

**United States Department of the Interior
Bureau of Land Management**

DOI-BLM-MT-C020-2016-0106-EA

July 15, 2016

ZOOK CREEK HAZARDOUS FUELS PROJECT

Location: **Rosebud County, MT**
T5S, R41E, Section 24 and 25, and portions of 30 & 32.
T5S, R42E, Section 29, 30 and portions of 19.
T6S, R41E, Section 1 & 2.

U.S. Department of the Interior
Bureau of Land Management
Miles City Field Office
111 Garryowen Road
Miles City, MT 59301
Phone: 406-233-2800
FAX: 406-233-2921



**UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT**

ENVIRONMENTAL ASSESSMENT REVIEW

OFFICE/AREA: Miles City Field Office	DOI-BLM-MT-C020-2016-0106-EA
	DATE POSTED:
NAME: Zook Creek	DATE DUE: 7/15/16
	FUNDING:
LOCATION: T5S, R41E, Section 24, 25 and portions of 30 and 32. T5S, R42E, Section 29, 30 and portions of 19. T6S, R41E, Section 1 and 2.	

ORIGINATOR DATE/INITIALS	TITLE	ASSIGNMENT
Paul Pauley	Fire Management Specialist	Fire/Fuels

REVIEWERS	TITLE	ASSIGNMENT	DATE/INITIALS
Fiona Petersen	Wildlife Biologist	Wildlife/T&E	FAP 12/23/2015
Doug Melton	Archeologist	Cultural	7/1/12/2016 Cultural Report MT-020-16-028 and 028a
Dawn Doran	RMS	Grazing/Vegetation	DLD 12/21/15 7/15/16
Brenda Witkowski	NRS	Invasive Species	BSW 12/17/2015 7/15/2016
Drea Traeumer	Hydrologist	Hydrology/Riparian	DET 6/15/2016
Dena Lang	Recreation Specialist	VRM	DJL 7/11/2016
Josh Buckmaster	Soils Scientist	Soils	JB 6/13/2016

**/s/ Kathy Bockness
ENVIRONMENTAL COORDINATOR**

**7/20/2016
DATE**

ENVIRONMENTAL ASSESSMENT

EA NUMBER: DOI-BLM-MT-C020-2016-0106-EA

RIPS#

GR#

PROPOSED ACTION/TITLE TYPE: Zook Creek Hazardous Fuels Project

LOCATION OF PROPOSED ACTION: T5S, R41E, Section 24 and 25, and portions of 30 and 32. T5S, R42E, Section 29, 30 and portions of 19. T6S, R41E, Section 1 and 2.

PREPARING OFFICE: Miles City Field Office

APPLICANT: US Department of the Interior; Bureau of Land Management; Miles City Field Office

DATE OF PREPARATION: December 2015

CONFORMANCE WITH APPLICABLE LAND USE PLAN: This proposed action is in conformance with the Bureau of Land Management (BLM) 2015, Miles City Field Office (MFO), Approved Resource Management Plan (ARMP). On page 3-36 of the ARMP, it states MD Fire 1: “Mechanical thinning of vegetation, biomass removal, and chemical and biological treatments are allowed to reduce hazardous fuels or improve land health; and page 3-37, MD FIRE 5: “Prescribed fire is allowed in the planning area with required design features to meet resource goals and objectives.”

BACKGROUND: Program guidance for actions include the Federal Land Policy and Management Act of 1976, Healthy Forests Restoration Act of 2003, the Healthy Forests Initiative, the National Fire Plan and the Miles City Fire Management Plan, all which support treatment uses which progress toward meeting ecosystem health. One of the emphasis items of the National Fire Plan and the Healthy Forests Initiative is to reduce hazardous fuel accumulations and restore the health and natural processes within forests and rangelands.

Beginning in 2015, Wildland Fire Management funding was appropriated for the purpose of treating and restoring tribal priority landscapes within and adjacent to ancestral and reserved treaty right lands. This resulted in the establishment of the Reserved Treaty Rights Lands (RTRL) program. The RTRL program will provide funding to enable American Indian Tribes to participate in collaborative projects with other landowners to enhance the health and resiliency of priority tribal natural resources at high risk to wildland fire. Due to the proximity of this project to the Northern Cheyenne Reservation, and the high risk to large catastrophic wildland fires, RTRL funds were secured to treat a portion of the BLM acres in the project area. Planning efforts will be completed by the BLM but the treatments in those areas will be completed by the Northern Cheyenne Tribe. Treatments may also be completed in the planning area that are funded by the BLM.

PURPOSE AND NEED: The purpose of the proposed project is to reduce the scope and consequences of catastrophic wildland fire to people, communities, and natural resources while restoring forest and rangeland ecosystems to more closely match their historical structure, function, diversity and dynamics. The need is this action will lead to improved ecosystem health and will lower the consequences of a large catastrophic wildland fire.

PROPOSED ACTION: The BLM proposes to treat ponderosa pine (*Pinus ponderosa*) and Rocky Mountain juniper (*Juniperus scopulorum*) utilizing a series of treatments. Treatments include prescribed fire, mechanical and hand thinning, where appropriate, to restore resiliency and reduce risks associated with wild land fire in forested systems.

Prescribed Fire: Prescribed fire treatments include broadcast burning and/or the burning of hand stacked piles following hand thinning treatments. Broadcast burning treatments are located in areas where creating openings in the vast overstocked ponderosa pine/Rocky Mountain juniper woodlands has been identified as a priority. Prescribed fire would reduce hazardous fuels loading. Broadcast burning would be completed during the spring (February through

June) or fall (September through December), Pile burning would be completed in winter months (October through April). For spring burns, start date would be as early as possible after snow melt to allow for trees to burn with minimal impacts to soil and understory herbaceous vegetation. Fall burns would begin based on prescriptions outlined in the burn plans for each specific treatment area. Prescribed burning would be targeted in units delineated by specialists prior to project implementation. However, if the prescribed fire threatens to exceed the targeted area, the prescribed fire Burn Boss and on-site resource specialist would have the flexibility to determine whether or not to initiate suppression actions based on fire behavior, topography, fuel continuity, and firefighter safety. Therefore, any variation in size would depend on resource specialist input. When in combination with the mechanical treatments described below, pile burning may be the appropriate action to remove fuels from the site. Piles would be constructed using the debris and dead material on site after the implementation of a mechanical treatment. Piles would be burned based on environmental conditions and in coordination with a developed burn plan.

Control lines for prescribed fire would consist of existing roads, natural barriers (sparse fuels or cow trails), hand lines, and lines made by mechanical means to clear vegetation down to mineral soil. A masticator may be used for prepping control lines where terrain allows. Off-road travel by engines and ATV/UTV's would be required during implementation of prescribed fire.

Mechanical: Mastication would be completed using mechanical equipment such as a skid-steer with a masticating attachment, and will be used for fire line preparation. Mastication includes the mulching and/or shredding of trees on site. Wood chips and branch/leaf mulch would be dispersed on site, not to exceed 6 inches in depth. This mastication effort may be in coordination with seeding operations that allow for mulch and chips to cover seed. This management method would have less ground disturbance than chaining, but would have more ground disturbance than selective hand thinning methods.

Hand Thinning: This treatment would include hand thinning methods using chainsaws. Selective cutting may occur in specific areas, and may include a single tree to several acres of trees. Selective cutting may include dead, diseased, or healthy trees depending on site evaluation and treatment objectives. Cut trees may be removed, chipped, lopped and scattered, or piled and burned, based on site evaluation and objectives.

Applicable to all fuels treatments: Work would only be performed when the use of heavy equipment would result in soil rutting of no more than four inches and on slopes less than 40 percent, unless work can be completed without rutting or disturbance to the soil surface. In order to protect riparian areas, hand thinning will be implemented and felled trees will be left in the drainages and placed across the slope for erosion protection. This action will preserve precipitation infiltration and filtering functions. Project implementation could begin in the spring/summer of 2016, and could occur over the next ten years. In the event of temporary road, construction, standards will be to the minimum required for safe transport. These temporary road locations will be designed to minimize ephemeral stream or wet area crossings, and no perennial streams would be crossed. Post-treatment road closure will be accomplished by placing slash material on the road and/or recontouring and reseeding with native grasses, forbs and shrubs. If necessary, temporary roads will be signed upon the completion of the forest management activities. Snags and other key wildlife trees would be retained as they provide valuable nesting, roosting and foraging habitat for numerous migratory bird species and mammals. The specifics for proactive measures for wildlife habitat would be identified in the burn plans completed for each unit.

Project implementation would include the following:

- Implementation when ground conditions are either dry or frozen, with a limitation of 4 inches of rutting and would occur on slopes of 40% or less;
- All mechanical equipment would be power washed and inspected prior to arrival on and before leaving the site;
- Signing near the work area would be required to warn public of prescribed fire or mastication activities;
- Identified cultural resources would be flagged prior to project implementation.
- The operator and/or contractor shall immediately contact the Miles City BLM Field Manager in the event that any antiquities or other items of cultural or scientific interest, including, but not limited to historic or

prehistoric ruins, fossils, artifacts or burials, are discovered as a result of the project operations. Such discoveries shall be left intact until written authorization to proceed is issued by the Miles City BLM Field Manager.

ALTERNATIVE 1 - NO ACTION: No Action would include a continuance of non-treatment.

ALTERNATIVE CONSIDERED BUT DROPPED FROM FURTHER ANALYSIS:

1. The use of prescribed fire only was not considered for further analysis since it would not reduce risk of stand replacing fire and therefore not meet the purpose and need of the EA.
2. Commercial timber sale, at the current time there is not a market for the timber in the area, due to the size of merchantable timber, distance from pulp mills and cost of fuel. It does not appear that there will be a market any time in the future.

AFFECTED ENVIRONMENT:

The following resources have been evaluated in this EA:

ELEMENTS

Determination*	Resource	Rationale for Determination*
NI	Air Quality	Treatments will not impact air quality. Prescribed fire may be used but mainly for small pile burning; appropriate permits would be obtained prior to implementation.
NP	Areas of Critical Environmental Concern	There are no areas of critical environmental concerns within the project area.
PI	Cultural Resources	A crew Surveyed by Northern Cheyenne THPO Office 3 Sites Located Avoidance recommended for sites. No adverse Effect to historic properties.
NP	Environmental Justice	Environmental justice is not associated with the project.
NP	Farmlands (Prime or Unique)	There are no prime or unique farmlands in the project area.
PI	Fire	Impacts from large catastrophic fires would be lowered by the proposed actions in this document.
NI	Floodplains	Impacts to 100-yr floodplains that may be present in the project area will be minimal, short-term, and in compliance with Executive Order 11988.
PI	Forestry	Forested acres will be treated to minimize potential impacts from large fires.
NP	Geology/Minerals	There would be no direct impacts to fluid or solid minerals associated with this project.
NI	Invasive, Non-native Species	Invasive, Nonnative species are inventoried, treated, and monitored using Integrated Weed Management.
NI	Lands and Realty	No impacts would occur to existing land use authorizations.
PI	Lands With Wilderness Characteristics	This area has been inventoried and wilderness characteristics were found to be present at the time of the inventory (MT-027-704).

NP	Livestock Grazing	There would be no impacts to livestock grazing.
PI	Native American Religious Concerns	One site of concern in project area Avoidance of landform recommended
NI	Recreation	Recreation is present within the proposed project area, but not affected to a degree that detailed analysis is required.
PI	Socio-economics	Project will stimulate local economy and employ Northern Cheyenne tribal members to implement project.
NI	Soils	Project implementation could have impacts to soils.
NP	Threatened, Endangered or Candidate Plant Species	T&E plant species do not exist within project area.
NP	Threatened, Endangered or Candidate Animal Species	T&E species habitat does not exist within project area.
PI	Vegetation	Vegetation disturbance would be limited to treatment of Juniper and Pine trees,
PI	VRM	The project area falls in a VRM II management objective. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
NP	Wastes (hazardous or solid)	No hazardous or solids concerns would be associated with the project.
NI	Water Quality (surface/ground)	The timing of implementation and preservation of riparian functions will minimize soil erosion and sediment delivery.
NI	Wetlands/Riparian Zones	No surface disturbing activities will occur in or within 300ft of the boundary of the riparian-wetland areas that are present in the project area.
NP	Wild and Scenic Rivers	There are no wild and scenic rivers in the project area.
NP	Wilderness	There is no wilderness or Wilderness Study Areas in the project area.
PI	Wildlife	Numerous wildlife habitats including migratory bird habitats exist in the proposed action area and may be directly and indirectly affected.
NP	GRSG Habitat (General)	The proposed action is not within GRSG GHMA (general)
NP	GRSG Habitat (Priority)	The proposed action is not within GRSG PHMA (priority habitat).
NP	GRSG Habitat (Restoration)	The proposed action is not within GRSG RA (restoration area).

NP = not present in the area impacted by the proposed or alternative actions

NI = present, but not affected to a degree that detailed analysis is required

PI = present and may be impacted to some degree. Will be analyzed in affected environment and environmental impacts. (NOTE: PI does not mean impacts are likely to be significant in any way).

Cultural: BLM lands were inventoried by the Northern Cheyenne Tribal Historic Preservation Office (THPO) between April 11th and May 17th 2016. The inventory resulted in the identification of three cultural sites. The sites include an eagle catching complex and lithic scatter, a small lithic scatter, and a cabin and line shack. The Eagle Catching Complex and Cabin Site are recommended as eligible for listing on the National Register of Historic Places (See BLM Cultural Resources Report MT-020-16-028a). Avoidance of the eligible sites is recommended. BLM has determined that if the eligible sites are avoided, the project would have no adverse effect to historic properties.

Fire: The Zook Creek area evolved with wildfire. The most recent large destructive fires that have occurred in the Zook Creek analysis area have been within the past 20 years, the most notable was the Ash Creek fire that burned 300,000 acres in 2012.

The predominate cause of wildland fires is lightning, with less than one percent being man-caused. Fire regimes can be described based on the characteristics of the disturbance, the dominant or potential vegetation of an ecosystem, or fire severity based on the dominant vegetation (Agee, 1993). The project area falls into Fire Regime Condition Classes (FRCC) 2 and 3 (MCFO FMP, 2004). The fire regime is high frequency (Fischer and Clayton, 1983 Fire Groups 2 and 3) and would normally host fires of low intensity. However, fires of high intensity can be expected due to the high amount of fuel loading which have resulted from a combination of limited timber harvest and fuels management, lack of frequent fire and possibly overgrazing which may have reduced competition to ponderosa pine seedlings from grass. These conditions have allowed juniper and ponderosa pine to increase in density. Probably the element of this combination with the largest effect is the lack of frequent fire (Burkhardt, 1976).

Forested vegetation in the project area is categorized as Fire Group Two as described by (Fisher and Clayton, 1983), a warm, dry ponderosa pine habitat type. This group consists of open stands of ponderosa pine with predominantly grass understory. Some stands have a dense mixed-aged understory of ponderosa pine. Interior ponderosa pine evolved under a regime of frequent surface fires (5-25 years) and infrequent mix-severity and stand replacement fires. Ponderosa pine communities at lower elevations experienced fires that were mostly low to moderate severity surface fires, which maintained open-grown, uneven-aged, park-like stands. Fire suppression over the past 100+ years has created an artificial, un-natural ecosystem, which greatly departs from historic conditions.

Water Resources and Riparian-Wetland Areas: The proposed action is located within Cook Creek, Coal Bank Creek, Zook Creek, Bull Creek, and Whitten Creek sub-watersheds, which are located within the larger Tie Creek-Tongue River and Canyon Creek-Tongue River watersheds. Drainages in these sub-watersheds are predominantly ephemeral, and only two perennial streams flow through the project area (Coal Bank Creek and Whitten Creek). Montana Department of Environmental Quality (MDEQ) surface water quality standards apply only to perennial streams, and no perennial streams in these sub-watersheds are listed under of Section §303(d) of the Clean Water Act as water quality impaired due to water quality standards exceedances.

Riparian-wetland areas present in the project area are associated with Coal Creek, and treatments in these riparian-wetland areas will be hand thinning only with no surface disturbing activities occurring in or within 300 feet of the boundary of these areas.

Livestock Grazing: Two BLM grazing lessees have grazing authorizations in the project area. The Moreland Allotment is licensed for cattle with a season of use from 6/1 to 2/28. The Moreland Allotment grazing lessee has not utilized this allotment for over a decade, however. The Quarter Circle U Allotment is also licensed for cattle with a season of use from 3/1 to 2/28. This area does get grazed, although use levels are low due to the lack of water.

Socio-economics: The local economy near the Zook Creek Project is primarily agricultural based. Agricultural income and employment fluctuate with livestock and grain prices. The community that will be the most affected by the project is Lame Deer, which is located in southern Rosebud County. Median household income for Lame Deer in the 2010 to 2014 timeframe was \$26,452. The percentage of the population currently below the poverty level for that time frame is 43.1%. Soils: Project area soils have developed in alluvium and residuum derived from the Tongue River Member of the Tertiary Fort Union Formation, with minor components developing from alluvium of modern channels and floodplains. Lithology consists of light to dark yellow and tan siltstone and sandstones with coal seams.

In many areas, the coal seams have burned, baking the surrounding rock, producing clinker. Differences in lithology have produced the topographic and geomorphic variations seen in the area. An erosion resistant cap of clinker, porcellanite or sandstone protects higher ridges and hills. Soils have surface and subsurface textures varying from gravelly loam to sandy and fine sandy loams to silt loam. Soil depths vary from >200 cm deep on shallow slopes to <18 cm on steep slopes. Soils are generally productive, ranging from 600 to 2,200 lbs/acre, depending on depth, slope, water holding capacity, and chemical composition. Calcium carbonate within these soils averages approximately 5.6%, which does not limit plant productivity, and slopes range from 2-70 percent, with the majority of falling in the 12-15 percent range. Approximately two percent of these soils are considered to be farmland of statewide importance. The majority of these soils are highly susceptible to fire degradation, however they are also rated as having a high potential for restoration.

Vegetation: The project area involves two grazing allotments. The Moreland allotment was assessed in 2003, and was found to be meeting the Standards for Rangeland Health. This determination was confirmed in 2012 by an interdisciplinary team. Dominant herbaceous species include bluebunch wheatgrass, little bluestem, sideoats grama, and western wheatgrass. There is a large diversity of forbs. Shrub species include skunkbush sumac, Wyoming big sagebrush, greasewood, and rubber rabbitbrush. Rocky Mountain juniper and ponderosa trees are present with a very dense overstory in some areas. Leafy spurge infestations have been treated within the project area. These infestations are small in size and will be continually treated. The Quarter Circle U Allotment was assessed in 1999, and was found to be meeting the Standards for Rangeland Health. This determination was confirmed in 2016 by an interdisciplinary team. The Quarter Circle U Allotment shares the same dominant species as the Moreland Allotment.

Lands with Wilderness Characteristics: The result of the wilderness characteristics inventory in the late 1970s for this area resulted in the BLM recommending the area be managed under Section 603 of the Federal Land Policy and Management Act (FLPMA). This recommendation was accepted by the Secretary of Interior; therefore resulting in the area being designated as the Zook Creek Wilderness Study Area. This designation as the Zook Creek Wilderness Study Area and the associated management of these lands were to be in accordance with Section 603(c) of FLPMA until such a time Congress determined otherwise. With the enactment of Public Law 113-291, the National Defense Authorization Act of 2015 (NDAA), on December 19, 2014, Zook Creek WSA was released by Congress from being managed as WSAs (i.e. under Section 603 of FLPMA). NDAA also stated this area was to be managed in accordance with Section 202 of FLPMA.

VRM: The proposed project is located within a VRM Class II management objective (see attached map). The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Wildlife: The project area consists of steep ridges and valleys dominated by closed canopy ponderosa pine (*Pinus ponderosa*) and rocky mountain juniper (*Juniperus scopulorum*). Wyoming big sagebrush (*Artemisia tridentata*) and grasslands can be found along drainage bottoms. South facing slopes have scattered timber with herbaceous cover including yucca (*Yucca glauca*), and skunkbrush sumac (*Rhus trilobata*). The steep topography and thick stands of ponderosa pine and juniper reduces snow accumulation and provides thermal cover. Valleys are incised with steep ridges and rocky outcroppings and provide limited shrub and herbaceous vegetation. Currant (*Ribes spp.*), chokecherry (*Prunus virginiana*), western snowberry (*Symphoricarpos occidentalis*) and Wood's rose (*Rosa woodsii*) can be found in microsites within the planning area.

The project area is located in elk, white-tailed and mule deer, wild turkey, bobcat, coyote, and mountain lion habitat. Various non-game species are expected in the treatment area, including raptors, various small mammals, amphibians, and migratory birds. Two red tailed hawk nests of unknown activity are 510 and 942 meters from the project planning area. Mule deer winter range falls within a portion of treatment area. The closest known sharp-tailed lek is 1.6km from the treatment area and closest known greater sage-grouse lek is over 28km from the treatment area.

Portions of the planning area may provide habitat for species considered as BLM "special status species". Special status species (SSS), collectively, are United States Fish and Wildlife Service (USFWS) federally listed or proposed

species, and the BLM sensitive species from the 2014 Montana/Dakota's sensitive species list. BLM sensitive species also include both federal candidate species and delisted species within 5 years of delisting. The following table presents this list of species that may be within the planning area and if suitable habitat is present.

Table 2: Potential occurrence of BLM sensitive species and USFWS threatened, endangered, candidate or proposed terrestrial species in planning area.

Species	USFWS Status	BLM Status	Suitable Habitat present
Mammals			
Long-legged Myotis	None	Sensitive	Yes
Townsend's big-eared bat	None	Sensitive	Yes
Fringed Myotis	None	Sensitive	Yes
Pallid Bat	None	Sensitive	Yes
Birds			
**Bald eagle	None	Sensitive	Yes
Baird's sparrow	None	Sensitive	Not likely
Black tern	None	Sensitive	Not likely
Chestnut-collared longspur	None	Sensitive	Possible
Golden eagle	None	Sensitive	Yes
Ferruginous hawk	None	Sensitive	Yes
Swainson's hawk	None	Sensitive	Yes
Northern goshawk	None	Sensitive	Possible
Loggerhead shrike	None	Sensitive	Yes
Brewer's sparrow	None	Sensitive	Yes
Lewis's woodpecker	None	Sensitive	Yes
Long-billed Curlew	None	Sensitive	Not Likely
Red-headed woodpecker	None	Sensitive	Yes
Black-backed woodpecker	None	Sensitive	Yes
Amphibians			
Great Plains toad	None	Sensitive	Yes
Northern leopard frog	None	Sensitive	Yes
Plains spadefoot	None	Sensitive	Yes
Reptiles			
Greater short-horned lizard	None	Sensitive	Yes
Milk snake	None	Sensitive	Yes
Western hog-nosed snake	None	Sensitive	Yes

Table 2 sources: MTNHP (2015); USDI BLM (2014); USDA – NRCS Plants Database (2010) USFWS (2008)

**Bald eagle has been delisted and has been moved to the sensitive list.

ENVIRONMENTAL IMPACTS:

DESCRIPTION OF IMPACTS FROM PROPOSED ACTION:

Cultural: The proposed action could adversely impact two historic properties. Avoidance of the historic properties is required. An area of 200meters SW to NW and 150 meter NESE is needed for the eagle catching complex and an area 250 meters W/W by 200meters N/S for the cabin site. This would result in no adverse effect to historic properties. Unanticipated discoveries of cultural materials on BLM managed lands during project implementation would require notification to the BLM and avoidance until notified to proceed by the BLM Authorized Officer.

Fire: Treated areas would be moved towards a FRCC 1, with healthier, more open stands of trees conducive to higher frequency, lower intensity fires. Under the proposed action, fire intensity would be decreased as a result of reduced fuel loading. Future natural fires would be less extensive and smaller in size. Smaller wildfires would be easier to manage, reducing the risk to multiple natural resources, private withholding's, and physical structures. The danger of large, uncontrolled wildfires would be reduced under this alternative. Pollet and Omi (2002) found that fuel treatments mitigate wildland fire severity and provide an opportunity for effective fire suppression in treated areas.

Water Resources and Riparian-Wetland Areas: The proposed action could have impacts to surface water quality and quantity. Reducing vegetation density through the removal of overstocked ponderosa pine and Rocky Mountain juniper would result in less evapotranspiration and less precipitation interception by forest canopy, which could increase overland runoff and stream flows. Soil compaction from mechanical treatments and hydrophobic (water repellent) soil conditions that could develop from prescribed pile burning could decrease infiltration, which could also increase overland runoff and stream flows. Increased overland runoff could increase soil erosion and sediment delivery, and increased stream flows could cause channel erosion and streambank instability. While these effects could occur, they are not expected to be significant or result in exceedances of MDEQ perennial stream water quality standards for sedimentation/siltation because: 1) implementation would occur when ground conditions are frozen or dry, 2) ground cover that inhibits soil erosion would quickly re-establish, 3)no surface disturbing activities would occur in or within 300ft of the boundary of the riparian-wetland areas that are present in the project area, and 4) riparian areas would receive hand thinning treatment only, thereby retaining their infiltration and sediment filtration functions that would buffer the stream from potential increases in overland runoff and sediment delivery.

Socio-economics: Potential total financial impact of the project to the Northern Cheyenne Tribe is \$708,000. Approximately \$500,000 will be paid in wages to seasonal Tribal crewmembers, which will have a significant impact on the community. An additional \$155,000 will be paid to the agency for contract administration costs with the remainder of the money being utilized for supplies and cultural clearances.

Soils: Prescribed Fire: Prescribed fire would remove ground cover and expose soils to wind and water erosion; project area soils are particularly susceptible to water erosion. However, fire would also result in enhanced nutrient cycling, soil development, and biodiversity. Soils would recover natural rates of erosion and productivity within two to five years following disturbance. Prescribed fire would reduce the risk of catastrophic wildland fire. A stand-replacing wildland fire would result in higher rates of erosion and mass movement as compared to areas burned with prescribed fire. High soil burn severity from a catastrophic wildland fire would also result in sterilized soils, increased pH, reduced fertility, increased overland flow, and/or produce a hydrophobic surface layer, which would inhibit water infiltration.

Mechanical: Soil disturbance would occur primarily from soil mixing, compaction, and ground-cover removal, exposing soils to accelerated erosion by wind and water. Compaction would decrease nutrient cycling, and increase runoff until the site returns to natural rates due to freeze–thaw cycles. Though there are steep slopes within the project area, treatments would be applied when environmental conditions reduce impacts to soils (e.g., frozen or dry soils). Masticated material would shade the soil surface reducing soil temperatures and increasing moisture content, creating microsites for herbaceous seedling establishment. Masticated material would also result in increased soil bacteria

populations leading to depleted nitrogen content for several years, followed by increased fertility and pH. Project area soils are resilient to disturbance and would recover natural rates of erosion, compaction, and have increased productivity within two to five years following disturbance.

Hand Thinning: Soil disturbances including mixing, compaction, and ground-cover removal would not occur with hand thinning methods. Slash material would shade the soil surface reducing soil temperatures and increasing moisture content, creating microsites for seedling establishment. Slash material would also result in increased soil bacteria populations leading to depleted nitrogen content for several years, followed by increased fertility and pH. Project area soils are resilient to disturbance and would recover natural rates of erosion, compaction, and nutrient cycling, subsequently increasing productivity within two to five years following disturbance. An increase in erosion and a decrease in productivity beneath slash and pile burns is likely in response to the removal of protective vegetation and organic matter. These effects would be localized and minimal with the implementation of BMPs. Effects from wider spread slash burns will be minimized by burning in the fall or spring, using a low intensity burn.

Vegetation: *Prescribed Fire:* Removing the dense stands of ponderosa pine and rocky mountain juniper would increase production of native grasses, forbs and shrubs. There would be an increase of available area for grasses, forbs and shrubs to re-establish post fire. Vegetative cover would be reduced for a short period of time but long term effects would not be expected. Mature ponderosa pine trees are well adapted to survive surface burns with thick bark that protects the cambium and high crowns that lessen the possibility of crown scorch (Brown 2006). Surface fire's main effect was to kill the majority of tree regeneration (Brown 2006) which reduced ladder fuels lessening the possibility of crown fires in mature trees. Mature ponderosa pine tree health would be enhanced by a reduction in competition for water and nutrients. Opening up the canopy would allow for increased production of herbaceous and shrub species (Thompson and Gartner 1971) that are currently lacking in most of the current understory. Most of the shrub component would re-sprout and would be rejuvenated by the nutrient release from the ash produced by the fire. Western wheatgrass cover usually increases or changes little after fire (Tirmenstein 1999). Fall, winter, and spring burning of little bluestem usually increases productivity, while fire during the growing season is generally detrimental as dry conditions allow hotter fire that burns the crowns more easily (Steinberg 2002). Canada thistle infestations may occur in the short term after disturbance from prescribed fire. Native vegetation usually out-competes the Canada thistle infestations within one to two years due to healthier soil conditions. If the infestations are still present in the third season they will be chemically treated to aid in native plant establishment.

Mechanical: Removing the dense stands of ponderosa pine and rocky mountain juniper would increase production of native grasses, forbs and shrubs (Thompson and Gartner 1971). Residual woody vegetation would be left on-site and would consist of slash/wood chips created from mastication equipment. Wood chips scattered across the site would allow for increased infiltration and water retention and decreased soil erosion. The decomposition of woody plant material should also improve soil nutrient content which could enhance recruitment, establishment and long-term viability of the grass and shrub community, as well as provide protection to the soil resource. Some understory vegetation would be impacted by the track or wheeled equipment navigating through the site. However, the impacts of the equipment moving through the site would be short term. Vegetation left on-site, as a whole, would benefit in the long term resulting in decreased competition and increased vegetation species composition, structure and health. These treatment methods would have less of an impact on understory vegetation than burning. Litter and debris resulting from mastication treatments would benefit the site and improve infiltration and water retention. Canada thistle infestations may occur in the short term after disturbance from mechanical thinning. Native vegetation usually out-competes the Canada thistle infestations within one to two years due to healthier soil conditions. If the infestations are still present in the third season they will be chemically treated to aid in native plant establishment.

Hand Thinning: Removing the dense stands of ponderosa pine and rocky mountain juniper would increase production of native grasses, forbs and shrubs (Thompson and Gartner 1971). There would be an increase of available nutrients and space for grasses, forbs and shrubs to re-establish. Vegetative cover would be reduced for a short period-of-time but long term effects would not be expected. Mature ponderosa pine tree health would be enhanced by a reduction in competition for water and nutrients. Additionally, opening the canopy would allow for increased production of herbaceous and shrub species that are currently lacking in most of the current understory.

Lands with Wilderness Characteristics: The result of the fuels treatments would impact the naturalness of the area through the reduction of the conifer trees. However, in the long term the treatments would result in the improvement in the naturalness of the area through providing an area that would appear to be affected primarily by the forces of nature and not an area that illustrates the impact of suppressing wildland fires.

VRM: Prescribed Fire: The landscape would be burned with areas void of above ground vegetation. These impacts would affect color and texture of the landscape, however, they would be temporary and short term in nature as vegetation begins to reestablish post burn. Fire is a natural process in this ecosystem so any effects will still be “natural”. Color of the landscape could change during the implementation phase due to trampling of vegetation caused by equipment and any off-road travel by engines and UTV’s required during this phase.

Mechanical: Reducing canopy cover will create a change to the visual texture of the area; however this should not dominate the view of most casual observers. Impacts to line, color and texture would change due to the changes in vegetation (decrease of ponderosa pine and juniper). New noxious weed infestations created by the proposed project would also create a short term visual change for the area, but would decrease over time. Implementation of the proposed action, such as the masticated material, would create a short term visual intrusion impacting color and texture of the landscape. After natural rates of decomposition occur, the action would not detract from the existing character of the project area.

Hand Thinning: Reducing canopy cover will create a change to the visual texture of the area; however this should not dominate the view of most casual observers. Impacts to line, color and texture would change due to the changes in vegetation (decrease of ponderosa pine and juniper). New noxious weed infestations created by the proposed project could also create a short term visual change for the area, but would decrease over time. Implementation of the proposed action, such as the slash piles, would create a short term visual intrusion impacting color and texture of the landscape. After burning of slash piles and natural rates of decomposition occur, the action would not detract from the existing character of the landscape.

Mitigation methods would include a feathering cut vs. straight cut to reduce the visibility of sharp lines within the natural occurring landscape. The three combined items will create a change in the landscape viewshed from the current landscape characteristic currently within the proposed project area. However, with mitigation and under current and proposed VRM condition classes of II, management activities should not attract the attention of the casual observers.

Wildlife: Prescribed Fire: As stated by Smith and Fischer (1997), fire may threaten a population that is already small if the species is limited in range and mobility or has specialized reproductive habits. Mortality rates from a prescribed fire are low, as most animals have adapted avoidance measures in response to such disturbances (Smith 2000). Most avoidance measures include burrowing or tunneling underground, or fleeing the immediate area. Neonates account for most of the mortality as they are less mobile. Burning in spring months may result in higher mule deer and elk fawn mortality as the spring treatment months overlap with parturition times. The loss of reproductive efforts for the year within the treatment area would have inconsequence effects on a regional scale.

A spring prescribed burn would affect migratory birds through the destruction of nests and reducing forage available. The prescribed fire may coincide with raptor egg laying, incubation, hatching, and rearing of young. Older and larger diameter trees with thickened bark, which often contain raptor nests, are less likely to be effected by a prescribed burn.

Prescribed fires leads to a short-term decline in coarse woody debris on the forest floor within a ponderosa pine forest, ranging from 36-61 percent in similar project areas (Randall-Parker & Miller, 2002). This will initially reduce the amount of insects, decreasing forage for many small mammals and birds. Small mammals also use the course woody debris for shelter and seed food sources. One year after the initial treatment, small rodents typically show an increase in abundance, providing additional food sources for raptors and small carnivores. The alteration of vegetative structure from fire often favors raptors by reducing hiding cover and exposing prey populations. When prey species

increase in response to fire raptors are also favored (Smith 2000). This can increase foraging opportunities for those sensitive species raptors that may occur within the proposed action area.

Fall burns eliminate plant biomass that holds moisture, eliminating forage for elk and deer the initial winter after a prescribed burn. By the spring, the increased production of native forbs and grasses will increase the density and nutrients of forage for ungulate species. Mule deer and elk favor early successional to intermediate seral vegetation stages where habitats are abundant with nutrient rich grasses, forbs and shrubs. Shrubs and small tree species frequently browsed by ungulates, such as currant (*Ribes spp.*), chokecherry (*Prunus virginiana*), western snowberry (*Symphoricarpos occidentalis*), skunkbrush sumac (*Rhus trilobata*) and Wood’s rose (*Rosa woodsii*), can benefit greatly from low to moderate intensity fire as sprouting and seedling development are enhanced (Fox et. al., 2009).

Initial mortality from the burn is possible in bats species if the fire advances rapidly or flame heights reach that of roosting bats. Post-fire, burned areas provide increased prey availability for bats and roost sites as well as increased foraging opportunities by reducing clutter. Bats tend to be resilient to forest fires and results from fire in mixed conifer forests of California suggest that some species may select for burned areas (Buchalski et. al., 2013).

Studies show a range of 12-38 percent net decrease in snags in prescribed fires in ponderosa pine forests (Randall-Parker & Miller, 2002) leading to decrease nesting habitat and insect abundance for bird species. 10-20 years post fire, species such as bluebirds, flycatchers, and swallows were noted to utilize the areas because of improved aerial foraging following decreases in canopy cover and increases in flying arthropods associated with shrub regrowth (Lowe et al., 1978, Hannon & Drapeau, 2005). The desired fire prescription will result in a release of nutrients from a consumption and reduction of understory and over story vegetation. Additional light will be entering the ground in these timbered habitats. This will promote a flush of diverse herbaceous vegetation including grasses, forbs and shrubs. This flush of vegetation would provide increased nesting cover for ground nesting avian species. Habitat for avian species associated with and adapted to late successional closed canopy forests will be degraded, thus leading to a shift in bird community composition.

Table 3. Predicted responses by cavity-nesting birds to three possible fire regimes compared with the presettlement low intensity, high frequency fire regime in Idaho ponderosa pine/ Douglas-fir forests (Saab and Dudley 1998), presented as a framework of hypotheses to be tested. + = more favorable than presettlement regime, 0 = no different, - = less favorable.

Bird Species	Potential new fire regime		
	High intensity stand replacement fire	Complete fire suppression	Prescribed fire with stand management
American kestrel	+	-	+
Lewis’ woodpecker	+	-	+
Red-naped sapsucker	-	0	+
Downy woodpecker	-	0	+
Hairy woodpecker	+	0	+
Black-backed woodpecker	+	-	0
White-headed woodpecker	-	-	+
Northern flicker	+	+	-
Pileated woodpecker	-	+	-
Western bluebird	+	-	+
Mountain bluebird	+	-	+

Note: Table as presented in Smith (2000).

Populations of opportunistic large carnivores and omnivores with large home ranges change little in response to fire.

Sage grouse will not be affected by the desired prescription as suitable habitat does not exist within the proposed action area.

Timing restrictions and impact mitigation

NEPA analysis pursuant to Executive Order (EO) 13186 (January 2001) requires BLM to ensure migratory bird treaty act (MBTA) compliance and ensure the effects of Bureau actions and agency plans on migratory birds are evaluated, reduce take of migratory birds and contribute to their conservation. Additionally, the EO directed a Memorandum of Understanding (MOU) to be prepared between the Bureau and the USFWS for further guidance. The MOU between the agencies was finalized in 2010.

The purpose of the MOU was to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds from land management actions such as from this proposal. The MOU prioritized direction to: 1) focus on bird populations, as opposed to individuals or the species, in their entirety; 2) focus on habitat restoration and enhancement where actions can benefit specific ecosystems and migratory birds dependent upon them; and 3) recognize that actions that may provide long-term benefits to migratory bird populations as a whole may also have impacts on individual birds. This proposed action and resulting habitat enhancement meets and supports the directives for migratory bird conservation identified in the MOU. Short term affects such as direct mortality to individuals may occur; however, local populations of native migratory birds would be expected to be maintained or increase over the long term from habitat enhancement through project implementation. As a result of beneficial long term affects, no timing restriction will be applied to mitigate impacts to migratory birds.

No raptor nests are identified within the treatment areas; however, surveys prior to implementation will be conducted. In the event a nest is identified prior to implementation, one of the following mitigating efforts may be applied: appropriate buffers or timing restrictions, nesting substrate or nest trees removed prior to nest initiation, or specific pretreatment fuels reductions adjacent to nest tree.

Winter range for mule deer was identified within the treatment units. Our desired prescription may overlap with the MCFO suggested timing stipulation of December 1 to March 31 if prescribed burns are to occur during early spring months. While previously acknowledging potential short-term impacts, the prescribed fire treatments and resulting enhanced big game foraging opportunities are expected to provide long-term benefits to local mule deer populations, thus the commonly applied big game timing restriction will not be required.

Mechanical: Direct mortality as a result of mechanic thinning is uncommon but possible. Less mobile wildlife, including young, are most susceptible to direct mortality. An initial disturbance leading to displacement of resident wildlife is expected during the mechanical thinning process. Potential impacts will be minimized for bird species by adhering to a timing restriction within the proposed action. Mule deer winter range is identified within the project area; however, a timing restriction will not be applied for this action.

Long-term displacement will occur in species that prefer closed canopy or dense forest habitat types. Under mechanical and manual treatment, habitat alterations can be more selective than a wildfire event (i.e. the equipment operator can discriminate between a chokecherry and a pine whereas fire cannot). Small mammals, particularly rodents, show an increase in abundance after mechanical treatment and increase forage for carnivores and raptors. Increased coarse woody debris through slash deposits create additional shelter and a growth in insect abundance, increasing bird species that rely on insects as the primary source of their diet, such as woodpeckers.

The debris also protects plant biomass in the winter from frost and provides winter forage for ungulate species. Long term benefits of rejuvenated forbs and shrubs within these treated areas will offer long term benefits to winter range forage. Opening of the forest canopy increases grass and forb growth providing an increase in available forage for

mule deer and elk. Total biomass production was nearly four times higher in ponderosa pine forests with moderate to heavy thinning, with shrubs contributing to 78% of the biomass in South Dakota (Gibbs et al. 2004). Reducing canopy cover to 85% or less will increase utilization of the area from mule deer. Treatments would be expected to result in a reduction in hiding and thermal cover, nesting cover, brood-rearing and fawning cover, travel corridors, and forage until these areas were re-vegetated, although not to the same extent and duration as if a stand replacing wildfire occurred.

The resulting increase in open canopies and mosaics would provide additional “edge” habitat, which is valuable for many species. Additional sunlight from the removal of conifers would stimulate browse and shade-intolerant species, increase the palatability and nutrient content of available forage, and increase the recruitment of forbs. Over the long term, the diversity of vegetation would likely increase and the functionality of wildlife habitat would be enhanced, which may increase wildlife species diversity in the area.

The treatments proposed would also significantly reduce the potential for extensive loss of habitats to wildfire in the project area. Because the project area is adjacent to state and private lands, actions on public lands would create a mosaic within the landscape. Adjacent private lands may not be affected and would provide somewhat differing habitats for wildlife and both combined would create a diversity of habitats for wildlife.

Hand Thinning: Following the treatment, similar effect to mechanical treatment is expected. There will be an increase in the abundance of insects, small rodents, and birds within the treatment area. This will provide additional food sources for carnivores and raptors. As opposed to mechanical thinning and prescribes fire, the initial disturbances during the thinning process is reduced and contained to small areas, minimizing disruption to wildlife.

DESCRIPTION OF IMPACTS FROM ALTERNATIVE 1 - NO ACTION:

Cultural: Cultural Sites would not be impacted by fuels treatments if the no action alternative is selected.

Fire: Under the no action alternative, the project area would continue its current trend of growth and buildup of vegetation and subsequent hazardous fuels. Tree stands would continue to become overstocked and regenerative growth providing ladder fuels for ground fire to transition to the crown. During extreme weather and fuel indices, the effect from intensity and severity of a naturally occurring wildfire would be compounded with the effects from suppression efforts which under these extreme conditions would require utilizing heavy mechanized equipment, use of aerial fire retardant chemicals, and other surface disturbing suppression actions to control the fire. Adjacent private land owners and Tribal lands would be at an increased risk of wildland fire leaving public land. Fire fighters would be subjected to increased risk to manage the wildland fire on a landscape with elevated fuel loadings. The cost to suppress the wildfire would be greater from an untreated or heavily fuel loaded landscape due to the increased need for resources to manage the incident.

Water Resources and Riparian-Wetland Areas: Water resources and riparian-wetland areas would continue at their current trends until a significant wildfire event occurs.

Livestock Grazing: Livestock grazing will continue as permitted. However, as ponderosa pine and Rocky Mountain juniper continue to increase the capability of this area to support the permitted amount of forage would no longer be possible.

Socio-economics: Under the no action alternative, no treatment would take place. This would result in no positive impact to the local economy. Potential consequences from a large catastrophic fire could result in negative financial impacts to the community through the potential loss of revenue from cattle sales and recreationalists.

Soils: Conifers would continue to maintain an altered soil system with erosion rates, soil development, nutrient cycling, and soil biodiversity altered from the natural regime.

Vegetation: The vegetative community would continue to change in both the short and long term. The number of

ponderosa pine trees and Rocky Mountain juniper will increase until disease or wildfire alter the landscape. Grasses and shrubs, including silver sagebrush and common chokecherry will decrease as they are out competed by conifers. With an insect/disease or wildfire event, a large reduction in conifers is probable and an increase in the shrub component is likely. Green ash associated with the ephemeral drainages will likely follow the same pattern as the chokecherry. Existing known invasive species populations would be treated. Any newly discovered infestations would be inventoried and treated to limit the spread of the species.

Lands with Wilderness Characteristics: Since there would be no treatment, there would be no impact to wilderness characteristics.

VRM: The VRM objective would not change under this alternative.

Wildlife: Wildlife use will not change in the short term. This will remain an area of use for mule and whitetail deer, elk, wild turkeys, and closed canopy bird species, or those birds that are more closely associated with dense forest habitats. Should disease or wild fire occur, an associated change in the kind and amount of wildlife use would also occur. If treatments are not completed, the potential for a stand-replacing wildfire would remain high. A severe wildfire could cause direct or indirect mortality to wildlife species from actual heat/burn injury as well as the loss of habitat and displacement to those species.

CUMULATIVE IMPACTS: This area is currently being grazed by livestock and this use is not likely to change. Small fires (less than 100 acres) are common in the project area. Large fires have occurred in the Zook Creek area, which have changed the vegetative community of the fire area. Some users of the public land may consider large-scale wild fire undesirable.

MITIGATION: NEPA analysis pursuant to Executive Order (EO) 13186 (January 2001) requires BLM to ensure migratory bird treaty act (MBTA) compliance and ensure the effects of Bureau actions and agency plans on migratory birds are evaluated, reduce take of migratory birds and contribute to their conservation. Additionally, the EO directed a Memorandum of Understanding (MOU) to be prepared between the Bureau and the USFWS for further guidance. The MOU between the agencies was finalized in 2010.

The purpose of the MOU was to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds from land management actions such as from this proposal. The MOU prioritized direction to: 1) focus on bird populations, as opposed to individuals or the species, in their entirety; 2) focus on habitat restoration and enhancement where actions can benefit specific ecosystems and migratory birds dependent upon them; and 3) recognize that actions that may provide long-term benefits to migratory bird populations as a whole may also have impacts on individual birds. This proposed action and resulting habitat enhancement meets and supports the directives for migratory bird conservation identified in the MOU. Short term affects such as direct mortality to individuals may occur; however, local populations of native migratory birds would be expected to be maintained or increase over the long term from habitat enhancement through project implementation. As a result of beneficial long term affects, no timing restriction will be applied to mitigate impacts to migratory birds.

No raptor nests are identified within the treatment areas; however, surveys prior to implementation will be conducted. In the event a nest is identified prior to implementation, one of the following mitigating efforts may be applied: appropriate buffers or timing restrictions, nesting substrate or nest trees removed prior to nest initiation, or specific pretreatment fuels reductions adjacent to nest tree.

Winter range for mule deer was identified within the treatment units. Our desired prescription may overlap with the MCFO suggested timing stipulation of December 1 to March 31 if prescribed burns are to occur during early spring months. While previously acknowledging potential short-term impacts, the prescribed fire treatments and resulting enhanced big game foraging opportunities are expected to provide long-term benefits to local mule deer populations, thus the commonly applied big game timing restriction will not be required.

Prior to project initiation, an area of 150 meters by 200 meters for the eagle catching complex and cabin site would be flagged for avoidance. The flagging would be done by the Northern Cheyenne THPO Office.

CONSULTATION/COORDINATION: Northern Cheyenne Agency, Bureau of Indian Affairs, Permittees.

LIST OF PREPARERS:

Paul Pauley-Fire Management Specialist
Dawn Doran – Rangeland Management Specialist
Fiona Petersen – Wildlife Biologist
Doug Melton – Archaeologist
Drea Traeumer – Hydrologist,
Brenda Witkowski – Natural Resource Specialist
Dena Lang – Outdoor Recreation Specialist
Reyer Rens – Supervisory Rangeland Management Specialist
Joshua Buckmaster – Soil Scientist

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Zook Creek Mechanical Treatment

