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Warm Springs Habitat Enhancement Project

Draft Environmental Impact Statement

*Helena Ranger District
Helena National Forest
Jefferson County, Montana*

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**Warm Springs Habitat Enhancement Project
Draft Environmental Impact Statement
Jefferson County, Montana**

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Abstract: This draft environmental impact statement (EIS) considers three alternatives in detail. Alternative 1 is the no action alternative, which provides a baseline for comparing the magnitude of environmental effects of the action alternatives. Alternative 2, the proposed action, would treat 4,200 acres in the 9,638-acre project area with a combination of regeneration harvest (2,059 acres), intermediate harvest (1,002 acres), and prescribed fire (1,140 acres). The regeneration and intermediate treatments would be followed by approximately 2,632 acres of post-harvest burning. Connected actions for Alternative 2 would include the construction of up to 13.7 miles of temporary roads and the reconstruction of approximately 8.8 miles of existing roads. Alternative 3 would treat 3,941 acres with a combination of regeneration harvest (646 acres), intermediate harvest (427 acres), and prescribed fire (2,869 acres). The regeneration and intermediate treatments would be followed by approximately 732 acres of post-harvest burning. This alternative would not require temporary road construction but would involve reconstructing approximately 8.8 miles of existing roads. In addition to road construction and reconstruction, both Action Alternatives would require road maintenance in preparation for hauling logs on 6.1 miles of existing road.

Comments should be provided prior to the close of the comment period and should clearly articulate the reviewers' concerns and contentions. The timeliness and specificity of reviewer comments will enable the Forest Service to analyze and respond to the comments and use the information in preparing the final EIS, thus avoiding undue delay in the decision making process. The timeliness and specificity of reviewer's comments can also affect a reviewer's ability to participate in subsequent administrative or judicial review.

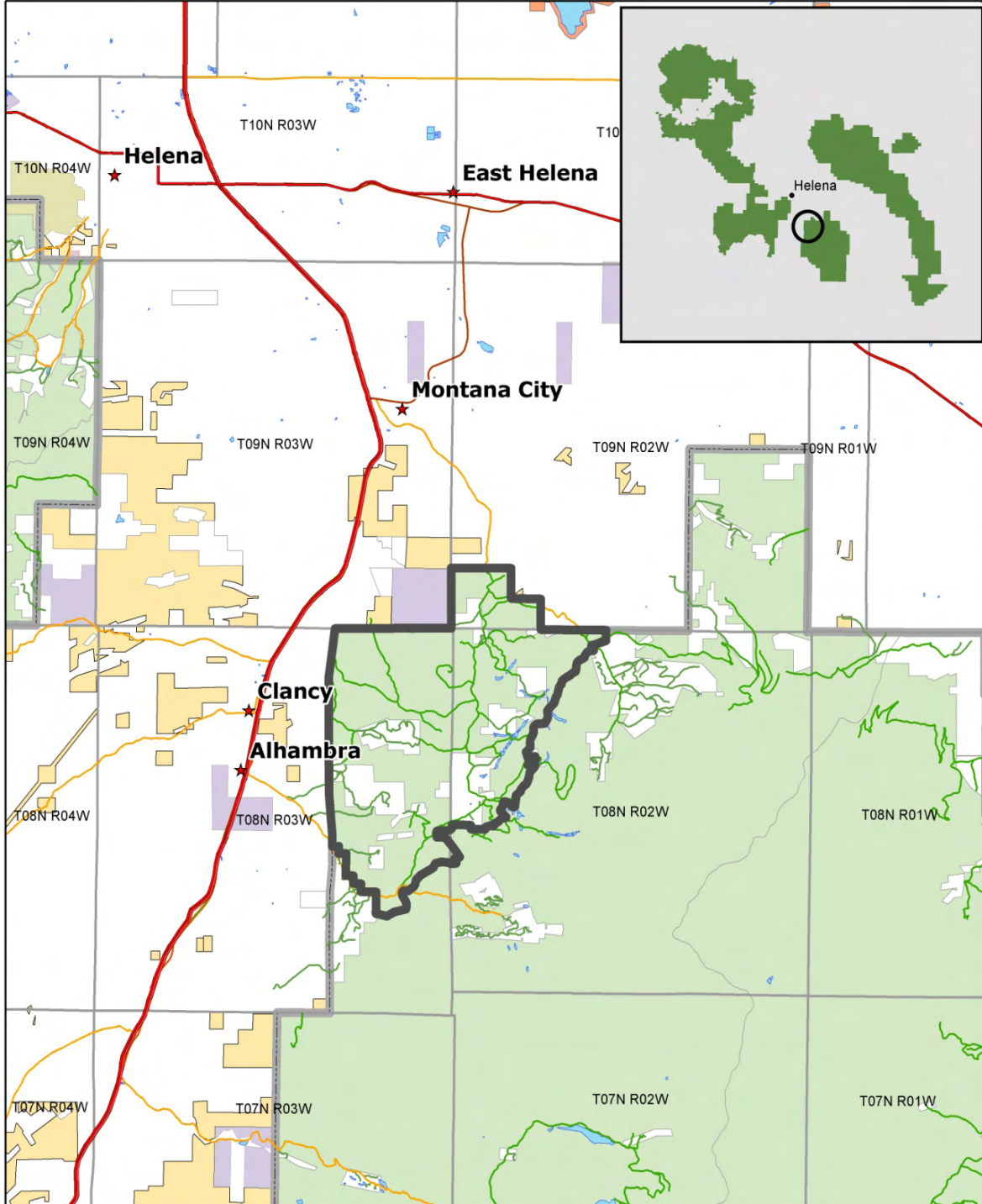
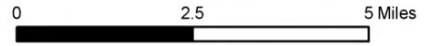
Reviewers have an obligation to structure their participation in the National Environmental Policy Act (NEPA) process so that it is meaningful and alerts the agency to the reviewers' positions and contentions (*Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 553 (1978)). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the final EIS (*City of Angoon v. Hodel* (9th Circuit, 1986) and *Wisconsin Heritages, Inc. v. Harris*, 490 F. Supp. 1334, 1338 (E.D. Wis.1980)). Comments on the draft EIS should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3).

Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the public record for this project. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative or judicial review.

Send comments to: Liz VanGenderen, Helena National Forest, 2880 Skyway Drive, Helena, MT 59601
email: comments-northern-Helena@fs.fed.us

*The review period will be 45 days beginning the day after the Environmental Protection Agency's
Notice of Availability appears in the Federal Register.*

Warm Springs DEIS Project Vicinity



SUMMARY

Introduction

The United States Department of Agriculture (USDA) Forest Service Helena National Forest (HNF) is proposing the Warm Springs Habitat Enhancement Project (Warm Springs Project), a 9,638-acre restoration project in the Elkhorn Mountains. The project is focused on restoring and promoting key wildlife habitat components by managing vegetation, reducing fuels, and promoting a more resilient, fire-adapted ecosystem. This would restore a more natural and sustainable forest structure based on the fire ecology of lower elevation ponderosa pine/Douglas-fir forests. This in turn would restore important wildlife habitat in the Elkhorn Mountains. This project responds to current vegetation conditions in the project area, including the mountain pine beetle (MPB) infestation. Approximately 466,000 ponderosa, lodgepole pine and whitebark trees have been killed in the Elkhorn Mountains (41% of the Elkhorns landscape) by the mountain pine beetle since the infestation was first seen in the mountain range in 2007. Approximately 90% of pine > 5 inches diameter breast height (DBH) in high hazard stands in the project area are projected to be killed by the epidemic (USDA 2008a).

The Elkhorn Mountains are a small, isolated mountain range of approximately 142,000 acres on the Helena National Forest located on the east side of the Continental Divide. Historically, the Elkhorns have provided a variety of productive wildlife habitats and are especially known for those that are more commonly found in the Elkhorn Mountains than elsewhere on the Helena National Forest, such as aspen groves, open-grown ponderosa pine, and mountain meadows. The Elkhorns contain approximately 273 miles of streams with 40 watersheds that drain into three different bodies of water: the Missouri River to the east and the northeast, Prickly Pear Creek to the west and northwest, and the Boulder River to the southwest.

The proposed project is located on the northwest portion of the Elkhorn Mountains approximately 10 miles south of Helena, Montana. At 9,638 acres, the project area makes up approximately 7% of the Elkhorn Mountain land area. The proposed treatment areas encompass portions of three sub-watersheds of Prickly Pear Creek: Middle Prickly Pear Creek, Warm Springs Creek, and McClellan Creek. The area borders private land to the north and west, and is adjacent to the Warm Springs Fire of 1988 to the east and southeast. There are several large inclusions of private land within the project boundary although project activities would occur on National Forest System (NFS) land only.

The NFS land in the Elkhorn Mountains is a Wildlife Management Unit (WMU) and is designated as such in the *HNF Land and Resource Management Plan (Forest Plan)*. There are four management areas within the Elkhorn WMU. The overall management goal for this unit is to manage wildlife habitat to maintain populations of species associated with existing ecosystems. The Warm Springs Project area is classified as Management Area (MA) Elkhorn-4 (E-4). The primary *Forest Plan* management goal for MA E-4 is to optimize moose, elk, and mule deer habitat, and maintain or improve water quality and stream stability.

In 2008, Forest specialists conducted a Forest-wide landscape-level assessment of insect conditions. The *Insect Activity on the Helena National Forest: Assessment and Recommendations* (USDA 2008g) describes current conditions on the Forest. It forecasts vegetation mortality and discusses treatment options and expectations. This report characterized the Warm Springs Project area as having high levels of MPB and high vegetation mortality. This area was identified as a priority for vegetation management due to the extent of the MPB infestation and the habitats of special concern at risk.

Purpose and Need for Action

The need for action is determined by the degree to which existing conditions differ from desired conditions. Desired conditions are embodied in the regulatory framework directing Forest management, and existing conditions are determined through field surveys, data analysis, and

professional interpretations by Forest staff. Where there is little difference between these two conditions, the need for action is low. Where differences are substantial, the need for action is high. Based on a comparison of existing and desired conditions, the responsible official has determined there is a need for the Warm Springs Project in order to improve and maintain wildlife habitats that are threatened by current vegetation conditions.

Need

A variety of factors has influenced the need for treatment in the project area. This area represents one of the few places in the Elkhorn Mountains and on the HNF with a substantial component of mature ponderosa pine, aspen groves, and grassland habitats (Arno et al. 2008; McClelland 1977; Smith 2000). This unique mosaic of species evolved with and is dependent on fire, and provides valuable wildlife habitat. The desired condition on this landscape is a mosaic of species, size classes, and age classes (including open-grown, regenerating ponderosa pine, more open Douglas-fir stands, sustainable aspen, and open meadows) that are necessary to maintain viable populations of species association with existing ecosystems and optimize moose, elk, and mule deer habitat (*Forest Plan III/78 and III/90*).

An epidemic-level MPB infestation is currently present in ponderosa pine stands across the project area. In 2008, Forest specialists conducted a Forest-wide landscape-level assessment of insect conditions and predicted outcomes (USDA 2008g). This report characterized the Warm Springs Project area as having high levels of MPB and corresponding pine mortality. It identified this area as a priority for vegetation management due to the extent of the MPB infestation, the locally rare mature ponderosa pine habitat at risk. Based on R1-VMAP information prior to the MPB outbreak, ponderosa pine-dominated stands comprise only about 4% of the HNF, 9% of the Elkhorn Mountains, and yet they dominated approximately 52% of the Warm Springs Project area.

In addition to the loss of overstory ponderosa pine, the lack of frequent, low-intensity fires over the last 100 years has allowed forested areas to fill in with Douglas-fir creating denser, more homogeneous conditions across the project area. Fuels available to support large wildfires are extensive and becoming more continuous, which increases the likelihood of uncharacteristic, high intensity wildfire that could further alter wildlife habitat. Grasses, shrubs, and forbs that provide valuable wildlife habitat are generally being shaded out by encroaching conifers, mainly Douglas-fir, and suppressed by needle duff. Trees have also colonized into small meadows. Aspen stands are scattered throughout the area, but many are dying because of shading by conifers. Few aspen stands in the area are reproducing successfully due to the lack of disturbance such as fire, which is needed to stimulate regeneration.

There was a need for wildlife habitat restoration in the Warm Springs Project area prior to the current MPB epidemic. The conditions described above with respect to dense homogenous stands, excessive fuels, and encroaching conifers reflect that need for habitat restoration. The insect infestation has, however, exacerbated this need and changed the approach of the project. Based on aerial detection surveys, the number of acres in the 9,638-acre project area infested with MPB increased from 935 acres in 2007 to 6,520 acres in 2009, resulting in 67% of the project area either dead or dying from insects (Gibson 2009). Existing ponderosa pine could be nearly eliminated from the landscape either through MPB mortality and/or high severity wildfire. Under both scenarios, successful regeneration would be threatened by the loss of viable seed sources. Due to the large-scale and sudden nature of the mortality, any natural regeneration would likely be synchronous and uniform, causing a repeat of the homogeneous conditions that are currently threatening the landscape. In light of the current MPB infestation, there is an increased need to actively manage the project area to retain key wildlife habitat components and promote a resilient, fire-adapted ecosystem that can maintain viable populations of wildlife species into the future.



MPB-infested stand in the Warm Springs Project area

Purpose

The purpose of the Warm Springs Project is to ensure that large, open-grown ponderosa pine and Douglas-fir and aspen are abundant and well-distributed in the project area in the future. In order to achieve this objective, it is necessary to ensure that ponderosa pine regeneration is established on low elevation sites where a viable seed source no longer exists. Implementation of this project would improve our ability to achieve the following:

- Forest structures and fuel loadings at the landscape level that change the fire behavior of uncharacteristic, high intensity wildland fire
- Resilient forests with a mosaic of tree structure and age class, and a diversity of trees, shrubs, forbs, and grasses
- Mature habitat structures where possible:
 - ✓ Large living ponderosa pine
 - ✓ Growth and regeneration of live conifers, ponderosa pine being preferred
 - ✓ Large diameter ponderosa and Douglas-fir snags, optimal levels of coarse woody debris, and provisions for providing these components over time
 - ✓ Healthy aspen stands
 - ✓ Healthy stands of other tree species where ponderosa pine is not viable.

In addition to restoring wildlife habitat, another anticipated outcome of the project is improved watershed health. Improvements in watershed health would provide benefits to fish habitat and stream function. The encouragement and acceleration of tree and shrub restoration would create a resilient mosaic of size and age classes that would benefit watersheds. Inclusion of design elements, best management practices (BMPs), and mitigations aimed at protecting and improving watersheds

would help offset sediment production associated with management activities and promote better water quality, fisheries, and watershed conditions (Dalsoglio 2009).

This project would also help scientists and land managers better understand the effects of fire on wildlife habitats. The vegetation communities within the Warm Springs Project are part of the Birds and Burns Network, a research study led by the Rocky Mountain Research Station to examine fire effects on populations and habitats of wildlife in ponderosa pine forests. The Birds and Burn Network includes study areas in eight states across the western United States. Although the goal of this research is to study wildlife in relation to fire in ponderosa pine, its goal in the Warm Springs Project area has expanded to include studying the consequences of MPB as well.

The objectives and anticipated outcomes of the Warm Springs Project serve to bring the current conditions in the project area closer to desired conditions as embodied in the regulatory framework. The project proposes using prescribed fire and vegetation treatments to enhance key wildlife habitat components, which is consistent with *Forest Plan* direction for MA E-4 of the Elkhorn WMU. The project is designed to restore key habitats such as ponderosa pine, aspen, and grassland, which are recognized as important and threatened in the Northern Region Integrated Restoration and Protection Strategy. Hazardous fuel reduction and use of prescribed fire serves to change the behavior of uncharacteristic, high intensity wildland fire and foster a more fire-adapted, resilient ecosystem as directed in the National Fire Plan (NFP), the Tri-county Community Wildfire Protection Plan (CWPP), and the Northern Region Integrated Strategy. And lastly, the proposed action conforms to direction from the National Forest Management Act (NFMA) concerning the diversity of all existing native and desirable non-native vertebrate species; maintenance or restoration of ecosystems at appropriate spatial and temporal scales; and to meet regeneration timeframes and opening size limits, and the site-specific silvicultural prescriptions prepared and approved by a certified Forest Service silviculturist.

Summary of the Proposed Action

The proposed action (Alternative 2) was designed by the HNF interdisciplinary team to meet the purpose and need for the Warm Springs Project. It is summarized below and described in detail in Chapter 2.

The proposed action would treat 4,200 acres in the 9,638-acre project area with a combination of regeneration harvest, intermediate harvest, and prescribed fire. The 2,059 acres of regeneration harvest are designed to create diverse age classes and are located primarily in dead or dying ponderosa pine stands. The 1,002 acres of intermediate harvest are designed to enhance growth, quality, vigor, and composition of existing stands of mixed Douglas-fir and dead or dying pine. Both treatment types would be followed by approximately 2,632 acres of post-harvest burning. In addition, approximately 1,140 acres of prescribed fire would be used to accomplish primarily fuels reduction and vegetation restoration, including grasslands and aspen. Connected actions required to implement the proposed action would be the construction of up to 13.7 miles of new temporary roads and the reconstruction of approximately 8.8 miles of existing roads. Additionally, approximately 6.1 miles of road would need maintenance prior to log hauling.

Scope of the Analysis

The analyses of effects disclosed in this document include those occurring across the entire "scope" of the project, which is defined in 40 *CFR* 1508.25 as the range of actions, alternatives, and impacts to be considered in an EIS. The geographic and temporal boundary for effects analysis varies by resource and is described in Chapter 3 and in each resource specialist report contained in the project record. Any new information that develops after the decision for this project would be considered prior to project implementation.

Decisions to be Made

The responsible official for this project, the Forest Supervisor for the HNF, will make the following decisions and document them in a record of decision after completion of the final EIS.

- Whether or not to implement the proposed action or an alternative to the proposed action
- What monitoring requirements are appropriate to evaluate implementation of this project
- Whether or not a *Forest Plan* amendment is necessary.

Document Organization

This draft EIS is in compliance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations found in 40 *CFR* 1500–1508, and other relevant federal and state laws and regulations. This document discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters and a number of appendices.

Chapter 1 discusses the purpose of and need for the project and summarizes the proposed action, the regulatory framework affecting the project, and the decisions to be made by the responsible official.

Chapter 2 describes the alternative development process including public scoping and the identification of key issues. The proposed action and alternatives analyzed are described in detail including a no action alternative. Features designed to reduce the effects of the proposed action are also listed and a summary comparison of alternatives and their effects is provided.

Chapter 3 describes the natural and human environments potentially affected by the proposed action and alternatives, and discloses anticipated potential effects. This chapter is organized by resource area and alternative.

Chapter 4 contains a list of preparers and a list of agencies, organizations, and individuals to which a copy of the draft EIS was distributed.

Materials appended to this document include Appendix A, a unit-by-unit comparison of treatments by alternative; Appendix B, a table of past, present, and foreseeable future activities considered in the cumulative effects analysis, and Appendix C, Wildlife Analysis.

This EIS incorporates by reference the project record (40 *CFR* 1502.21). The project record contains specialist reports and other technical documentation used to support analyses and conclusions. The project record is available for review at the HNF, Supervisor's Office in Helena, Montana.

Issues

All comments obtained through public scoping process in the Fall of 2009 were reviewed and used to identify issues relevant to the project. Significant issues will be referred to as “key” issues in this document. Key issues are defined as those used to modify the proposed action or develop an alternative to the proposed action. In contrast, analysis issues are those that are addressed in the course of analyzing the environmental effects of the proposed action and alternatives.

Key Issue

Based on content analysis of the comments received, the following key issue was identified and used to develop a third alternative.

Road Construction

Several comments received during the public scoping process centered on the construction of new roads and concerns over the potential for additional sedimentation that could affect area streams and watersheds. The primary measurement indicators for this issue are tons of sediment per year added to area streamcourses and miles of temporary road construction.

Alternatives

Federal agencies are required by the CEQ to rigorously explore and objectively evaluate reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 *CFR* 1502.14 (a)).

Alternatives Considered but Not Given Detailed Study

Public comments received during scoping suggested alternatives for the Warm Springs Project that were not carried forward for detailed analysis. The reasons for this fell into three main categories: (1) they did not meet the purpose and need for the project; (2) they were duplicative to alternatives already developed; or (3) they were determined to have unacceptable environmental impacts. Alternatives considered but dismissed from detailed study along with their reasons for dismissal are listed.

Prescribed Fire

Commenters suggested an alternative that would eliminate mechanical treatments and use only prescribed fire to achieve the objectives of the project. The rationale was that this would avoid the soil disturbance and sedimentation typically associated with mechanical treatments. This alternative was not carried forward for further analysis because the use of prescribed fire alone would not be as effective in establishing vegetative conditions which over time would provide the wildlife habitat objectives described in the purpose and need for the project.

Winter Harvest Operations

An alternative was suggested that would limit harvest operations to winter with the intent to reduce the amount of soil disturbance and compaction typically associated with tree removal equipment. It would also reduce the potential for spreading noxious weeds. This concern is addressed in mitigation considered in the Noxious Weed and Soils Specialist reports which talk to the benefits which would be realized by winter logging, so a separate alternative was not needed to address it. The analyses also consider other mitigation which would reduce potential effects without a requirement for winter only operations.

Removal of Hazard Trees Adjacent to Private Infrastructure

Comments were received from private property owners in the project area suggesting that the HNF consider the removal of hazard trees on National Forest lands that are posing a risk to private infrastructure. Approximately 290 acres adjacent to private lands, within 100 feet of property boundaries, are currently being considered for treatment in the proposed action.

All the areas adjacent to private land that were appropriate for treatment to meet the purpose and need of the project have been included. The issue is incorporated in the current alternatives.

Expand Treatment Areas

A preliminary alternative was considered that uses the same treatment methods as in the proposed action but that treats more acres in the project area. An additional 1,550 acres were considered for treatment under this alternative for a total of 5,750 total acres. This alternative was not carried forward for detailed analysis because of elk issues, road construction and watershed concerns, anticipated impacts to cultural resources, and the proximity of added treatment units to other projects and managed private lands.

Alternatives Considered in Detail

The following section describes the alternatives analyzed in detail. For an alternative to be considered in detail, it must respond to the purpose and need for action and address key issues. For this project, three alternatives were considered. Alternative 1 is the no action alternative and is required by CEQ regulations (40 *CFR* 1502.14d). Alternative 2 is the proposed action, and Alternative 3 is an additional action alternative that was developed in response to the key issue of road construction, which was identified from public comments. A comprehensive unit-by-unit comparison of alternatives can be found in Appendix A.

All alternatives comply with pertinent statutes on NFS lands. Impacts to resources are considered in accordance with NEPA. Maps of the action alternatives are located in Chapter 2.

Alternative 1 – No Action

Alternative 1 is the no action alternative. It describes the existing condition and analyzes the impacts of taking no action. This alternative provides a baseline for the comparison of the environmental effects of the action alternatives.

Under the no action alternative, current conditions and activities would continue to guide management of the project area. Ongoing work or work previously planned and approved such as routine road maintenance, weed spraying, trail maintenance, and firewood gathering would still occur. None of the vegetation management activities proposed in the action alternatives would occur. No new temporary roads would be constructed; no existing roads would be reconstructed.

Because the environment is not static, environmental consequences would still occur under Alternative 1. Current conditions and trends in vegetation, fuels, and fire hazard would likely continue, perpetuating dense, homogeneous stands, large-scale mortality from MPB, and the loss of open-grown ponderosa pine and aspen habitats. Conifers would continue to colonize on grasslands. In the absence of disturbance, hazardous fuels would continue to develop with this condition being exacerbated by insect-induced tree mortality; the risk of uncharacteristic, high intensity wildfire would increase (Jenkins et al. 2008).

Alternative 2 – Proposed Action

This alternative was designed to meet the purpose and need for the Warm Springs Project by managing fuels, restoring fire-adapted ecosystems, and promoting ponderosa pine, aspen, and grassland habitat components.

Proposed treatments include regeneration treatment in the ponderosa pine dominated stands; intermediate harvest in the Douglas-fir dominated stands; and prescribed fire in a variety of stands to reduce ladder fuels (fuels that provide a vertical connection between the forest floor and canopy). Hand tree planting would occur in areas where additional tree stocking is needed to achieve ponderosa pine and wildlife objectives. See Appendix A for a unit-by-unit comparison of treatments by alternative.

Treatments are described below. It should be noted that silvicultural treatments are typically aimed at removing live trees, and this is reflected in the definitions below. With the exception of intermediate harvest units, the treatments would only remove dead trees.

Regeneration Harvest: Treatment designed to create a new age class (single-aged or two or more age classes). The existing stand is replaced. For the Warm Springs Project, the existing stands that would be replaced are already dead from MPB infestation.

- **Seedtree** (Smith et al. 1997a): Most trees are removed except those needed to provide seed for regeneration. Reserves may be left in treatment units (two-storied dominated stand). Reserved trees or reserves are defined as greater than 10% of the stocking left for reasons other than providing seed. Leave trees are less than 10% of the stocking left for reasons other than providing seed.

- Shelterwood (Smith et al. 1997a): In a shelterwood, all trees are removed except those needed to provide seed and shelter for regeneration. A group shelterwood is when shelter trees are left in a clumpy distribution. Reserves may be left as above (two-storied dominated stand).

Intermediate Harvest: Treatment designed to enhance growth, quality, vigor, and composition of the stand after establishment or regeneration and prior to final harvest. Intermediate treatments can result in uneven-aged, two-aged, or even-aged stands depending on existing conditions and objectives.

- Improvement Harvest (Smith et al. 1997a): Harvest done in a stand pole-sized or larger, to improve composition and quality by removing less desirable trees.
- Underburn: Prescribed fire method where burning is conducted in the understory of the forest, below the dominant trees.

Prescribed Fire: Fire is used to accomplish a variety of goals, including reducing ladder fuels, surface fuels, and duff accumulations; stimulating understory grasses and shrubs; reintroducing fire to the boles of mature trees so that the stand becomes more fire resilient; creating desirable habitat structures and vegetative patterns; and preparing seed beds for regeneration.

- *Slashing:* Cutting small diameter trees (generally < 6-inch DBH) mechanically or with chainsaws. Slashing is used to reduce ladder fuels to lower crown fire potential to create sufficient surface fuels to carry a prescribed fire and/or to add fuels to meet woody debris goals for nutrient cycling.
- *Snag Falling:* Cutting dead trees (generally >6-inch and <20" DBH) mechanically or with chainsaws. Falling is used to increase surface fuel loading to a desirable level to facilitate burning that would reduce overall future fuel loading, reduce danger to tree planters, and prevent excessive damage to planted ponderosa pine when snags begin to fall naturally. Approximately 10 snags per acre would be felled. Snags to be retained would include the largest, straightest and broken topped when possible.
- *Pile/Burn:* Generally follows slashing or harvest where slash disposal is needed but broadcast burning is not feasible or desirable. Residual slash and debris is placed into piles and burned when conditions are favorable. Target amounts of slash may be left un-piled to meet woody debris and nutrient cycling goals.
- *Jackpot Burn:* Burning focused on concentrations of fuel, generally after harvest or slashing. Jackpot may involve burning loose piles or areas of slash which are not continuous and/or overstory mortality not a concern (as in a natural opening). A minimal amount of mortality may occur in trees > 6-inch DBH. In Warm Springs, jackpot burning will primarily be applied in aspen. Target density is 60–140 BA/ac, 150–350 trees/ac and canopy cover of 25–60%.
- *Underburn* (following intermediate harvest): The primary purpose is to reduce slash and ladder fuels. It is low intensity where direct mortality <5%, indirect mortality <5%, and <1/4 acre group mortality occurs in overstory residual trees. The objectives are to reduce ladder fuels (trees generally under 6 inch diameter), reduce fine woody debris (<3-inch diameter), reduce duff fuel loadings while minimizing exposure of mineral soil (<10%), and retain most coarse woody debris (>3-inch diameter) for nutrient cycling and wildlife habitat.
- *Site Prep Burn* (following regeneration harvest): The goal is to reduce fuels and prepare the site for regeneration. It is a low to moderate intensity fire where direct and indirect mortality of leave trees is <5% (reserve, shelter, or seed trees left are minimal and a high priority to protect). The goals are to reduce fine woody debris (<3-inch diameter), reduce duff fuel loadings, expose 5–25% mineral soil, reduce competing vegetation, and retain most coarse woody debris (>3-inch diameter) for nutrient cycling, seedling microsites, and wildlife habitat.
- *Broadcast Burn (Low Severity Burn, no harvest):* Fire is used as a tool to achieve objectives with low severity effects. The purpose is to reduce ladder fuels and reduce overstory tree density to a minor extent. Slashing as needed would occur to limit intensity and create a fuel

bed. An additional purpose is the re-introduction of fire to the ecosystem. Direct mortality <5%, indirect mortality <10%, and <1 acre mortality patches may occur in the overstory. Objectives include reducing fine woody debris (<3-inch diameter), reducing duff fuel loading while minimizing exposure of soil (<10%), and retaining most coarse woody debris (>3-inch diameter).

For Alternative 2, intermediate treatments encompass 1,002 acres, regeneration treatments 2,059 acres, and prescribed fire 1,140 acres for a total of 4,200 acres treated. There would be changes to the structure of treated areas. Generally, treatments would reduce tree density and ladder fuels, and/or return stands to earlier successional stages. No new system roads are proposed, although approximately 13.7 miles of temporary roads and 8.8 miles of existing road reconstruction would be required. In addition to road construction and reconstruction, Alternative 2 would require road maintenance in preparation for hauling logs on 6.1 miles of existing road.

Alternative 3

This alternative was developed in response to the key issue of road construction, which was identified during the public scoping process. Alternative 3 was designed to meet the purpose and need for the Warm Springs Project while not requiring any road construction, including temporary roads. Like Alternative 2, it includes a combination of intermediate and regeneration treatment followed by post-harvest burning, and prescribed fire. However, units receiving mechanical treatments were limited to those that could be accessed by existing roads. Mechanical treatment units proposed in Alternative 2 that could not be reached in Alternative 3 were changed to prescribed fire only or dropped from treatment altogether. This alternative not only eliminates road construction but also increases the use of prescribed fire, which was also suggested in public scoping comments. There would be fewer acres of tree removal and more acres of prescribed fire under this alternative. See Appendix A for a unit-by-unit comparison of treatments by alternative.

Design Elements and Mitigation Common to Alternatives 2 and 3

The IDT identified best management practices (BMP), design criteria and in some cases mitigation to reduce or prevent undesirable effects resulting from management activities associated with either action alternative. These measures also include Forest Plan standards and guidelines, and other environmental protection required by laws and regulations. These measures are integral to each action alternative and therefore, are required should an action alternative be selected.

Design elements and mitigations common to both action alternatives for the Warm Springs Project are listed below by resource area. Some of the design elements and mitigation measures apply to more than one resource. For example, mitigation identified under soils could also apply to hydrology and/or fisheries. However, for brevity, they are only mentioned under one resource area in the following list. For more information on design elements and mitigation measures as they pertain to a particular resource, please see the specialists report in the project record.

Wildlife

- The Birds and Burns Research Project is designed to compare the effects of treatments on Neotropical migrants and cavity nesting birds in the Project area. In order to do so, treatments would be deferred on approximately 360 acres while treatments would proceed elsewhere in the Project area to allow for data collection in 'treated' and 'untreated' areas for comparative purposes.
- All prescribed fire and underburning would be implemented prior to May 1 or after July in order to protect nesting birds, unless surveys indicate birds are not present.
- If any listed species are detected in the Project area, activities would be examined to determine if modification is necessary.
- Helena National Forest Recommendations from the Final Report of the Montana Cooperative Elk-Logging Study, 1970–1985 for Coordinating Elk and Timber Management would be implemented during timber harvest.
- For new active goshawk nests, a no-treatment buffer of a minimum of 30–40 acres would be maintained around nest trees. No ground disturbing activities would occur inside known post

fledgling areas from April 15 through August 15 to protect the goshawk pair and young from disturbance during the breeding season, until fledglings are capable of sustained flight.

- Implementation of post-treatment weed mitigation measures would occur in treatment units. Following weed treatments, monitoring of affected areas would occur.
- The Montana Streamside Management Zone Law would be followed to protect riparian resources.
- Grazing would be deferred for at least 1-2 years following vegetative treatments to minimize possible cumulative effects of grazing and vegetation treatments.
- At least 180 acres of nesting Goshawk habitat per home range would be retained within the project area if it is available, with an emphasis on stands that have been used by Goshawks for nesting in 2009 and 2010.
- Forest Plan Standards regarding snags would be met as described in the Habitats of Special Concern report. While OSHA requires the felling of trees deemed to be safety hazards, site specific sicultural prescriptions would include snag retention and coarse woody debris goals.
 - Regeneration harvest units would retain on average 20 snags per 10 acres of the largest diameter wind firm snags available that do not pose a safety or feasibility concern.
 - Intermediate harvest units would retain on average 7 snags per acre greater than 20" dbh of any species, or as many as are available less than that amount; AND 7 Ponderosa pine or Douglas-Fir snags greater than 10" dbh, or as many are available less than that amount, where they do not pose a safety or feasibility concern.

Cultural Resources

- Cultural resources in treatment units and road reconstruction zones would be protected by buffering or avoidance. In those cases where avoidance/protective measures are not feasible, impacts would be mitigated through historical research and reporting or archaeological data recovery.
- Three sites would be reexamined after units are physically designated on the ground and reconsideration of their historic importance may identify these properties as particularly important and worthy of specialized treatment such as hand-thinning/logging.
- Cultural resources would be monitored by Forest archaeologists and sale administrators during and after project activities.
- If previously unknown heritage resources are encountered during implementation of the project, activities at the site would be halted and the Forest archaeologist would be notified immediately. Activities would not resume until adequate protective measures including unit reconfiguration, site buffering, and avoidance were developed and specified in the field.
- A contractual provision that requires identification and protection of known resources and allows for modification or cancellation of the timber sale would be included in any timber sale contract or other contracts if necessary to protect resources discovered while project implementation is in progress.

Fire and Fuels

- A variable no-ignition buffer for burning activities would be employed in all units adjacent to stream channels. The Warm Springs Project Hydrology Specialist Report provides unit specific guidance.
- Any necessary fire control lines for burn units would be constructed by hand to a maximum width of 18 inches.
- Should prescribed fire spread into the streamside buffer, fire would not be actively suppressed.
- Structural improvements would be protected during burning operations.

- Mop up standards would be determined through the prescribed burn plan and by the Burn Boss the day of the burn

Air Quality

- Prior to initiating any burning activities, a burn plan in compliance with the Montana/Idaho Airshed Group Operating Guide would be prepared for areas proposed within each action alternative.
- During the burn implementation periods, the prescribed burn boss would be responsible for conducting a site-specific smoke analysis with current weather and air quality conditions prior to ignition to determine how many acres can be burned and identify any effects on residents located downwind of the project burn area.
- Prior to burning, the location, timing, and possible smoke effects would be disclosed in the local newspaper.

Fisheries

- Design criteria and mitigation measures applicable to fisheries can be found under Soils and Hydrology.

Hydrology

- Hauling and other heavy-equipment traffic should not occur during conditions where the road surface is at or near saturation.
- If snow plowing is necessary, follow standard Forest Service timber contract snow plow guidance (C5.316) with a minimum of 4" of compacted snow left on road surface.
- Any wetlands, seeps and springs should be identified and marked during project implementation, and should be protected in accordance with Montana SMZ law.
- Incidental removal of non-hazardous tree vegetation (e.g. shrubs, small trees) should be minimized within SMZs.
- Operation of equipment within non-SMZ wetlands would not occur.
- Project operations would be monitored by a representative of the Watershed/Fisheries staff to ensure proper application and effectiveness of BMPs
- Road reconstruction and maintenance would be done in accordance with standard BMPs with an unrutted gravel or native surface and effective drainage for the duration of the project in order to avoid developing sediment delivery points.
- Road surface drainage should divert road-surface runoff to undisturbed forest floor, where conditions allow for sediment deposition and infiltration.
- Any new culvert crossings on temporary roads would be constructed when there is no water in the stream, if possible. If not, clear water would be diverted around culvert installation sites and appropriate best management practices (BMPs) would be used to protect streams from turbidity.
- A Montana SPA 124 permit would be obtained for every temporary stream crossing installation.
- Sediment filtering devices (e.g., filter fence or certified-weed-free straw bales) should be used as needed (e.g. at road/stream crossings, especially around temporary road locations) to limit erosion and delivery of sediment into streams or ephemeral drainages.
- Dewater site before culvert installation for new and replacement culverts.
- Use vibrator plate or hammer type compactor for proper soil compaction during culvert installation.

Soils

- For units thinned by tractor operations, conduct operations of ground-based heavy equipment under the following seasonal conditions: either during "summer-conditions" when soils are generally dry, or during "winter-conditions" when there is at least 4 inches of frozen ground or 6 inches of packed snow (USDA 1988; BMP 13.06 and 14.04).

- Limit ground-based heavy equipment operations to slopes less than 35% gradient (USDA 1988; BMP 13.02 and 14.07).
- On slopes greater than 35% gradient, use hand-falling and lead-end, suspended log yarding operations, such as skyline cable or helicopter yarding (USDA 1988; BMP 14.09).
- Soil organic matter losses should be kept to a minimum by conducting prescribed burning when the forest floor is moist (Harvey et al. 1994).
- Design burn prescriptions to retain adequate ground cover that would limit surface erosion rates to comply with Region 1 soil management guidelines of generally less than 1 to 2 tons per acre per year. Retaining adequate soil cover would be especially critical in units 53, 54, 57, 68, 69, 70, 71 and 72 in Alternative 2 and units 2, 8, 9a, 10, 11, 13a, 17a, 18a, 28, 29, 30a, 42, 45a, 45b, 46a, 46b, 52a, 53, 54, 57, 58, 59a, 60, 61, 62, 63, 64, 68, 69, 70, 71 and 72 in Alternative 3 where mixed severity burning would be implemented.
- Design burn prescriptions to achieve low to moderate fire intensity (USDA 1988; BMP 18.02; Harvey et al. 1994).
- In units where soil effects resulting from mechanical tree thinning combined with prescribed fire are anticipated to exceed Region 1 soil quality standards, the following special mitigation measure would be recommended:
- Defer implementation of prescribed fire until soil conditions can be field verified by the Forest Soil Scientist following mechanical tree thinning. If field monitoring verifies that prescribed burning could be implemented without exceeding Region 1 soil quality standards, then burning would proceed. If field monitoring indicates that Region 1 soil quality standards would likely be exceeded with implementation of prescribed fire, then burning would not be implemented.
- Utilize winter logging as opposed to summer logging. Winter logging would allow all units to be harvested and burned within Region 1 soil quality standards. Winter logging benefits are also outlined in the Noxious Weed Report, to minimize spread of noxious weeds.
- The Noxious Weeds Report specifies mitigation measures to minimize effects of noxious weeds: following implementation of proposed vegetation treatments (including road construction and road decommissioning), sites would be monitored for noxious weed invasion, and subsequent weed treatments would be conducted to control and eradicate weeds. With this mitigation, soil cumulative effects from noxious weeds would be minimized.
- Combine adjacent units with the same prescription
- Following implementation of proposed vegetation treatments (including road construction and road decommissioning), sites would be monitored for noxious weed invasion, and subsequent weed treatments conducted to control and eradicate weeds.(also applies to noxious weeds)
- Temporary road construction would be conducted in a manner that facilitates conservation of the upper soil layers (topsoil) and permits the lower soil layers to be easily placed onto the temporary road prism and then to be covered with the topsoil during reclamation.

Transportation

- Road reconstruction consists of preparing the roadway surface to meet BMP standards in accordance with soil and water conservation practices hand book (USDA 1988) to be suitable for logging trucks and equipment. Road reconstruction activities can include: surface shaping and grading (blading), minor earthwork (cut and fill), ditch reshaping, adding gravel, installing or replacing culverts, and installation of surface cross drains.
- Road maintenance would be performed on haul roads during project implementation in order to meet BMP standards. (Also applies to Hydrology and Fisheries)
- Cut and fill slopes would be re-vegetated with native species wherever possible.
- Harvest and burning activities would be coordinated to minimize impact to forest users and private landowners.

- Warning signs would be posted along Forest Service haul routes to notify the public of truck traffic, logging, and burning activity in the area.
- Log hauling would be prohibited on weekends and Federal holidays.
- Some roads and areas could be temporarily closed or have restrictions on public use as necessary to provide for safety of the public and logging crews during project activities.
- Temporary roads would be designed and constructed in accordance with standard BMPs e.g., FSH 2509.22; FSH 7709.56; 7709.56b (USDA 1988; USDA 1994; USDA 1998) (Also applies to Hydrology, Soils, and Fisheries)
- Temporary roads would be decommissioned in conformance with Practice 15.25 of the soil and water conservation practices handbook (USDA 1988), as soon as possible after project completion. Decommissioning refers to full obliteration of the road—ripping the roadbed, restoring the road prism to natural contour, removing culverts, replacing topsoil, placement of woody debris to provide stability, and native seeding. (Also applies to Wildlife, Hydrology, Soils)
- Until temporary roads could be decommissioned, they would be maintained to minimum haul standards. (Also applies to Hydrology)
- All temporary roads would have locked gates and be closed to the public at all times. (Also applies to Wildlife)

Lands

Boundary

- Boundary lines would be established when in question and/or when working in close proximity to adjacent third-party lands that are not well marked.
- Corner monuments and accessories to corner monuments would be protected.
- Adjacent land owners would be notified of project activities. Private landowners would have adequate notice prior to tree harvesting or prescribed fire treatments to plan accordingly for noise and potential air quality effects associated with burning.

Non-recreation Special Uses

- Permittees and landowners would be notified of the proposed and selected actions to ensure that project activities do not materially interfere with private landowner/permittee rights. Privately owned improvements would be protected during operations.
- If detours or temporary road closures occur during project activities, signs would be posted and prior warning would be given to affected parties.
- Project managers and contractors would be cognizant of the location of permitted private roads and classified private roads.

Land Exchange/Rights-of-Way

- Land exchange partners potentially affected by treatment activities on lands that are proposed for exchange would be advised and coordinated with prior to treatment.
- Road use would be coordinated with Jefferson County on roads having county jurisdiction.
- Private rights-of-way would be pursued, to serve both short-term project access needs and long-term public and administrative access needs.

Minerals

- Mine sites and their relic features would be avoided during vegetation work because of their hazards, as well as their historic value.
- Fuels would be removed where appropriate to protect mining features.
- In order to maintain the stability of waste rock dumps and features, heavy equipment would avoid tracking over unreclaimed waste rock piles.
- In places where treatments would substantially reduce vegetative cover above waste piles, vegetative buffer zones or slash would be used to reduce potential for erosion into these areas in the event of a high intensity storm or extreme runoff event.

- Areas where mine workings are suspected would be inventoried prior to implementing treatments in those areas. For worker safety, workers would avoid areas with pits, shafts, and adits.
- Equipment operators conducting road reconstruction activities would be informed of any mining-related sites located within 150 feet of the reconstructed roadbed.
- Personnel conducting prescribed fire would be informed of any mining-related features, particularly those features of historical importance that include timber supports or wooden structures, ensuring that the integrity of those structures would not be impacted.

Noxious Weeds

The following Best Management Practices are required by FMS 2081.2—Prevention and Control Measures (FSM 2080, 5/14/01) (USDA 2001).

Roads

- Incorporate weed prevention into road layout, design, and alternative evaluation. Environmental analysis for road construction and reconstruction would include weed risk assessment.
- Remove the seed source that could be picked up by passing vehicles and limit seed transport in new and reconstruction areas.
- Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. This does not apply to service vehicles that would stay on the roadway, traveling frequently in and out of the project area.
- Landings, skid trails, and other areas of disturbance resulting from logging activities would be monitored for weed infestations.
- Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders as determined by the Forest Weed Specialist. Reference Contract Provision C/CT 6.626.
- Re-establish vegetation on bare ground due to construction and reconstruction activity to minimize weed spread. (Also applies to Hydrology and Soils)
- Revegetate all disturbed soil, except the travel way on surfaced roads, in a manner that optimizes plant establishment for that specific site, unless ongoing disturbance at the site would prevent weed establishment. Use native material where appropriate and available. Use a seed mix that includes fast, early season species to provide quick, dense revegetation. To avoid weed contaminated seed, each lot must be tested by a certified seed laboratory against the all State noxious weed lists and documentation of the seed inspection test provided.
- Use local seeding guidelines for detailed procedures and appropriate mixes. Use native material where appropriate and available. Revegetation may include planting, seeding, and weed-free mulching as indicated by local prescriptions.
- Monitor and evaluate success of revegetation in relation to project plan. Repeat as indicated by local prescriptions.
- Minimize the movement of existing and new weed species caused by moving infested gravel and fill material. A borrow pit would not be used if new invaders, defined by the Forest Weed Specialist, are found on site.
- Minimize sources of weed seed in areas not yet revegetated. If straw is used for road stabilization and erosion control, it must be certified weed-free or weed-seed free.
- Minimize roadside sources of weed seed that could be transported to other areas during maintenance.
- Look for priority weed species during road maintenance and report back to District Weed Specialist.
- Do not blade roads or pull ditches where new invaders are found.

- Maintain desirable roadside vegetation. If desirable vegetation is removed during blading or other ground disturbing activities, area must be revegetated according to section (3) (a), (b), (c) above.
- Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that would stay on the roadway, traveling frequently in and out of the project area.)
- Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders, as determined by the Forest Weed Specialist. Reference Contract Provision C/CT 6.626.
- Straw used for road stabilization and erosion control would be certified weed-free or weed-seed-free.

Timber

- Ensure that weed prevention is considered in all pre-harvest timber projects.
- Include weed risk assessment in environmental analysis for timber harvest projects.
- Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that would stay on the roadway, traveling frequently in and out of the project area.) Reference Contract Provision C/CT6.26
- Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as designated by the Forest Weed Specialist). Reference Contract Provision C/CT6.261
- Minimize the creation of sites suitable for weed establishment.
- There are no BMPs specific to prescribed fire in FSM 2080. The above BMPs that apply would be implemented in prescribed fire units.

Rangeland

- The following fences would be protected during treatment operations:
- Badger Creek; 1.30 miles
- Bauer; 0.52 miles
- Maupin Billy Herman fence; 1.39 miles
- Section 32 North Fork fence; 0.45 miles
- Strawberry electric fence; 0.39 miles
- Strawberry fence; 1.54 miles
- Wing fence; 0.60 miles
- Warm Springs fence; 0.48 miles
- Range specialists would be provided advanced notification of scheduled project activities in order to coordinate with permittees.
- Livestock use would be withheld in prescribed fire units to ensure that adequate fine fuels are available for burning; livestock could also be withheld for the first growing season following burning.
- Range personnel would establish key areas, and sites would be monitored through normal permit administration to ensure use levels are not exceeded.

Scenery

- Created openings would resemble the size and shape of those found in the surrounding natural landscape.
- Unit edges would undulate and feather to the extent practicable.

- Where the unit is adjacent to denser forest, the percent of thinning within the transition zone would be progressively reduced toward the outside edge of the unit. In addition, the width of the transition zone would be varied.
- Thinly spaced trees that are silhouetted along the skyline would be avoided where possible.
- Final design and unit layout of all units that lie within lands allocated Visual Quality Objectives (VQOs) of Retention and Partial Retention by the HNF Forest Plan would be reviewed by the Forest landscape architect. During temporary construction, slash and root wads would be eliminated or removed from view in the immediate foreground (generally within 100 feet) of main travelled roads to the extent possible. .
- Log landings, roads, gravel pits, borrow areas, and bladed skid trails would be minimized within sensitive view sheds.
- Slash would be reduced in the immediate foreground (generally within 100 feet) of main travelled roads by scattering, chipping, or other techniques.

Recreation

- In harvest units with system trails, mechanized equipment would cross system trails only at designated sites (see the “Transportation” section above for additional design elements related to roads and skid trails).

Sensitive Plants

- If any sensitive plant populations are found during marking, implementation or monitoring, those areas would be buffered and protected.

Forested Vegetation

- Sufficient debris would be left onsite to meet coarse woody debris and burning prescription guidelines as follows: 5-12 tons/acre in warm dry forest habitat types; 10-18 tons/acre in other forest types. (Also applies to Wildlife, fuels, Soils)
- Burning in non-harvested areas would occur after necessary preparation (i.e., slashing) and when conditions meet objectives.
- Burning for site preparation would be done as soon as possible to encourage prompt natural regeneration, within 3 years of harvest; this burning would fit within mixed severity guidelines. In some cases, natural regeneration would be monitored for one year to determine if a burn is needed. A more detailed, site-specific schedule for burning is developed in silvicultural prescriptions.
- In units containing a component of large diameter DF (>14” dbh), proposed burning may be delayed depending on DFB at the time of implementation. The Silviculturist and fuels specialists would coordinate to determine the most appropriate time for burning.
- In intermediate treatment units the healthiest and generally largest trees would be retained.
- In units where green pine slash is created and there is residual mature ponderosa pine, one or more of pine engraver mitigation measures would be employed. These measures would be specified on final silvicultural prescriptions on a unit-by-unit basis.
- Perform slash creation from late summer to early winter (August to December); or
- Burn slash immediately following treatment, before April; or
- Lop slash into small pieces and scatter it into openings; or
- Create large slash piles to draw the insects into the pile until it can be burned.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Table S-1 summarizes acres treated by treatment type and alternative.

Table S-1, Treatment Types, Acres, and Percent Area for Action Alternatives by Treatment Category (*Due to rounding, acre totals are approximate)

Prescription		Alternative 2			Alternative 3		
		Unit Numbers	Acres	% of proposed treatment acres	Unit Numbers	Acres	% of proposed treatment acres
Intermediate Harvest	Improvement Cut, Underburn	2, 12, 13, 14, 15, 16, 17, 18, 23, 25, 28, 29, 33, 34, 35, 38, 42	1,002		12, 13, 14, 16, 17, 18, 23, 25, 35, 38	427	
	<i>Total acres of Inter. Harvest</i>		1002		427		
Regeneration Harvest	2-aged seedtree with reserves, burn	30, 27, 52, 58, 59, 8, 10, 11, 45, 46, 47, 60, 61, 62, 63, 64, 65	1630		27, 30, 52, 11a, 45, 46, 47, 59, 63b, 65	305	
	Shelterwood w/ reserves	1, 3, 4, 5, 6, 7, 9	429		1, 3, 4, 5, 6, 7, 9	340	
<i>Total acres of Regen. Harvest</i>			2059		646		
Total acres of Harvest			3060	73%		1072	27%
Prescribed Fire	Slashing, broadcast burn	68, 69, 70, 71, 72, 53, 54, 57	644		53, 54, 57, 68, 69, 70, 71, 72, 2, 8, 9a, 10, 11, 13a, 17a, 18a, 28, 29, 30a, 42, 45a, 45b, 46a, 46b, 52a, 58, 59a, 60, 61, 62, 63, 64	2373	
	Slashing, burn (grassland)	39, 40, 66, 67	169		39, 40, 66, 67	169	
	Slashing, jackpot burn (aspen)	24, 26, 41, 50, 51	326		24, 26, 41, 50, 51	326	
Total Prescribed Fire Acres			1140	27%		2869	73%
Total Approximate Treatment Acres*			4,200	100		3,941	100

Table S-2 summarizes the logging systems proposed for the action alternatives. Alternative 2 includes almost three times as much logging activity compared to Alternative 3 due to the fact that temporary road construction is not a component of Alternative 3. Subsequently, fewer acres are treated and of those treated prescribed fire comprises the majority of treatment prescriptions.

Table S-2 Harvest Systems for Action Alternatives

Harvest System	Alternative 2 (Acres)	Alternative 3 (Acres)
Tractor	3,017	1,059
Cable	43	14
Total	3,060	1,073

Table S-3 summarizes road work proposed for each alternative. Alternative 2 would require 13.7 miles of temporary road construction. No new system roads or temporary roads were proposed in Alternative 3. Approximately 8.8 miles of existing road reconstruction would be needed to accomplish the activities associated with both Alternatives 2 and 3. Additionally, approximately 6.1 miles of road would need maintenance prior to log hauling in both alternatives.

Table S-3 Road Reconstruction and Temporary Road Construction for Action Alternatives

	Alternative 2 (miles)*	Alternative 3 (miles)*
Temporary roads	13.7	0
Reconstructed roads	8.8	8.8
Maintenance for log haul	6.1	6.1
*Due to rounding, road mile totals are approximate		

Table S-4 provides a comparison of the changes among alternatives in the measurements used to describe the analysis issues for each respective resource area. While all analysis issues are addressed in Chapter 3, only those for which there are impacts associated with each alternative are summarized in the following table.

Table S-4, Comparison of Alternatives by Analysis Issues and Measurements

Resource/Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	
Wildlife				
<i>Wildlife Habitats</i>				
Acres of dry forest habitats treated	0	3,682	3,285	
Acres of treatments that benefit aspen	0	2,670	2,441	
Acres of non-forested habitats treated	0	507	503	
<i>Elk hiding cover by elk herd unit in acres (percent)</i>				
Prickly Pear Herd Unit	3,429 (11.0%)	3,429 (11.0%)	3,429 (11.0%)	
Sheep Creek Herd Unit	4,681 (10.7%)	4,189 (9.5%)	4,266 (9.7%)	
<i>Snag/acre across 3rd Order Drainages</i>				
3 rd Order Drainage 0822	79	78	78	
3 rd Order Drainage 0901	8	6	6	
3 rd Order Drainage 0904	0.5	0.5	0.5	
<i>Threatened, Endangered, Sensitive Species</i>				
Black-backed Woodpecker – Forest acres treated	0	4200	3,940	
Flammulated Owl – Acres of dry forest habitats treated	0	3,682	3,285	
<i>Management Indicator Species</i>				
Acres of potential Northern Goshawk habitat treated (Nesting)	0	218	148	
Acres of potential Pileated Woodpecker habitat treated	0	940	835	
Acres of potential Hairy Woodpecker habitat treated	0	940	835	
Acres of potential American Marten habitat treated	0	217	147	
Fire and Fuels				
High Fuel Load Fuel Models (fuel models 185, 188). Current/ Immediately following implementation	FM 185	28%	18%	19%
	FM 188	52%	25%	35%
High Fuel Load Fuel Models (fuel models 185, 185, 187, 188, 10). In 2025.	FM185	5%	3%	3%
	FM188	10%	5%	8%
	FM 187	5%	2%	3%
	FM 10	60%	34%	38%

Resource/Issue		Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
PPDF1 BpS Succession Class Departure from Reference-- (% departure from reference)	Current/ Immediately following implementation	High (70%)	Mod (40%)	Mod (55%)
	2020	High (89%)	Mod (64%)	High (83%)
Forested Vegetation				
<i>Create Forest structure that is resilient to insects</i>				
Acres of Douglas-fir mixed forest treatments		0	876	294
Basal area below DFB susceptibility thresholds	Current	BA 99 - No	BA 99 - No	BA 99 - No
	Post-treatment	BA 102 - No	BA 67 – Yes	BA 67 – Yes
	2040	BA 119 - No	BA 78 - Yes	BA 78 - Yes
	2060	BA 132 - No	BA 88 - No	BA 88 - No
DBF hazard rating through time	Current	2 - Moderate	2 - Moderate	2 - Moderate
	Post-treatment	2 - Moderate	2 - Moderate	2 - Moderate
	2040	3 - High	2 - Moderate	2 - Moderate
	2060	3 - High	2 - Moderate	2 - Moderate
WSB hazard rating	Current	3-High	3-High	3-High
	Post-treatment	3-High	1-Low	1-Low
	2040	3-High	1-Low	1-Low
	2060	3-High	3-High	3-High
<i>Promote ponderosa pine composition through time</i>				
Percent ponderosa pine composition through time	Current	42%	42%	42%
	Post-treatment	42%	90%	41%
	2040	42%	92%	54%
	2060	53%	92%	66%
Promote landscape resiliency by creating a mosaic of structures. % area treated	Regeneration harvest	0%	22%	7%
	Intermediate harvest	0%	10%	4%
	Prescribed fire	0%	12%	30%
Acres treated by prescription in ponderosa pine	Regeneration harvest	0	2,036	624
	Intermediate harvest	0	0	0
	Prescribed fire	0	644	2,234
Habitats of Special Concern				
<i>Old Growth Effect on potential fire behavior in adjacent designated old growth stands</i>				
Acres Adjacent to Old Growth	Regeneration harvest	0	89	0
	Intermediate harvest	0	0	0

Resource/Issue		Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
	Prescribed fire	0	102	191
<i>Snags: Effect on the snag resource in 3rd order drainages level</i>				
Estimated snags per 3rd order drainage post-treatment	Drainage 0822	79	78	78
	Drainage 0901	8	6	6
	Drainage 0904	0.5	0.5	0.5
<i>Ponderosa Pine: Effect on the percent composition of ponderosa pine</i>				
% composition of ponderosa pine in ponderosa pine by prescription	Existing condition	42%	Regeneration: 42% Prescribed Fire: 42%	Regeneration: 42% Prescribed Fire: 42%
	Post-treatment	42%	Regeneration: 90% Prescribed Fire: 41%	Regeneration: 90% Prescribed Fire: 41%
	2040	42%	Regeneration: 942% Prescribed Fire: 54%	Regeneration: 92% Prescribed Fire: 54%
	2060	53%	Regeneration: 92% Prescribed Fire: 66%	Regeneration: 92% Prescribed Fire: 66%
Ponderosa pine presence on the landscape over time		0	2036 acres treated with regeneration harvest which would maximize Ponderosa pine composition	644 acres treated with regeneration harvest which would maximize Ponderosa pine composition
<i>Aspen: How would alternatives promote aspen</i>				
Acres of proposed treatment units that contain a component of aspen	Regeneration harvest	0	1313 acres	628 acres
	Intermediate harvest	0	709 acres	342 acres
	Prescribed fire	0	648 acres	1441 acres
<i>Grasslands/Sagebrush: How would alternatives promote grasslands/shrublands</i>				
Acres of proposed treatment units that contain non-forested habitats		0	507 acres	503 acres
Potential to reduce uncharacteristic fires in the dry ponderosa pine habitats		Lowest potential	Highest potential	Moderate potential
Noxious Weeds				
Potential acres of noxious weeds treated		0	97-551	96-320
Treatment costs associated with noxious weed treatment		0	\$4,850 – \$27,550	\$4,800 – \$16,000
Sensitive Plants				
Populations of Sensitive Plants threatened		0	0	0

Resource/Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Range			
Acres of treatment within suitable rangeland (i.e. primary and secondary range)	0	1169	1144
Hydrology			
<i>Sedimentation from Treatment Units (tons per year/probability of sedimentation)</i>			
Warm Springs Creek	N/A	0.6(2%–16%)	0.4 (2%–14%)
McClellan Creek	N/A	0.1 (4%–12%)	0.0 (2%–12%)
Middle Prickly Pear Creek	N/A	0.0 (0%)	0.0 (0%)
<i>Sedimentation from Roads (tons per year – key issue measurement indicator)</i>			
Warm Springs Creek	1.2	1.3	1.2
McClellan Creek	4.6	4.3	4.2
Middle Prickly Pear Creek	No sediment delivery points observed	N/A – no sediment delivery points observed	N/A – no sediment delivery points observed
Fisheries			
<i>Predicted Trend in Mean Percent Fine Sediment (<1/4 inch diameter) Levels in Spawning Substrates%</i>			
Middle Prickly Pear Creek	N/A	N/A	N/A
Warm Springs Creek	Decrease	Decrease	Decrease
McClellan Creek	Maintain	Maintain	Maintain
<i>Hydrologically Connected Roads (Tons of Sediment)</i>			
Warm Springs Creek	1.2	1.3	1.2
McClellan Creek	4.6	4.3	4.2
Middle Prickly Pear Creek	0	0	0
<i>Number of High Risk Culverts</i>			
Middle Prickly Pear Creek	0	0	0
Warm Springs Creek	5	5	5
McClellan Creek	11	11	11
Soils			
Units that exceed 15% detrimental soil disturbance (non-winter logging)	N/A	18 units exceed as prescribed—13 have further evaluation and would likely not exceed, 2 would	0

Resource/Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
		not be burned following treatment, and 3 recommended to be dropped without further mitigation.	
Units that exceed 15% detrimental soil disturbance with winter logging	N/A	0	0
Transportation/Road Management (miles)			
Temporary Road Construction (key issue measurement indicator)	0	13.7	0
Existing Road Reconstruction (BMPs)	0	8.8	8.8
Recreation/Scenery			
Acres of treatment meeting Forest Plan Visual Quality Objectives	No treatment	All treatment acres meet FP VQOs	All treatment acres meet FP VQOs
Change in scenic condition based on human activity	None	Most regeneration harvest, thus most change of action alternatives	Least regeneration harvest, thus least change of action alternatives
Cultural Resources			
Number of currently identified cultural sites within or adjacent to treatment units or roads	0	12 cultural sites	12 cultural sites
Minerals			
Mining-related features within treatment units adversely affected	0	17 present, none adversely affected with design criteria	16 present, none adversely affected with design criteria
Economics			
Present Net Value-Timber Harvest	\$0	-\$3,043,240	-\$2,284,851
Total Employment Potential	0	149	85
Air Quality (modeled, 24-hour average at > 1.0 miles from burn)			
PM _{2.5} emissions (35 µg/m ³ standard)	0	< 29.8 µg/m ³ (spring) < 27.2 µg/m ³ (fall) < 24.2 µg/m ³ (all piles)	< 29.8 µg/m ³ (spring) < 27.2 µg/m ³ (fall) < 24.2 µg/m ³ (all piles)

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CHAPTER 1, PURPOSE AND NEED

Introduction

The United States Department of Agriculture (USDA) Forest Service Helena National Forest (HNF) is proposing the Warm Springs Habitat Enhancement Project (Warm Springs Project), a 9,638-acre restoration project in the Elkhorn Mountains. The project is focused on restoring and promoting key wildlife habitat components by managing vegetation, reducing fuels, and promoting a more resilient, fire-adapted ecosystem. This would restore a more natural and sustainable forest structure based on the fire ecology of lower elevation ponderosa pine/Douglas-fir forests. This in turn would restore important wildlife habitat in the Elkhorn Mountains. This project responds to current vegetation conditions in the project area, including the mountain pine beetle (MPB) infestation. Approximately 466,000 ponderosa, lodgepole pine and whitebark trees have been killed in the Elkhorn Mountains by the mountain pine beetle since the was first seen in the mountain range in 2007. Approximately 90% of pine > 5 inches diameter breast height (DBH) in high hazard stands in the project area are projected to be killed by the epidemic (USDA 2008a).

The Elkhorn Mountains are a small, isolated mountain range of approximately 250,000 acres located on the east side of the Continental Divide. Historically, the Elkhorns have provided a variety of productive wildlife habitats and are especially known for those that are more commonly found in the Elkhorn Mountains, than elsewhere on the Helena National Forest, such as aspen groves, open-grown ponderosa pine, and mountain meadows. The Elkhorns contain approximately 273 miles of streams with 40 watersheds that drain into three different bodies of water: the Missouri River to the east and the northeast, Prickly Pear Creek to the west and northwest, and the Boulder River to the southwest.

The proposed project is located on the northwest portion of the Elkhorn Mountains approximately 10 miles south of Helena, Montana (Figure 1-1). The project area makes up approximately 7% of the Elkhorn Mountain land area. The legal description for the project is T8N, R3W, sections 1, 2, 11, 12, 13, 14, 23, 24, 25, and 26, Principal Meridian (P.M.) and T8N, R2W, sections 4, 5, 6, 7, 8, 17, 18, and 19 P.M. and T9N, R2W, sections 31 and 32 P.M. The proposed treatment areas encompass portions of three sub-watersheds of Prickly Pear Creek: Middle Prickly Pear Creek, Warm Springs Creek, and McClellan Creek. The area borders private land to the north and west, and is adjacent to the Warm Springs Fire of 1988 to the east and southeast. There are several large inclusions of private land within the project boundary although project activities would occur on National Forest System (NFS) land only.

The NFS land in the Elkhorn Mountains is a Wildlife Management Unit (WMU) and is designated as such in the *HNF Land and Resource Management Plan (Forest Plan)*. There are four management areas within the Elkhorn WMU. The overall management goal for this unit is to manage wildlife habitat to maintain populations of species associated with existing ecosystems. The Warm Springs Project area is classified as Management Area (MA) Elkhorn-4 (E-4). The primary *Forest Plan* management goal for MA E-4 is to optimize moose, elk, and mule deer habitat, and maintain or improve water quality and stream stability.

In 2008, Forest specialists conducted a Forest-wide landscape-level assessment of insect conditions. The *Insect Activity on the Helena National Forest: Assessment and Recommendations* (USDA 2008g) describes current conditions on the Forest. It forecasts vegetation mortality and discusses treatment options and expectations. This report characterized the Warm Springs Project area as having high levels of MPB and high vegetation mortality. This area was identified as a priority for vegetation management due to the extent of the MPB infestation and the habitat components at risk. The project area was identified as the highest priority landscape in the Elkhorn Mountains for treatment.

Warm Springs DEIS Project Vicinity

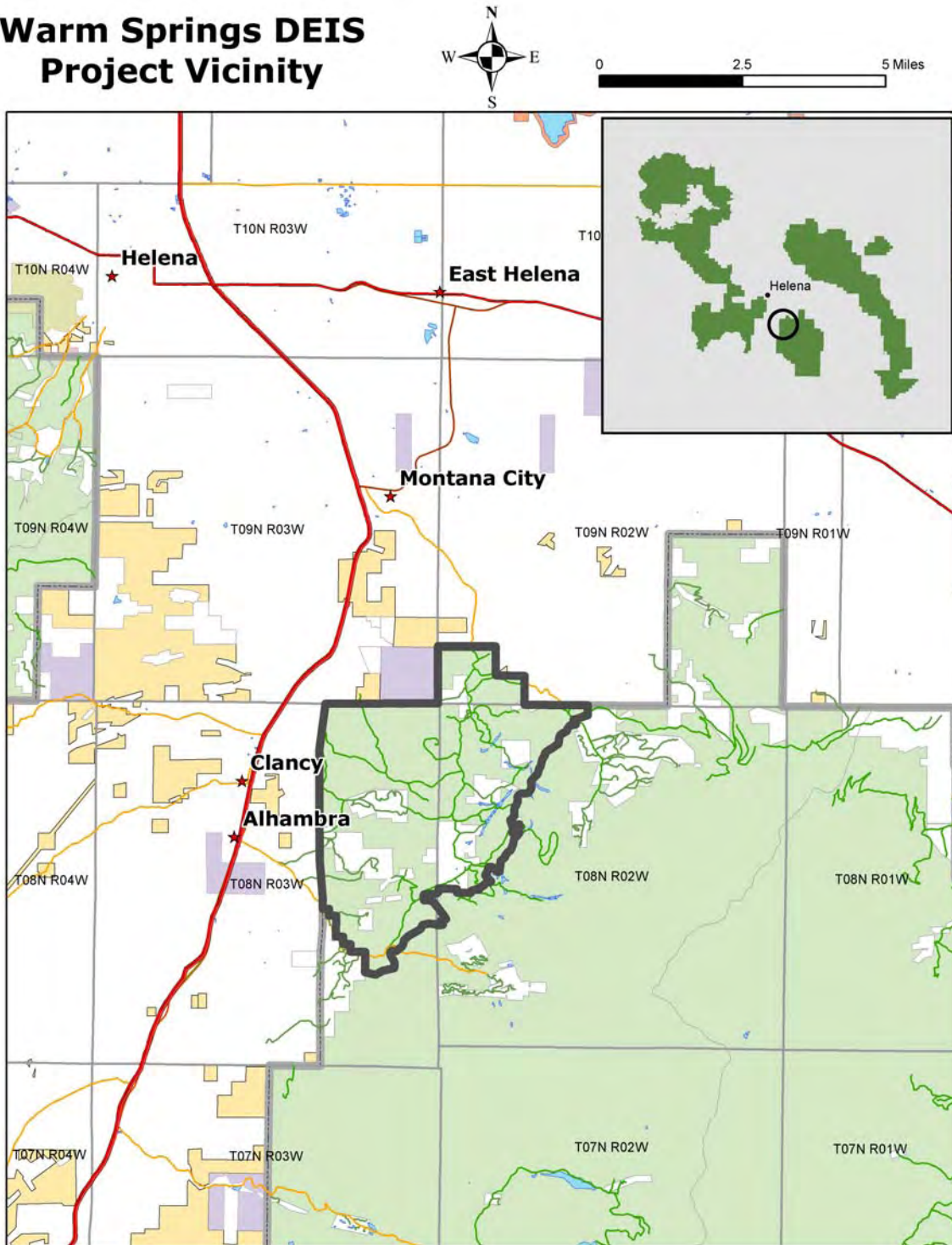


Figure 1-1, Vicinity Map

Regulatory Framework and Guidance

Several laws and policies form the regulatory framework for managing the HNF. The management direction provided in this framework is a driving force behind the purpose and need for this project. The following laws and policies provide much of the direction for the Warm Springs Project:

- Elkhorn Wildlife Management Unit Designation (USDA 1982a)
- The National Forest Management Act (USDA 1976)
- The National Fire Plan (USDA 2004a)
- Helena National Forest Plan (USDA 1986b)
- Northern Region Integrated Restoration and Protection Strategy (2008h)

In addition to this over-arching direction, each resource analyzed for this environmental impact statement (EIS) has its own regulatory framework, which is outlined in a specialist report. These reports are incorporated by reference in this EIS and are contained in their entirety in the project record.

Elkhorn Wildlife Management Unit was established as a result of the *Final Elkhorn Wilderness Study Report* (USDA 1982a). The wilderness study was done in compliance with Public Law 94-557. In addition to mandating the study, the law required that the land's present wilderness character and potential for inclusion into the National Wilderness Preservation System be maintained for four years after the study was submitted to Congress on September 1986, or until Congress acted on the study's recommendation; whichever came first. The final report (and final EIS) recommended no area be designated for wilderness, but that a wildlife management area be established and administered through the HNF and Deerlodge National Forest - Forest Plans (USDA 1986a). The Elkhorn WMU is unique in that it encompasses 175,000 acres, the largest parcel of Forest Service land in the country dedicated to wildlife management (MTFWP et al. 2000).

In 1993, the Forest Service, in cooperation with the Bureau of Land Management (BLM) and Montana Fish, Wildlife, and Parks (MTFWP), released the *Elkhorns Landscape Analysis*, a collaborative effort that developed a long-term integrated program of work and desired conditions for a variety of resources in the Elkhorn Mountains (Laflen et al. 2004). Following the overall landscape analysis, the Elkhorns were divided into three implementation areas that were examined in more detail. The Warm Springs Project area is in the North Elkhorn Implementation Area, and results of analyses for this area can be found in the *North Elkhorns Implementation Area Final Document* (USDA 1995b). Although no decisions were made in the landscape or implementation area analyses, they aid in implementing HNF *Forest Plan* direction.

The National Forest Management Act (NFMA) of 1976 governs resource management on national forest lands. Several sections in the act and its accompanying regulations (USDA 1982b) specifically address terms and conditions relevant to managing resources in the Warm Springs Project area.

With respect to wildlife, the NFMA charges the Forest Service with maintaining the diversity of all existing native and desirable non-native vertebrate species in a planning area (36 *CFR* 219.19). The HNF *Forest Plan* identifies management indicator species (MIS) that serve as proxies for fulfilling the NFMA diversity requirement. The regulations require that habitat objectives be established for maintaining viability of MIS throughout a planning area.

Plant communities are addressed under 36 *CFR* 219.20 which states "To achieve ecological sustainability the responsible official must ensure that plans provide for maintenance or restoration of ecosystems at appropriate spatial and temporal scales determined by the responsible official. *CFR* 219.20(a)(1) states "Characteristics of ecosystem diversity include, but are not limited to: (A) Major vegetation types: the composition distribution and abundance of the major vegetation types and successional stages of forest and grassland systems; the prevalence of invasive or noxious plant or animal species.

NFMA contains sections on timber suitability and management requirements for vegetative manipulation that include tree regeneration timeframes and opening size limits. It also requires that appropriate vegetative manipulation and stocking levels for reforestation be determined by a site-specific silvicultural prescription, prepared or approved by a certified Forest Service silviculturist.

The National Fire Plan (NFP) was developed in August 2000 following a landmark fire season. One of the five key points addressed in the NFP is the need for hazardous fuels reduction to decrease fire risk to natural resources, communities, and people while promoting historical diversity, structure, and function of forest ecosystems (USDA 2004b). Following development of the NFP, the Forest Service and Department of Interior in cooperation with the Western Governors Association, National Association of State Foresters, National Association of Counties, and the Intertribal Timber Council approved *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-Year Comprehensive Strategy* (USDA and USDI 2001). This effort was mandated by Congress as a supporting document for the NFP. Two of the stated goals of the *10-Year Comprehensive Strategy* include reducing hazardous fuels and restoring fire-adapted ecosystems (USDA and USDI 2001).

The *10-year Comprehensive Strategy* served as a framework to guide completion of collaborative, community-based plans to address wildland fire issues. Broadwater, Lewis and Clark, and Jefferson Counties formed a Tri-County Fire Working Group that prepared the Regional Community Wildfire Protection Plan (CWPP) for the three counties (Tri-County Fire Working Group 2005). This was completed in 2005. The CWPP recommends landscape-scale treatment options that reduce hazardous fuels and reduce risks to values that are important to communities, people, and natural resources. Recommended objectives include removing or modifying wildland fuels, reducing the potential for severe wildland fire behavior, lessening post-fire damage, and limiting the spread or proliferation of invasive species and diseases. Activities to accomplish these objectives include prescribed fire, mechanical thinning, herbicides, grazing, or combinations of these and other methods.

The HNF Forest Plan (1986a) provides guidance for public lands on the HNF. The forest-wide management direction in Chapter II of the *Forest Plan* applies to all management areas (MA's) (*Forest Plan* pg. II/1). In addition to Forest-wide management direction, the plan identifies MAs and provides additional direction for each. The overall management goal for this unit is to maintain viable populations of species associated with existing ecosystems. For additional information on *Forest Plan* goals and standards see the *Forest Plan* on pages II/17 to II/21, III/78 to III/80, and III/90 to 92.

The Warm Springs Project area is contained within MA E-4, which emphasizes big game habitat management. This MA is considered unsuitable for long term production for timber, but harvest may be used as a tool to meet other objectives. Specific management goals in the MA E-4 include:

- Optimizing moose, elk, and mule deer habitat.
- Maintaining or improving water quality and stream stability.
- Providing for other resource objectives as long as these uses are compatible with maintaining big game habitat.

The MA E-4 standards for wildlife, protection, and timber are contained in the following table.

Table 1-1 Management Area E-4 Standards for Wildlife, Protection, and Timber

Resource Area	Management Area E-4 Standard
Wildlife	Implement wildlife habitat improvement practices, including prescribed fire and timber manipulation, to maintain and enhance aspen and willow regeneration and other forested areas, for wildlife habitat. Suggested habitat improvement projects will be provided in the Elkhorn Wildlife Monitoring Program annual progress reports, prepared jointly by the Helena and Deerlodge National Forests and Montana Department of Fish, Wildlife, and Parks (MTFWP).
Protection	<p>Prescribed fire from planned ignition may be used to maintain and improve wildlife habitat.</p> <p>Prescribed fire with unplanned ignitions may be used, for the enhancement and maintenance of resources, when within pre-established fire criteria. These criteria are detailed in the Fire Management Direction in Appendix R in the <i>Forest Plan</i>.</p> <p>Wildfires will be suppressed in a manner that minimizes the impact of heavy equipment use.</p> <p>Evaluate area periodically for significant insect and disease problems. Endemic levels of insects and disease will be accepted as normal. If epidemic levels develop and control is necessary, the control method will minimize impacts on wildlife habitat.</p>
Timber	Timber in this management area is classified as unsuitable for management, however, silvicultural practices may be used as a management tool to maintain and improve vegetation diversity. Firewood gathering from existing roads is allowed. Other forest products, such as Christmas trees and posts and poles, may be harvested. These activities must be carefully reviewed to ensure compatibility with wildlife habitat management goals.

The Northern Region Integrated Restoration and Protection Strategy (2008h) provides information to help local Forest Service units accomplish Forest and Grassland Plan goals and objectives. This strategy recognizes the Forest Service National Strategic Goals of reducing the risk of catastrophic wildland fire and improving watershed condition. It focuses on restoration and maintenance of watersheds, wildlife habitats (including more resilient vegetation conditions), and the protection of people, structures, and community infrastructure in and associated with the wildland urban interface (WUI). The strategy also recognizes the importance of restoring ponderosa pine, western larch, and whitebark pine and identifies aspen, whitebark pine, ponderosa pine, sagebrush, and grasslands among the areas currently at risk in the Northern Region.

The strategy assessed Northern Region lands and identified areas that are directly threatened by large-scale fires, drought, insects and disease, invasive plants and animals, forest encroachment into grasslands, dense vegetation that creates hazardous fuel conditions, erosion, sedimentation, and toxic chemicals. The Warm Springs Project area contains portions of Priority 4 and 5 watersheds as designated by the strategy. This means that either fish/aquatic resources or big game winter range are threatened (Priority 5) or that both of these values are threatened in the same watershed (Priority 4).

Purpose and Need for Action

The need for action is determined by the degree to which existing conditions differ from desired conditions. Desired conditions are embodied in the regulatory framework directing Forest management, and existing conditions are determined through field surveys, data analysis, and professional interpretations by Forest staff. Where there is little difference between these two conditions, the need for action is low. Where differences are substantial, the need for action is high.

Based on a comparison of existing and desired conditions, the responsible official has determined there is a need for the Warm Springs Project in order to improve and maintain wildlife habitats that are threatened by current vegetation conditions.

Need

A variety of factors has influenced the need for treatment in the project area. This area represents one of the few places in the Elkhorn Mountains and on the Helena National Forest with a substantial component of mature ponderosa pine, aspen groves, and grassland habitats (Arno et al. 2008; McClelland 1977; Smith 2000). This unique mosaic of species evolved with and is dependent on fire, and provides valuable wildlife habitat. The desired condition on this landscape is a mosaic of species, size classes, and age classes (including open-grown, regenerating ponderosa pine, more open Douglas-fir stands, sustainable aspen, and open meadows) that are necessary to maintain viable populations of species association with existing ecosystems and optimize moose, elk, and mule deer habitat (*Forest Plan III/78 and III/90*).

An epidemic-level MPB infestation is currently present in ponderosa pine stands across the project area. In 2008, Forest specialists conducted a Forest-wide landscape-level assessment of insect conditions and predicted outcomes (USDA 2008g). This report characterized the Warm Springs Project area as having high levels of MPB and corresponding pine mortality. It identified this area as a priority for vegetation management due to the extent of the MPB infestation and the unique and locally rare mature ponderosa pine habitat at risk. Based on R1-VMAP information prior to the MPB outbreak, ponderosa pine-dominated stands comprise only about 4% of the HNF, 9% of the Elkhorn Mountains, and yet they dominated approximately 52% of the Warm Springs Project area.

In addition to the loss of overstory ponderosa pine, the lack of frequent, low-intensity fires over the last 100 years has allowed forested areas to fill in with Douglas-fir creating denser, more homogeneous conditions across the project area. Fuels available to support large wildfires are extensive and becoming more continuous, which increases the likelihood of uncharacteristic, stand-replacing wildfire that could further alter wildlife habitat. Grasses, shrubs, and forbs that provide valuable wildlife habitat are in poor condition because they are generally being shaded out by encroaching conifers, mainly Douglas-fir, and suppressed by needle duff. Trees have also colonized into small meadows. Aspen stands are scattered throughout the area, but many are dying because of shading by conifers. Few aspen stands in the area are reproducing successfully due to the lack of disturbance such as fire, which is needed to stimulate regeneration.

There was a need for wildlife habitat restoration in the Warm Springs Project area prior to the current MPB epidemic. The conditions described above, with respect to dense homogenous stands, excessive fuels, and encroaching conifers reflect that need for habitat restoration. The insect infestation has, however, exacerbated this need and changed the approach of the project. Based on aerial detection surveys, the number of acres in the project area infested with MPB increased from 935 acres in 2007 to 6,520 acres in 2009, resulting in 67% of the project area either dead or dying from insects (Gibson 2009). Existing ponderosa pine could be eliminated from the landscape entirely either through MPB mortality and/or high-severity wildfire. Under both scenarios, successful regeneration would be threatened by the loss of viable seed sources. Due to the large-scale and sudden nature of the mortality, any natural regeneration would likely be synchronous and uniform, causing a repeat of the homogeneous conditions that are currently threatening the landscape. In light of the current MPB infestation, there is an increased need to actively manage the project area to

retain key wildlife habitat components and promote a resilient, fire-adapted ecosystem that can maintain viable populations of wildlife species into the future.

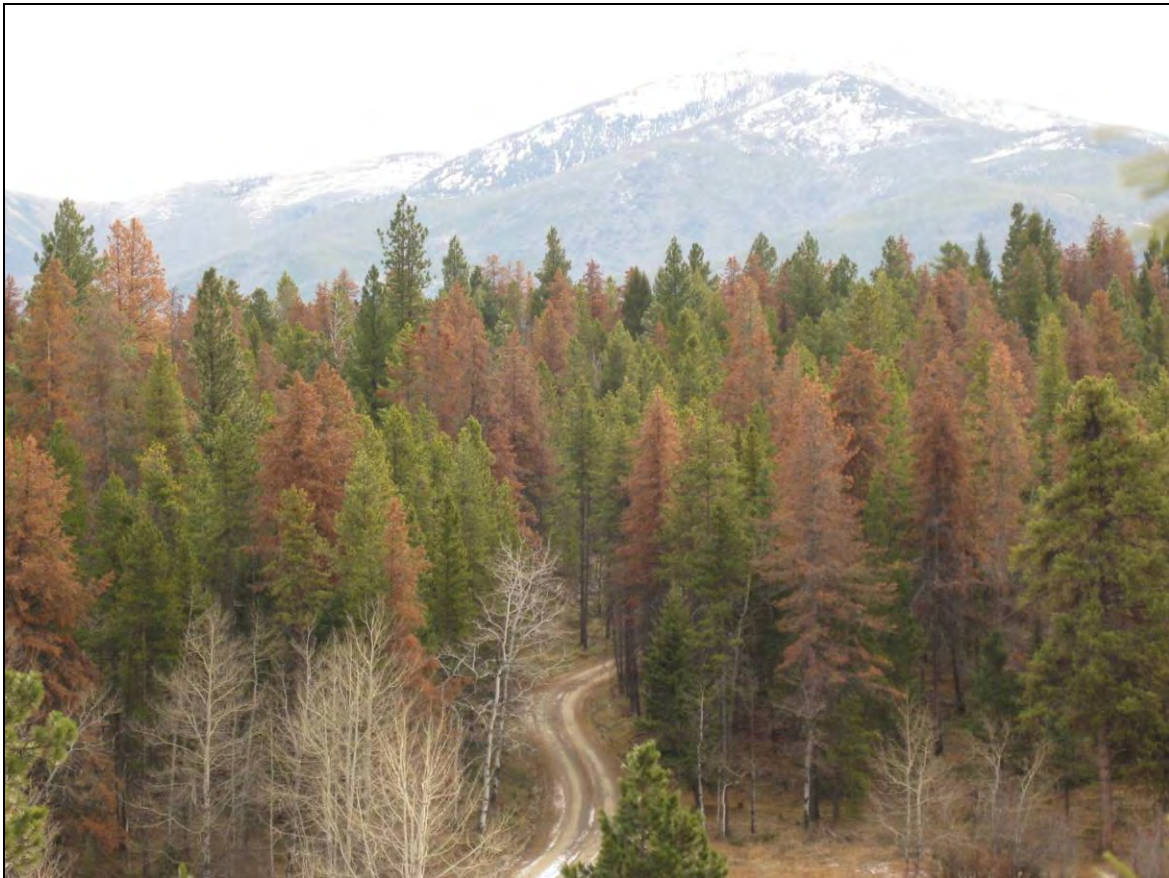


Figure 1-2 MPB-infested stand in the Warm Springs Project area

Purpose

The purpose of the Warm Springs Project is to ensure that large, open-grown ponderosa pine and Douglas-fir and aspen are abundant and well-distributed in the project area in the future. In order to achieve this objective, it is necessary to ensure that ponderosa pine regeneration is established on low elevation sites where a viable seed source no longer exists. Implementation of this project would improve our ability to achieve the following:

- Forest structures and fuel loadings at the landscape level that change the fire behavior of uncharacteristic, high intensity wildland fire .
- Resilient forests with a mosaic of tree structure and age class, and a diversity of trees, shrubs, forbs, and grasses
- Mature habitat structures where possible:
 - ✓ Large living ponderosa pine
 - ✓ Growth and regeneration of live conifers, ponderosa pine being preferred
 - ✓ Large diameter ponderosa and Douglas-fir snags, optimal levels of coarse woody debris, and provisions for providing these components over time
 - ✓ Healthy aspen stands
 - ✓ Healthy stands of other tree species where ponderosa pine is not viable.

In addition to restoring wildlife habitat, another anticipated outcome of the project is improved watershed health. Improvements in watershed health would provide benefits to fish habitat and

stream function. The encouragement and acceleration of tree and shrub restoration would create a resilient mosaic of size and age classes that would benefit watersheds. Inclusion of design elements, best management practices (BMPs), and mitigations aimed at protecting and improving watersheds would help offset sediment production associated with management activities and promote better water quality, fisheries, and watershed conditions (Dalsoglio 2009).

This project would also help scientists and land managers better understand the effects of fire on wildlife habitats. The vegetation communities within the Warm Springs Project are part of the Birds and Burns Network, a research study led by the Rocky Mountain Research Station to examine fire effects on populations and habitats of wildlife in ponderosa pine forests. The Birds and Burn Network includes study areas in eight states across the western United States. Although the goal of this research is to study wildlife in relation to fire in ponderosa pine, its goal in the Warm Springs Project area has expanded to include studying the consequences of MPB as well.

The objectives and anticipated outcomes of the Warm Springs Project serve to bring the current conditions in the project area closer to desired conditions as embodied in the regulatory framework. The project proposes using prescribed fire and vegetation treatments to enhance key wildlife habitat components, which is consistent with *Forest Plan* direction for MA E-4 of the Elkhorn WMU. The project is designed to restore key habitats such as ponderosa pine, aspen, and grassland, which are recognized as important and threatened in the Northern Region Integrated Restoration and Protection Strategy. Hazardous fuel reduction and use of prescribed fire serves to change the fire behavior of wildland fire and foster a more fire-adapted, resilient ecosystem as directed in the NFP, the Tri-county CWPP, and the Northern Region Integrated Strategy. And lastly, the proposed action conforms to direction from the NFMA concerning the diversity of all existing native and desirable non-native vertebrate species, provide for maintenance or restoration of ecosystems at appropriate spatial and temporal scales, regeneration timeframes and opening size limits, and the site-specific silvicultural prescriptions prepared and approved by a certified Forest Service silviculturist.

Summary of the Proposed Action

The proposed action (Alternative 2) was designed by the HNF interdisciplinary team to meet the purpose and need for the Warm Springs Project. It is summarized below and described in detail in Chapter 2.

The proposed action would treat 4,200 acres in the 9,638-acre project area with a combination of regeneration harvest, intermediate harvest, and prescribed fire. The 2,059 acres of regeneration harvest are designed to create diverse age classes and are located primarily in dead or dying ponderosa pine stands. The 1,002 acres of intermediate harvest are designed to enhance growth, quality, vigor, and composition of existing stands. Both treatment types would be followed by approximately 2,632 acres of post-harvest burning. In addition, approximately 1,140 acres of prescribed fire would be used as a treatment tool to accomplish primarily fuels reduction and vegetation restoration, including grasslands and aspen. Connected actions required to implement the proposed action would be the construction of up to 13.7 miles of new temporary roads and the reconstruction of approximately 8.8 miles of existing roads. Additionally, approximately 6.1 miles of road would need maintenance prior to log hauling. Acreages for each treatment type and miles of road activity are displayed in Table 1-2.

Table 1-1 Proposed Action (Alternative 2) Treatment Acres by Type and Road Activity

Treatment Type	Acres (Post-harvest Burning Acres)
Regeneration Harvest ¹	2,059 (1,629)
Intermediate Harvest ²	1,002 (1,002)
Prescribed Fire	1,140 (NA)
Total Acres	4,200

Treatment Type	Acres (Post-harvest Burning Acres)
Road Activity	Miles
Temporary Road Construction	13.7
Existing Road Reconstruction	8.8
Maintenance for log haul	6.1
¹ Treatment to promote a new age class.	
² Treatment to enhance growth, quality, vigor, and composition.	

Scope of the Analysis

The analyses of effects disclosed in this document include those occurring across the entire "scope" of the project, which is defined in 40 *CFR* 1508.25 as the range of actions, alternatives, and impacts to be considered in an EIS. The geographic and temporal boundary for effects analysis varies by resource and is described in Chapter 3 and in each resource specialist report contained in the project record. Any new information that develops after the decision for this project would be considered prior to project implementation.

Decisions to be Made

The responsible official for this project, the Forest Supervisor for the HNF, will make the following decisions and document them in a record of decision after completion of the final EIS.

- Whether or not to implement the proposed action or an alternative to the proposed action
- What monitoring requirements are appropriate to evaluate implementation of this project
- Whether or not a *Forest Plan* amendment is necessary.

Document Organization

This draft EIS is in compliance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations found in 40 *CFR* 1500–1508, and other relevant federal and state laws and regulations. This document discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters and a number of appendices.

Chapter 1 discusses the purpose of and need for the project and summarizes the proposed action, the regulatory framework affecting the project, and the decisions to be made by the responsible official.

Chapter 2 describes the alternative development process including public scoping and the identification of key issues. The proposed action and alternatives analyzed are described in detail including a no action alternative. Features designed to reduce and monitor the effects of the proposed action are also listed and a summary comparison of alternatives and their effects is provided.

Chapter 3 describes the natural and human environments potentially affected by the proposed action and alternatives, and discloses anticipated potential effects. This chapter is organized by resource area and alternative.

Chapter 4 contains a list of preparers and a list of agencies, organizations, and individuals to which a copy of the draft EIS was distributed.

Materials appended to this document include Appendix A, a unit-by-unit comparison of treatments by alternative; Appendix B, a table of past, present, and foreseeable future activities considered in the cumulative effects analysis; and Appendix C, Wildlife Analysis.

This EIS incorporates by reference the project record (40 *CFR* 1502.21). The project record contains specialist reports and other technical documentation used to support analyses and conclusions. The project record is available for review at the Helena National Forest, Supervisor's Office in Helena, Montana.

The Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. They may be: developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, incomplete while being created or revised, etc. Using GIS products for purposes other than those for which they were created may yield inaccurate or misleading results. The Forest Service reserves the right to correct, update, modify or replace GIS products without notification.

CHAPTER 2, ALTERNATIVES

Introduction

This chapter describes the alternatives considered for the Warm Springs Project. The first section describes the alternative development process including the public scoping undertaken for this project. The next section lists key issues identified during this process. This is followed by a brief description of alternatives considered but not given detailed study. The next section looks at alternatives analyzed in detail and includes detailed descriptions and map references. The final section is a comparison of alternatives in terms of environmental impacts. The information in the last section is summarized from Chapter 3.

Proposed Action Development

The proposed action was developed by an interdisciplinary team of resource specialists on the HNF. Prior to its development, the team conducted a detailed NFMA assessment of resources in the Warm Springs Project area. This included an evaluation of existing resource conditions, compliance with applicable law, regulation, and policy; and recommended project design elements and mitigations.

Following the detailed NFMA assessment, the team developed the proposed action using the HNF *Forest Plan*, Northern Region Integrated Restoration and Rehabilitation Strategy, and the Tri-county CWPP for guidance. Treatment units were evaluated for potential impacts to resource values and units were eliminated based on elk issues, road construction and watershed concerns, and the proximity of treatment units to other projects and managed private lands. Design elements were included where possible to address anticipated impacts. The final proposed action treats 4,200 acres representing 44% of the 9,360-acre project area. Treatments included 2,059 acres of regeneration harvest, 1,002 acres of intermediate harvest, and 1,139 acres of prescribed fire with hand or mechanical slashing. No new permanent roads were proposed, although approximately 13.7 miles of temporary road construction and 8.8 miles of existing road reconstruction would be required. Additionally, approximately 6.1 miles of road would need maintenance prior to log hauling. Alternative 2 was released to the public for scoping.

Public Scoping

The Warm Springs Project proposal first appeared on the Forest Schedule of Proposed Actions in October 1, 2009. The Forest Supervisor signed a Notice of Intent to prepare an EIS on October 2, 2009, which was published in the *Federal Register* on October 9, 2009 (Volume 74, No. 195). Also on October 1, 2009, the Forest Service issued a news release informing the public of the proposed action and of an open house meeting scheduled for October 20, 2009 where questions would be answered and comments taken. A public scoping document was mailed to approximately 385 individuals and organizations, and a public notice inviting comment and announcing the open house meeting was published in the *Helena Independent Record* on October 13, 2009.

The open house meeting was held at the Helena Ranger District Office on October 20, 2009 and was attended by four people. A public field trip to the project location was held on October 24, 2009 from 9:00AM to noon. Five people attended.

The public was asked to provide comment by November 2, 2009. A total of 39 comments were received during the initial scoping effort. The record of public involvement for this project is available for review in the project record.

Issues

All comments obtained through public scoping were reviewed and used to identify issues relevant to the project. Significant issues will be referred to as "key" issues in this document. Key issues are

defined as those used to modify the proposed action or develop an alternative to the proposed action. In contrast, analysis issues are those that are addressed in the course of analyzing the environmental effects of the proposed action and alternatives.

Key Issue

Based on content analysis of the comments received, road construction was identified as a key issue and used to develop a third alternative.

Road Construction

Several comments received during the public scoping process centered on the construction of new roads and concerns over the potential for additional sedimentation that could affect area streams and watersheds. The primary measurement indicators for this issue are tons of sediment per year added to area streamcourses and miles of temporary road construction.

Analysis Issues

Analysis issues were addressed in analyzing the environmental impacts of the proposed action and alternatives for each resource area. These issues, along with the impact of each alternative, are summarized by resource area and described in detail under the relevant resource areas in Chapter 3. The specialist reports for this project also contain detailed information on the analysis issues for this project. These can be found in the project record, which is available for review at the HNF Supervisor's office in Helena, Montana.

Alternatives

Federal agencies are required by the CEQ to rigorously explore and objectively evaluate reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14 (a)).

Alternatives Considered but not Given Detailed Study

Public comments received during scoping suggested alternatives for the Warm Springs Project that were not carried forward for detailed analysis. The reasons for this fell into three main categories: (1) they did not meet the purpose and need for the project; (2) they were duplicative to alternatives already developed; or (3) they were determined to have unacceptable environmental impacts. Alternatives considered but dismissed from detailed study along with their reasons for dismissal are listed.

Prescribed Fire

Commenters suggested an alternative that would eliminate mechanical treatments and use only prescribed fire to achieve the objectives of the project. The rationale was that this would avoid the soil disturbance and sedimentation typically associated with mechanical treatments. This alternative was not carried forward for further analysis because the use of prescribed fire alone would not be as effective in establishing vegetative conditions which over time would provide the wildlife habitat objectives described in the purpose and need for the project.

Winter Harvest Operations

An alternative was suggested that would limit harvest operations to winter with the intent to reduce the amount of soil disturbance and compaction typically associated with tree removal equipment. It would also reduce the potential for spreading noxious weeds. This concern is addressed in mitigation considered in the Noxious Weed and Soils Specialist reports which talk to the benefits which would be realized by winter logging, so a separate alternative was not needed to address it. The analyses also consider other mitigation which would reduce potential effects without a requirement for winter only operations.

Removal of Hazard Trees Adjacent to Private Infrastructure

Comments were received from private property owners in the project area suggesting that the HNF consider the removal of hazard trees on National Forest lands that are posing a risk to private infrastructure. Approximately 290 acres adjacent to private lands, within 100 feet of property boundaries, are currently being considered for treatment in the proposed action.

All the areas adjacent to private land that were appropriate for treatment to meet the purpose and need of the project have been included. The issue is incorporated in the current alternatives.

Expand Treatment Areas

A preliminary alternative was considered that uses the same treatment methods as in the proposed action but that treats more acres in the project area. An additional 1,550 acres were considered for treatment under this alternative for a total of 5,750 total acres. This alternative was not carried forward for detailed analysis because of elk issues, road construction and watershed concerns, anticipated impacts to cultural resources, and the proximity of added treatment units to other projects and managed private lands.

Alternatives Considered in Detail

The following section describes the alternatives analyzed in detail followed by design elements and mitigation common to Alternatives 2 and 3. For an alternative to be considered in detail, it must respond to the purpose and need for action and address key issues. For this project, three alternatives were considered. Alternative 1 is the no action alternative and is required by CEQ regulations (40 *CFR* 1502.14d). Alternative 2 is the proposed action, and Alternative 3 is an additional action alternative that was developed in response to the key issue of road construction, which was identified from public comments. A comprehensive unit-by-unit comparison of alternatives can be found in Appendix A.

All alternatives comply with pertinent statutes on NFS lands. Impacts to resources are considered in accordance with NEPA. Maps of the action alternatives are located in Chapter 2.

Alternative 1 – No Action

Alternative 1 is the no action alternative. It describes the existing condition and analyzes the impacts of taking no action. This alternative provides a baseline for the comparison of the environmental effects of the action alternatives.

Under the no action alternative, current conditions and activities would continue to guide management of the project area. Ongoing work or work previously planned and approved such as routine road maintenance, weed spraying, trail maintenance, and firewood gathering would still occur. None of the vegetation management activities proposed in the action alternatives would occur. No new temporary roads would be constructed, no existing roads would be reconstructed.

Because the environment is not static, environmental consequences would still occur under Alternative 1. Current conditions and trends in vegetation, fuels, and fire hazard would likely continue, perpetuating dense, homogeneous stands, large-scale mortality from MPB, and the loss of open-grown ponderosa pine and aspen habitats. Conifers would continue to colonize on grasslands. In the absence of disturbance, hazardous fuels would continue to develop with this condition being exacerbated by insect-induced tree mortality; the risk of uncharacteristic, high-intensity wildfire would increase (Jenkins et al. 2008).

Alternative 2 – Proposed Action

This alternative was designed to meet the purpose and need for the Warm Springs Project by managing fuels in order to establish resilient vegetative conditions, restoring fire-adapted ecosystems, and promoting ponderosa pine, aspen, and grassland habitat components.

Proposed treatments include regeneration treatment in the ponderosa pine dominated stands; intermediate harvest in the Douglas-fir dominated stands; and prescribed fire in a variety of stands to reduce ladder fuels (fuels that provide a vertical connection between the forest floor and canopy). See Appendix A for a unit-by-unit comparison of treatments by alternative.

The treatments are described below. It should be noted that silvicultural treatments are typically aimed at removing live trees, and this is reflected in the definitions below. However, for the Warm Springs Project, the treatments would only remove dead trees.

Regeneration Harvest: This treatment is designed to create a new age class (single-aged or two or more age classes). The existing stand is replaced. For the Warm Springs Project, the existing stands that would be replaced have already experienced very high mortality from MPB infestation. Too few live trees would remain for any other silviculture prescription to be employed. Douglas-fir is expected to regenerate naturally. Where too few seed trees remain (due to MPB mortality) for successful ponderosa pine regeneration, ponderosa pine would be planted.

- **Seedtree** (Smith et al. 1997a): Most trees are removed except those needed to provide seed for regeneration. Reserves may be left in treatment units (two-storied dominated stand). Reserved trees or reserves are defined as greater than 10% of the stocking left for reasons other than providing seed. Leave trees are less than 10% of the stocking left for reasons other than providing seed.
- **Shelterwood** (Smith et al. 1997a): In a shelterwood, all trees are removed except those needed to provide seed and shelter for regeneration. A group shelterwood is when shelter trees are left in a clumpy distribution. Reserves may be left as above (two-storied dominated stand).

Intermediate Harvest: This treatment is designed to enhance growth, quality, vigor, and composition of the stand after establishment or regeneration and prior to final harvest. Intermediate treatments can result in uneven-aged, two-aged, or even-aged stands depending on existing conditions and objectives.

- **Improvement Harvest** (Smith et al. 1997a): Harvest done in a stand pole-sized or larger, to improve composition and quality by removing less desirable trees. In this case, mostly dead ponderosa pine affected by MPB would be removed.
- **Underburn:** Prescribed fire method where burning is conducted in the understory of the forest, below the dominant trees.

Prescribed Fire: Fire is used to accomplish a variety of goals, including reducing ladder fuels, surface fuels, and duff accumulations; stimulating understory grasses and shrubs; reintroducing fire to the boles of mature trees so that the stand becomes more fire resilient; creating desirable habitat structures and vegetative patterns; and preparing seed beds for regeneration.

- **Slashing:** Cutting small diameter trees (generally < 6-inch DBH) mechanically or with chainsaws. Slashing is used to reduce ladder fuels to lower crown fire potential to create sufficient surface fuels to carry a prescribed fire and/or to add fuels to meet woody debris goals for nutrient cycling.
- **Snag Falling:** Cutting dead trees (generally >6-inch and <20" DBH) mechanically or with chainsaws. Falling is used to increase surface fuel loading to a desirable level to facilitate burning that would reduce overall future fuel loading, reduce danger to tree planters, and prevent excessive damage to planted ponderosa pine when snags begin to fall naturally. Approximately 10 snags per acre would be felled. Snags to be retained would include the largest, straightest and broken topped when possible.
- **Pile/Burn:** Generally follows slashing or harvest where slash disposal is needed but broadcast burning is not feasible or desirable. Residual slash and debris is placed into piles and burned when conditions are favorable. Target amounts of slash may be left un-piled to meet woody debris and nutrient cycling goals.

- *Jackpot Burn*: Burning focused on concentrations of fuel, generally after harvest or slashing. Jackpot may involve burning loose piles or areas of slash which are not continuous and/or overstory mortality not a concern (as in a natural opening). A minimal amount of mortality may occur in trees > 6-inch DBH. In Warm Springs, jackpot burning would primarily be applied in aspen. Target density is 60–140 BA/ac, 150–350 trees/ac and canopy cover of 25–60%.
- *Underburn* (following intermediate harvest): The primary purpose is to reduce slash and ladder fuels. It is low intensity where direct mortality <5%, indirect mortality <5%, and <1/4 acre group mortality occurs in overstory residual trees. The objectives are to reduce ladder fuels (trees generally under 6 inch diameter), reduce fine woody debris (<3-inch diameter), reduce duff fuel loadings while minimizing exposure of mineral soil (<10%), and retain most coarse woody debris (>3-inch diameter) for nutrient cycling and wildlife habitat.
- *Site Prep Burn* (following regeneration harvest): The goal is to reduce fuels and prepare the site for regeneration. It is a low to moderate intensity fire where direct and indirect mortality of leave trees is <5% (reserve, shelter, or seed trees left are minimal and a high priority to protect). The goals are to reduce fine woody debris (<3-inch diameter), reduce duff fuel loadings, expose 5–25% mineral soil, reduce competing vegetation, and retain most coarse woody debris (>3-inch diameter) for nutrient cycling, seedling microsites, and wildlife habitat.
- *Broadcast Burn (Low Severity Burn, no harvest)*: Fire is used as a tool to achieve objectives with low severity effects. The purpose is to reduce ladder fuels and reduce overstory tree density to a minor extent. Slashing as needed would occur to limit intensity and create a fuel bed. An additional purpose is the re-introduction of fire to the ecosystem. Direct mortality <5%, indirect mortality <10%, and <1 acre mortality patches may occur in the overstory. Objectives include reducing fine woody debris (<3-inch diameter), reducing duff fuel loading while minimizing exposure of soil (<10%), and retaining most coarse woody debris (>3-inch diameter).

Table 2-1 shows the acres by treatment category, prescription, and unit number. For Alternative 2, intermediate treatments encompass 1,002 acres, regeneration treatments 2,059 acres, and prescribed fire 1,140 acres for a total of 4,200 acres treated. There would be changes to the structure of treated areas. Generally, treatments would reduce tree density and ladder fuels, and/or return stands to earlier successional stages.

Table 2-1 Treatment Types, Acres, and Percent Area for Action Alternatives by Treatment Category (*Due to rounding, acre totals are approximate)

Prescription		Alternative 2			Alternative 3		
		Unit Numbers	Acres	% of proposed treatment acres	Unit Numbers	Acres	% of proposed treatment acres
Intermediate Harvest	Improvement Cut, Underburn	2, 12, 13, 14, 15, 16, 17, 18, 23, 25, 28, 29, 33, 34, 35, 38, 42	1,002		12, 13, 14, 16, 17, 18, 23, 25, 35, 38	427	
	<i>Total acres of Intermediate Harvest</i>		1002		427		
Regeneration Harvest	2-aged seedtree with reserves, burn	30, 27, 52, 58, 59, 8, 10, 11, 45, 46, 47, 60, 61, 62, 63, 64, 65	1630		27, 30, 52, 11a, 45, 46, 47, 59, 63b, 65	305	
	Shelterwood w/ reserves	1, 3, 4, 5, 6, 7, 9	429		1, 3, 4, 5, 6, 7, 9	340	
<i>Total acres of Regeneration Harvest</i>		2059			646		
Total Acres of Harvest		3060		73%		1072	27%
Prescribed Fire	Slashing, broadcast burn	68, 69, 70, 71, 72, 53, 54, 57	644		53, 54, 57, 68, 69, 70, 71, 72, 2, 8, 9a, 10, 11, 13a, 17a, 18a, 28, 29, 30a, 42, 45a, 45b, 46a, 46b, 52a, 58, 59a, 60, 61, 62, 63, 64	2373	
	Slashing, burn (grassland)	39, 40, 66, 67	169		39, 40, 66, 67	169	
	Slashing, jackpot burn (aspen)	24, 26, 41, 50, 51	326		24, 26, 41, 50, 51	326	
Total Acres of Prescribed Fire		1140		27%		2869	73%
Total Approximate Treatment Acres*		4,200		100		3,941	100

Table 2-2 summarizes the logging systems and road categories proposed for the alternatives.

Table 2-2 Harvest Systems for Action Alternatives

Harvest System	Alternative 2 (Acres)	Alternative 3 (Acres)
Tractor	3,017	1,059
Cable	43	14
Total	3,060	1,073

The following table shows road work proposed for each alternative. Alternative 2 would require 13.7 miles of temporary road construction. No new system roads or temporary roads were proposed in Alternative 3. Approximately 8.8 miles of existing road reconstruction would be needed to accomplish the activities associated with both Alternatives 2 and 3. Additionally, approximately 6.1 miles of road would need maintenance prior to log hauling in both alternatives.

Table 2-3 Road Reconstruction and Temporary Road Construction for Action Alternatives

	Alternative 2 (miles)*	Alternative 3 (miles)*
Temporary roads	13.7	0
Reconstructed roads	8.8	8.8
Maintenance for log haul	6.1	6.1
*Due to rounding, road mile totals are approximate		

Forest Plan Amendment

In order to implement Alternative 2, a site-specific *Forest Plan* amendment would be needed for Forest-wide Big Game Standards #3 relative to hiding cover and #4a (USDA 1986a, page II/17). The amendment would be required due to the current conditions and trends in vegetation in the project area primarily due to insect mortality. The Warm Springs Project area includes two elk herd units (EHUs), the Sheep Creek and the Prickly Pear. However, there are no impacts to elk hiding cover in the Prickly Pear herd unit since there are no treatments planned in hiding cover.

Standard #3 requires 35% or greater elk hiding cover in elk summer range and 25% or greater thermal cover on elk winter range in elk herd units, subject to hydrologic and other resource constraints. Standard #4a designates maximum open road densities during big game hunting season based on the percent hiding cover in an elk herd unit (Table 2-4). We are utilizing the Forest Plan thresholds for the Sheep Creek herd unit since cover board data were collected which align with the Forest Plan definition – i.e. the ability to hide 90% of an elk at 200 feet.

Table 2-4 *Forest Plan* Big Game Season Maximum Open Road Density based on Percent Hiding Cover

% Hiding Cover(FS Definition ¹)	Max Open Road Density (miles/square mile)
56	2.4
49	1.9
42	1.2
35	0.1
FS = Forest Service ¹ A timber stand that conceals 90% or more of a standing elk at 200 feet.	

Due to MPB morality, the existing hiding cover in elk summer range in both elk herd units does not meet *Forest Plan* Standard #3 (35% or greater), as shown in Table 2-5. Implementation of Alternative 2 would result in a decrease of 492 acres in hiding cover in the Sheep Creek elk herd unit, which

already is below *Forest Plan* standards. Analysis of elk winter range concluded that no areas of the elk herd units meet thermal cover standards as defined in the *Forest Plan* (70% canopy cover).

Table 2-5 Acreage and % Hiding Cover by Elk Herd Unit for Existing Condition and Alt. 2

Scale	Existing Condition	Alternative 2 Proposed Action
Sheep Creek	4,681 acres (10.7%)	4,189 acres (9.5 %)

A site-specific *Forest Plan* amendment would be required to account for the reductions in hiding cover associated with Alternative 2 since it is currently inconsistent with *Forest Plan* standards. Please refer to the “Wildlife” section of Chapter 3 and the *Warm Spring Project Wildlife Specialist Report* for details and analyses associated with these amendments.

Alternative 3

This alternative was developed in response to the key issue of road construction, which was identified during the public scoping process. Alternative 3 was designed to meet the purpose and need for the Warm Springs Project while not requiring any road construction, including temporary roads. Like Alternative 2, it includes a combination of intermediate and regeneration treatment followed by post-harvest burning, and prescribed fire. However, units with mechanical treatments were limited to those that could be accessed by existing roads. Mechanical treatment units proposed in Alternative 2 that could not be reached in Alternative 3 were changed to prescribed fire only or dropped from treatment altogether. This alternative not only eliminates temporary road construction but also increases the use of prescribed fire, which was also suggested in public scoping comments. There would be fewer acres of harvest and more acres of prescribed fire under this alternative. See Appendix A for a unit-by-unit comparison of treatments by alternative. Table xx (above) shows the acres by treatment category, prescription, and unit number for Alternative 3. Table xx (above) summarize the logging systems and road categories proposed for this alternative. No new system roads or temporary roads are proposed. Approximately 8.8 miles of existing road reconstruction would be needed to accomplish the activities associated with Alternative 3 and approximately 6.1 miles of road would need maintenance prior to log hauling.

Forest Plan Amendment

As with Alternative 2, implementing Alternative 3 would require a site-specific *Forest Plan* amendment to the Forestwide Big Game Standards #3 for hiding cover and #4a (USDA 1986a page 11/17). The amendment would be required due to the existing condition of elk hiding in the project area as described in the *Forest Plan* Amendment discussion for Alternative 2 (above). Alternative 3 would result in a decrease in elk hiding cover in the Sheep Creek EHU by 415 acres as shown in Table 2-6.

Table 2-6 Acreage and Percent Hiding Cover by Elk Herd Unit for Existing Condition, Alternative 3 and *Forest Plan* Standard

Elk Herd Unit	Existing Condition	Alternative 3
Sheep Creek	4,681 acres (10.7%)	4,266 acres (9.7 %)
Prickly Pear	3,429 acres (11.0%)	3,429 acres (11.0%)

A site-specific *Forest Plan* amendment would be required to account for the reductions in hiding cover associated with Alternative 3 since it is currently inconsistent with *Forest Plan* standards. Please refer to the “Wildlife” section of Chapter 3 and the *Warm Spring Project Wildlife Specialist Report* for details and analyses associated with these amendments.

Design Elements and Mitigation Common to Alternatives 2 and 3

The IDT identified best management practices (BMP), design criteria and in some cases mitigation to reduce or prevent undesirable effects resulting from management activities associated with either action alternative. These measures also include Forest Plan standards and guidelines, and other environmental protection required by laws and regulations. These measures are integral to each action alternative and therefore, are required should an action alternative be selected.

Design elements and mitigations common to both action alternatives for the Warm Springs Project are listed below by resource area. Some of the design elements and mitigation measures apply to more than one resource. For example, mitigation identified under soils could also apply to hydrology and/or fisheries. However, for brevity, they are only mentioned under one resource area in the following list. For more information on design elements and mitigation measures as they pertain to a particular resource, please see the specialists report in the project record.

Wildlife

- The Birds and Burns Research Project is designed to compare the effects of treatments on Neotropical migrants and cavity nesting birds in the Project area. In order to do so, treatments would be deferred on approximately 360 acres while treatments would proceed elsewhere in the Project area to allow for data collection in 'treated' and 'untreated' areas for comparative purposes.
- All prescribed fire and underburning would be implemented prior to May 1 or after July in order to protect nesting birds, unless surveys indicate birds are not present.
- If any listed species are detected in the Project area, activities would be examined to determine if modification is necessary.
- Helena National Forest Recommendations from the Final Report of the Montana Cooperative Elk-Logging Study, 1970–1985 for Coordinating Elk and Timber Management would be implemented during timber harvest.
- For new active goshawk nests, a no-treatment buffer of a minimum of 30–40 acres would be maintained around nest trees. No ground disturbing activities would occur inside known post fledgling areas from April 15 through August 15 to protect the goshawk pair and young from disturbance during the breeding season, until fledglings are capable of sustained flight.
- Implementation of post-treatment weed mitigation measures would occur in treatment units. Following weed treatments, monitoring of affected areas would occur.
- The Montana Streamside Management Zone Law would be followed to protect riparian resources.
- Grazing would be deferred for at least 1-2 years following vegetative treatments to minimize possible cumulative effects of grazing and vegetation treatments.
- At least 180 acres of nesting Goshawk habitat per home range would be retained within the project area if it is available, with an emphasis on stands that have been used by Goshawks for nesting in 2009 and 2010.
- Forest Plan Standards regarding snags would be met as described in the Habitats of Special Concern report. While OSHA requires the felling of trees deemed to be safety hazards, site specific silvicultural prescriptions would include snag retention and coarse woody debris goals.
 - Regeneration harvest units would retain on average 20 snags per 10 acres of the largest diameter wind firm snags available that do not pose a safety or feasibility concern.
 - Intermediate harvest units would retain on average 7 snags per acre greater than 20" dbh of any species, or as many as are available less than that amount; AND 7 Ponderosa pine or Douglas-Fir snags greater than 10" dbh, or as many as are available less than that amount, where they do not pose a safety or feasibility concern.

Cultural Resources

- Cultural resources in treatment units and road reconstruction zones would be protected by buffering or avoidance. In those cases where avoidance/protective measures are not feasible, impacts would be mitigated through historical research and reporting or archaeological data recovery.
- Three sites would be reexamined after units are physically designated on the ground and reconsideration of their historic importance may identify these properties as particularly important and worthy of specialized treatment such as hand-thinning/logging.
- Cultural resources would be monitored by Forest archaeologists and sale administrators during and after project activities.
- If previously unknown heritage resources are encountered during implementation of the project, activities at the site would be halted and the Forest archaeologist would be notified immediately. Activities would not resume until adequate protective measures including unit reconfiguration, site buffering, and avoidance were developed and specified in the field.
- A contractual provision that requires identification and protection of known resources and allows for modification or cancellation of the timber sale would be included in any timber sale contract or other contracts if necessary to protect resources discovered while project implementation is in progress.

Fire and Fuels

- A variable no-ignition buffer for burning activities would be employed in all units adjacent to stream channels. The Warm Springs Project Hydrology Specialist Report provides unit specific guidance.
- Any necessary fire control lines for burn units would be constructed by hand to a maximum width of 18 inches.
- Should prescribed fire spread into the streamside buffer, fire would not be actively suppressed.
- Structural improvements would be protected during burning operations.
- Mop up standards would be determined through the prescribed burn plan and by the Burn Boss the day of the burn

Air Quality

- Prior to initiating any burning activities, a burn plan in compliance with the Montana/Idaho Airshed Group Operating Guide would be prepared for areas proposed within each action alternative.
- During the burn implementation periods, the prescribed burn boss would be responsible for conducting a site-specific smoke analysis with current weather and air quality conditions prior to ignition to determine how many acres can be burned and identify any effects on residents located downwind of the project burn area.
- Prior to burning, the location, timing, and possible smoke effects would be disclosed in the local newspaper.

Fisheries

- Design criteria and mitigation measures applicable to fisheries can be found under Soils and Hydrology.

Hydrology

- Hauling and other heavy-equipment traffic should not occur during conditions where the road surface is at or near saturation.
- If snow plowing is necessary, follow standard Forest Service timber contract snow plow guidance (C5.316) with a minimum of 4" of compacted snow left on road surface.
- Any wetlands, seeps and springs should be identified and marked during project implementation, and should be protected in accordance with Montana SMZ law.

- Incidental removal of non-hazard tree vegetation (e.g. shrubs, small trees) should be minimized within SMZs.
- Operation of equipment within non-SMZ wetlands would not occur.
- Project operations would be monitored by a representative of the Watershed/Fisheries staff to ensure proper application and effectiveness of BMPs
- Road reconstruction and maintenance would be done in accordance with standard BMPs with an unrutted gravel or native surface and effective drainage for the duration of the project in order to avoid developing sediment delivery points.
- Road surface drainage should divert road-surface runoff to undisturbed forest floor, where conditions allow for sediment deposition and infiltration.
- Any new culvert crossings on temporary roads would be constructed when there is no water in the stream, if possible. If not, clear water would be diverted around culvert installation sites and appropriate best management practices (BMPs) would be used to protect streams from turbidity.
- A Montana SPA 124 permit would be obtained for every temporary stream crossing installation.
- Sediment filtering devices (e.g., filter fence or certified-weed-free straw bales) should be used as needed (e.g. at road/stream crossings, especially around temporary road locations) to limit erosion and delivery of sediment into streams or ephemeral drainages.
- Dewater site before culvert installation for new and replacement culverts.
- Use vibrator plate or hammer type compactor for proper soil compaction during culvert installation.

Soils

- For units thinned by tractor operations, conduct operations of ground-based heavy equipment under the following seasonal conditions: either during “summer-conditions” when soils are generally dry, or during “winter-conditions” when there is at least 4 inches of frozen ground or 6 inches of packed snow (USDA 1988; BMP 13.06 and 14.04).
- Limit ground-based heavy equipment operations to slopes less than 35% gradient (USDA 1988; BMP 13.02 and 14.07).
- On slopes greater than 35% gradient, use hand-falling and lead-end, suspended log yarding operations, such as skyline cable or helicopter yarding (USDA 1988; BMP 14.09).
- Soil organic matter losses should be kept to a minimum by conducting prescribed burning when the forest floor is moist (Harvey et al. 1994).
- Design burn prescriptions to retain adequate ground cover that would limit surface erosion rates to comply with Region 1 soil management guidelines of generally less than 1 to 2 tons per acre per year. Retaining adequate soil cover would be especially critical in units 53, 54, 57, 68, 69, 70, 71 and 72 in Alternative 2 and units 2, 8, 9a, 10, 11, 13a, 17a, 18a, 28, 29, 30a, 42, 45a, 45b, 46a, 46b, 52a, 53, 54, 57, 58, 59a, 60, 61, 62, 63, 64, 68, 69, 70, 71 and 72 in Alternative 3 where mixed severity burning would be implemented.
- Design burn prescriptions to achieve low to moderate fire intensity (USDA 1988; BMP 18.02; Harvey et al. 1994).
- In units where soil effects resulting from mechanical tree thinning combined with prescribed fire are anticipated to exceed Region 1 soil quality standards, the following special mitigation measure would be recommended:
- Defer implementation of prescribed fire until soil conditions can be field verified by the Forest Soil Scientist following mechanical tree thinning. If field monitoring verifies that prescribed burning could be implemented without exceeding Region 1 soil quality standards, then burning would proceed. If field monitoring indicates that Region 1 soil quality standards would likely be exceeded with implementation of prescribed fire, then burning would not be implemented.

- Utilize winter logging as opposed to summer logging. Winter logging would allow all units to be harvested and burned within Region 1 soil quality standards. Winter logging benefits are also outlined in the Noxious Weed Report, to minimize spread of noxious weeds.
- The Noxious Weeds Report specifies mitigation measures to minimize effects of noxious weeds: following implementation of proposed vegetation treatments (including road construction and road decommissioning), sites would be monitored for noxious weed invasion, and subsequent weed treatments would be conducted to control and eradicate weeds. With this mitigation, soil cumulative effects from noxious weeds would be minimized.
- Combine adjacent units with the same prescription
- Following implementation of proposed vegetation treatments (including road construction and road decommissioning), sites would be monitored for noxious weed invasion, and subsequent weed treatments conducted to control and eradicate weeds.(also applies to noxious weeds)
- Temporary road construction would be conducted in a manner that facilitates conservation of the upper soil layers (topsoil) and permits the lower soil layers to be easily placed onto the temporary road prism and then to be covered with the topsoil during reclamation.

Transportation

- Road reconstruction consists of preparing the roadway surface to meet BMP standards in accordance with soil and water conservation practices hand book (USDA 1988) to be suitable for logging trucks and equipment. Road reconstruction activities can include: surface shaping and grading (blading), minor earthwork (cut and fill), ditch reshaping, adding gravel, installing or replacing culverts, and installation of surface cross drains.
- Road maintenance would be performed on haul roads during project implementation in order to meet BMP standards. (Also applies to Hydrology and Fisheries)
- Cut and fill slopes would be re-vegetated with native species wherever possible.
- Harvest and burning activities would be coordinated to minimize impact to forest users and private landowners.
- Warning signs would be posted along Forest Service haul routes to notify the public of truck traffic, logging, and burning activity in the area.
- Log hauling would be prohibited on weekends and Federal holidays.
- Some roads and areas could be temporarily closed or have restrictions on public use as necessary to provide for safety of the public and logging crews during project activities.
- Temporary roads would be designed and constructed in accordance with standard BMPs e.g., FSH 2509.22; FSH 7709.56; 7709.56b (USDA 1988; USDA 1994; USDA 1998) (Also applies to Hydrology, Soils, and Fisheries)
- Temporary roads would be decommissioned in conformance with Practice 15.25 of the soil and water conservation practices handbook (USDA 1988), as soon as possible after project completion. Decommissioning refers to full obliteration of the road—ripping the roadbed, restoring the road prism to natural contour, removing culverts, replacing topsoil, placement of woody debris to provide stability, and native seeding. (Also applies to Wildlife, Hydrology, Soils)
- Until temporary roads could be decommissioned, they would be maintained to minimum haul standards. (Also applies to Hydrology)
- All temporary roads would have locked gates and be closed to the public at all times. (Also applies to Wildlife)

Lands

Boundary

- Boundary lines would be established when in question and/or when working in close proximity to adjacent third-party lands that are not well marked.
- Corner monuments and accessories to corner monuments would be protected.

- Adjacent land owners would be notified of project activities. Private landowners would have adequate notice prior to tree harvesting or prescribed fire treatments to plan accordingly for noise and potential air quality effects associated with burning.

Non-recreation Special Uses

- Permittees and landowners would be notified of the proposed and selected actions to ensure that project activities do not materially interfere with private landowner/permittee rights. Privately owned improvements would be protected during operations.
- If detours or temporary road closures occur during project activities, signs would be posted and prior warning would be given to affected parties.
- Project managers and contractors would be cognizant of the location of permitted private roads and classified private roads.

Land Exchange/Rights-of-Way

- Land exchange partners potentially affected by treatment activities on lands that are proposed for exchange would be advised and coordinated with prior to treatment.
- Road use would be coordinated with Jefferson County on roads having county jurisdiction.
- Private rights-of-way would be pursued, to serve both short-term project access needs and long-term public and administrative access needs.

Minerals

- Mine sites and their relic features would be avoided during vegetation work because of their hazards, as well as their historic value.
- Fuels would be removed where appropriate to protect mining features.
- In order to maintain the stability of waste rock dumps and features, heavy equipment would avoid tracking over unreclaimed waste rock piles.
- In places where treatments would substantially reduce vegetative cover above waste piles, vegetative buffer zones or slash would be used to reduce potential for erosion into these areas in the event of a high intensity storm or extreme runoff event.
- Areas where mine workings are suspected would be inventoried prior to implementing treatments in those areas. For worker safety, workers would avoid areas with pits, shafts, and adits.
- Equipment operators conducting road reconstruction activities would be informed of any mining-related sites located within 150 feet of the reconstructed roadbed.
- Personnel conducting prescribed burns would be informed of any mining-related features, particularly those features of historical importance that include timber supports or wooden structures, ensuring that the integrity of those structures would not be impacted.

Noxious Weeds

The following Best Management Practices are required by FMS 2081.2—Prevention and Control Measures (FSM 2080, 5/14/01) (USDA 2001).

Roads

- Incorporate weed prevention into road layout, design, and alternative evaluation. Environmental analysis for road construction and reconstruction would include weed risk assessment.
- Remove the seed source that could be picked up by passing vehicles and limit seed transport in new and reconstruction areas.
- Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. This does not apply to service vehicles that would stay on the roadway, traveling frequently in and out of the project area.
- Landings, skid trails, and other areas of disturbance resulting from logging activities would be monitored for weed infestations.

- Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders as determined by the Forest Weed Specialist. Reference Contract Provision C/CT 6.626.
- Re-establish vegetation on bare ground due to construction and reconstruction activity to minimize weed spread. (Also applies to Hydrology and Soils)
- Revegetate all disturbed soil, except the travel way on surfaced roads, in a manner that optimizes plant establishment for that specific site, unless ongoing disturbance at the site would prevent weed establishment. Use native material where appropriate and available. Use a seed mix that includes fast, early season species to provide quick, dense revegetation. To avoid weed contaminated seed, each lot must be tested by a certified seed laboratory against the all State noxious weed lists and documentation of the seed inspection test provided.
- Use local seeding guidelines for detailed procedures and appropriate mixes. Use native material where appropriate and available. Revegetation may include planting, seeding, and weed-free mulching as indicated by local prescriptions.
- Monitor and evaluate success of revegetation in relation to project plan. Repeat as indicated by local prescriptions.
- Minimize the movement of existing and new weed species caused by moving infested gravel and fill material. A borrow pit would not be used if new invaders, defined by the Forest Weed Specialist, are found on site.
- Minimize sources of weed seed in areas not yet revegetated. If straw is used for road stabilization and erosion control, it must be certified weed-free or weed-seed free.
- Minimize roadside sources of weed seed that could be transported to other areas during maintenance.
- Look for priority weed species during road maintenance and report back to District Weed Specialist.
- Do not blade roads or pull ditches where new invaders are found.
- Maintain desirable roadside vegetation. If desirable vegetation is removed during blading or other ground disturbing activities, area must be revegetated according to section (3) (a), (b), (c) above.
- Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that would stay on the roadway, traveling frequently in and out of the project area.)
- Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders, as determined by the Forest Weed Specialist. Reference Contract Provision C/CT 6.626.
- Straw used for road stabilization and erosion control would be certified weed-free or weed-seed-free.

Timber

- Ensure that weed prevention is considered in all pre-harvest timber projects.
- Include weed risk assessment in environmental analysis for timber harvest projects.
- Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that would stay on the roadway, traveling frequently in and out of the project area.) Reference Contract Provision C/CT6.26
- Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as designated by the Forest Weed Specialist). Reference Contract Provision C/CT6.261
- Minimize the creation of sites suitable for weed establishment.

- There are no BMPs specific to prescribed fire in FSM 2080. The above BMPs that apply would be implemented in prescribed fire units.

Rangeland

- The following fences would be protected during treatment operations:
- Badger Creek; 1.30 miles
- Bauer; 0.52 miles
- Maupin Billy Herman fence; 1.39 miles
- Section 32 North Fork fence; 0.45 miles
- Strawberry electric fence; 0.39 miles
- Strawberry fence; 1.54 miles
- Wing fence; 0.60 miles
- Warm Springs fence; 0.48 miles
- Range specialists would be provided advanced notification of scheduled project activities in order to coordinate with permittees.
- Livestock use would be withheld in prescribed fire units to ensure that adequate fine fuels are available for burning; livestock could also be withheld for the first growing season following burning.
- Range personnel would establish key areas, and sites would be monitored through normal permit administration to ensure use levels are not exceeded.

Scenery

- Created openings would resemble the size and shape of those found in the surrounding natural landscape.
- Unit edges would undulate and feather to the extent practicable.
- Where the unit is adjacent to denser forest, the percent of thinning within the transition zone would be progressively reduced toward the outside edge of the unit. In addition, the width of the transition zone would be varied.
- Thinly spaced trees that are silhouetted along the skyline would be avoided where possible.
- Final design and unit layout of all units that lie within lands allocated Visual Quality Objectives (VQOs) of Retention and Partial Retention by the HNF Forest Plan would be reviewed by the Forest landscape architect. During temporary construction, slash and root wads would be eliminated or removed from view in the immediate foreground (generally within 100 feet) of main travelled roads to the extent possible.
- Log landings, roads, gravel pits, borrow areas, and bladed skid trails would be minimized within sensitive view sheds.
- Slash would be reduced in the immediate foreground (generally within 100 feet) of main travelled roads by scattering, chipping, or other techniques.

Recreation

- In harvest units with system trails, mechanized equipment would cross system trails only at designated sites (see the "Transportation" section above for additional design elements related to roads and skid trails).

Sensitive Plants

- If any sensitive plant populations are found during marking, implementation or monitoring, those areas would be buffered and protected.

Forested Vegetation

- Sufficient debris would be left onsite to meet coarse woody debris and burning prescription guidelines as follows: 5-12 tons/acre in warm dry forest habitat types; 10-18 tons/acre in other forest types. (Also applies to Wildlife, fuels, Soils)

- Burning in non-harvested areas would occur after necessary preparation (i.e., slashing) and when conditions meet objectives.
- Burning for site preparation would be done as soon as possible to encourage prompt natural regeneration, within 3 years of harvest; this burning would fit within mixed severity guidelines. In some cases, natural regeneration would be monitored for one year to determine if a burn is needed. A more detailed, site-specific schedule for burning is developed in silvicultural prescriptions.
- In units containing a component of large diameter DF (>14" dbh), proposed burning may be delayed depending on DFB at the time of implementation. The Silviculturist and fuels specialists would coordinate to determine the most appropriate time for burning.
- In intermediate treatment units the healthiest and generally largest trees would be retained.
- In units where green pine slash is created and there is residual mature ponderosa pine, one or more of pine engraver mitigation measures would be employed. These measures would be specified on final silvicultural prescriptions on a unit-by-unit basis.
- Perform slash creation from late summer to early winter (August to December); or
- Burn slash immediately following treatment, before April; or
- Lop slash into small pieces and scatter it into openings; or
- Create large slash piles to draw the insects into the pile until it can be burned.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. While all analysis issues are addressed in Chapter 3, only those for which there are impacts associated with each alternative are summarized in the following table.

Table 2-7, Comparison of Alternatives by Resource Area

Resource/Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	
Wildlife				
<i>Wildlife Habitats</i>				
Acres of dry forest habitats treated	0	3,682	3,285	
Acres of treatments that benefit aspen	0	2,670	2,441	
Acres of non-forested habitats treated	0	507	503	
<i>Elk hiding cover by elk herd unit in acres (percent)</i>				
Prickly Pear Herd Unit	3,429 (11.0%)	3,429 (11.0%)	3,429 (11.0%)	
Sheep Creek Herd Unit	4,681 (10.7%)	4,189 (9.5%)	4,266 (9.7%)	
<i>Snag/acre across 3rd Order Drainages</i>				
3 rd Order Drainage 0822	79	78	78	
3 rd Order Drainage 0901	8	6	6	
3 rd Order Drainage 0904	0.5	0.5	0.5	
<i>Threatened, Endangered, Sensitive Species</i>				
Black-backed Woodpecker – Forest acres treated	0	4200	3,940	
Flammulated Owl – Acres of dry forest habitats treated	0	3,682	3,285	
<i>Management Indicator Species</i>				
Acres of potential Northern Goshawk habitat treated (Nesting)	0	218	148	
Acres of potential Pileated Woodpecker habitat treated	0	940	835	
Acres of potential Hairy Woodpecker habitat treated	0	940	835	
Acres of potential American Marten habitat treated	0	217	147	
Fire and Fuels				
High Fuel Load Fuel Models (fuel models 185, 188). Current/Immediately following implementation	FM 185	28%	18%	19%
	FM 188	52%	25%	35%

Resource/Issue		Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
High Fuel Load Fuel Models (fuel models 185, 185, 187, 188, 10). In 2025.	FM185	5%	3%	3%
	FM188	10%	5%	8%
	FM 187	5%	2%	3%
	FM 10	60%	34%	38%
PPDF1 BpS Succession Class Departure from Reference-- (% departure from reference)	Current/ Immediately following implementation	High (70%)	Mod (40%)	Mod (55%)
	2020	High (89%)	Mod (64%)	High (83%)
Forested Vegetation				
<i>Create Forest structure that is resilient to insects</i>				
Acres of Douglas-fir mixed forest treatments		0	876	294
Basal area below DFB susceptibility thresholds	Current	BA 99 - No	BA 99 - No	BA 99 - No
	Post-treatment	BA 102 - No	BA 67 – Yes	BA 67 – Yes
	2040	BA 119 - No	BA 78 - Yes	BA 78 - Yes
	2060	BA 132 - No	BA 88 - No	BA 88 - No
DBF hazard rating through time	Current	2 - Moderate	2 - Moderate	2 - Moderate
	Post-treatment	2 - Moderate	2 - Moderate	2 - Moderate
	2040	3 - High	2 - Moderate	2 - Moderate
	2060	3 - High	2 - Moderate	2 - Moderate
WSB hazard rating	Current	3-High	3-High	3-High
	Post-treatment	3-High	1-Low	1-Low
	2040	3-High	1-Low	1-Low
	2060	3-High	3-High	3-High
<i>Promote ponderosa pine composition through time</i>				
Percent ponderosa pine composition through time	Current	42%	42%	42%
	Post-treatment	42%	90%	41%
	2040	42%	92%	54%
	2060	53%	92%	66%
Promote landscape resiliency by creating a mosaic of structures. % area treated	Regeneration harvest	0%	22%	7%
	Intermediate harvest	0%	10%	4%
	Prescribed fire	0%	12%	30%
Acres treated by prescription in ponderosa pine	Regeneration harvest	0	2,036	624
	Intermediate harvest	0	0	0
	Prescribed fire	0	644	2,234

Resource/Issue		Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Habitats of Special Concern				
<i>Old Growth Effect on potential fire behavior in adjacent designated old growth stands</i>				
Acres Adjacent to Old Growth	Regeneration harvest	0	89	0
	Intermediate harvest	0	0	0
	Prescribed fire	0	102	191
<i>Snags: Effect on the snag resource in 3rd order drainages level</i>				
Estimated snags per 3rd order drainage post-treatment	Drainage 0822	79	78	78
	Drainage 0901	8	6	6
	Drainage 0904	0.5	0.5	0.5
<i>Ponderosa Pine: Effect on the percent composition of ponderosa pine</i>				
% composition of ponderosa pine in ponderosa pine by prescription	Existing condition	42%	Regeneration: 42% Prescribed Fire: 42%	Regeneration: 42% Prescribed Fire: 42%
	Post-treatment	42%	Regeneration: 90% Prescribed Fire: 41%	Regeneration: 90% Prescribed Fire: 41%
	2040	42%	Regeneration: 942% Prescribed Fire: 54%	Regeneration: 92% Prescribed Fire: 54%
	2060	53%	Regeneration: 92% Prescribed Fire: 66%	Regeneration: 92% Prescribed Fire: 66%
Ponderosa pine presence on the landscape over time		0	2036 acres treated with regeneration harvest which would maximize Ponderosa pine composition	644 acres treated with regeneration harvest which would maximize Ponderosa pine composition
<i>Aspen: How would alternatives promote aspen</i>				
Acres of proposed treatment units that contain a component of aspen	Regeneration harvest	0	1313 acres	628 acres
	Intermediate harvest	0	709 acres	342 acres
	Prescribed fire	0	648 acres	1441 acres
<i>Grasslands/Sagebrush: How would alternatives promote grasslands/shrublands</i>				
Acres of proposed treatment units that contain non-forested habitats		0	507 acres	503 acres
Potential to reduce uncharacteristic fires in the dry ponderosa pine habitats		Lowest potential	Highest potential	Moderate potential
Noxious Weeds				
Potential acres of noxious weeds treated		0	97-551	96-320

Resource/Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Treatment costs associated with noxious weed treatment	0	\$4,850 – \$27,550	\$4,800 – \$16,000
Sensitive Plants			
Populations of Sensitive Plants threatened	0	0	0
Range			
Acres of treatment within suitable rangeland (i.e. primary and secondary range)	0	1169	1144
Hydrology			
<i>Sedimentation from Treatment Units (tons per year/probability of sedimentation)</i>			
Warm Springs Creek	N/A	0.6(2%–16%)	0.4 (2%–14%)
McClellan Creek	N/A	0.1 (4%–12%)	0.0 (2%–12%)
Middle Prickly Pear Creek	N/A	0.0 (0%)	0.0 (0%)
<i>Sedimentation from Roads (tons per year – key issue measurement indicator)</i>			
Warm Springs Creek	1.2	1.3	1.2
McClellan Creek	4.6	4.3	4.2
Middle Prickly Pear Creek	No sediment delivery points observed	N/A – no sediment delivery points observed	N/A – no sediment delivery points observed
Fisheries			
<i>Predicted Trend in Mean Percent Fine Sediment (<1/4 inch diameter) Levels in Spawning Substrates%</i>			
Middle Prickly Pear Creek	N/A	N/A	N/A
Warm Springs Creek	Decrease	Decrease	Decrease
McClellan Creek	Maintain	Maintain	Maintain
<i>Hydrologically Connected Roads (Tons of Sediment)</i>			
Warm Springs Creek	1.2	1.3	1.2
McClellan Creek	4.6	4.3	4.2
Middle Prickly Pear Creek	0	0	0
<i>Number of High Risk Culverts</i>			
Middle Prickly Pear Creek	0	0	0
Warm Springs Creek	5	5	5
McClellan Creek	11	11	11

Resource/Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Soils			
Units that exceed 15% detrimental soil disturbance (non-winter logging)	N/A	18 units exceed as prescribed—13 have further evaluation and would likely not exceed, 2 would not be burned following treatment, and 3 recommended to be dropped without further mitigation.	0
Units that exceed 15% detrimental soil disturbance with winter logging	N/A	0	0
Transportation/Road Management (miles)			
Temporary Road Construction (key issue measurement indicator)	0	13.7	0
Existing Road Reconstruction (BMPs)	0	8.8	8.8
Recreation/Scenery			
Acres of treatment meeting Forest Plan Visual Quality Objectives	No treatment	All treatment acres meet FP VQOs	All treatment acres meet FP VQOs
Change in scenic condition based on human activity	None	Most regeneration harvest, thus most change of action alternatives	Least regeneration harvest, thus least change of action alternatives
Cultural Resources			
Number of currently identified cultural sites within or adjacent to treatment units or roads	0	12 cultural sites	12 cultural sites
Minerals			
Mining-related features within treatment units adversely affected	0	17 present, none adversely affected with design criteria	16 present, none adversely affected with design criteria
Economics			
Present Net Value-Timber Harvest	\$0	-\$3,043,240	-\$2,284,851
Total Employment Potential	0	149	85
Air Quality (modeled, 24-hour average at > 1.0 miles from burn)			
PM _{2.5} emissions (35 µg/m ³ standard)	0	< 29.8 µg/m ³ (spring) < 27.2 µg/m ³ (fall) < 24.2 µg/m ³ (all piles)	< 29.8 µg/m ³ (spring) < 27.2 µg/m ³ (fall) < 24.2 µg/m ³ (all piles)

