

**RED ROCK LAKES NATIONAL WILDLIFE REFUGE
HAZARDOUS FUELS REDUCTION PROJECT**

ENVIRONMENTAL ASSESSMENT

United States Fish & Wildlife Service
Red Rock Lakes National Wildlife Refuge

August, 2014

Chapter 1 - Purpose and Need

1.1 Introduction

This Environmental Assessment (EA) documents the results of a study of the potential environmental impacts of actions proposed by the U.S. Fish and Wildlife Service to reduce the fire hazard and restore forest system health at Red Rock Lakes National Wildlife Refuge by use of mechanical and prescribed fire methods.

This EA has been prepared in compliance with:

- The National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for major Federal Actions having the potential to impact the quality of the human environment;
- Council of Environmental Quality Regulations at 40 Code of Federal Regulations (CFR) 1500-1508, which implement the requirements of NEPA;
- US Fish and Wildlife NEPA Policy Handbook (550 FW 1)
- National Wildlife Refuge System Improvement Act, 1997

Key objectives of NEPA are to help Federal agency officials make well-informed decisions about agency actions and to provide a role for the general public in the decision-making process. The study and documentation mechanisms associated with NEPA seek to provide decision-makers with sound knowledge of the comparative environmental consequences of the several courses of action available to them. NEPA studies, and the documents recording their results, such as this EA, therefore focus on providing input to the particular decisions faced by the relevant officials. In this case, the Manager of the Red Rock Lakes is faced with a decision as to what, if anything, the Fish and Wildlife Service should do to reduce the fire hazard and restore forest stands.

The Purpose of an Environmental Assessment (EA)

An EA study is performed by a Federal agency to determine if an action they are proposing to implement would significantly affect any portion of the environment.

The intent is to provide project planners and Federal decision-makers with relevant information on a Proposed Action's potential impacts to the environment.

If the study finds no significant impacts, then the agency can publish a Finding of No Significant Impact (FONSI) and can proceed with the action. If the study finds there would be significant impacts, then the agency must prepare and publish a detailed Environmental Impact Statement to help determine how to proceed with the action.

These plans establish overall rules and guidance for management and forest stand restoration-related actions taken within the refuge. Therefore, the alternative courses of action considered in this EA were crafted to be consistent with the concepts established in them.

1.1.1 Background

Red Rock Lakes National Wildlife Refuge is located in the Centennial Valley in southwestern Montana in Beaverhead County, 45 miles west of West Yellowstone and 43 miles east of the town of Lima. It is one of the most remote refuges in the contiguous United States and is bordered by private land and public lands managed by the Bureau of Land Management (BLM), US Forest Service (USFS), and Montana Department of Natural Resources and Conservation (DNRC). Land is mostly undeveloped with cattle ranching being the primary economic use of the surrounding area.

President Franklin D. Roosevelt established Red Rock Lakes Migratory Waterfowl Refuge (later named Red Rock Lakes National Wildlife Refuge on July 19, 1961) under Executive Order 7023, signed on April 22, 1935, “as a refuge and breeding ground for wild birds and animals.” On September 4, 1935, President Roosevelt enlarged the refuge under Executive Order 7172, “provided, that any private lands within the areas described shall become a part of the refuge upon the acquisition of title or lease thereto by the United States.” The refuge currently encompasses over 51,000 acres.

One of the management goals identified in the Refuge’s Comprehensive Conservation Plan (CCP) is to “create and maintain aspen stands of various age classes within a mosaic of coniferous forest and shrubland for cavity-nesting birds, and other migratory and resident wildlife.” Another management goal stated in the CCP is “to provide wildland-urban interface (WUI) protection around Lakeview...” and to “...develop a fire management plan that will use prescribed fire and mechanical treatments to thin conifer stands and reduce hazardous fuels, minimizing threat to life and property.” The Refuge contains over 3,500 acres of coniferous woodlands (evergreen trees having <60% canopy cover) and forests (evergreen trees having >60% canopy cover). (USFWS, 2009) In addition, aspen communities comprise approximately 280 acres on the refuge. Since Euro-American settlement of the Centennial Valley, which includes the refuge, wildfires have been suppressed. Suppression of wildfires contributes to an increase in the overall density of trees within forested habitats. Historic cattle grazing of forests also reduced fine grass fuel loads, which suppresses the spread of wildfires. Combined, both factors created ideal conditions for the expansion of conifer (e.g. Douglas-fir) species into aspen habitats within the Centennial Valley of southwest Montana (Heyerdahl et al 2006, Korb 2005, Sankey et al. 2006). Conifer encroachment in aspen stands is believed to be one of the factors leading to the large scale declines of Aspen communities in the Greater Yellowstone Ecosystem (Brown et al. 2006).

Coniferous woodland, forest, and aspen community health has decreased since settlement of the Centennial Valley. Conifer mortality can be attributed to the impacts of fire suppression, historically high tree densities, and global climate change. Currently, both native bark beetles and exotic diseases (e.g. white pine blister rust) are the primary drivers of the large scale die-off of many conifer species across the Intermountain West. High tree densities often cause

decreased individual tree vigor, which are more susceptible to insect and pest outbreaks. The abundance and distribution of dead and dying conifers is high in southwest Montana, creating a larger risk for a catastrophic wildfire that could have dire impacts on ecological systems and human health and safety. The Centennial Valley of southwest Montana is a place where aspen forests have declined greater than four-fold, coinciding with an increase in conifer encroachment of greater than three-fold. These conditions have led to the concern of severe wildfire that not only threatens biodiversity, but also now threatens human life and property. The town of Lakeview is nestled in a mountainous landscape of the Centennial Valley, and is home to the Red Rock Lakes NWR headquarters, the University of Utah Environmental Humanities Education Center, and several private landowners. The fuel loads within the forests surrounding Lakeview have now increased to the point where action is needed to reduce the potential for significant loss of human property and to improve aspen habitats by increasing their abundance and distribution. The area around Lakeview is considered a high-risk wildland-urban interface.

1.2 Purpose and Need

The U.S. Fish and Wildlife Service proposes to implement a plan to reduce the wildland fire hazard on approximately 350 acres within Red Rock Lakes National Wildlife Refuge, as well as promote aspen restoration to increase habitat quality and species diversity. The objectives of the plan are to:

- provide a margin of protection to neighboring residences from future wildfires;
- reduce the likelihood of catastrophic stand-altering fire;
- help restore and maintain the health of forest stands;
- restore aspen groves and create preferable timber stand diversity for wildlife

The existing high fire hazard on the refuge is the result of fire exclusion in recent history. As a result of fire suppression efforts, much of the refuge contains overly dense stands of Douglas-fir and mixed conifer forest communities. These stands, in conjunction with equally high levels of woody debris on the ground, pose a high fire hazard to those residences adjacent to the refuge. Aspen habitats also support a high diversity of migratory birds, so the decline in aspen could affect bird diversity, and other wildlife species diversity, that live within this altered habitat.

1.2.2 Human Health & Safety

A key component in meeting the underlying need is the protection and treatment of fire hazard in the wildland urban interface. The wildland urban interface refers to areas where wildland vegetation meets urban developments, or where forest fuels meet urban fuels (such as houses). These areas encompass not only the interface (areas immediately adjacent to urban development), but also the continuous slopes and fuels that lead directly to the urban developments. Reducing the fire hazard in the wildland urban interface requires the efforts of federal, state, and local agencies, and private individuals. Similar thinning work, using mechanical equipment and commercial contractors, has been completed around Lakeview by private landowners and the Montana DNRC. “The role of [most] federal agencies in the wildland urban interface includes wildland firefighting, hazard fuels reduction, cooperative

prevention and education and technical experience. Structural fire protection [during a wildfire] in the wildland urban interface is [largely] the responsibility of state, and local governments” (USFS, 2014). Property owners share a responsibility to protect their residences and businesses and minimize fire danger by creating defensible areas around them and taking other measures to minimize the fire risks to their structures (Schossler, 2012). With treatment, a wildland urban interface can provide firefighters a defensible area from which to suppress wildland fires or defend communities. In addition, a wildland urban interface that is properly thinned will be less likely to sustain a crown fire that enters or originates within it.

By reducing hazardous fuel loads, ladder fuels, and tree densities, and creating new and reinforcing defensible space, the Fish and Wildlife Service would protect the wildland urban interface, the biological resources of the refuge, and adjacent property owners by:

- minimizing the potential of high-severity ground or crown fires entering or leaving the refuge;
- reducing the potential for firebrands (embers carried by the wind in front of the wildfire) impacting the refuge. Research indicates that flying sparks and embers (firebrands) from a crown fire can ignite additional wildfires as far as 1 mile away during periods of extreme fire weather and fire behavior (McCoy et al., 2000);
- improving defensible space in the immediate areas for suppression efforts in the event of wildland fire.

The Beaverhead County Pre-Disaster Mitigation Plan has classified the structures in and around Lakeview as “high wildfire hazard structures.” The 2005 Beaverhead County Wildfire Protection Plan classifies Lakeview as a Category I High Wildfire Risk area. Montana DNRC maps show that Red Rock Lakes NWR has been classified as a Wildland-Urban Interface and the Federal Government has declared Lakeview as a “Community at Risk” in the Federal Register (August 17, 2001, Volume 66, Number 160). This wildland urban interface can be characterized as a Rural Condition, where scattered small clusters of structures (ranches, farms, resorts or summer cabins) are exposed to wildland fuels. Additional information on this topic can be found in: Teie, William C. and Weatherford, Brian F., *Fire in the West, The Wildland/Urban Interface Problem*, A Report for the Western State Fire Managers, 2000.

1.2.3 Forest Health

Forest health refers to the condition in which all the components of a forest (the plants, the animals, the soil, water and nutrients, i.e. the ecosystem) are interacting (growing, feeding, reproducing, dying) in a reasonably stable, self-sustaining pattern that maintains productivity and diversity appropriate to the location and climate, and which can renew itself and recover from various disturbance events as necessary, while meeting current and future desired levels of uses, and products for people (Dahms and Geils, 1997).

A forest ecosystem can "function" insofar as trees grow and various animals inhabit it, but the species and number of trees, their sizes and densities on the ground, and the numbers and

diversity of species of animals living there may be very different from a normally functioning, healthy forest system.

It is well documented that overstocked forest stands yield trees that are stunted in growth and in poor health because of increased competition for limited resources, particularly in drought years. Such conditions can increase tree susceptibility to disease and insect attack (McCambridge and Stevens, 1982, Fiddler et. al. 1989, Patterson, 1992).

1.2.4 Existing Conditions

Fire plays an important role in maintaining healthy conifer forests in Montana. Wildfires historically consumed the grassy and other herbaceous vegetation on the forest floor, along with the dead branches, needles, fallen trees, brush, and seedlings, while leaving the mature trees largely unharmed. The result was a forest community that was rather open and somewhat park-like, with very few young trees or seedlings growing among the grassy vegetation on the forest floor.

Mixed severity-fire regimes used to dominate the Centennial Valley, but fire has been excluded from the Centennial Valley for the last century (Korb, 2005). Wildfires were actively suppressed in and around the refuge. The result has been Douglas-fir and mixed conifer communities that have developed in the absence of natural fires for many decades. Without frequent fires to kill seedlings, many have survived to form dense stands of trees crowding and interfering with growth. High fuel loads in these overly dense stands can also be attributed to the dead woody material on the forest floor, standing dead trees, and dead trees that have fallen to rest on standing living trees. These ladder fuels can help flames climb from the forest floor up to the crowns of the trees. Although still alive, many conifers are stressed or dying due to beetle infestation. These trees may appear in normal health externally, but have low water content internally, and can ignite and burn intensely under the right conditions. When trees are close together as they are in many parts of the refuge, fire in tree crowns can spread rapidly from tree to tree. In forest communities where the historic role of fire has been altered, and where high fire hazard exists, high-severity wildfires can occur that oftentimes result in stand replacement, where a majority of a forest stand(s) is killed outright.

Fires are most often caused by lightning, although human caused starts are possible on the refuge. One hiking trail routes through the proposed treatment area, while it receives relatively low activity, heaviest use is during the big game hunting season. Hikers, backpackers, and horse travelers routinely bring fire starting devices into the outdoors, and although illegal, campfires could potentially be built on refuge lands. The use of emergency warming fires in exigent circumstances is also possible at any time of the year. Additionally, 2011 satellite imagery shows that approximately 50 structures, of which about 20 are houses or temporary use cabins, border the proposed treatment area of the refuge. Additional lots have been subdivided for residential development, while no development has yet occurred, it is anticipated to in the future. Bonfires, fireworks, and grass fires caused by motor vehicles or machinery, along with other activities and actions occurring on bordering private lands could lead to a wildland fire spreading onto refuge lands and the Centennial Mountains.

1.2.5 Desired Conditions

The Fish and Wildlife Service's objectives are to provide a margin of protection to neighboring residences from future wildfires; reduce the likelihood of catastrophic stand altering fire; help restore and maintain the health of the forest stands; and promote a more rapid restoration of aspen groves and conifer forest stand characteristics that would benefit a wide array of wildlife. A reduced fire hazard condition would be one in which refuge lands have sufficiently low fuel loading to prevent large, high-severity fires from spreading into or out of the refuge, reduce the potential of firebrand ignitions, or to slow down a fires' progress sufficiently to allow firefighters an opportunity to suppress it if needed. Aspen restoration is a focal component of this proposed plan as it is vital to wildlife and acts as a "green fireline," slowing the spread and reducing intensity of the fire. Land management agencies have several tools at their disposal to reduce hazardous fuel loadings. Two primary examples are to modify vegetation configurations in the wildland urban interface and other fire-prone areas, and to provide defensible areas from which firefighters can manage and suppress wildfires. Methods include manual and mechanical fuel treatments (removal or re-arrangement of woody fuels), and prescribed fires and wildland fire use (consumption of woody fuels). It is important to note that while lower tree densities and lower fuel loadings reduce the potential of large, high-severity and/or crown fires, they do not eliminate the potential of all wildland fires.

Thinning treatments and the re-introduction of fire through prescribed fire in some areas would help maintain lower fuels and densities, and would restore the natural fire regime characteristic of healthy Douglas-fir and mixed conifer forests with aspen groves. Forests with a lower fuel loading and lower tree density will generally be closer to naturally occurring forest structure and will be healthier.

1.3 Decisions To Be Made

Based on the analysis documented in this EA, the Manager of Red Rock Lakes National Wildlife Refuge will decide whether or not to authorize implementation of one or more of the management alternatives developed for this proposed project. The decision will include:

- Thinning methods to be used, including mechanical methods;
- Prescribed fire methods to be used
- Mitigation measures to employ to reduce the risk of environmental harm

1.4 Impact Topics Evaluated in this Environmental Assessment

Impact topics are derived from issues raised during internal and external scoping. Not every conceivable impact of a proposed action is substantive enough to warrant analysis. The following topics, however, do merit consideration in this environmental assessment:

Soils: Soils can potentially be adversely affected by fires as well as by thinning activities; therefore, impacts to soils are analyzed in this assessment.

Water Resources: Both fires and thinning activities can affect water resources by exposing soils or impacting streambeds and riparian areas, which lead to erosion during storm events and subsequent suspended solids and turbidity in downstream surface waters. Therefore, impacts to water resources are analyzed in this assessment.

Vegetation: The protection and management of forest communities is a management goal for Red Rock Lakes National Wildlife Refuge. Since fire hazard reduction involves changes to the current vegetation structure and fire regime in the forest communities, this assessment considers the impacts on vegetation.

Wildlife: There are resident populations of various species of birds, mammals, reptiles, amphibians and invertebrates at the proposed project area, including the federally protected Grizzly Bear; therefore, impacts on wildlife are evaluated in this assessment.

Noise: Thinning and prescribed fire activities can all involve the use of noise-generating mechanical tools and devices with engines, such as chain saws and trucks. Impacts on noise to wildlife, the surrounding residents and workers are evaluated in this assessment.

Air Quality: The Federal 1970 Clean Air Act stipulates that Federal agencies have an affirmative responsibility to protect air quality from adverse air pollution impacts. All types of fires generate smoke and particulate matter, which can impact air quality within the refuge and surrounding region to some extent; therefore impacts to air quality are evaluated in this assessment.

Transportation: Thinning activities may include the use of large trucks to remove felled trees, and these operations could impact existing access roads into the refuge; therefore, this topic is evaluated in this assessment.

Socioeconomics: NEPA requires an analysis of impacts to the "human environment" which includes economic, social and demographic elements in the affected area. Since commercial thinning may result with the implementation of the action alternatives, this impact topic is included for further analysis in this assessment.

Human Health and Safety: Fires can be extremely hazardous, even life-threatening, to humans, and current federal fire management policies emphasize that firefighter and public safety is the first priority. Since prescribed fire is a component of the proposed action, impacts to human health and safety are addressed in this assessment.

Cultural Resources: Section 106 of the National Historic Preservation Act of 1966 provides the framework for Federal review and protection of cultural resources, and ensures that they are considered during Federal project planning and execution. Cultural resources can be affected both by fire itself and thinning activities, thus potential impacts to cultural resources are addressed in this assessment.

1.4.2 Impact Topics Considered but not Evaluated in this Environmental Assessment

NEPA and the CEQ Regulations direct agencies to "avoid useless bulk ...and concentrate effort and attention on important issues" (40 CFR 1502.15). Certain impact topics that are sometimes addressed in NEPA documents on other kinds of proposed actions or projects have been judged to not be substantively affected by any of the alternatives considered in this assessment. These topics are listed and briefly described below, and the rationale provided for considering them, but dropping them from further analysis.

Public Access (Recreation): Public access is a minor issue since the project only covers a very small portion of the refuge. This does not inhibit access to other areas of the refuge, and trail access is expected to be maintained with only minimal duration closures for public safety.

Land Use Plans/Policies/Controls: Selection of any of the alternatives would not set a precedent for future actions with significant effects on land use plans, policies or controls.

Chapter 2 - Alternatives

This Chapter describes the range of alternatives, including the Proposed Action and No Action Alternatives, formulated to address the purpose of and need for the proposed project.

2.1 Alternatives Considered But Not Analyzed Further In This EA

Fire Hazard Reduction with Wildland Fire Use

Wildland fire use involves the management of fires ignited by natural means (usually lightning) that are permitted to burn under specific environmental conditions for natural resource benefits. This alternative was considered but not analyzed further in this EA because it would be near impossible to contain within refuge boundaries and could potentially spread to 10s to 100s of thousands of acres in size. Refuge staff concluded that the potential risks to human health and safety, personal property, and natural resources under this alternative outweigh any potential benefits that would be obtained from including wildland fire use.

Fire Hazard Reduction with Prescribed Fire Only

This alternative was considered but not analyzed further in this EA because the existing conditions on the refuge, over-crowded forest stands and high levels of surface and ladder fuels, would make it impossible for Fish and Wildlife Service fire management personnel to ensure, with any degree of certainty, fire containment. Without employing thinning treatments in conjunction with prescribed fire, the probability of a prescribed fire burning out-of-prescription under the current fire hazard conditions is great enough that refuge staff concluded that the potential risks to human health and safety, personal property, and natural resources under this alternative outweigh any potential benefits that would be obtained.

2.2 Alternatives Considered And Analyzed In This EA.

Alternative 1 (No Action Alternative) – Suppression of All Wildfires and No Fire Hazard Reduction

Under this alternative, the Fish and Wildlife Service would continue current management practices as detailed in the refuge Comprehensive Conservation Plan which was approved in 2009. Red Rock Lakes National Wildlife Refuge will suppress human-caused fires and wildfires that threaten life and property.

Alternative 2 (Proposed Action) – Implement Thinning and Prescribed Fire Treatments to Reduce Fire Hazard

Under this alternative, the Fish and Wildlife Service proposes to reduce fuels on approximately 350 acres around Lakeview. The Refuge would accomplish fire hazard reduction with manual and mechanical fuel treatments, as well as with prescribed fire. Approximately 20-30 acres of the area is in a designated Wilderness. If this alternative is selected, we will follow the provision in the Wilderness Act and a wilderness minimum requirement analyses will be conducted to determine if it is appropriate to conduct the proposed action in the wilderness and, if so, what treatment method should be used.

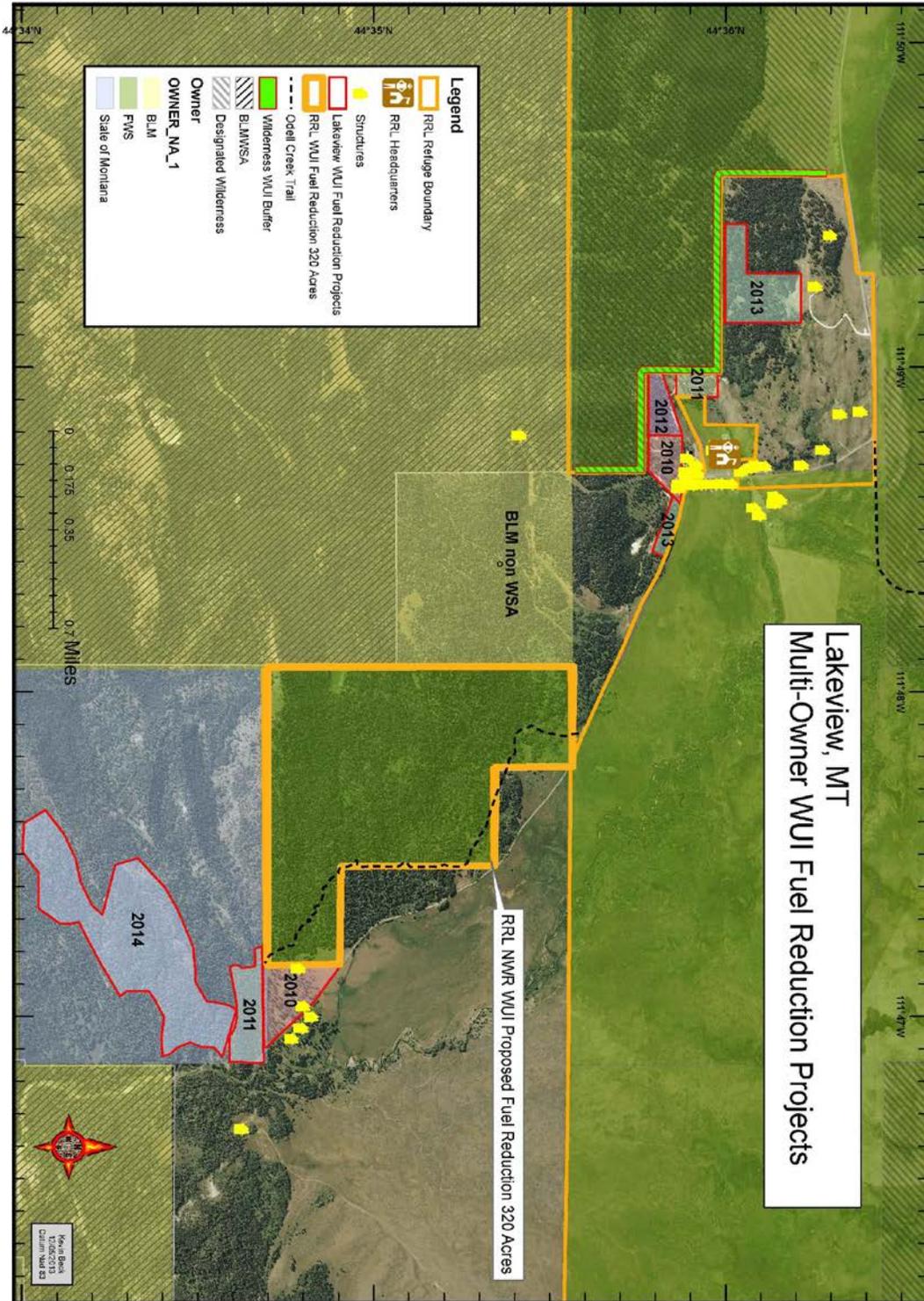
Manual and mechanical fuel treatments would be employed on about 350 acres slated for fire hazard reduction efforts (see Figure 2-1). These areas would be thinned by commercial contracts and agreements and/or through the refuge staff. A certified consulting forester has been contracted to complete a wildlife-beneficial fuels reduction timber management plan for the proposed treatment area. The management plan will incorporate un-even age timber stand management and aspen stand restoration, and provides for habitat diversity. This plan will guide the mechanical treatment.

Prescribed fire would be employed in treated areas to remove ground fuels and slash from thinning operations, and later, to restore a natural fire regime of forest communities. Prescribed fires will not be conducted unless there is very low risk of containment loss. Surrounding BLM and state DNRC lands are planned to or are currently undergoing thinning. The Service will work cooperatively with BLM, DNRC, and other agencies to accomplish local and landscape scale prescribed burns if conditions allow after treatment.

Alternative 3 – Implement Only Thinning Treatments to Reduce Fire Hazard

This alternative responds to concerns regarding the possible escape of prescribed fire and any associated human health & safety and property issues associated with such an event. Under this alternative, manual and mechanical fuel treatments would be similar to those described in Alternative 2.

Figure 2.1: Proposed Project



2.3 Impact Definitions

Table 2-1 depicts the impact definitions used in this Environmental Assessment. Significant impact thresholds for the various impact topics were determined in light of compliance with existing state and federal laws, and compliance with existing Red Rock Lakes National Wildlife Refuge planning documents.

Table 2-1: Impact Definitions

	"Minor" Impact	"Major" or "Significant" Impact
Impact Topics		
Soils	Minor damage to or loss of the litter/humus layers that causes minor localized increases in soil loss from erosion; fire severe enough to cause minor harm to soil community; minor, temporary surface sterilization of soils that does not cause long term loss of soil productivity that would alter or destroy vegetation community	Damage to or loss of the litter/humus layers that would increase soil loss from erosion on a substantial portion of the burn area; fire severe enough to damage soil community; substantial surface sterilization of soils that may cause long term loss of soil productivity and that may alter or destroy a portion of the vegetation community
Water Resources	Minor damage to or loss of the litter/humus layers that increases sedimentation on no more than 0.1% of a sub watershed; localized and indirect riparian impact that does not substantively increase stream temperatures or affect stream habitats	Damage to or loss of the litter/humus layers that increases sedimentation on greater than 0.1% of a sub watershed; localized and indirect riparian impact that may substantively increase stream temperatures or affect stream habitats
Vegetation	Thinning of small trees; transition from closed canopy plant species to open or semi-open canopy understory species	Adverse impacts (taking, permanent displacement, loss of critical habitat) to Threatened, Endangered, or Sensitive species or their protected habitats (federal and state listed)
Wildlife	Temporary displacement of localized individuals or groups of animals; isolated mortality of individuals of species not afforded special protection by state and/or federal law	Adverse impacts (taking, permanent displacement, loss of critical habitat) to Threatened, Endangered, or Sensitive species or their protected habitats (federal and state listed); mortality of species that jeopardize the resident population
Air Quality	Minimal to negligible air emissions and temporary smoke accumulation; temporary and limited smoke exposure to sensitive resources	Violation of state and federal air quality standards; prolonged smoke exposure to sensitive receptors
Noise	<65 dBA at sensitive receptors; temporary noise levels <90 dBA	>65 dBA noise level at sensitive receptors, continued exposure to noise levels > 90 dBA for workers and/or the general public

Transportation	An increase in traffic that is not predicted to upset the normal flow of traffic; the need for minor road repair as a result of the action; the generation of traffic levels that does not require the expansion of existing roadways or facilities	An increase in traffic that is predicted to upset the normal flow of traffic; the need for major road repair as a result of the action; the generation of traffic levels requiring the expansion of existing roadways or facilities
Socioeconomics	Minimal to no short or long-term economic impact on local or regional economy (>2%); proportionate impact on poor or minority communities	A change in local or regional economy greater than 2%; disproportionately high and adverse impact on poor or minority communities
Human Health & Safety	Minor injuries to any worker; limited exposure to hazardous compounds or smoke particulates at concentrations below health-based levels	Serious injury to any worker or member of the public; exposure to hazardous compounds or smoke particulates at concentrations above health-based levels.
Cultural Resources	Temporary, non-adverse effects to registered heritage sites, eligible heritage sites, sites with an undetermined eligibility, and traditional cultural properties	Temporary or long-term adverse impacts to registered heritage sites, eligible heritage sites, sites with an undetermined eligibility, and traditional cultural properties

2.4 Mitigation Measures

Mitigation measures are prescribed to prevent and/or mitigate adverse environmental impacts that may occur from fire hazard reduction activities. Mitigation measures are common to all alternatives.

Fire Management Activities

- No handlines exposing mineral soil will be allowed through cultural sites, and all handlines will be rehabilitated. Erosion control methods will be used on slopes exceeding 30% where handline construction takes place;
- All sites where improvements are made or obstructions removed will be rehabilitated to pre- fire conditions, to the extent practicable;
- Whenever consistent with safe, effective suppression techniques, the use of natural barriers will be used as extensively as possible;

Soil, Water Resources, and Vegetation

- Stream crossings will be limited as much as practical; proper state permits will be obtained ensure minimal impact.
- Except for spot maintenance to remove obstructions, no improvements will be made to intermittent waterways or clearings in forested areas;
- Fire lines will be located outside of highly erosive areas, steep slopes, intermittent streams, riparian areas, and other sensitive areas;
- Fire retardants and foams will be avoided and only used as a last option;
- mechanical equipment (large equipment and vehicles) would:

- not be employed in highly sloped portions of the treatment areas (> 35% slope),
- would be restricted in operations to when soil is dry (<20% soil moisture), frozen, or snow covered (12" depth if packed or 18" depth if not packed)
- would not be employed within 100 feet of surface water resources.

Wildlife

- Mechanical work will be completed as quick and efficiently as reasonably possible to lessen noise and other disturbance to wildlife
- Prescribed burns will be conducted at most opportune time for wildlife benefits while maintaining adequate conditions needed for effective fire. The timing of the burn will be dependent on the size and particular burn objectives.
- Prior to mechanical work being initiated, the refuge will consult with FWS Ecological Services to ensure that actions will not affect or not likely to adversely affect threatened or endangered species or critical habitat

Air Quality and Noise

- Operation of large vehicles associated with thinning efforts will be restricted to daylight hours.
- Dust abatement already occurs on South Valley Road through Lakeview, which would be used to access the project site. No dust issues are expected during hauling operations, but if they arise, road wetting or extending distance of annual dust abatement treatment may be completed.

Transportation

- Vehicle traffic associated with thinning activities will access and exit the refuge via South Valley Road. Up to three miles of temporary road may be constructed in the non-wilderness treatment area for access and operations
- Following the conclusion of thinning activities temporary roads will be rehabilitated for aesthetic, biological, and soil erosion concerns
- Vehicles associated with thinning operations must comply with posted speed limit signs on South Valley Road

Cultural Resources

- Prior to all thinning and prescribed fire activities, a cultural resource review and survey will be completed by an Archeologist to identify any potential cultural resources. State and Tribal agencies will be supplied a copy of the report with the opportunity to comment on the findings. Sensitive areas will be avoided or mitigated under direction of the archeologist. No known cultural sites are located on the project area.
- If unrecorded cultural resources are discovered during thinning and prescribed fire activities, all work in the immediate vicinity of the cultural resource will stop until a Fish and Wildlife Service Archeologist, or another Archeologist under their direction,

surveys and records the location.

2.5 COMPARISON OF ALTERNATIVES

Table 2-2 briefly summarizes the environmental effects of the various alternatives. It provides a quick comparison of how well the alternatives respond to the project need, objectives and impact topics

Table 2-2: Comparison of Alternatives

	Alternative 1 – No Action Alternative (Current Management)	Alternative 2 – Proposed Action (Thinning and Prescribed Fire)	Alternative 3 – Thinning Treatments Only
Project Need			
Fire hazard reduction	No, hazardous fuels would continue to increase. This alternative provides the least hazardous fuels reduction.	Yes, hazardous fuels reduction over time on about 350 acres. This alternative provides the greatest hazardous fuels reduction.	Yes, hazardous fuels reduction over time on about 350 acres. This alternative provides less hazardous fuels reduction on about 350 acres than does the Proposed Action.
Restore forest stands	No, forest stands would not be restored on about 350 acres of the refuge. This alternative provides the least amount of forest stand restoration.	Yes, hazardous fuel treatments would help restore forest stands on about 350 acres of the refuge. This alternative provides the greatest amount of forest stand restoration.	Yes, hazardous fuel treatments would help restore forest stands on about 350 acres of the refuge. This alternative provides less forest stand restoration than does the Proposed Action.
Project Objectives			
Protect neighboring residences from future wildfires	Besides fire suppression, no additional protection to neighboring residences would be provided. This alternative provides the least degree of protection to neighboring residences from future wildfires.	Yes, hazardous fuels treatments would help protect neighboring residences from future wildfires. This alternative provides the greatest degree of protection to neighboring residences from future wildfires.	Yes, hazardous fuels treatments would help protect neighboring residences from future wildfires. This alternative provides less protection to neighboring residences from future wildfire than does the proposed action.
Reduce the likelihood of catastrophic stand-altering wildfire near Lakeview	No, there would not be any reduction in the likelihood of catastrophic forest stand altering fire. This alternative does not reduce the likelihood of catastrophic stand-altering wildfire near Lakeview.	Yes, hazardous fuel treatments would reduce the likelihood of catastrophic stand-altering fire. This alternative best reduces the likelihood of catastrophic stand-altering wildfire near Lakeview.	Yes, hazardous fuels treatments would reduce the likelihood of catastrophic stand-altering fire. This alternative marginally reduces the likelihood of catastrophic stand-altering wildfire near Lakeview.

Restore and maintain health of forest stands	No, forest health would not be restored or maintained. The alternative does not restore and maintain forest stand health.	Yes, hazardous fuels treatments would help restore and maintain the health of forest stands on approximately 350 acres of the refuge. This alternative provides the greatest degree of restoration and maintenance of forest stand health.	Yes, hazardous fuels treatments would help restore and maintain the health of forest stands on approximately 350 acres of the refuge. This alternative provides less restoration and maintenance of forest stand health than the proposed action.
Restore aspen groves and create greater timber stand diversity for wildlife	No, aspen groves would not be restored and greater timber stand diversity for wildlife would not occur. This alternative does not restore aspen groves and does not create greater timber stand diversity for wildlife.	Yes, hazardous fuels treatment would help restore aspen grove and create greater timber stand diversity for wildlife. This alternative provides for the greatest degree of aspen restoration and timber stand diversity for wildlife.	Yes, hazardous fuels treatment would help restore aspen grove and create greater timber stand diversity for wildlife. This alternative provides less aspen restoration and less timber stand diversity for wildlife than the proposed action.
Significant Issues			
Potential escape of prescribed fire	There would be no potential for escape of prescribed fire since there would be no prescribed fire.	This alternative allows for prescribed fire, however, potential for escape would be minimal in light of mitigation measures and adherence to established guidelines and procedures for ignition of prescribed fires.	There would be no potential for escape of prescribed fire since there would be no prescribed fire.
Important Topics			
Soils	No immense soil impacts, potential for soil erosion in the event of a large, high-severity wildfire.	Minor short-term erosion and compaction impacts resulting from thinning and prescribed fire activities; soil buildup and enrichment from nutrients released by prescribed fires.	Minor short-term soil and compaction impacts resulting from thinning.
Noise	No noise impacts	Minor noise impacts during thinning activities and transportation of felled timber off-site; minor impact on resident wildlife.	Similar to proposed action
Transportation	No transportation-related impacts.	Minor impact to local traffic and public roads with the use of trucks to haul felled timber.	Similar to proposed action
Socio-economics	No impacts to minority or low-income populations; no impact on local or regional economies.	No impacts to minority or low-income populations; very minor positive impact on local and regional economy through sale of timber and contractor wages.	Similar to proposed action

Human Health and Safety	Continued short and long-term safety risk to adjacent residences and refuge buildings from high fire hazard.	Human health and safety are improved with reduction of fire hazard after thinning and prescribed fire treatments; increased potential for isolated injuries to crews from thinning and prescribed burning activities; minor exposure to smoke by workers and the public during prescribed burns.	Similar to proposed action except that workers and the public would not be exposed to smoke from prescribed fires; human health and safety would be improved with reduction in fire hazard following thinning efforts, however, improvement would be less than Proposed Action.
Cultural Resources	No immediate impact to cultural resources; potential long term risk to unknown cultural resources from increased fire hazard and higher severity fires.	Similar to No Action Alternative, however, there would be the potential for impacting unknown cultural resources.	Similar to Proposed Action.
Water Resources	No immediate water resource impacts; potential for flooding events that degrade stream channels after large high-severity fires.	Minor indirect impacts to water resources from thinning, prescribed fires, and construction of fire lines if needed.	Minor indirect impacts to water resources from thinning.
Vegetation	No reduction of hazard fuels, no restoration of forest health, no restoration of aspens, no improvement in timber stand diversity for wildlife, increased risk of insect infestations, high severity stand-altering wildfire, habitat and plant diversity continue to decline.	Reduction of hazard fuels on approximately 350 acres. Forest health improves with reduction in tree densities, more open canopy, increased aspen component to forest, restoration of natural fire regimes, allows for development of old-growth large diameter trees, forest able to better withstand high severity fire, beetle infestations reduced with greater tree vigor, plant habitat and diversity increases over time.	Similar to Proposed Action, however plant habitat and diversity marginally improved with thinning. Forest health and diversity impacted in absence of prescribed fire and natural fire regimes.
Wildlife	No immediate wildlife impacts but long term impacts are possible through continuation of habitat health and diversity degradation.	Hazardous fuels reduction would temporarily displace some wildlife species in the short term with potential for individual mortality; however thousands of acres of similar habitat surround the refuge project that could be used for impacted species. In the long term, increased forest health and plant diversity will benefit wildlife.	Similar to Proposed Action, however less improvement in wildlife habitat and diversity will occur due to absence of fire.
Air Quality	No immediate air quality impacts; air quality impacts from future wildfires would be greater in the absence of hazardous fuels reduction.	Minor and short-term air quality impacts from prescribed fires, mechanical equipment emissions, and potential dust.	Minor and short-term air quality impacts from mechanical equipment emissions and potential dust.

Chapter 3 - Environmental Analysis

This chapter summarizes the existing environmental conditions and the probable environmental consequences (effects) of implementing the action and No-Action alternatives. This chapter also provides the scientific and analytical basis for comparing the alternatives. The probable environmental effects are quantified where possible; where not possible, qualitative descriptions are provided.

3.1 Soils

Affected Environment

The approximately 320 acre portion of the project principally contains Yellowmule-Pricepeet, very stony-Chicken soils. These soils are characterized by 15 to 60 percent slopes containing slightly decomposed plant material at the top few inches of the surface, to gravelly loam and clay loam, to unweathered bedrock. It is present at elevations from 6,700-8,900 feet, drains well, and receives 24-35" annual precipitation. Less prevalent soil types include Yellowmule very stony-Currycreek-Pricepeet complex soils, which are found on 4-25% slopes and derived from sedimentary rock, and Currycreek-Yellowmule very stony complex, which are found on 2-15% slopes and are derived from igneous and sedimentary rock. Other soil complexes are found in small areas of the project area. The 20-30 acre wilderness parcel contains primarily Yellowmule very stony-Currycreek-Pricepeet complex soils.

Environmental Consequences

Soil impacts were qualitatively assessed using soil characteristics, soil surveys, and mitigation measures.

Alternative 1 – No Action

Under the No Action Alternative, there would not be any actions that would directly impact soils. In the absence of fire hazard reduction treatments, however, the likelihood of a high- severity fire increases. Such an event could be detrimental to soils as nutrients are volatilized and the organic layer of the soil could be consumed. In addition, the potential for erosion would increase following a high-severity fire.

Alternative 2 -Proposed Action

Proposed activities with the potential to impact soils include thinning, building fire lines and prescribed burning.

The construction of a fire line involves digging a 15-inch wide line down to mineral soil and raking a 15-foot buffer along each side of the fire line to clear out vegetative debris on the ground. Fire line construction would result in soil disturbance and could lead to increased erosion, especially in steeply sloped areas. To avoid potential impacts, fire lines would only be built when necessary and would be located outside of highly erosive areas, steep

slopes, intermittent streams, and riparian and other sensitive areas. Following fire activities, fire lines would be rehabilitated.

Thinning activities that involve heavy machinery would result in compaction of soils in localized areas of ingress and egress. The degree of soil compaction depends on the number of passes over a particular area as well as the type of vehicle. Slash generated from mechanical thinning activities would be spread on the pathways of the equipment to minimize soil compaction. In addition, mechanical equipment (large equipment and vehicles) would not be employed in highly sloped portions of the treatment areas (> 35% slope), would be restricted in operations to when soil is dry (<20% soil moisture), frozen, or snow covered (12" depth if packed or 18" depth if not packed) and would not be employed within 100 feet of surface water resources.

Prescribed fire would release nutrients into the soil and the fertilization effects of ash would provide an important source of nutrition for vegetation in the area. In addition to increasing nitrification of the soils and increasing minerals in the soil, the ash and charcoal residue resulting from incomplete combustion would aid in soil buildup and soil enrichment by being added as organic matter to the soil profile. The added material works in combination with dead and dying root systems to make the soil more porous, better able to retain water, and less compact while increasing needed sites and surface areas for essential microorganisms, mycorrhiza, and roots (Vogl, 1979; Wright and Bailey, 1980).

If a prescribed fire exceeded a burn prescription and burned "hot", resulting in areas of high-burn severity, the organic layer of the soil could be consumed and soil layers could become water repellent. Fire management personnel would contain and/or suppress out-of-prescription fires, minimizing the potential for and effects of any high-burn severity prescribed fires.

Alternative 3

General soil impacts would be similar to those described under Alternative 2, except the benefits accruing to soils from prescribed fire would not occur.

3.2 Water Resources

Affected Environment

Surface water resources on the project area at Red Rock Lakes are limited to one creek and intermittent streams that carry water during high rain events and following snow melt in the spring. The project area contains springs and small areas of wetlands or wet-soil communities.

Environmental Consequences

Water resource impacts were qualitatively assessed using presence/absence and mitigation measures.

Alternative I – No Action

Under the No Action Alternative, there would not be any actions that would directly impact water resources. In the absence of fire hazard reduction treatments, however, the likelihood of a high-severity fire increases. In the aftermath of a large, high-severity wildfire, the refuge could experience flash flooding events that degrade the stream channels.

Alternative 2-Proposed Action

Proposed activities with the potential to impact water resources include building fire lines, temporary roads, thinning, and prescribed burning; however, in light of the mitigation measures employed during fire management activities (e.g. avoid fire line construction when possible, no fire line construction in intermittent streams, wetlands or adjacent to natural springs) and no mechanical thinning treatments (large vehicles) within 100-feet of surface water resources, there would be minor indirect impacts on surface water resources on the refuge. Travel through wet areas would be avoided and any stream crossings would require temporary culverts or bridges. The proper permits from the State of Montana would be obtained for stream crossings as applicable.

In addition, the use of prescribed fire would temporarily reduce vegetation and expose soils to a greater potential of erosion from wind and rain. This effect would be temporary as burned areas become re-vegetated with grasses and shrubs.

Alternative 3

General water resources impacts under Alternative 3 would be similar to those described under Alternative 2 except for any prescribed fire impacts.

3.3 Vegetation

Affected Environment

There are three different plant communities on the project area, occupying sites that differ in elevation, slope, and aspect, and therefore moisture and temperature. A small area of medium-tall temperate or subpolar grassland with a sparse needle-leaved or microphyllus evergreen shrub layer (characterized by young Douglas-fir invaded grasslands) is located on the western end of the linear treatment area around Lakview. The landscape quickly transitions to Conical-crowned temperate or subpolar needle-leaved evergreen forest (characterized by Douglas-fir but also including Engelmann spruce, subalpine fir, and lodgepole pine) for the duration of the linear buffer treatment. The larger 320 acre tract is dominated primarily by conical-crowned temperate or subpolar needle-leaved evergreen forest but also contains Montane or boreal cold-deciduous forest (characterized by Aspen trees), medium-tall temperate or subpolar grassland with a sparse needle-leaved or microphyllus evergreen shrub layer, and seasonally flooded temperate or subpolar grassland. Understory plants associated with conifer habitat include Western meadowrue, showy aster, northern valerian, mountain sweet-cicely, and graminoids such as Geyer's sedge and pinegrass. No plants listed as threatened or endangered are known to exist in the project area (USFWS, 2009).

Overly dense forest stands not only pose a high fire hazard, they can lead to outbreaks of insects, including bark beetles and western spruce budworm (*Choristoneura occidentalis*). Bark beetles are among the most destructive insects of North American conifer forests. Many species reach epidemic proportions in forests that are either overmature, overstocked or stressed by drought or wildfire. Bark beetles attack the cambium layer of trees where they construct egg and larval galleries. Trees that are successfully attacked are killed. Specific bark beetles of importance in the Refuge include the mountain pine beetle (*Dendroctonus ponderosae*) and Douglas-fir beetle (*Dendroctonus pseudotsugae*).

Once fire hazard reduction treatments improve overall forest health, some natural mortality would be acceptable in the refuge from insect and disease attacks. Increased forest health and vigor should improve, but not eliminate, tree resistance to insects. Disease and insects are primary sources of discontinuities in forest stand structure and are important natural sources of landscape diversity (Lundquist, 1993).

The Centennial Valley and Red Rock Lakes contains small generally isolated populations of noxious weeds, however, infestation risk is considered low. The highest priority noxious weeds are common tansy (*Tanacetum vulgare*), houndstoung (*Cynoglossum officinale*), spotted knapweed (*Centaurea maculosa*), black henbane (*Hyoscyamus niger*) and hoary alyssum (*Betseroa incana*). Canada thistle (*Cirsium arvense*) is present widespread but in small numbers. The proposed project should not have any delirious impacts in spread of noxious weeds. The Centennial Valley is suspected of having some of the “cleanest” weed-free vegetation in the region. All equipment utilized will be washed and cleaned to prevent the transportation of noxious weeds and weed seed.

Environmental Consequences

Vegetation impacts were qualitatively assessed using literature reviews and quantitatively assessed by acres impacted.

Alternative 1 -No Action

Under the No Action Alternative, hazardous fuel loadings would continue to accumulate in the refuge. Existing high densities of trees would continue to stress the forest stands and make them more susceptible to insect infestations. Conifers would continue to encroach in and out-compete aspen, reducing aspen distribution and abundance. Habitat diversity and plant species diversity in the refuge would decline in the absence of thinning or prescribed fire treatments. The development of large trees with preferred roosting and nesting characteristics would be reduced.

Alternative 2 -Proposed Action

Thinning and prescribed fire activities would occur on approximately 350 acres under this alternative.

The restoration of the historic fire regime to the aspen and mixed conifer ecosystems would

enhance the variety and diversity of native plant species and habitats. Those plant communities adapted to low-severity fires would be favored with prescribed fire. Aspen stand distribution and abundance would increase by use of prescribed fire and native grasses and forbs would also increase in the understory. Prescribed fire would also release nutrients into the soil and the fertilization effects of ash would provide an important source of nutrition for vegetation (Vogl, 1979; Wright and Bailey, 1980). Finally, prescribed fire would kill some trees and help replenish the supply of standing dead trees (snags) in the refuge. Snags would typically be preserved unless they are adjacent to the hiking trail and posed a risk to human health and safety and were deemed hazardous.

Thinning activities would avoid old growth large trees. Timber thinning will be completed using methods to create an uneven age forest with maximum habitat diversity. Reducing tree density will help return some areas to a more open park-like structure thought to be characteristic of pre-European settlement. At least 15% of the treatment areas would be maintained as clumps, or thickets, of trees; however, some minor thinning may be employed within those existing clumps. Some woody debris would be left on site to provide for wildlife habitat, particularly small rodents that provide a food base for owls, raptors, and other wildlife.

Thinning and prescribed fire activities would remove some dead, damaged, and stressed trees, which are weakened and susceptible to insect infestations, and would decrease the likelihood of spreading bark beetle infestations. Thinning activities would also decrease the likelihood of large, high-intensity fires in the future that could result in large areas of dead and dying trees, which in turn, could lead to an increased likelihood of bark beetle infestation.

Activities that resulted in soil disturbance would be more susceptible to noxious weed infestation, though the risk is low. Disturbed areas would be monitored for noxious weed infestation and, in the event of noxious weed colonization, would be treated with appropriate management techniques.

Generally, the forest stands in the refuge would contain lower amounts of surface and ladder fuels, as well as larger crown spacing. These characteristics provide for more healthy forest stands, enable them to better withstand mixed wildland fires, and help prevent surface fires from becoming pervasive and destructive crown fires.

Alternative 3

General vegetation impacts under Alternative 3 would be similar to those described under Alternative 2; however, the exclusion of prescribed fire would not result in or allow for the restoration of the natural fire regimes. Thinning efforts would provide a degree of hazardous fuels reduction, but less than that provided for under Alternative 2. Forest health would be improved with a reduction in tree densities; however, thinning treatments alone as a fire substitute would not fully restore forest communities on the refuge. Habitat and species diversity would continue to decline in the absence of prescribed fire.

3.4 Wildlife

Affected Environment

A variety of wildlife resources inhabit the forests of Red Rock Lakes National Wildlife Refuge including ungulates, small mammals, birds, reptiles, fish and amphibians. Some common forest species include elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), moose (*Alces alces*), and yellow-rumped warbler (*Dendroica coronata*). While no known dens exist on refuge lands, grizzly bear (*Ursus arctos*) have used portions of the project area in the recent past; likely in a periodic or transient way.

Environmental Consequences

Wildlife impacts were qualitatively assessed using presence/absence determinations, literature reviews, and mitigation measures.

Alternative 1 -No Action

Under the No Action Alternative, there would not be any direct or short-term indirect impacts to wildlife. In the long-term, the old-growth trees that provide essential roosting and nesting habitat would be subjected to an increasing probability of high-severity catastrophic fire that could destroy the forest stands. Generally, aspen habitat would continue to degrade and species diversity would continue to decrease in the absence of fire hazard reduction activities.

Alternative 2 -Proposed Action

Proposed activities with the potential to impact wildlife include building fire lines, temporary roads, thinning, and prescribed fires.

Habitat conditions for many wildlife species that inhabit aspen and mixed conifer would improve with the restoration of the historic fire regime. Such a fire regime would help restore and enhance the variety and diversity of native plant and wildlife habitats. Nutrients released to plants through the fertilization effects of ash would provide an important source of nutrition for wildlife in the area. While some trees would be killed from the effects of fire, these dead standing trees (snags) would be left as these provide important habitat for a variety of wildlife species. Some woody debris would also be left on site for wildlife habitat.

Fire hazard reduction activities could result in the temporary displacement of wildlife or isolated mortality of individuals. The loss of individuals, however, would not jeopardize the viability of the populations on and adjacent to the refuge. Temporary roads may affect wildlife movements in the short-term. Thinning of conifer stands would reduce the percentage of canopy closure and foster a more productive understory. By leaving at least 15% of treatment areas in thickets (clumps), hiding cover would be maintained for mule deer and other wildlife and impacts to the resident populations would be reduced.

In the long-term, thinning and prescribed fire would encourage the growth of large diameter

conifer species, and would provide for future nesting and roosting habitat for small mammals and birds in addition to a diverse understory.

Management activities in the spring and early summer would likely impact some migratory birds nesting on the refuge, however, the limited extent of thinning operations expected to be conducted during the breeding season would not jeopardize the breeding population of a particular migratory bird species in the region. There are no known Endangered Species Act listed migratory bird species that breed within or adjacent to the project area.

Riparian habitats preferred by bears do occur within the proposed project area. The wet draws support relatively moderate levels of hiding cover bears can utilize if needed. Present hiding cover within the proposed treatment area ranges from low to moderate as some areas are relatively open. The value of habitat contained in the proposed project area overall is moderate for grizzly bears. Due to small size of project and similar habitat surrounding the project area, wildlife migration out of the project area would likely be of short distance.

Alternative 3

General wildlife impacts under Alternative 3 would be similar to those described under Alternative 2; however, the exclusion of prescribed fire would result in the continued decline of wildlife habitat and species diversity, as well as a higher retention of hazardous fuels in the refuge. Thinning overly dense forest stands, removing some ladder fuels and surface fuels, and increasing crown spacing between the conifers would greatly reduce the potential for surface fires reaching the crowns and becoming sustained and destructive high-severity crown fires. These efforts would, in turn, help protect habitat, but to a lesser extent than the proposed action.

3.5 Air Quality

Affected Environment

Red Rock Lakes National Wildlife Refuge is designated as a Class I air quality area. Congress gave this greatest degree of air quality protection to certain national parks and wilderness areas. These Class I areas are national parks or national wilderness areas that were so designated as of August 7, 1977. There are 21 units of the National Wildlife Refuge System, including Red Rock Lakes NWR designated as Class I area. Only a small amount of new pollution is allowed in these Class I areas.

Environmental Consequences

Air quality impacts were qualitatively assessed upon the Refuge's best management practices to reduce air emissions.

Alternative 1 –No Action

There would not be any direct air quality impacts under the No Action Alternative. In the absence of fire hazard reduction, air quality impacts from a high-severity wildfire would likely

be greater than those experienced in treated forest stands.

Alternative 2-Proposed Action

Smoke consists of dispersed airborne solids and liquid particles, called particulates, which could remain suspended in the atmosphere for a few days to several months. Particulates can reduce visibility and contribute to respiratory problems. Very small particulates can travel great distances and add to regional haze problems. Regional haze can sometimes result from multiple burn days and/or multiple owners burning within an airshed over too short a period of time to allow for dispersion.

Prior to any prescribed fire, the US Fish and Wildlife Service must develop a burn plan that addresses smoke management and air quality concerns. Any prescribed burns will only take place with the approval from and adherence to all laws and regulations set by the Montana/Idaho Airshed Group.

Vehicle use associated with thinning operations may increase dust levels on South Valley Road. Dust levels are not expected to become an air quality issue, but if so, access roads will be wetted during hauling operations associated with thinning or the annual dust abatement treatment will be expanded to cover more roadway.

Alternative 3

Under Alternative 3, there would be very minor air quality impacts from vehicles associated with thinning activities. Dust levels would be similar to the Proposed Action. In the absence of fire hazard reduction, air quality impacts from a high- severity wildfire would likely be greater than those experienced in treated forest stands.

3.6 Noise

Certain facilities, communities, and land uses, (sensitive receptors) are more sensitive to a given level of noise than others. Impacts from noise production are generally assessed with respect to changes in noise levels experienced at sensitive receptors. Different types of sensitive receptors vary in their acceptance of noise disturbance. As a result, noise impacts for different receptors are often assessed using different noise level standards.

Affected Environment

There are several potential noise sources associated with thinning and prescribed fire activities for all the action alternatives. The dB sound levels from the equipment at a distance of 50' includes the following: chainsaw (78 dB), harvester/forwarder (86 dB), and engine/truck (91 dB). The town of Lakeview is adjacent to the project area. Prior similar thinning operations have been completed on private land bordering Lakeview and on state land to the south of the project area. Prior work has had no known appreciable negative noise impacts on wildlife or residents and visitors.

Environmental Consequences

Noise impacts were qualitatively assessed with respect to the location of sensitive receptors and mitigation measures.

Alternative 1 – No Action

There would not be any noise-related impacts under the No Action Alternative.

Alternative 2 - Proposed Action

It is not expected there would be any substantial noise-related impacts to wildlife on or adjacent to the refuge in light of the mitigation measure to concentrate thinning activities from between middle to late summer to spring thaw time periods. There would be the possibility of minor impacts on wildlife within the refuge if thinning and/or prescribed fire activities were conducted on some stands during the spring and summer months. Noise may reduce species diversity and abundance and potentially reproduction at during the duration of the project. Long-term, this project will have greater benefits on diversity, abundance, and reproduction that the current forest conditions support.

The general public would likely not be exposed to continual sound levels greater than 90 dB; however equipment workers may experience levels greater than 90 dB. Those workers operating the equipment would be required to mitigate any possible adverse noise impacts by using noise reduction devices such as earplugs.

Several residences would be subjected to elevated noise levels from large vehicles hauling out felled trees. To minimize the noise effects of the large vehicles, operation of the large vehicles would be restricted to daylight hours.

Alternative 3

General noise impacts under Alternative 3 would be similar to those described under Alternative 2.

3.7 Transportation

Affected Environment

Red Rock Lakes National Wildlife Refuge is primary accessed by South Valley Road; under 30 residences are located on it, of those only about 6-8 are occupied year-round. The remaining residences are seasonal temporary use residences or seasonal residences associated with cattle ranching operations. South Valley Road is a gravel road that runs the length of the valley east-west, approximately 60 miles. There are no bridges on South Valley Road that would be a barrier to logging operations. Traffic on the road consists of residents, tourists, ranching operations, and other timber harvest operations being completed elsewhere in the Centennial Mountains. Traffic is generally light with heaviest use times being over the summer recreation

season and big game hunting season. There are currently no roads into the proposed project area.

Environmental Consequences

Transportation impacts were qualitatively assessed in light of the extent of local traffic on the South Valley Road and mitigation measures.

Alternative 1 -No Action

There would not be any transportation related-impacts under the No Action Alternative.

Alternative 2 -Proposed Action

Under this alternative, the development of temporary roads into the 320 acre project area would be needed. The other 30 acre project area would not have any access roads. Temporary roads would only be open to operations associated with the thinning project and not maintained for prescribed fire breaks or prescribed fire access. The minimum length of road necessary to complete the project will be used, not to exceed 3 miles. Roads will be developed in the least intrusive manner possible, typically on dry land following geographic contours. To mitigate potential long-term adverse impacts, temporary roads will be restored upon completion of project and remain closed. Roads will be restored to as close to the natural state as reasonably possible. Any skid trails would also be restored when no longer needed or upon completion of project. All vehicles will be held to posted speed limits on South Valley Road through the refuge.

Alternative 3

General transportation impacts under Alternative 3 would be similar to those described under Alternative 2.

3.8 Socioeconomics

Affected Environment

Red Rock Lakes is located in Beaverhead County, Montana which has an estimated 2013 population of 9,341 (USCB, 2010). Education and healthcare, agriculture, and art/entertainment/recreation are the top three industries in the county (USCB, 2010). In addition to the refuge, Beaverhead County also contains “blue ribbon” trout streams, and public land managed by the National Park Service, The Bureau of Land Management, and The US Forest Service that bring visitors to the county each year.

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, directs federal agencies to identify and address any disproportionately high adverse human health or environmental effects of its projects on minority or low-income populations.

Minority populations constitute approximately 5% of the total population in this county. Using the Census Bureau's categories, 3% of the population identified themselves as Hispanic or

Latino; persons in this group can be of any race. 1.6 % said they were of two or more races and 1.4 % said they were Native American or Alaskan Native. Asian, Black or African American, and Native Hawaiian groups each made up less than 1% of the county's population. 1.6% of the population stated they were two or more races.

The median household income for Beaverhead County was \$41,039 in 2012 (USCB, 2010). In 1999, 12.8% of families live below the poverty level as did 17.1% of individuals. More recent data from the Census Bureau was not readily available.

There are approximately 20 residences or cabins and 50 structures within approximately two miles of the refuge boundary around Lakeview, with additional residential lots being sold and developed. Homeowners in the approximately two-mile radius are not predominantly minority or low-income populations.

The Fish and Wildlife Service proposes to enter into contracts with outside parties to conduct planning and thinning operations on the refuge, infusing money into the regional labor force and local tax base.

Environmental Consequences

Socioeconomic impacts were quantitatively assessed using U.S. Census Bureau data on personal income, population data, and poverty measures.

Alternative 1 -No Action

There would not be any direct socioeconomic impacts under the No Action Alternative. In the long-term, the absence of fire hazard reduction on the refuge could lead to high-severity fires that threaten private residences adjacent to and near the refuge, likely creating economic hardships. There would not be a highly disproportionate impact on minority or economically disadvantaged persons.

Alternative 2 -Proposed Action

The probability of a highly disproportionate impact to minority or economically disadvantaged persons in Beaverhead County resulting from the implementation of fire hazard reduction activities would be small.

It is anticipated that any commercial operations to aid in thinning activities on the refuge would have a positive effect on the local economy, however, it is unclear whether timber that is removed would be processed in the local area or that new jobs would be created. It is not anticipated that the revenues generated from the contracts and project would have an appreciable impact to the overall local or regional economy.

Alternative 3

General socioeconomic impacts under Alternative 3 would be similar to those described under

Alternative 2.

3.9 Human Health and Safety

Affected Environment

Prior to the ignition of any prescribed fire in the refuge, all burn parameters of the approved prescribed fire burn plan must be met to ensure a safe and effective prescribed fire. In addition, staff would advise the public of the time and extent of the proposed burn. In the event of potentially hazardous escaped prescribed fire within the refuge, the refuge manager would coordinate public notification efforts. The extent of public notice would depend on the specific fire situation. In every case, assuring visitor, refuge staff, and adjacent residents' safety would take priority over other activities. Prescribed burns are not expected to be able to occur for many years, if ever, depending on neighboring land treatment efforts needed to reduce risks of escape.

Environmental Consequences

Human health & safety impacts were qualitatively assessed through determination of activities, equipment and conditions that could result in injury, and in light of mitigation measures and best management practices.

Alternative 1-No Action

Under the No Action Alternative, there would not be any direct or short-term indirect human health and safety impacts. In the long-term, the absence of fire hazard reduction efforts would increase the potential for a high-severity, catastrophic wildfire that could adversely impact human health and safety.

Alternative 2-Proposed Action

Factors most likely to adversely impact firefighter health and safety include activities associated with prescribed fire and, if necessary, wildland fire suppression efforts (accidental spills from firefighting equipment, injuries from the use of fire-fighting equipment, smoke inhalation, and, in severe cases, burn injuries or death from prescribed or wildland fires). Impacts to the public could include smoke inhalation, and in severe cases, injuries from wildland fires.

Fire line construction can pose safety threats to firefighters. Injuries can occur from the use of equipment as well as from traveling overland to targeted areas for firefighting efforts during suppression efforts. While each crewmember is trained in the use of firefighting equipment, accidental injuries may occur from time to time. Strict adherence to guidelines concerning firefighter accreditation, and equipment and procedure safety guidelines would minimize accidents.

Smoke inhalation can also pose a threat to human health & safety. Smoke from wildland fires is composed of hundreds of chemicals in gaseous, liquid, and solid forms. The chief inhalation

hazard appears to be carbon monoxide (CO), aldehydes, respirable particulate matter with a median diameter of 2.5 micrometers and total suspended particulate. Adverse health effects of smoke exposure begin with acute, instantaneous eye and respiratory irritation and shortness of breath, but can develop into headaches, dizziness, and nausea lasting up to several hours.

Use restrictions applied to areas of wildland fires or prescribed fires would minimize or eliminate public human health & safety concerns resulting from smoke exposure and fire injuries. When using prescribed fire, strict adherence to prescribed burn plans would minimize the potential for an out-of-prescription burn or escape. Elements of the prescribed burn plan that relate to ensuring a safe burn include such measures as fuel moisture, wind speed, rate of fire spread, and estimated flame lengths. While the potential for a fire escape will always exist when conducting prescribed fires, that potential is extremely small. Statistics summarized by the Boise Interagency Fire Center report that approximately 1% of prescribed fires on federal lands required suppression activities of some kind. In most cases these prescribed fires jumped a control line and suppression tactics were successfully used to control them. Out of the 1% of prescribed fires that required suppression, 90% were controlled without incident. Statistically, this result leaves about 0.1% of prescribed fires that required major suppression actions (Stevens, 2000).

Alternative 3

The general impacts to human health & safety under Alternative 3 would be similar to those described under Alternative 2. The exclusion of prescribed to reduce ground fuels would eliminate the possibility of an out-of-prescription burn or fire escape. Slash pile prescribed burning would be conducted during winter, the potential for escape from a slash pile burn and for a subsequent wildfire would be very low. In the long-term, however, fuels buildup in the absence of prescribed fire would result in more intense and severe wildland fires that could be more difficult to suppress.

3.10 Cultural Resources

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their proposals on historic properties, and to provide state historic preservation officers and tribal historic preservation officers a reasonable opportunity to review and comment on these actions.

Affected Environment

A cultural resources site survey on the project area was completed in early 2014 by a Service Archeologist. Preliminary findings show that there are no known cultural or historical resources outside of a man-made pond and an irrigation ditch that may or may not be significant. The Refuge is awaiting a formal report from the Archeologist, which will be sent to state and tribal officials for review and comment.

Environmental Consequences

Cultural resource impacts were qualitatively assessed through a presence/absence determination of significant cultural resources and mitigation measures to be employed during thinning and prescribed fire activities.

Alternative 1 –No Action

Under the No Action Alternative, there would not be any direct impacts to cultural resources. The absence of fire hazard reduction in the refuge, and the corresponding fuels buildup, would result in more intense and severe wildland fires, which have an increased potential for affecting any known or unknown cultural resource site.

Alternative 2 -Proposed Action

Proposed activities with the potential to impact cultural resources include building fire lines, thinning, and prescribed fire.

Culturally resource sites that could be potentially affected during thinning, fire line and temporary road construction and slash piling would be avoided to eliminate potential damage. Site boundaries would be clearly marked for avoidance, and sites would be monitored during and after completion of the activities. Because these sites would be avoided, there should be no effect to these cultural resource sites.

Fire lines will only be used when necessary and would be built around the perimeter of cultural sites that contain combustible materials (i.e. exposed wood). Fuels would be removed from the interior of the sites and from the area surrounding the site to maintain low burn temperatures. Back burning may also take place around the site to reduce fuel loading. There would be the potential for fire hazard reduction activities to affect unrecorded cultural resources within the refuge. If any unrecorded resources are located or discovered, work will be suspended until clearance is received from a US Fish and Wildlife Service Archeologist.

Alternative 3

General impacts to cultural resource sites under Alternative 3 would be similar to those described under Alternative 2. In addition, the absence of prescribed fire in the refuge, and the corresponding fuels buildup would result in more intense and severe wildland fires, which have an increased potential for affecting cultural resource sites. As with the other action alternatives, there would be the potential for fire management activities affecting unrecorded cultural resource sites.

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