growth and a change in the types and amounts of vegetation.

Rangeland Vegetation

Vegetation would continue to progress toward a mature conifer and juniper overstory with a decrease in understory species. Potential for wildfire would increase over time.

Visual Resource Management

There would be no impact to the visual resource if the No Action Alternative is selected. However, the occurrence of a large high severity fire in the area due to the current excess of fuels would severely impact the scenery.

Wildlife

Threatened, Endangered, and Species Proposed for Listing, BLM Designated Sensitive Species, Migratory Birds and Fisheries:

Wildlife, General: Depending on seasonal weather conditions a natural ignition during dry conditions could have devastating impacts due to the amount of understory and ladder fuels. These fires could have long-term impacts to wildlife

habitat, especially big game winter range by removing all cover and possibly sterilizing soils due to high fire temperatures.

Without the removal of accumulated litter, production of grasses and forbs would continue to be limited for mule deer, elk, and bighorn sheep. Winter browse would also be negatively impacted by not allowing rejuvenation of species important to sustaining big game on winter range.

BLM Designated Sensitive Species: Designated sensitive species would not be impacted by the proposed action.

Migratory Birds: These species could be impacted in the event of a high severity wildfire which destroys large blocks of habitat.

Riparian/Water Resources

No immediate increases in the quantity of runoff and sediment would occur. Wildfire burning through larger fuel loads would have greater burn intensity. This would lead to a temporary larger increase in runoff and sediment than a lower intensity prescribed burn. However, even a greater intensity burn would not adversely affect water resources within the project area as both the river physical processes and the riparian-wetland areas are dependent upon periodic disturbance by flow and sediment pulses to function.

Air Quality

The No Action Alternative would have no impact on air quality.

CUMULATIVE IMPACTS:

Fire exclusion and other management practices throughout the Missouri River Breaks have caused a departure from historic fire regimes. Closed forest canopies and continuous fuels in the understory, and conifer encroachment in rangeland sites have contributed to the risk of negative impacts from high severity wildfire.

By restoring some of the natural range of forest stand structure across the landscape, and by removing conifers in rangeland sites, the Proposed Action would improve fire regime condition class ratings. Species composition and age class diversity would increase for understory grass, forb, and shrub species. The reduction in fuel loadings and ladder fuels may lessen the risk of high severity wildfire and improve firefighter and public safety.

Wildlife Resources

Factors that have modified habitat in the Missouri River Breaks include grazing by domestic livestock, timber management, fire suppression, invasion by non-

native plants, conversion of native vegetation to agricultural uses, increases in recreation use and energy development.

These changes and activities have occurred on both public and private land and have resulted in habitat loss for some species, fragmented habitat, the creation of smaller islands of habitat and isolated blocks of public land that are surrounded by extensive areas of agricultural lands. Expansion of roads during gas development and the noise and the disturbance associated with maintenance activities have also disrupted wildlife populations.

With designation of the area as a "National Monument" it is expected that most habitat loss in the future would occur on private land. Activities permitted on public land would be more restrictive and more closely managed than previous uses.

Treatments that reduce the risk of high severity wildfire and restore natural fire regimes would benefit wildlife species that historically use recently burned areas. Implementing the treatments under the Proposed Action Alternative would create a mosaic of plant communities benefiting a wide range of wildlife species, rather than large, continuous areas of similar habitat. Restoration of fire and its effects on the vegetative community would improve wildlife habitat through changes in vegetative species diversity and structure. This would provide long term benefits which directly improve habitat for those species that respond to the effects of fire, such as woodpeckers and other cavity nesters.

MITIGATION:

Cultural Resources

Any known cultural resources would be avoided during project implementation. Protective measures may include black/wet lining, hand removal of vegetation, etc. around identified cultural sites. Post-implementation inventory would be conducted on 10% of the area that did not receive intensive (Class III) cultural resource inventory prior to the burn. A report confirming pre-burn findings and documenting unanticipated discoveries would be drafted at that time.

Grazing Administration and Livestock Grazing

Permittees would be required to make changes in grazing operations to accommodate vegetative recovery after the prescribed fire.

Invasives/Non-native Species

Post burn monitoring and treatment of infestations would mitigate the spread of invasive species. No new travel routes would be created during post burn

monitoring and treatment of infestations. Using clean vehicles and equipment during the proposed action would also help reduce potential spread.

Wildlife

The proposed action would take place in spring, fall or winter when fire effects would be less severe than those that occur during wildfire season in summer. This would minimize impacts to all wildlife species. Burning during these time periods would reduce potential impacts to young of the year, nesting species and species such as short-horned lizard which are active and more susceptible to direct mortality during warmer weather. Big game winter restrictions are in place from December 1st until March 31st but potential impacts vary depending on severity of winter and early spring weather. Bighorn sheep activity restrictions for lambing areas begin April 1st and end June 15th. If prescribed burning is planned between December 1st and June 15th, treatment areas would be monitored by air immediately prior to disruptive activities to confirm that such activities would not adversely impact wintering bighorn sheep prior to vegetative green-up, or impact ewe and lamb survival. Aircraft used for survey would stay a minimum of 1000 feet above ridge tops during survey to minimize disturbance to any bighorn sheep. Ground personnel conducting prep work or pre-burn operations would be restricted to areas outside identified lambing areas, timber stands or adjacent to existing roads, to avoid disruptive activities until the area has been cleared. Spring prescribed burning operations would normally be completed by mid–April. Depending on actual burning conditions in a given spring, prescribed burning operations could occur beyond mid–April with approval from the authorized official(s).

The proposed action would avoid any bighorn sheep if burning occurs in winter or spring, any raptor nests observed during burn preparation and the known turkey roosting area. Any bighorn lambs, elk calves, or mule deer fawns discovered during burning actions would be identified and those sites and young animals avoided by ground personnel. Aircraft and ground personnel utilized during prescribed burning and monitoring would avoid all areas where bighorn sheep are observed during burning preparation and burning operations.

Soils

Limiting prescribed burning of all areas would ensure low to low end moderate severity. Suggested prescription conditions that would promote low to moderate severity include:
Implement burning at a time of year when litter, duff, and soil moisture conditions are favorable for minimizing the loss of litter and duff, and reducing excess soil heating.

Powerlines, natural gas facilities and other improvements

Any structures or improvements at risk to damage from prescribed fire operations would be protected by a combination of mechanical pre-treatment and avoidance or wet lining with engines during prescribed fire implementation.

CHAPTER 4 - PERSONS, GROUPS, AND AGENCIES CONSULTED

List of Persons, Groups, and Agencies Consulted

1. Tom Stivers - Montana Fish, Wildlife, & Parks
2. Dave Bergum - BLM and State land grazing permittee and landowner
3. Dave and Tammy Udelhoven - BLM grazing permittees and landowners
4. Matt and Karla Knox - BLM grazing permittees and landowners
5. Wilson and Nancy Stulc - BLM and State land grazing permittees and landowners.
6. Cliff Henderson - landowner
7. Glen Smith - landowner
8. Larry Udelhoven - landowner
9. Jim & Patricia Ayers - landowners
10. Greg Bergum - landowner

List of Preparers/Reviewers/Consultants:

John Seemann, Fuels Specialist/Team Leader
Jennifer Walker, Fire Ecologist
Jerry Majerus, NEPA Coordination
Vinita Shea, Rangeland Management Specialist
Adam Carr, Rangeland Management Specialist
Zane Fulbright, Archaeologist
Jody Peters, Wildlife Biologist
Kenny Keever, Natural Resource Specialist
Lowell Hassler, Natural Resource Specialist
Bruce Reid, Forester
Chad Krause, Hydrologist
Rod Sanders, Outdoor Recreation Planner
Josh Sorlie, Soil Scientist
Fred Roberts, Wildlife Biologist
Gary Kirpach, Zone FMO
Deb Tucek, Realty Specialist
Clive Rooney, Montana DNRC

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MAPS

Figure 1

Gallatin Rapids Prescribed Fire Vicinity Map

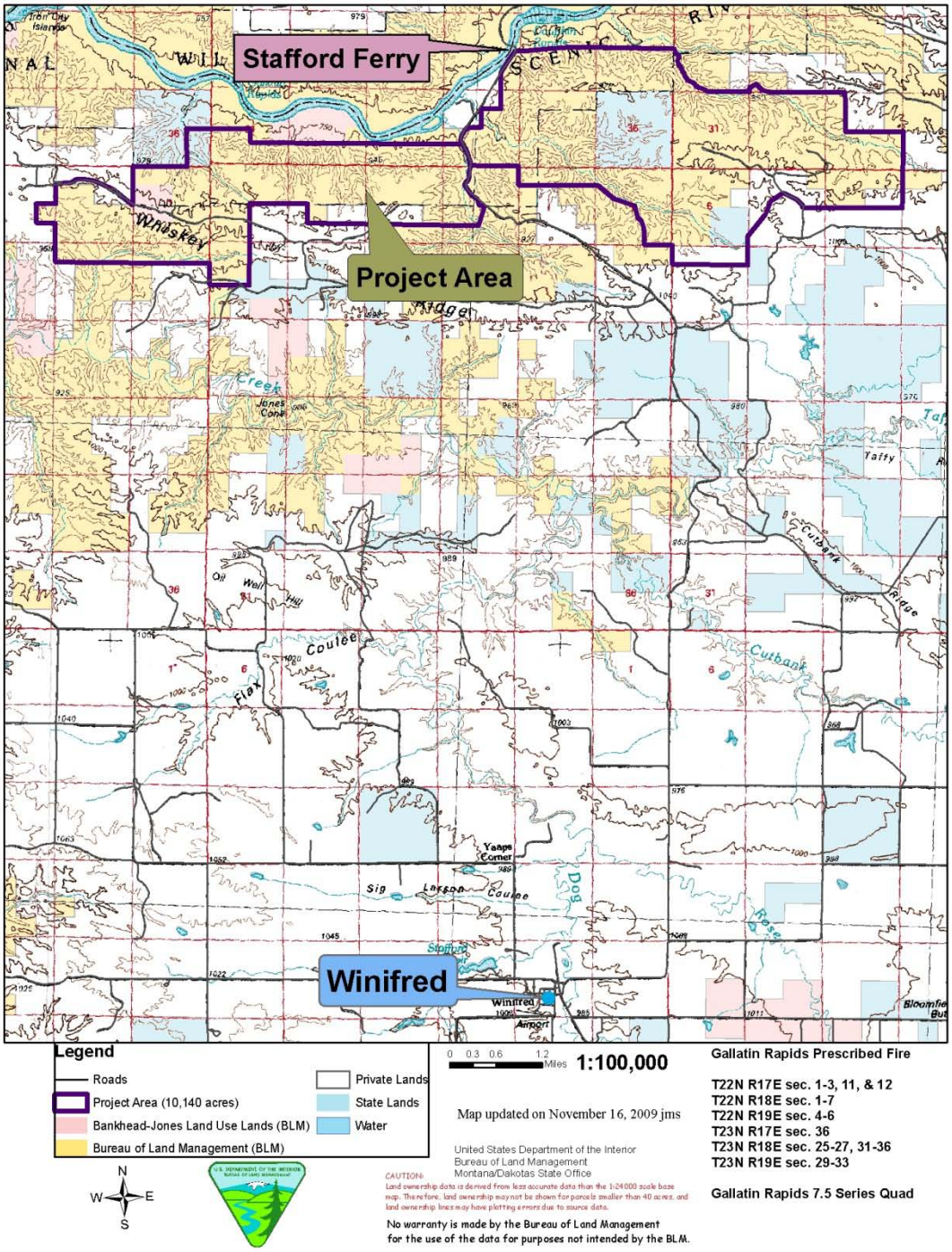
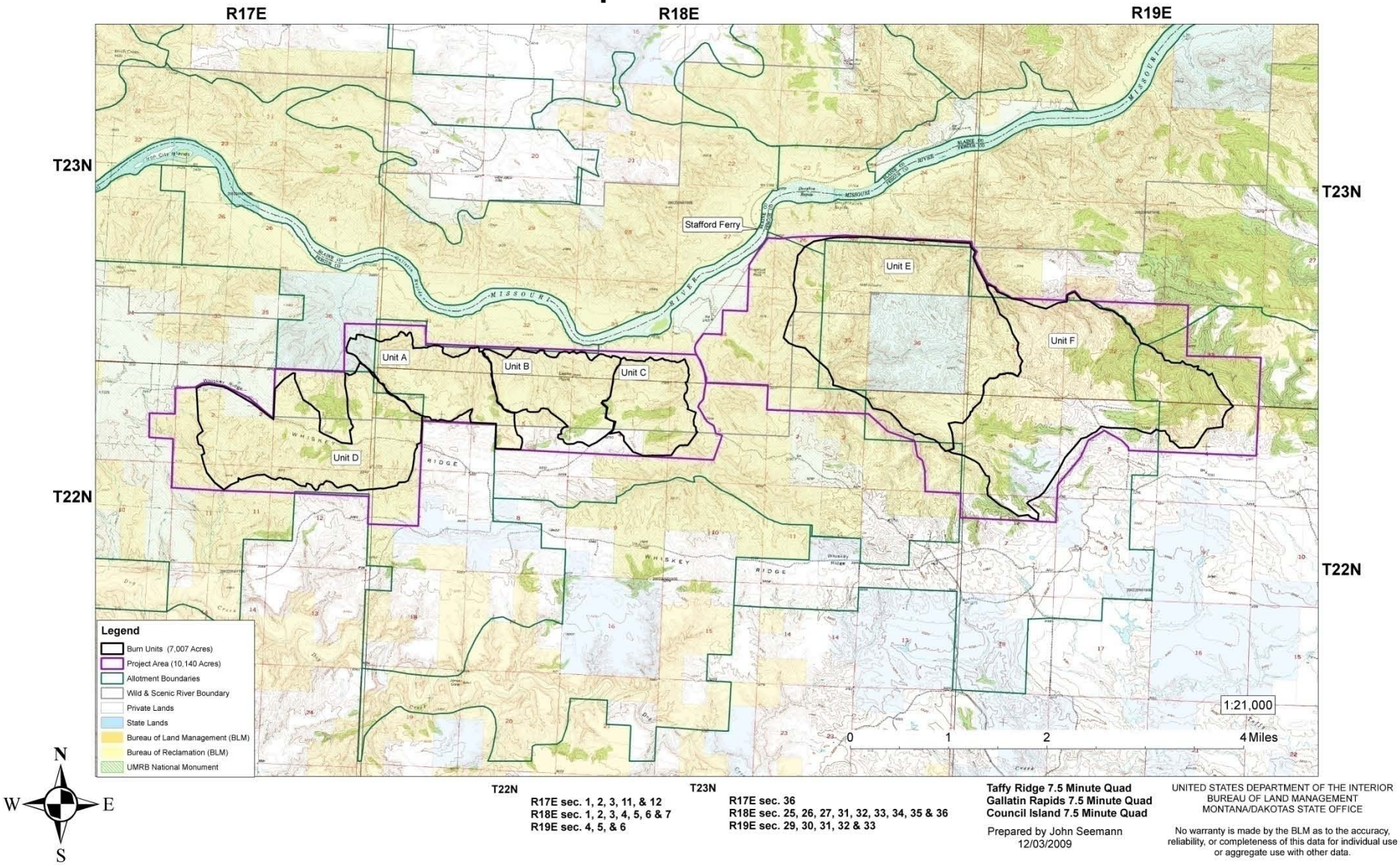


Figure 2

Gallatin Rapids Prescribed Fire



T22N
R17E sec. 1, 2, 3, 11, & 12
R18E sec. 1, 2, 3, 4, 5, 6 & 7
R19E sec. 4, 5, & 6

T23N
R17E sec. 36
R18E sec. 25, 26, 27, 31, 32, 33, 34, 35 & 36
R19E sec. 29, 30, 31, 32 & 33

Taffy Ridge 7.5 Minute Quad
Gallatin Rapids 7.5 Minute Quad
Council Island 7.5 Minute Quad

Prepared by John Seemann
12/03/2009

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MONTANA/DAKOTAS STATE OFFICE

No warranty is made by the BLM as to the accuracy, reliability, or completeness of this data for individual use or aggregate use with other data.

Appendix A

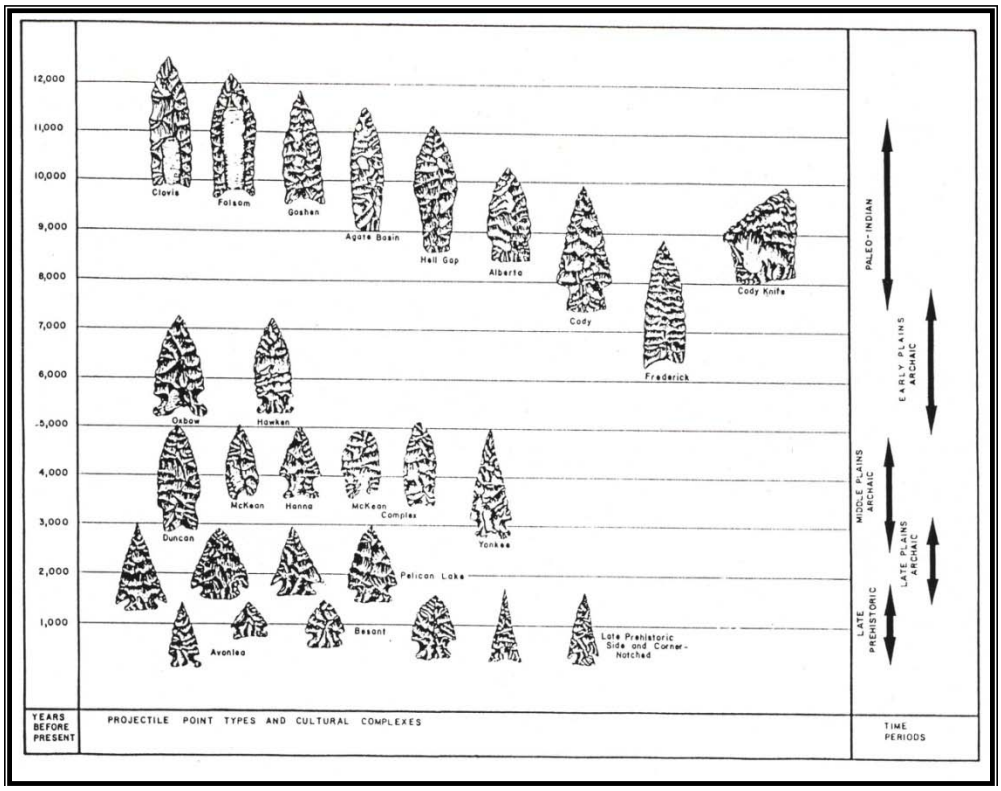
Cultural Setting

(taken from "Lewistown Fuels Reduction Class III Cultural Resource Inventory of Gallatin Rapids and Cyprian Units, Fergus & Phillips Counties, Montana 08-MT-068-009," Patrick Walker-Kuntz, 2007. References cited in this section can be found in the original report on file at the Lewistown Field Office.)

The prehistory and history of Montana, and the Northwestern Plains, generally includes five cultural periods. The periods discussed in this document are Paleo-Indian, Middle Prehistoric, Late Prehistoric, Protohistoric, and Historic. Within the prehistoric periods are various complexes, phases, and subphases, while the Protohistoric period is characterized by non-Indian immigration, trade of European items, and the introduction of the horse and firearms. The Historic period further distinguishes itself with the introduction of mining, homesteading, farming, and ranching.

Prehistory

The prehistory of the Northwestern Plains generally includes four cultural periods: Paleo-Indian, Middle Prehistoric, Late Prehistoric, and the Protohistoric. These periods are typically distinguished in the archaeological record by distinctive artifacts and feature types. Current cultural chronologies rely primarily upon projectile point styles and certain tool types as diagnostic temporal and cultural markers (Figure 5).



Projectile Point Styles and Cultural Complexes.

Many archaeologists in the region follow Frison (1991) using the term "Archaic" for the Middle Prehistoric Period. This term suggests a change in the emphasis of prehistoric economies, with plants emerging as more important in diet at the beginning of the Middle Prehistoric Period, and a focus on bison in the Late Prehistoric Period. However, the use of Frison's term is not particularly accurate (i.e., some Folsom peoples may have been "archaic," while some McKean sites show no evidence of archaic strategies) and we therefore prefer and use "Middle Prehistoric."

Paleo-Indian Period

The most reliable archaeological evidence currently indicates that the first people in North America migrated over the Bering Land Bridge from Asia soon after the retreat of continental ice sheets of the Wisconsin glaciation. From this point of entry, these nomadic hunters traveled south through the "ice free corridor" into Canada approximately 15,000 years ago.

The Paleo-Indian Period of occupation on the Northwestern Great Plains begins approximately 11,500 years ago and lasts until approximately 7,500 years before present (BP). The first two cultural complexes of this period are Clovis (11,500 to 11,000 BP) and Folsom (10,800 to 10,500 BP), named after the distinctive projectile point styles associated with these complexes. Excellent manufacture and the removal of flutes on both faces of the point characterize these projectile points. Anthropologists and archaeologists regularly cite the fine craftsmanship of Paleo-Indian projectile points as an important and distinctive aspect of early human occupation in North America (Bamforth 1991).

The earliest Paleo-Indian hunters appear to have been primarily big game hunters. The earliest defined group, Clovis, hunted a variety of now extinct fauna including mammoth. Later groups generally relied on early forms of bison as a subsistence base. A series of unfluted lanceolate shaped points represent the post-Folsom Paleo-Indian complexes (Frison 1991; Frison 1983; Irwin-Williams el al. 1973; Sundstrom 1989). These post-Folsom complexes include Agate Basin, Hell Gap, Alberta, Cody, Lusk, and Pryor Stemmed complexes. During the terminal Paleo-Indian Period, the development of two separate economic orientations begins to appear on the plains. One included broad-spectrum hunting and gathering in the mountains; the other was a communal bison-hunting pattern on the open plains (Sundstrom 1989; Frison 1991; Wettstaed 1989:15).

Paleo-Indian point styles found on the upland prairie usually occur as isolates. These likely represent ephemeral occupations rather than occupations of an extended duration (Deaver and Deaver 1988). No Clovis sites have been systematically investigated in Montana, although some investigations were carried out at the Anzick Site near Livingston, Montana (Lahren and Bonnichsen 1974). One isolated basal point fragment was discovered in northern Blaine

County (Deaver 1980). Brumley reports Clovis surface finds at four sites in and near the Bearspaw Mountains (Brumley 1988). A few Folsom surface finds have been reported in northeastern Montana (Aaberg et al. 1999).

Middle Prehistoric Period

The early part of the Middle Period occurred during a relatively dry climatic episode (Atlantic or Altithermal), roughly 8,500 years ago. The earlier emphasis on big game hunting gave way to a more diversified economy. A transition from lanceolate shaped to large stemmed and side-notched projectile points appears in the archaeological record of this time period. Projectile points of this age include the Bitterroot/Mummy Cave Complex of large, side-notched points. Information from the early Middle Period is sparse. Prehistoric peoples likely moved into mountain, foothill, and river valley regions during the early Middle Period, where resources were relatively plentiful (Wettstaed 1989, Husted 1969). Island mountain ranges in central Montana may have served as a “refugia” during this time.

During the middle part of the Middle Period, groups began to adopt increasingly specialized subsistence and settlement strategies. The McKean Complex (4,500 to 3,100 BP) roughly corresponds with the Sub-Boreal climatic episode that was cool and moist, reflecting modern conditions. These improved climatic conditions led to increased resource availability, which, in turn, probably led to two distinguishing McKean Complex characteristics: a rather dramatic increase in the number of sites (Deaver and Deaver 1988; Frison 1991; Gregg 1985), and an expansion in geographic distribution. Prehistoric peoples moved into the open plains and intermontane basins in greater numbers during this period. Grinding slabs and manos, in addition to roasting pits and cooking hearths, indicates an increase in the use of plant resources. McKean Complex points are relatively common in the Northwestern Plains and are typically a medium to long lanceolate shape with a notch in the base.

Reeves asserts that McKean is an intrusive cultural complex into the Northern Plains and Rocky Mountains that originated in the northeastern Great Basin (Reeves 2000). Some archaeologists, however, have proposed that the McKean complex actually developed among late Early period hunters in the northern Rockies (Husted 1969). Other cultural complexes often associated with the middle Middle Period are Oxbow and Duncan/Hanna. A significant Oxbow site found in north central Montana is the Cree Crossing site (Aaberg et al. 1999).

The Spiro site, a housepit site dating from the Middle Prehistoric Period, was discovered in 1997 on the west flanks of the Pryor Mountains (Walker-Kuntz 1999). Excavations revealed nine housepits and fifty-one thermal features. Grinding stones, a variety of plant and animal material, and stylized food preparation features indicate a broad-spectrum subsistence strategy. Several small, “eared” projectile points from the site are unlike most McKean complex point types. The points may be Duncan/Hanna variants or may represent a

separate, unnamed complex. Further investigations of this site type are leading to new ideas about archaic adaptations (Larson and Francis 1997).

Further adaptations toward upland living and the exploitation of open prairie resources mark the late Middle Period (3,000 to 1,800 BP). Groups continued to occupy river valley and foothill settings, while also devoting greater time and attention to the prairies. This change of focus is illustrated by the adoption of new cooperative hunting techniques and the development of the tipi, a specialized structure suited for open plains habitation. Projectile point styles from this period include Pelican Lake, Besant, and a common variety of corner-notched atlatl dart points.

Late Prehistoric Period

An increased specialization toward upland living and the utilization of open prairie resources, including bison, characterizes the Late Prehistoric Period (1,800 to 200 BP). The introduction of the bow and arrow occurs during this period, as well as a more widespread use of pottery. Although present in only small amounts, potsherds are a valuable chronological and cultural marker.

The vast majority of Late Prehistoric sites occur in open prairies rather than in protected hills or river valleys. Prehistoric groups lived in these upland areas for the majority of the year, specifically on bluff edges and high terraces overlooking river or creek valleys. “Smaller social units used lowlands and forested areas, but usually for shorter intervals and special purposes (plant collecting, quarrying, seasonal hunting, tipi poles)” (Deaver and Deaver 1988:96). The major complexes associated with the Late Prehistoric Period are Avonlea, Benson Butte/Beehive Complex, and Old Women’s.

During the Avonlea period, the use of the bow and arrow became widespread, with an increased focus on bison as a primary resource (Reeves 1990). Communal bison hunting was the main economic pursuit of Avonlea peoples, and bison trapping in draws, breaks, and corrals were favored. Avonlea culture seems to have flourished in north-central Montana where bison kills are numerous. Although bison were generally the focus of these hunters, archaeological investigations indicate that antelope were sometimes the focus of Avonlea peoples (Davis and Fisher 1988). Evidence suggests Avonlea groups communally hunted throughout the year, regardless of season (Peterson and Walker-Kuntz 1999; Payette and Peterson 1999).

A variety of small, side-notched arrow points known collectively as Old Women’s or Late Plains points follow Avonlea in age. Late Plains people continued the tradition of focusing on bison hunting, preferring the practice of bison jumping for communal killing. Communal bison processing for both a group’s immediate and long-term consumption may also have been important. The preparation of long-term foodstuffs, such as pemmican, possibly began during the Old Women’s Phase. The Thunderstruck site in northern Montana contains evidence of bone

grease extraction from bison killed in the spring (Winzler 1999). Grease extraction was essential in the making of pemmican, a food source that did not spoil and was lighter than cooked meat. This extraction process suggests that Late Plains people produced long-term foodstuffs not only in fall for the winter months, but in the spring, possibly to allow groups to gather in the summer for communal activities without the need for a large, continuous supply of fresh meat. "The production of these foodstuffs allowed a continual, complex pattern of cyclical social interaction" (Winzler 1999:9-5).

Protohistoric Period

The Protohistoric Period marks the transition between the Prehistoric and the Historic periods. The introduction of Euro-American trade goods (glass beads, brass pendants, musket balls, and metal projectile points) and adaptations within Native American lifeways distinguishes the Protohistoric Period (Deaver and Deaver 1988; Duke 1991). Of all trade items, the horse had the greatest impact on native cultures. Before the arrival of the horse, prehistoric peoples used jumps, corrals, and pounds to kill bison. When the horse reached the Northern Plains around A.D. 1750, hunting techniques involved chasing and killing the bison from horseback.

Although bison hunting was still the mainstay of subsistence for Plains groups in the Protohistoric Period, trade became an important factor. Trading for goods and transporting goods on horseback established economic opportunities not previously possible. Trapping and fur trading also became a subsistence alternative for some groups (Deaver and Deaver 1988).

The appearance of guns on the Northwestern Plains occurred by the early 1700s because of the trading posts situated along many of the major northern rivers (Ewers 1958). Guns were used for both warfare and hunting. However, a muzzle-loading firearm was difficult to reload on horseback. Consequently, the bow and arrow was often used instead (Ewers 1958). During this time, metal points replaced or joined projectile points made from stone.

The transition of prehistoric groups into the ancestors of the groups now living in and near the project area is extremely difficult to trace. Most of the data used to trace the movements of the ancestors of modern tribal groups is based on linguistics and ethnohistorical data. However, human groups have always been very dynamic and fluid. Furthermore, ethnic categories are culturally constructed and were never fixed, bounded entities. In the Northwestern Plains, human populations were particularly dynamic.

The cultural geography of the Plains before AD 1300 is controversial. The debate involves the locations of Algonquian versus Athabascan tribal and linguistic groups of the Northern Plains (Deaver 1995). The Algonquian theory maintains that the peoples of the Northern Plains in AD 1300 were exclusively Algonquian-speakers who migrated from the east, or, possibly, from the west.

Contemporary Algonquian-speaking tribes include the Blackfeet, Arapaho, Gros Ventre, Cheyenne, Cree, and Chippewa. The Athabascan theory asserts that ancestors of the Apache and Navajo peoples were the main occupants on the Northern Plains before AD 1300, moving southward from Alaska and Canada. Kehoe (1981:133) states that a few Athabascan hunting bands "moved south along the high plains just east of the Rocky Mountains." There are no Athabascan-speaking tribes in the area today.

A number of tribes, beginning with the Flathead (Salish) in the 1600s, may have occupied Montana during the protohistoric and historic periods (Bryan 1985; Malouf 1973). Around AD 1700, the Shoshone, who acquired the horse earlier than other tribes occupying Montana, pushed the Flathead west across the Continental Divide. The Shoshone ranged far with the acquisition of the horse reaching as far north as the southern plains of Canada. Soon other Plains tribes acquired the horse and displaced the Shoshone southward. The Blackfeet became dominant in most of northern Montana east of the Divide and in central Montana by the mid-1700s. During this period (approximately 1739), the diffusion of horses from the southwest and guns from the northeast began to converge.

Tribes that historically and presently occupy north-central Montana are believed to have entered the area during the Protohistoric Period. The Gros Ventre, or Atsina, are very strongly associated with the region around the project area. The Gros Ventre, closely allied with the Blackfeet, are known to have occupied the plains of northern Montana by the late 1700s (Bryan 1985). The Assiniboine, originally a division of the Yanktonai Sioux from the region between Lake Superior and the Mississippi River, may have separated into their own tribe by the early 1600s, gradually moving west into northeastern Montana.

Soon after the Lewis and Clark Expedition in 1805-06, fur trading became an important activity in the Northwestern Plains. Beaver trapping gave way to the buffalo hide trade in the mid-nineteenth century. During this time, introduced diseases and diminished bison herds claimed the lives of 20 percent of the Native population. Increased Euroamerican intrusions on Indian lands led to pressure to create reservations for the tribes.

History

Historically, the Assiniboine, Blackfeet, and Gros Ventres Indians tribes occupied the region that now includes the project area (Malouf 1973). The Treaty of 1855, or Lame Bull's Treaty, organized by Isaac Stevens, defined the Blackfoot territory as bounded on the east by a line due north from the mouth of the Milk River. The Assiniboine were allowed the right to hunt in the eastern most portion of the Blackfoot territory.

The Métis, a unique cultural group of French, Scottish, Irish, English, Chippewa, and Cree ancestry, are also strongly associated with parts of Montana, including

the region around the current project area. Métis culture was initially focused in southern portions of Saskatchewan and Manitoba provinces in Canada. Conflict and trade opportunities led many of them into Montana possibly as early as the 1830s, but certainly before 1869 (Walter 1997).

Prior to the 1880s, most activity in the project area was associated with trapping and transportation along the Missouri River, as well as a few government sponsored overland expeditions. Northeastern Montana continued to be undesignated territory until an Executive Order of July 6, 1873, established a joint reservation for the Gros Ventre, Blood, Blackfoot, and Peigan tribes north of the Missouri from the Dakota border west to the Sun River. The Assiniboine joined the reservation in 1875. The Indian Agency was established at Fort Peck, built by the trading company of Durfee and Peck in 1867. The railroad companies lobbied to reduce the size of the reservation. In 1887, treaties were negotiated with the various tribes, and an 1888 Act of Congress established three reservations, the Blackfeet, Fort Belknap, and Fort Peck. The remaining lands became public domain (Ewers 1958).

Although the Missouri River corridor was the focus of much activity in the mid-nineteenth century, the area north of the Missouri remained relatively free of white settlement. The open range brought cattle ranching into the area in the 1880s and 1890s. Reports from the early explorers made clear that this portion of Montana had fertile grasslands for grazing. By the early 1880s, herds of cattle by the thousands were driven into Montana. Many of these herds were longhorns driven north from Texas (Malone et al 1991). The ranching business on the open range flourished during the 1880s. Cattle and sheep were seen all across the eastern two-thirds of the state, thriving on the free grass of the public domain. These companies depended on unrestricted grazing on the open range under public domain. The livestock industry dominated the region until the 1900s when homesteaders began to arrive via the railroad.

Gold mining in the Little Rocky Mountains began in 1884, when Frank Aldrich, Powell “Pike” Landusky, and "Dutch" Lou Meyers found gold. The news of the strike brought large numbers of miners to Little Alder, Rock Creek, Camp Creek, Grouse Creek, and the other streambeds in the mountains. As soon as the placer gold was exhausted the boom was over and the area deserted (Wolle 1963). In 1890, Powell Landusky located the first lode mine; the Julia, as well as another mine, the Gold Bug. In August 1893, Landusky and his son-in-law, Robert Orman, located a claim they called the August. They believed their prospect was within the Fort Belknap Reservation so they worked the claim at night to avoid being forced off. Their discovery led to a second rush to the Little Rockies. This rush was all hardrock mining. In June, 1894, a settlement called Landusky was organized by the miners and stockmen. The mines and associated population of miners fluctuated with developments in mining technology (Wolle 1963).

From 1903 to 1912, the towns of Landusky, Zortman and Ruby (first called Whitcomb) saw a rapid population increase. Zortman boomed to 200 people, and boasted a hotel, two general stores, two saloons, a livery stable, and mining company offices. Several stage lines connected communities in the area. In 1913 the Ruby Gulch Mill burned down, and mining once again lulled (Murray 1978). Operations continued off and on in the early 1920's. The Anaconda Copper Mining Company began work on the Alabama mine, building a new mill. In October of 1923, the new mill burned down and operations at Ruby Gulch again went into a lull (Murray 1978).

The district saw a rebound as a result of the rise in gold prices in 1934, and the towns of Landusky and Zortman also grew. Two fires, one in 1929 and one in 1944 raged through Zortman. Though still profitable, the mines shut down as labor and resources were withdrawn during World War II. There were hopes that the mines would reopen after the war, and some attempts were made. However, by 1951, all serious mining activities ceased. A short revival in mining occurred in the early 1990's, but now mine reclamation is a major activity.

In eastern Montana, with the Enlarged Homestead Act, settlers began farming in the semi-arid environment of the project area. The Enlarged Homestead Act of 1909 increased allotments to 320 acres (further increased to 640 acres in 1916), and in 1912, the Three Year Homestead Act shortened the length of required residency time and allowed the claimant to be absent for five months a year. The passage of these laws, rising prices of land in the Midwest, a barrage of promotional campaigns, and several years of deceptively humid weather helped to usher in a second, much larger wave of settlers (Malone et al 1991).

The settlement of eastern Montana in the early twentieth century was swift. During the period 1910 to 1922, homesteaders claimed nearly half the land area. Powerful business interests, such as the "Empire Builder" James J. Hill, sponsored promotional campaigns to populate the lands along the Great Northern Railway. Brochures touted eastern Montana as, "a poor man's paradise where land was plentiful and a fortune could be made with little effort" (Malone et al 1991). Between 1909 and 1918, nearly 80,000 people moved into eastern Montana.

A settler near Chinook, Lillie Klein Rasmussen, wrote in 1913 that she and her husband could see the lights of 55 other homestead shacks from their own, noting Norwegians, English, Irish, German, French, Scotch, and Mexican nationalities (Spritzer 1999). When the Rasmussens abandoned their homestead a decade later, they could no longer see neighbors in any direction. Unfortunately, for the homesteaders, more than 80 percent of the new farmlands proved to be unfit for crop agriculture. After little more than a decade, the homestead "boom" was followed by a long "bust" period that displaced thousands of settlers. The year 1919 marked the beginning of a region-wide drought cycle that continued through the 1930s. By 1922, approximately 60,000 people had

left Montana (Spritzer 1999). Consolidation of homesteads into a smaller number of larger farming units has been a continuing trend since the Second World War. The deserted homestead dating back to this boom and bust period is a common historic site type in Montana.

Many of the BLM lands in this part of Montana are Bankhead Jones Lands, also called Land Use lands. Congress passed the Bankhead-Jones Farm Tenant Act in 1937 to return abandoned or sub-marginal farmland to public ownership for revegetation. Proponents of the Bankhead-Jones Act argued that improper land management by homesteaders led to the dustbowl of the 1930s.

Appendix B

Soils

Map unit: 4 - Abor-Yawdim silty clay loams, 4 to 15 percent slopes
The Abor component makes up 50 percent of the map unit. Slopes are 4 to 15 percent. This component is on plains, hills. The parent material consists of clayey residuum over semi-consolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R058AC041MT Clayey (cy) 11-14" P.z. ecological site. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface.

The Yawdim component makes up 30 percent of the map unit. Slopes are 4 to 15 percent. This component is on hills, plains. The parent material consists of clayey residuum over semiconsolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R058AC057MT Shallow (sw) 11-14" P.z. ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent.

Map unit: 62 - Delpoint-Yawdim complex, 4 to 8 percent slopes
The Delpoint component makes up 50 percent of the map unit. Slopes are 4 to 8 percent. This component is on plains. The parent material consists of loamy residuum over semiconsolidated sedimentary rock. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R058AC040MT Silty (si) 11-14" P.z. ecological site. Nonirrigated land capability classification is 3e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

The Yawdim component makes up 35 percent of the map unit. Slopes are 4 to 8 percent. This component is on plains. The parent material consists of clayey residuum over semiconsolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R058AC057MT Shallow (sw) 11-14" P.z. ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent.

Map unit: 64 - Dilts-Julin-Rock outcrop complex, 15 to 50 percent slopes
The Dilts component makes up 40 percent of the map unit. Slopes are 15 to 50 percent. This component is on hills, plains. The parent material consists of clayey residuum over consilidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.

The Julin component makes up 20 percent of the map unit. Slopes are 15 to 25 percent. This component is on plains, hills. The parent material consists of clayey residuum over consolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria.

The Rock outcrop is a miscellaneous area.

Map unit: 65 - Dilts-Thebo-Neldore clays, 4 to 60 percent slopes
The Dilts component makes up 40 percent of the map unit. Slopes are 4 to 50 percent. This component is on hills, plains. The parent material consists of clayey residuum over consilidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent.

Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.

The Thebo component makes up 30 percent of the map unit. Slopes are 4 to 45 percent. This component is on plains. The parent material consists of semiconsolidated shale and/or clayey residuum. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R058AC041MT Clayey (cy) 11-14" P.z. ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent.

The Neldore component makes up 20 percent of the map unit. Slopes are 4 to 60 percent. This component is on hills, plains. The parent material consists of clayey residuum over consolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.

Map unit: 174 - Neldore-Thebo clays, 4 to 25 percent slopes
The Neldore component makes up 40 percent of the map unit. Slopes are 4 to 25 percent. This component is on hills, plains. The parent material consists of clayey residuum over consolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R058AC059MT Shallow Clay (swc) 11-14" P.z. ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.

The Thebo component makes up 35 percent of the map unit. Slopes are 4 to 25 percent. This component is on plains. The parent material consists of semiconsolidated shale and/or clayey residuum. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches.

Organic matter content in the surface horizon is about 1 percent. This component is in the R058AC041MT Clayey (cy) 11-14" P.z. ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent.

Map unit: 176 - Neldore-Rock outcrop complex, 15 to 60 percent slopes
The Neldore component makes up 45 percent of the map unit. Slopes are 15 to 60 percent. This component is on plains, hills. The parent material consists of clayey residuum over consolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R058AC059MT Shallow Clay (swc) 11-14" P.z. ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.

The Rock outcrop is a miscellaneous area.

Map unit: 190 - Rock outcrop
The Rock outcrop is a miscellaneous area.

Map unit: 223 - Tanna-Abor complex, 2 to 8 percent slopes
The Tanna component makes up 60 percent of the map unit. Slopes are 2 to 8 percent. This component is on plains. The parent material consists of loamy residuum over interbedded sedimentary rock. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This component is in the R058AC041MT Clayey (cy) 11-14" P.z. ecological site. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

The Abor component makes up 30 percent of the map unit. Slopes are 2 to 8 percent. This component is on plains. The parent material consists of clayey residuum over semiconsolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R058AC041MT Clayey (cy) 11-14" P.z. ecological site. Nonirrigated land

capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface.

Map unit: 279 - Yamac-Delpoint-Yawdim complex, 4 to 25 percent slopes
The Yamac component makes up 35 percent of the map unit. Slopes are 4 to 25 percent. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R058AC040MT Silty (si) 11-14" P.z. ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface.

The Delpoint component makes up 30 percent of the map unit. Slopes are 4 to 25 percent. This component is on hills, plains. The parent material consists of loamy residuum over semiconsolidated sedimentary rock. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R058AC040MT Silty (si) 11-14" P.z. ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

The Yawdim component makes up 15 percent of the map unit. Slopes are 4 to 25 percent. This component is on plains, hills. The parent material consists of clayey residuum over semiconsolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R058AC057MT Shallow (sw) 11-14" P.z. ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent.

Map unit: 281 - Yawdim-Abor-Rentsac complex, 8 to 60 percent slopes

The Yawdim component makes up 35 percent of the map unit. Slopes are 8 to 50 percent. This component is on hills, plains. The parent material consists of clayey residuum over semiconsolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R058AC057MT Shallow (sw) 11-14" P.z. ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent.

The Abor component makes up 25 percent of the map unit. Slopes are 8 to 45 percent. This component is on plains, hills. The parent material consists of clayey residuum over semiconsolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R058AC041MT Clayey (cy) 11-14" P.z. ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface.

The Rentsac component makes up 15 percent of the map unit. Slopes are 8 to 60 percent. This component is on hills, plains. The parent material consists of residuum over fractured hard sandstone. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R058AC057MT Shallow (sw) 11-14" P.z. ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

Map unit: 282 - Yawdim-Delpoint-Rock outcrop complex, 25 to 50 percent slopes
The Yawdim component makes up 30 percent of the map unit. Slopes are 25 to 50 percent. This component is on plains, hills. The parent material consists of clayey residuum over semiconsolidated shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water

to a depth of 60 inches is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R058AC057MT Shallow (sw) 11-14" P.z. ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent.

The Delpoint component makes up 25 percent of the map unit. Slopes are 25 to 45 percent. This component is on plains, hills. The parent material consists of loamy residuum over semiconsolidated sedimentary rock. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R058AC040MT Silty (si) 11-14" P.z. ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

The Rock outcrop is a miscellaneous area.

U. S. Department of the Interior
Bureau of Land Management
Lewistown Field Office
and
Montana Department of Natural Resources and Conservation
Northeast Land Office
Lewistown, MT

FINDING OF NO SIGNIFICANT IMPACT for the Gallatin Rapids Prescribed Fire

ENVIRONMENTAL ASSESSMENT NUMBER: MT066-08-09

Finding of No Significant Impact

On the basis of the information contained in the environmental assessment for the Gallatin Rapids Prescribed Fire, I have determined that the proposed action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared.

This finding is based on the following reasons. Any known cultural resources will be avoided during project implementation; fuel loadings will be reduced and the potential for high severity wildfire will be lowered; the permitted use for livestock grazing will not change; changes to the visual landscape would not attract the attention of the casual observer after green up and revegetation occurs; there will be no significant or long-term effect to recreation values; and wildlife habitat will be enhanced.

_____ _____
Lewistown Field Office Manager Date

_____ _____
Upper Missouri River Breaks National Monument Manager Date

_____ _____
Area Manager, Northeast Land Office Date
Department of Natural Resources and Conservation