Chapter 3. Affected Environment and Environmental Consequences

Introduction

This chapter presents the relevant resource components of the existing environment – the baseline environment. It describes the resources of the area that would be affected by the alternatives. This chapter also discloses the environmental effects of implementing the alternatives. These form the scientific and analytical basis for comparing the alternatives described in chapter 2.

Chapter 3 explains the basic components of the analysis followed by a section on each resource. This should provide the reader a better understanding of the overall motorized routes and designations for wheeled motorized vehicles within the Blackfoot travel planning area. Acre and mileage totals are approximate within tables and text due to rounding.

The purpose of this analysis is to compare alternatives, not to make predictions about the future. The analysis in this chapter focuses on the effects of the proposed changes to the current designated system. It does not analyze the effects of the whole designated system.

This DEIS looks at effects within the Blackfoot travel planning area. The effects of proposed changes to the Blackfoot travel planning area were aggregated rather than describing the site-specific effect at each road or trail, unless necessary for a particular sensitive resource or concern area. For instance, specialist's reports describe the overall effects of reducing or allowing places people could drive instead of listing every route and predicting the effects at a particular site.

Most specialists used Geographic Information System (GIS) to calculate the miles and areas affected, or to model habitats. If specialists used models other than GIS, it is described in their report.

It was assumed that motorized use would occur where it is proposed. In doing so, the effects analysis describes the effects resulting from the change between where people are driving now (alternative 1) and where people would drive (alternatives 2 and alternative 3).

Affected Environment

An effects analysis starts by describing the affected environment. As the name implies, this section describes those parts of the environment or project area that would change as a result of implementing the action alternatives. The Council on Environmental Quality describes it this way:

"The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The descriptions shall be no longer than is necessary to understand the effects of the alternatives" (40 CFR 1502.15).

In this project, the Helena National Forest proposes to close some roads and trails to motorized use, and to continue to prohibit driving off designated routes, with the exception of camping within 300 feet of a designated route and parking within 30 feet (with provisions). The affected environment, then, relate to changes that would occur by opening or closing roads to wheeled motorized vehicle travel, such as wildlife habitat and recreational opportunities.

Past Actions

The interdisciplinary team considered the effects of past actions as part of the existing condition. The current conditions are the sum total of past actions. The CEQ recognizes “agencies can conduct an adequate cumulative effects analysis by focusing on current aggregate effects of past actions without delving into the historical details of individual past actions” (Council on Environmental Quality 2005). Innumerable actions over the last century and beyond have shaped the Helena National Forest’s current designated road system within the Blackfoot travel planning area. Attempting to isolate and catalog these individual actions and their effects would be nearly impossible. By looking at current conditions, the effects of past human actions and natural events, regardless of which event contributed to those effects are captured. Listing the past actions, however, can show trends. On balance, some past actions increased the amount of motorized use in the Blackfoot Travel Planning Area, and others decreased it.

Environmental Consequences

The impact analysis and conclusions contained in this chapter were based on forest staff knowledge of the resources and site, reviewing existing literature and agency studies, information provided by specialists within the Forest Service and other agencies, and professional judgment. The methodology section for each resource describes additional specific data collection or analysis or other methods used for that resource.

Potential impacts in this chapter are described in terms of type (direct, indirect, cumulative and are the effects beneficial or adverse?); context (are the effects site specific, local, or even regional?); duration (are the effects short term or long term?); and intensity.

Direct effects are caused by the action and occur at the same time and in the same locations as actions that cause them. Indirect effects are those caused by the action but that occur at a later time or in a different location than the actions that were their cause. Cumulative impacts result from the additive impacts of this project with past, present, and reasonably foreseeable future actions in or near the area.

Effects can be both beneficial and detrimental (40 CFR 1508.8). For example, for this travel management project, closing roads to motorized use could improve wildlife habitat (beneficial effect for wildlife species) and reduce the amount of motorized recreational opportunities (detrimental impact to riders).

The regulations do not require agencies to separate the direct and indirect effects, so in this document we describe them together by resource. Cumulative effects have their own section by resource.

For purposes of this analysis, short-term effects are those expected within the next 1 to 10 years (throughout the course of project implementation) and long-term effects are those that are expected between 10 and 20 years or more (after implementation is complete) unless specifically defined in individual resource sections that follow.

Cumulative Effects

The definition of cumulative impact according to the Council on Environmental Quality is:

‘Cumulative impact’ is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts

can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

To be cumulative, effects must overlap in space and time. Cumulative impacts are important because they could cause a tipping point, either beneficial or detrimental. To analyze cumulative effects, the interdisciplinary team looked at the effects from this proposal and added them to the effects from past, present, and reasonably foreseeable future actions.

Reasonably Foreseeable Actions

Courts have interpreted a "reasonably foreseeable future action" as one that has been proposed and is in the planning stages. To analyze the cumulative effects of present and reasonably foreseeable future actions, each resource specialist looked at the list of projects in Appendix D. They identified the ones expected to cause effects to their resource, at the same time and in the same place as effects from the proposed action or alternatives. Some specialists analyzed additional actions that pertained only to their resource.

Consistency with Adjacent National Forest Travel Management Planning

There are two areas within the Blackfoot travel planning area that share a common boundary with an adjacent National Forest. The first area is T15N R10W with the Lolo National Forest, where there is shared management of trail #483. The actions proposed for this trail in all three alternatives are consistent with the management of the trail when it crosses into the Lolo National Forest and then back onto the Helena National Forest. The Helena and Lolo National Forests have always shared in the maintenance of this trail and would continue to do so under implementation of any of the alternatives.

The second area is in T16N R7W; there is a trail junction between the Continental Divide National Scenic Trail #440 and trail #266 that occurs on the Lewis & Clark National Forest. Actions proposed for both trails under any of the alternatives are consistent with both Forest Plans and management of trail #266 as it is being managed on the Lewis & Clark National Forest.

Specialist Reports

This Draft Environmental Impact Statement incorporates by reference the resource specialist reports in the project record (40 CFR 1502.21). These reports contain the detailed data, executive summaries, regulatory framework, assumptions and methodologies, analyses, conclusions, maps, references, and technical documentation that the resource specialists relied upon to reach their conclusions. These reports are summarized in this chapter.

Amendments to the Helena National Forest Plan

A proposed programmatic Forest Plan amendment is a component of this analysis as described in chapter 2 and appendix F. By law, proposed actions must be consistent with the Forest Plan or the Plan must be changed. Amendments to the Forest Plan can have effects because they propose changes in the management of the forest. Other Forest Plan amendments may also be necessary to address trails within Forest Plan Management Area N-1 (Research Natural Areas) and R-1 (Unroaded and Undeveloped Areas), as discussed in chapter 2.

Project Record

As also stated in chapter 1, the Blackfoot Travel Plan project record is referenced in an effort to keep this document brief and concise as per 40 CFR 1502.21. The project record contains a variety of

documents, including, but not limited to: specialists' reports, literature, supporting documents, and other process-related documents.

Transportation System

Affected Environment

Existing Condition

Transportation System Description

The Blackfoot travel planning area is accessed by an extensive road and trail system. Most of the early roads were developed primarily for mining and grazing activities. Many of these roads were first used in the mid–1800s as wagon roads and then improved in the early 1900s to accommodate motorized vehicles. Since the 1950s, roads have been built to access forest stands for commercial timber sales. These roads have been built to a higher standard than the old mining and grazing roads. The road system now consists of a mixture of old and new roads as well as roads acquired through the land exchange process. Many of the older roads are in disrepair.

The majority of the roads in the Blackfoot travel planning area are single-lane, native-surface roads. There are roads that are under the jurisdiction of counties, state, private landowners and the National Forest System. Major road segments include Road 330 (Copper Creek), Road 1163 (Nevada Ogden) and Road 4106 (Beaver-Dry Creek). The majority of the routes that are currently open to motorized travel are not utilized to their full capacity.

Motorized travel tends to be higher during summer holiday, weekends and around the opening of big game rifle season; otherwise, traffic use tends to be low. Use has been increasing and we expect this trend to continue into the future. Refer to the Recreation section for more information on use. Table 7 displays the miles of roads within the project area by maintenance levels and identifies primary road segments.

To help the reader develop a perspective for the road locations, the analysis area has been divided into 4 geographic quadrants. The area is divided east and west by Highway 200 which runs through the entire project area, and is divided north and south approximately by the northern boundary of the 5th Hydrologic Unit Code (HUC 5) Blackfoot River-Keep Cool Creek Watershed. Table 7 lists the project area HUC 5 watersheds, and the primary roads that either run through, or originate in, that watershed. Appendix G displays maps of the existing road system. Table C- 1 in appendix C displays information on each road addressed in the analysis.

Table 7. HUC 5 Watersheds and primary roads by quadrants

Quadrant	HUC 5 Watershed (see figure 6)	Primary Roads
Northeast	A portion of the Blackfoot River Headwater	1815 - Meadow Creek
	Lower Dearborn River	1841 - Hogum Creek
	A portion of Middle Fork Dearborn River	293 - Alice Creek
	Upper Little Prickly Pear Creek	4087 - Mike Horse Mine Extension
	Little Prickly Pear Creek	4108 - West Flesher
Northwest	A portion of Middle Fork Dearborn River	330 - Landers Fork
	A portion of the Blackfoot River Headwaters	1882 - Indian Meadows
	Landers Fork	

Quadrant	HUC 5 Watershed (see figure 6)	Primary Roads
Southeast	Blackfoot River-Keep Cool Creek	601 - Stemple Pass (County Road)
	Lower Little Blackfoot River	329 - Dalton (Mixed Jurisdiction)
	Nevada Creek	1163 - Nevada-Ogden
		1892 - Sauerkraut
Southwest	Lower North Fork Blackfoot River	4106 - Beaver Creek-Dry Creek (Mixed Jurisdiction)
	A portion of Blackfoot River Keep Cool Creek	1800 - Sucker Keep Cool

Unauthorized Roads

We conducted field reviews and collaborated with user groups to identify approximately 156 miles of unauthorized routes located within the project area. These have been incorporated into this analysis. The majority of roads that fall into this category are dead end roads and are less than one mile long. The unauthorized roads identified as part of this analysis are listed in table c- 1 in appendix C. After the transportation planning process is complete, any unauthorized roads that exist on the landscape that were not identified prior to or during this process would be prohibited from motorized use and actions taken to mitigate environmental concerns.

Road Closures

Since adoption of the Helena Forest Plan in 1986, roads have been closed across the forest and in the analysis area for a variety of reasons. Closures are often with gates but also by contouring, barrier placement, and ripping/seeding. Closures are either year-long or are seasonal. Currently, 57 miles are closed yearlong to motorized use. Examples of seasonal closures include spring closures to protect the road surface from rutting during the wet time of the year, or hunting season closures to provide for big game security during the general rifle season. In accordance with the 2001 Tri-State OHV decision, wheeled motorized vehicle use is restricted to existing roads and trails.

Road Conditions

Road conditions vary across the analysis area with many factors influencing route surfaces including amount of use, type of use, maintenance level, type of surface and weather. Maintenance levels for roads within the Blackfoot travel planning area are adequate for the amount of traffic occurring and are expected to continue to provide adequate service into the future, accounting for area population growth and potential displacement. Maintenance levels are evaluated and adjusted as necessary as part of normal management activities.

Law Enforcement Complexity

The Helena National Forest has identified that the complexity of its current visitor use map is high. There are 12 different seasonal restrictions governing the use of the roads and trails in this area. In some locations existing roads and trails are open to motorized vehicles, including unauthorized routes, based on the 2001 Tri-State OHV Decision that allows for motorized use where there is evidence of previous motorized use. User compliance of Forest regulations on roads and trails is generally related to the level of user understanding of the sign system and available maps, resulting in confusion for forest users and violations of regulations. Off road use by OHVs and violations associated with woodcutting are the more problematic enforcement issues tied to travel planning in the analysis area.

Environmental Consequences

Methodology

The data we used to describe the existing condition for the road system was used to evaluate the effects of each alternative. The existing condition was developed using GIS data as well as information from the sources listed in the transportation report in the project record. The alternatives were evaluated on the following criteria:

- Transportation System - How the alternative changes the open transportation system, and ability to conduct maintenance.
- Road conditions - How the alternative affects conditions on the road.
- Complexity of Law Enforcement issues
- Right-of-way concerns
- Failure of roads to provide public access to the national forest
- To what degree the alternative provides for a quality motorized trail system
- How effectively the alternative provides for future vegetation management needs
- Treatment of the Continental Divide National Scenic Trail (CDNST) National Direction
- Motorized use within the proposed Granite Butte Proposed RNA and the established Red Mountain and Indian Meadows RNAs

Roads Analysis Process (RAP)

The Helena Roads Analysis Process (2002-2004) was used to inform this process. Since 2004 there have been updates to the roads database. Inventory correction and changes in land ownership have resulted in adjustments to the roads inventory since the RAP. This updated data was given consideration during this analysis and supplements information from the 2004 Roads Analysis Process.

The 2004 RAP divided all of the roads in the area into nine categories (combinations of high, medium or low value, and high, medium or low concern) to identify the road system necessary to effectively manage the Helena National Forest. The Helena National Forest Roads Analysis Report (USDA Forest Service 2004) is located in the project record.

The roads analysis recommended that roads rated low value-high concern (LVHC) be removed from the road system. There are two roads in this area that were classified in the roads analysis as LVHC; roads 4080 and 601-N1. During this analysis it was determined that both roads were incorrectly classified and are in fact considered to be High Value-High Concern and are necessary for effective forest management. Road 4080 is proposed for decommissioning from mile post .55 to 6.1 for resource protection. The remainder of that road would be managed as part of this decision. Road 601-N1 travels in and out of private land and also connects to county roads. This road was incorrectly classified during as Low Value and has been determined to be a High Value Road. To continue to provide access to county roads and private lands, this road will remain part of the National Forest System in all alternatives.

2005 Travel Management Rule

In addition to information in the Blackfoot portion of the Helena National Forest Roads Analysis Report (USDA Forest Service 2004) this study updated information regarding route statistics, existing conditions, and uses. It also added information on new routes acquired with recent land acquisitions

from 2009 and 2011. This work was ongoing through collaboration with user groups from 2006 to 2010 and conforms to the process as outlined in the 2005 Travel Rule and 36 CFR212.5 (b)(1).

2001 Tri-State Off-Highway Vehicle (OHV) Decision

The 2001 Tri-State OHV decision (located in the project record) allows for off-highway vehicle use on the national forest. Off-highway vehicle use would occur on designated routes to provide a variety of motorized and non-motorized recreational opportunities. However, designation of specific routes requires local site-specific planning consistent with the Forest Plan such as this analysis. The OHV decision and the local site-specific planning approach prescribed is consistent with the proposed roads rule the Forest Service recently updated (36 CFR 212). It provides a process for resolving the disposition of unauthorized roads, including unauthorized roads and trails. It moves the agency towards designated routes, which many people, organizations and other agencies have advocated. The OHV decision has been incorporated into this analysis process in the proposed decisions regarding unauthorized roads.

Incomplete and Unavailable Information

It is possible that there are existing unauthorized routes that were not identified on-the-ground for this analysis. Unauthorized roads that exist that were not identified prior to or during this process would be prohibited from motorized use and necessary actions taken to mitigate environmental concerns.

Spatial and Temporal Context for Effects Analysis

The area for evaluating cumulative effects is the boundary of the Helena National Forest and the National Forest System roads wholly or partially within the Forest boundary.

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Past, present and foreseeable future actions relevant to this analysis are described in appendix D. Those most relevant to the transportation system include:

Past: Travel management decisions in the surrounding National Forest areas have closed many roads and trails on public land to motorized vehicles.

Present Actions: Ongoing maintenance activities would continue as a normal part of the maintenance process.

Future Actions: Vegetation management projects-Several vegetation management projects are identified in cumulative effects appendix D. All vegetation management projects come with the anticipated effect of increase traffic in the area and a corresponding increase in maintenance activity.

Effects Common to All Alternatives

Road Conditions

The general maintenance level (see glossary) and condition of open roads and trails would not change by alternative. Roads that receive higher amounts of motorized use would continue to be maintained on a regular basis; as would roads that need maintenance to prevent resource damage. Lower use roads would continue to receive sporadic maintenance. The maintenance backlog would remain for the lower standard roads for all alternatives. Additional maintenance opportunities could occur through other projects in the analysis area.

Closures

Types of closures under all alternatives include closures during big game hunting season, year-long closures and spring closures. Spring closures would continue to occur r and are defined for each alternative

Rights-of-Way

Some roads and trails within the planning area cross private land where there is no recorded right-of-way or easement. Efforts to secure rights-of-way across these segments are ongoing.

Quality Motorized Trail System

Motorized mixed use is defined as designation of a NFS road for use by both highway-legal and non-highway-legal motor vehicles. Designating NFS roads for motorized mixed use requires an engineering analysis and must be completed by a qualified engineer. The assumption is made that engineering analysis of roads in the analysis for the purposes of addressing motorized mixed use would be completed on a case by case basis upon completion of the planning process and implemented over time. Refer to the recreation report for a discussion on a quality motorized trail system.

Ensure Access for Future Resource Management:

As part of the transportation planning process an evaluation was made to determine the necessary road system to meet future needs for vegetation management. All three alternatives retain a road system that accesses every part of the analysis area on the higher use roads and provide for adequate future resource management; more detail is provided in the socioeconomics and fire/fuels section of this chapter.

Indian Meadows and the Red Mountain RNAs

There are no roads in either the Indian Meadows or the Red Mountain RNAs, so there would be no effects associated with roads to these established RNAs.

Effects Common to All Action Alternatives

Transportation System

Alternatives 2 and 3 both increase the number of miles that are closed and decommissioned and both provide clarification to the 2001 Tri-State OHV decision by providing a road-by-road analysis.

Road Conditions

Closure of roads could potentially shift additional use to the remaining open roads increasing maintenance needs on those roads. Other funding sources, such as future proposed projects would be relied on to provide additional opportunities for road closures, decommissioning or for putting roads into storage. It is assumed that roads proposed for storage would be stored at level 3S and roads proposed for decommissioning would be at a level 4 (table 4).

Law Enforcement Complexity

Both action alternatives would simplify the motor vehicle use map by reducing the amount of seasonal closures within the planning area. We anticipate there would be a short term increased need for enforcement as visitors become familiar with the motor vehicle use map and changes to the Forest Visitor Map. Over-time enforcement needs would likely decline.

Failure to Provide for Public Access

Approximately 8 miles of roads within the planning area fail to provide public access to National Forest System lands; therefore, they are proposed for storage under alternative 2 and 3 (other roads are also proposed for storage under alternative 2 totaling 133 miles and for alternative 3 totaling 75 miles). Placing these roads in storage would retain them for future resource management needs. These 8 miles of routes are reflected in table 8 that follows.

Table 8. Roads proposed for storage under the action alternatives that fail to provide public access

HUC5 NAME	Road ID	BMP[1]	EMP[1]
Blackfoot River Headwaters	4084	0.105	1.711
	4084-A1	0	0.767
Blackfoot River-Keep Cool Creek	1892-D4	0	0.4
Nevada Creek	4047	0	0.299
	4047-A1	0	2.313
	4047-B1	0	0.824
	4047-C1	0	0.202
	4047-C2	0	0.382
	4047-D1	0	0.643

[1]BMP= Beginning mile post; EMP = ending mile post

Ensure Access for Future Resource Management

While all three alternatives provide for adequate future resource management, short segments of new construction are proposed where considered necessary to improve management of the national forest. Those segments are in the Blackfoot River Headwaters, the Upper Little Prickly Pear Creek and in the Blackfoot River-Keep Cool Creek HUC 5 watersheds.

Alternative 1 – No Action

Direct and Indirect Effects

No changes would be made to the existing system of available public motorized routes within the analysis area.

Transportation System Description

There would continue to be approximately 446 miles of National Forest System roads in the project area road open to public motorized use, with 270 miles open to highway legal vehicles with no seasonal restriction.

Unauthorized Roads

Alternative 1 would leave many roads unauthorized and individual problems with these roads would have to be addressed on a case-by-case basis. Unauthorized roads in alternative 1 that show evidence on the ground of frequent motorized use would keep their current status as open to traffic when they can be accessed as decided in the 2001 Tri-State Off-Highway Vehicle Decision. Closure or decommissioning of roads would be done on a case by case basis with some of the roads being decommissioned naturally over time. Roads that are currently not part of the National Forest System and are being managed as open would remain on the landscape. These routes may require some

degree of maintenance to bring them up to design standards and, if applicable, address environmental standards. Any new unauthorized routes would be eliminated.

Enforcement/Complexity

There would be no change in the existing map codes. The Forest visitor use maps would remain complex and difficult to understand. Enforcing compliance with the 12 different seasonal restrictions on the use of roads (and trails) would remain complex. Enforcement would also continue to be complicated with a number of miles of short, dead-end roads remaining open. The more problematic issues of off-road use violations by OHVs and violations associated with woodcutting would continue. Law enforcement efforts would continue.

Failure to Provide for Public Access

Roads that fail to provide public access to the National Forest due to jurisdictional concerns would continue to be open to highway legal vehicles even though the roads have been determined to be unnecessary for long-term management.

Quality Motorized Trail System

There are approximately 60 miles identified for motorized trail use. Per the 2001 Tri-State OHV Decision, any unauthorized roads that are currently show evidence of motorized activity would continue to be open to this use. Travel would continue to be restricted to travel within the road prisms.

CDNST

No change; mix of motorized and non-motorized use. Roads 1840-A1 and 1840-B1 would continue to be managed as road open to highway legal vehicles.

Granite Butte Proposed RNA

Within the Granite Butte Proposed RNA, roads 1840-A1 and 1840-B1 would continue to be open to motorized use (CDNST). These roads would be the only roads within the proposed RNA.

Cumulative Effects

Closures resulting from past planning efforts on other parts of the Helena National Forest may shift some traffic to the analysis area. The analysis area is easily accessible by the cities of Great Falls, Helena and Missoula. Cumulatively, an increase in use may eventually trigger a need to re-evaluate maintenance levels on some roads due to increased motorized use resulting from the increase in population in the surrounding areas. Conversely, future vegetation projects identified in appendix D would likely address needed maintenance in association with the respective projects. It is assumed that all future projects would comply with decisions made as part of this travel planning effort. Any new construction would be in compliance with current design standards. All necessary maintenance activities before, during and after the projects would be provided for in any resulting contracts developed in association with these projects.

Summary of Effects

The number of miles of roads as well as road conditions would remain unchanged in alternative 1. Maintenance would continue routinely on high use roads with sporadic maintenance taking place on other roads as needed. Lack of access to the entire forest by the general public would continue in cases where forest roads are located behind private roads without right of ways or easements. The travel planning effort would not result a motor vehicle use map; there would be no change in the existing codes on the visitor map. Enforcement of the existing signs and maps would continue to be

complicated. This alternative meets the purpose and need from the perspective that continues to provide a manageable road system and access to the national forest, but does not address other aspects of the purpose and need or project objectives. The unauthorized routes identified and displayed on the alternative 1 map in appendix G would continue to be utilized by motorized vehicles.

Alternative 2 – Proposed Action

Project Design Features

There is no specific project design feature tied to the roads resource. For a full list of project design features see chapter 2, page 28

Direct and Indirect Effects

Transportation System Description

The proposed action includes closing roads and trails that are currently open to motorized use, as well as opening other roads and trails for motorized use that are currently closed. It also includes some limited new construction of roads and trails. There would be approximately 348 miles of National Forest system roads in the project area road open to public motorized us, with 248 miles open to highway legal vehicles with no seasonal restriction. No areas would be designated for off-route wheeled motorized vehicle use, except for camping and parking associated with camping within 300 feet of a designated system route, and parking safely on the side of the road within 30 feet of the centerline.

Notable Changes to the Transportation System

Table 9and table 10 display some of the changes to the transportation system, by HUC 5watershed under alternative 2.

Table 9. Miles of road changing from open year-long to closed or stored by HUC 5 watershed

HUC 5 Watershed (see figure 6)	Miles Changing from Open Year-Long to Closed or Stored
Blackfoot River Headwaters	11 miles
Upper Little Prickly Pear Creek	10 miles
Landers Fork	<1 mile
Nevada Creek	9 miles
Blackfoot River Keep Cool	9 miles

The majority of roads identified for closure or storage are less than 1 mile long and have been determined to be not necessary for the management of the national forest. The roads displayed in table 10 are over 1 mile long and are proposed for storage.

Table 10. Alternative 2 - Roads greater than 1 mile in length proposed for storage that are currently open to motorized vehicles

HUC 5 Watershed (see figure 6)	Road #	Name	Reason
Blackfoot River Headwater	4084	Surveyor's Gulch	No Public Access
Blackfoot River Keep Cool	601-K2	No Name	Not Needed
Nevada Creek	1163-G1	Chimney Creek	Not Needed

HUC 5 Watershed (see figure 6)	Road #	Name	Reason
	296-A2	Huckleberry Creek	Resource Protection
	4047	Shingle Mill	No Public Access
	4047-A1	Mitchell Creek Conn.	No Public Access
Upper Little Prickly Pear	1819	Wilburn	Resource Protection

In alternative 2, the roads in table 11 would change from being open year-long to legal highway vehicles to being part of the motorized trail system. The majority are less than 1 miles in length.

Table 11. Roads designated as open to legal, highway, motorized vehicles proposed to become part of the motorized trail system

HUC 5 (see figure 6)	Road	Name	Miles
Blackfoot River Headwaters	4082	Pay Master	3
	4082-H1	Rogers Pass H1	2
	4082-H2	Rogers Pass H2	<1
	4082-I1	Rogers Pass I1	<1
	4082-I2	Rogers Pass I2	<1
	4086	Mike Horse Mine	<1
	4086-B1	Mike Horse B1	<1
	4086-B3	No Name	<1
	4086-B4	Rogers Pass B4	<1
	4086-B5	No Name	<1
	4090-C1	Rogers Pass C1	<1
Blackfoot River-Keep Cool Creek	1879	Mead-Prickly Gulch	2

Table 12 displays segments of unauthorized routes proposed for road or motorized trail construction.

Table 12. Unauthorized routes, less than 1 mile in length, proposed for road or motorized trail construction

HUC 5 (see figure 6)	Route Number	Proposed Use
Blackfoot River Headwaters	U-427	Motorized Trail
Blackfoot River Headwaters	U-NEW-005	Road
Upper Little Prickly Pear Creek	U-NEW-1006	Motorized Trail
Blackfoot River Headwaters	U-NEW2	Motorized Trail
Blackfoot River Headwaters	U-NEW3	Motorized Trail
Blackfoot River-Keep Cool Creek	U-NEW4	Motorized Trail
Blackfoot River-Keep Cool Creek	U-NEW-4043	Motorized Trail
Blackfoot River-Keep Cool Creek	U-NEW-4043	Motorized Trail

Closures

In alternative 2, there would be an increase of approximately 167 miles of closed or decommissioned roads when compared to alternative 1. Many of the 167 miles come from the proposed closure of roads either identified as acquired or as unauthorized in alternative 1. Alternative 2 takes the additional step of moving some of the closed roads into storage or decommissioning as defined in table 4 in chapter 2. In this alternative 86 miles would be closed yearlong to motorized use, an increase of 29 miles compared to alternative 1.

Unauthorized Routes

For alternative 2, unauthorized routes identified on the ground have been recognized as either a necessary part of the transportation system, and would be absorbed into either the road or trail system; or unnecessary, and would be closed, stored or decommissioned. Refer to table c- 1, in appendix C for road details by alternative, and the alternative 2 map in Appendix G that shows unauthorized routes that would be incorporated into the Forest Transportation System. Many of the unauthorized roads or roads acquired through the land exchange process are identified for storage rather than decommissioning to keep options open for long term resource management. It is anticipated that creation of unauthorized new routes would likely occur at a low rate.

Quality motorized trail system:

There are approximately 92 miles of motorized trail designated for inclusion into motorized National Forest System trails, which is an increase of 32 miles from alternative 1. Off-highway vehicle users would be given clarification regarding the use of the Helena National Forest transportation system because every currently unauthorized or acquired road would be included in the system and identified for specific use or for closure or storage.

CDNST

As in alternative 1, alternative 2 would not result in changes to the current management of the CDNST; it would continue to be managed for a mix of motorized and non-motorized use. Roads 1840-A1 and 1840-B1 would continue to be managed as roads open to highway legal vehicles.

Granite Butte Proposed RNA

Within the Granite Butte Proposed RNA, roads 1840-A1 and 1840-B1 would continue to be open to motorized use. These roads would be the only roads within the proposed RNA.

Cumulative Effects

The cumulative effects for alternative 2 would be the same as those described for alternative 1.

Summary of Effects

This alternative meets the purpose and need by providing a manageable system of designated public motorized access routes and by providing detailed analysis of every road on the system to determine effective management of that road. This alternative completes the site specific travel plan requirements identified in the 2001 Tri-State OHV Decision. Many of the unauthorized roads or roads acquired through the land exchange process are identified for storage to keep options open for long term resource management. Effects on the ground would be continued maintenance on the existing high use roads, capitalizing on opportunities for road improvements when presented as part of other projects. Decommissioning and storage activities would be implemented as part of an over-all comprehensive plan. A simplified motor vehicle use map would be produced as a result of implementation of this alternative and would clearly identify roads and trails and their designated

motorized uses for forest visitors. See the alternative 2 map in appendix G for proposed changes in route designations under alternative 2. All roads that fail to provide for public access due to jurisdictional concerns would be put into storage. Motorized use on roads 1840-A1 and 1840-B1along the CNDST and within the Granite Butte RNA would continue.

Alternative 3

Direct and Indirect Effects

Transportation System Description:

There would be approximately 307 miles of National Forest system roads in the project area road open to public motorized us, with 229 miles open to highway legal vehicles with no seasonal restriction. There is an over-all reduction of approximately 60 miles of road open year-long to highway legal vehicles between alternatives 1 and 2. There is a further reduction of approximately 11 miles in the same classification of miles from alternative 2 and 3. As in alternative 2, no areas would be designated for off-route wheeled motorized vehicle use, except for camping or parking associated with camping within 300 feet of a designated system route.

The majority of roads proposed for closure under alternative 3 are roads that are less than 1 mile long and have been determined to be unnecessary for the management of the forest. Table 13 and table 14 display currently open roads over 1 mile that are either proposed for closure or changed to motorized trail.

Table 13. Alternative 3-Roads currently open over 1 mile long proposed for storage

HUC5 Name (see figure 6)	ID	Name	Reason
Nevada Creek	1163-G1	Chimney Creek	Watershed/Security-Overgrown Road
Upper Little Prickly Pear Creek	1819	Wilburn	Resource Protection
Blackfoot River-Keep Cool Creek	1825-B1	South Fork Ridge	Not Needed to Provide Access
Landers Fork	1832	Snowbank Creek	Resource Protection
Nevada Creek	296-A2	Huckleberry Creek	Resource Protection
Nevada Creek	4047	Shingle Mill	No Public Access
Nevada Creek	4047-A1	Mitchell Creek Conn.	No Public Access
Blackfoot River Headwaters	4084	Surveyor's Gulch	No Public Access
Blackfoot River-Keep Cool Creek	4133	Granite Butte	Resource Protection
Blackfoot River-Keep Cool Creek	601-K2	No Name	Not Needed to Provide Access

Table 14. Alternative 3-Roads currently open over 1 mile long proposed as motorized trails

HUC5 Name (see figure 6)	ID	Name	Miles
Blackfoot River Headwaters	4082	Pay Master	2
Blackfoot River Headwaters	4082-H1	Rogers Pass H1	2
Blackfoot River Headwaters	4086	Mike Horse Mine	2
Blackfoot River Headwaters	4090	Sandbar Creek	1

The following table shows new road and motorized trail construction proposed under alternative 3. Total road length is approximately 0.5 miles; total motorized trail length is approximately 3 miles.

Table 15. Alternative 3-Proposed new road and motorized trail construction, each individual segment less than 1 mile long

HUC5 Name (see figure 6)	ID	Road or Trail
Blackfoot River Headwaters	U-427	Motorized Trail
Blackfoot River Headwaters	U-NEW-005	Road
Upper Little Prickly Pear Creek	U-NEW-1006	Motorized Trail
Blackfoot River Headwaters	U-NEW2	Motorized Trail
Blackfoot River Headwaters	U-NEW3	Motorized Trail
Blackfoot River-Keep Cool Creek	U-NEW4	Motorized Trail
Blackfoot River-Keep Cool Creek	U-NEW-4043	Motorized Trail

Closures

In alternative 3, there would be a decrease of 72 miles of closed or decommissioned roads in alternative 1 when compared to alternative 3 and a decrease of closed miles of 116 from alternative 2 to alternative 3. These changes can be accounted for in a variety of ways:

- Roads classified as unauthorized are determined to be necessary for resource management and are included as part of the forest system,
- Roads are changed from open or a seasonal closure to a different type of closure,
- In many cases the routes would be converted to either the motorized trail or the non-motorized trail system.

There are approximately 76 miles of roads closed from late fall or early winter until June 1 in the analysis area under this alternative. This is a reduction in approximately 57 miles from alternative 1 and a reduction of 23 miles between alternative 2 and alternative 3. Closure of roads could potentially shift additional use to the remaining open roads increasing maintenance needs on those roads. Specific road by road treatment can be found in the project record.

Unauthorized Roads

In alternative 3 more unauthorized routes are proposed for decommissioning, rather than storage, as compared to alternative 2. Roads would be closed if they would potentially be necessary for future resource management, or decommissioned if they are not potentially necessary for future management. It is anticipated that creation of unauthorized new routes would likely occur at a low rate.

Quality Motorized Trail System

There are approximately 46 miles of motorized trail designated for inclusion in the motorized trail system, which is a decrease of 14 miles and 46 miles from alternatives 1 and 2, respectively. Off-highway vehicle users would be given clarification regarding the use of the Helena National Forest transportation system because every currently unauthorized or acquired road would be included in the transportation system and identified for specific use or for closure or storage.

Ensure Access for Future Resource Management

Although there is an increase in the miles of road either being closed or put into storage, or decommissioned, access to the forest for vegetation management remains largely unchanged. The

majority of the roads being proposed for storage or decommissioning are short dead-end segments that were either user created or acquired as part of the land exchange process. The remaining system that is either left open or put in storage would leave in place an adequate system of roads that provides access to the national forest for the management of resources.

CDNST

Roads 1840-A1 and 1840-B1 would be managed primarily for non-motorized use. Seasonal motorized use (closed 9/1-6/30) would be limited to approximately 1 mile of trail and the rest of the trail would be managed for non-motorized use.

Effects on the Granite Butte Proposed RNA

Within the Granite Butte Proposed RNA, the majority of roads 1840-A1 and 1840-B1 would be closed to motorize use and managed as part of the non-motorized trail system.

Cumulative Effects

The cumulative effects for alternative 3 are the same as those described for alternative 1.

Summary of Effects

The effects of alternative 3 from the road management perspective are similar to that of the proposed action. This alternative completes the site specific travel plan requirements identified in the 2001 Tri-State OHV Decision, and would provide for a variety of recreational motorized and non-motorized opportunities throughout the forest. Effects on the ground would be continued maintenance on the existing high use roads as well as capitalizing on additional opportunities to increase road maintenance when presented as part of other projects. Decommissioning would be accomplished as part of a proactive, comprehensive plan. A MVUM would be produced as a result of implementation of this alternative, and would clearly identify roads and trails and their designated motorized uses for forest visitors. Both action alternatives would simplify the motor vehicle use map by reducing the amount of seasonal closures within the planning area. See the alternative 3 map in appendix G for the changes in route designations. All roads that fail to provide for public access due to jurisdiction concerns would be put into storage. The majority of the motorized use on roads 1840-A1 and 1840-B1 long the CNDST would change to non-motorized use; approximately 1 mile would remain open to motorized use.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

All alternatives would be consistent with the Forest Plan, with the possible exceptions of the continued motorized use in all alternatives on the CDNST and motorized use within the proposed Granite Butte RNA; a Forest Plan amendment may be necessary as discussed in chapter 2.

Alternatives 2 and 3 would be consistent with the 2005 Travel Management Rule.

Hydrology

Affected Environment

Analysis Area

As discussed in appendix C and D and in the Transportation System section of this chapter, the project area has been broken down in 5th-code watersheds or hydrologic unit codes (HUCs) to

evaluate effects within the same watershed, and to facilitate understanding on the project components by showing these watershed boundaries. For the hydrologic analysis, we sub-divided the project area even further into smaller 6th code watersheds (figure 6), or HUC 6s, containing roads with potential to be affected in the decision (table 16). This includes primarily subwatersheds within the Blackfoot River subbasin.

The Blackfoot travel planning area includes Nevada, Middle Blackfoot, and Blackfoot Headwaters total maximum daily load (TMDL) planning areas as well as smaller portions of the Little Blackfoot, Dearborn, and Holter TMDL planning areas. Several streams within the Blackfoot travel planning area are listed by the Montana Department of Environmental Quality (DEQ) as having impaired water quality. Most of these streams are not fully meeting beneficial uses due to sedimentation, among other impairments table 17). Additionally, some non-listed stream reaches within the planning area flow directly into listed impaired reaches. The majority of the streams contained within the Blackfoot travel planning area are within the Blackfoot Headwaters TMDL (Montana DEQ 2008), which recommended a 30 percent reduction in sedimentation from forest roads. The Little Blackfoot, Dearborn, and Holter TMDL planning areas do not contain any listed streams within the project area.

Water Quality

Forest roads, by virtue of their existence on the landscape, have a harmful effect on watershed values. The impact of a road is generally continuous whether the road is open or closed to public use, although, over time, unused roads are often partially stabilized by vegetation, thereby decreasing the negative impacts to the watershed. The alternatives identify the open-closed status of system roads as well as which roads would be decommissioned. This decision would potentially result in substantial changes in the impact of roads on streams and riparian areas within planning area watersheds.

The primary water quality concern related to the network of routes in the Blackfoot Travel Planning area is the transport of sediment from forest roads to streams. Other documented impairments in these watersheds include various metals related mainly to past mining activities, low pH, flow alteration, and alteration of riparian vegetation. This analysis focuses on sediment, as this impairment stems in large part, from forest roads in the Blackfoot travel planning area. Furthermore, this water quality issue has the greatest potential to be affected by the travel planning decision as resulting road decommissioning is completed.

Sediment: Roads

Unpaved roads are the predominant source of sediment in most forested drainages, including the 6th-HUC watersheds in the Blackfoot travel planning area. Specifically, unpaved roads (especially native-surface roads) that cross or run parallel to streams generally deliver sediment to streams during rain and snowmelt events because they are hydrologically connected to the stream (e.g., road segments that, during a runoff event, have a continuous surface-flow path between any part of the road prism and a natural stream channel). In contrast, roads without a hydrologic connection to a stream channel may lose eroded sediment from the road surface, but do not deliver sediment to stream channels and are thus generally not a water quality concern. Road and culvert maintenance and gravel surfacing can reduce the number or magnitude of sediment delivery points on a road for a period of years, but a road hydrologically connected to a stream would remain an episodic source of sediment as long as it remains.

Thus, the most important indirect indicators of the potential for road sedimentation in streams are the number of road-stream crossings and the length of road near a stream. Naturally, the number of observed sediment delivery points increases with the length of road near a stream and the number of stream crossings (table 18). The HNF Roads Analysis Process (RAP) evaluated the road network on

the Forest. The parameters used in determining the potential impact of roads on water quality in the RAP are essentially the same as presented in table 18, and are thus not presented in this analysis. For additional information on the RAP in the Blackfoot travel planning area, see the fisheries section or the fisheries report in the project record.

Table 16. 6th-HUC watersheds within the Blackfoot travel planning area and within TMDL planning area containing roads with potential to be affected by the decision

6th HUC ID	6th HUC Name	Area Total (Acres)	Area HNF (Acres)	Percent Basin on HNF	TMDL Planning Area
170102030309	Arrastra Creek	15,084	8,983	60	Blackfoot Headwaters
170102030303	Beaver Creek	11,617	8,856	76	Blackfoot Headwaters
170102030202	Blackfoot River-Anaconda Creek	17,154	16,318	95	Blackfoot Headwaters
170102030206	Blackfoot River-Hardscrabble Creek	12,474	3,362	27	Blackfoot Headwaters
170102030308	Blackfoot River-Lincoln	11,399	5,332	47	Blackfoot Headwaters
170102030310	Blackfoot River-Little Moose Creek	20,036	8,981	45	Blackfoot Headwaters
170102030201	Blackfoot River-Willow Creek	12,409	8,810	71	Blackfoot Headwaters
170102030103	Copper Creek	26,005	20,389	78	Blackfoot Headwaters
170102030205	Hogum Creek	7,630	7,595	100	Blackfoot Headwaters
170102030301	Humbug Creek	15,451	3,421	22	Blackfoot Headwaters
170102030304	Keep Cool Creek	22,834	13,618	60	Blackfoot Headwaters
170102030305	Lincoln Creek	7,552	5,777	77	Blackfoot Headwaters
170102030204	Lower Alice Creek	11,697	7,476	64	Blackfoot Headwaters
170102030104	Lower Landers Fork	15,662	5,452	35	Blackfoot Headwaters
170102030102	Middle Landers Fork	23,776	4,954	21	Blackfoot Headwaters
170102030302	Poorman Creek	25,783	24,947	97	Blackfoot Headwaters
170102030307	Sauerkraut Creek	8,524	4,945	58	Blackfoot Headwaters
170102030203	Upper Alice Creek	12,561	11,588	92	Blackfoot Headwaters
170102030306	Willow Creek	12,098	5,877	49	Blackfoot Headwaters
170102030703	Rock Creek	25,412	4,286	17	Middle Blackfoot
170102030704	Ward Creek	8,094	2,329	29	Middle Blackfoot
170102030405	Buffalo Gulch	9,160	5,027	55	Nevada Creek
170102030404	Jefferson Creek	6,799	2,722	40	Nevada Creek
170102030415	Lower Nevada Creek	31,370	4,817	15	Nevada Creek

6th HUC ID	6th HUC Name	Area Total (Acres)	Area HNF (Acres)	Percent Basin on HNF	TMDL Planning Area
170102030407	Middle Nevada Creek	18,047	4,514	25	Nevada Creek
170102030401	Nevada Creek Headwaters	25,255	18,184	72	Nevada Creek
170102030403	Washington Creek	8,013	5,037	63	Nevada Creek
100301020201	Green Creek	9,901	3,452	35	Dearborn
100301020203	Middle Fork Dearborn River	24,189	1,470	6	Dearborn
100301020401	Upper South Fork Dearborn River	13,116	5,292	40	Dearborn
100301011803	Little Prickley Pear Creek-Marsh Creek	17,152	3,419	20	Holter
100301011807	Lower Canyon Creek	17,506	1,068	6	Holter
100301011805	Upper Canyon Creek	15,169	10,806	71	Holter
100301011804	Virginia Creek	19,407	14,325	74	Holter

Table 17. Streams in the Blackfoot travel planning area (or directly downstream) listed as impaired by sediment by the Montana DEQ

HUC 6 ID	HUC 6 Name (see figure 6)	Stream Name
170102030309	Arrastra Creek	Arrastra Creek
170102030310	Blackfoot River-Little Moose Creek	Blackfoot River
170102030201	Blackfoot River-Willow Creek	Sandbar Creek, Willow Creek
170102030301	Humbug Creek	Blackfoot River, Poorman Creek
170102030302	Poorman Creek	Poorman Creek
170102030206	Blackfoot River-Hardscrabble Creek	Willow Creek
170102030704	Ward Creek	Ward Creek
170102030405	Buffalo Gulch	Buffalo Gulch
170102030404	Jefferson Creek	Jefferson Creek
170102030401	Nevada Creek Headwaters	Nevada Creek
170102030403	Washington Creek	Washington Creek

Approximately thirty percent of the 6th-HUC watersheds covered by the Blackfoot travel planning area contain a stream that is impaired by sediment, including some of the major streams in this area (table 17). In part, as a result of sediment impairment, all of these impaired stream reaches are not fully meeting the aquatic life and cold water fishery designated beneficial uses (MT DEQ, 2004). The Blackfoot Headwaters TMDL recommends a 30 percent reduction in system road sediment delivery reduction, and 100 percent for non-system roads (MT DEQ, 2004).

In addition to sediment delivery from roads, the presence of culverts (particularly those that are undersized) at road-stream crossings present a potential risk of sedimentation in any stream. During a flood event, especially following a wildfire, a culvert can become obstructed or overwhelmed by the magnitude of flow. The consequence of culvert failure is often the erosion and entrainment of road fill around the culvert. There has not been a comprehensive survey and analysis of culverts in the Blackfoot travel planning area, but many are old and likely undersized.

We provided a summary of available data (table 18) for System roads and unauthorized roads (table 19) including total road miles by 6th field HUC (HUC 6) drainage, road miles within 150 foot buffer of streams, number of stream crossings and surveyed road sediment points.

Table 18. Road information for portions of 6th-HUC subwatersheds within the Blackfoot travel planning area

HUC 6	HUC 6 Watershed Name	Roads (miles)	Roads within 150' buffer of stream (miles)	Stream Crossings (#)	Sediment delivery points (#)*
170102030309	Arrastra Creek	38.4	2.5	17	17
170102030303	Beaver Creek	39.3	4.3	27	24
170102030202	Blackfoot River-Anaconda Creek	80.0	17.2	57	49
170102030206	Blackfoot River-Hardscrabble Creek	15.4	0.1	0	0**
170102030308	Blackfoot River-Lincoln	24.4	2.2	8	5
170102030310	Blackfoot River-Little Moose Creek	54.3	4.9	30	8
170102030201	Blackfoot River-Willow Creek	44.5	5.4	21	7
170102030405	Buffalo Gulch	47.2	1.9	9	20
170102030103	Copper Creek	83.3	7.7	46	52
170102030205	Hogum Creek	46.8	3.6	21	14
170102030301	Humbug Creek	4.5	2.8	12	0†
170102030404	Jefferson Creek	33.5	2.6	11	32
170102030304	Keep Cool Creek	81.6	7.4	31	30
170102030305	Lincoln Creek	27.1	3.5	15	13
100301011803	Little Prickley Pear Creek-Marsh Creek	14.8	2.4	3	8
170102030204	Lower Alice Creek	54.8	5.4	24	6
100301011807	Lower Canyon Creek	1.9	0.2	1	0†
170102030104	Lower Landers Fork	18.8	0.0	0	0**
170102030415	Lower Nevada Creek	40.3	2.2	15	12
100301011903	Lyong Creek	4.4	0.0	0	0**
100301020203	Middle Fork Dearborn River	3.7	0.2	3	0**
170102030407	Middle Nevada Creek	42.1	4.5	12	11
170102030401	Nevada Creek Headwaters	31.9	2.7	10	8
170102030302	Poorman Creek	120.3	19.6	69	62
170102030703	Rock Creek	17.2	0.1	1	2
170102030307	Sauerkraut Creek	37.6	3.0	12	17
170102030203	Upper Alice Creek	15.8	1.7	11	11

HUC 6	HUC 6 Watershed Name	Roads (miles)	Roads within 150' buffer of stream (miles)	Stream Crossings (#)	Sediment delivery points (#)*
100301011805	Upper Canyon Creek	23.5	4.7	13	0†
100301020401	Upper South Fork Dearborn River	2.5	2.1	7	0†
100301011804	Virginia Creek	85.7	9.8	35	37
170102030704	Ward Creek	4.2	0.0	0	0**
170102030403	Washington Creek	17.7	1.2	5	0†
170102030306	Willow Creek	39.9	3.3	15	35
100301011905	Wolf Creek	1.4	0	0	0**

* Surveyed by HNF hydrology personnel during the 2009 and 2010 field season

** There is low potential in these watersheds for road sediment to get to streams.

† Roads in watershed not surveyed recently

Table 19. Non-System road information for 6th-HUC subwatersheds within the Blackfoot travel planning area

HUC 6	HUC 6 Watershed Name	Non-System roads (miles)	Non-System roads within 150 feet of streams (miles)	Stream Crossings (#)
170102030309	Arrastra Creek	1.0	0.5	1
170102030303	Beaver Creek	1.0	0.2	0
170102030202	Blackfoot River-Anaconda Creek	0.5	5.4	0
170102030308	Blackfoot River-Lincoln	0.0	0.0	0
170102030310	Blackfoot River-Little Moose Creek	17.9	0.0	10
170102030405	Buffalo Gulch	8.9	4.2	2
170102030404	Jefferson Creek	2.0	1.4	4
170102030304	Keep Cool Creek	1.4	0.7	1
170102030305	Lincoln Creek	0.2	0.0	0
100301011803	Little Prickley Pear Creek-Marsh Creek	0.1	0.0	0
170102030415	Lower Nevada Creek	1.4	0.4	2
170102030407	Middle Nevada Creek	23.1	8.9	13
170102030302	Poorman Creek	10.0	5.1	20
170102030703	Rock Creek	3.1	0.0	0
170102030307	Sauerkraut Creek	0.4	0.1	1
100301011804	Virginia Creek	0.1	0.0	0
170102030306	Willow Creek	5.0	0.4	0

Sediment: Non-Road Sources

Stream bank erosion occurs in undisturbed drainages as a part of natural channel geomorphic processes, but can be accelerated by management activities, most commonly cattle trampling on grazing allotments. Recommended load reductions in the Nevada Creek TMDL planning area range from 23-34 percent of current sediment loading. Along other streams within the Blackfoot travel

planning area, accelerated stream bank erosion due to past mining activities and cattle grazing is likely occurring.

Other sources of sediment in project area streams include natural watershed erosion, erosion from timber harvest activities on private and federal land, and abandoned mining lands (see cumulative effects list in appendix D). Aside from natural erosion, these sources likely contribute less sediment than erosion from roads, based on estimates made in the Blackfoot Headwaters TMDL and other TMDL reports (Montana DEQ 2004).

Non-Sediment Impairments

A dominant impairment of stream water quality in the study area is elevated metals from past mining activities. For example, following the failure of Mike Horse Tailings Dam on Beartrap Creek in 1975, flow from the reservoir delivered elevated metal loads to the Blackfoot River for approximately 3 weeks. Many of the 6th-field HUCs in the Blackfoot travel planning area are not fully meeting designated beneficial uses as a result of metal impairments.

Water Yield

Water yield in most, if not all, of the drainages in the Blackfoot travel planning area has likely increased as a result of widespread tree mortality from insect infestation, in concert with other activities that have removed trees from the watersheds (e.g., green-tree timber harvest) over the past few decades. Baseline conditions are defined to be the expected water yield given a natural extent of forest cover throughout a watershed. In practice, the concept of a static baseline water yield is of limited value, as forest cover in undisturbed watersheds is generally in a state of flux based on several factors, including fire and insect-induced mortality.

Riparian Conditions

The condition of riparian areas within the Blackfoot travel planning area varies widely. Within grazing allotments in the project area, we evaluated riparian areas using the Proper Functioning Condition protocol (Prichard 1998) during the summer of 2009 and 2010. This methodology qualitatively evaluates riparian area vegetation, channel, and floodplain characteristics to arrive at an estimate of how well the riparian area functions in dissipating flow energy and maintaining floodplain stability during larger flood events. Most of the surveyed riparian areas were not functioning properly or were functioning, but at risk based on these standards. The information gathered in 2009 and 2010 may not be representative of riparian areas throughout the Blackfoot travel planning area as these surveys were not completed for streams outside of grazing allotments. In the past, however, streams outside of grazing allotments and past mining areas have generally been rated as properly functioning.

Recreational activities (camping and campfires, off-highway vehicle use, etc.) also may impact non-riparian wetlands. Detrimental effects in these areas are avoided during project implementation and forest management activities by using appropriate best management practices.

Environmental Consequences

Methodology

Scale of analysis – The scale of analysis for direct and indirect effects is at the individual stream and 6th-HUC watershed scale. The scale of analysis for cumulative effects as described in appendix D is at the 5th-HUC but is also discussed at the smaller 6th-HUC in this section.

GIS data – The accuracy of HNF GIS datasets is described in GIS metadata files in the public record and in Chapter 1 of the EIS. Updated GIS data on stream-road crossings and miles of road within 150 feet of a stream were used in place of RAP data as indicators of problematic roads. Roads within the 150-foot buffer and number of stream crossings were selected as indicators because a road must be hydraulically connected to a stream in order for sediment-laden runoff to flow from the road to the stream. Roads with stream crossings or roads parallel and adjacent to streams are likely to have sediment delivery points. This observation is based on extensive professional experience with road-sediment-source surveys on the Forest. Furthermore, it follows that roads far from a stream are unlikely to be hydrologically connected (Ellis 2008). This surrogate for field data was used in the analysis because field data for all of the routes in the planning area were incomplete. The distance of 150 feet was chosen as the threshold for negative road-stream interaction because this distance generally affords a buffer of sufficient width to minimize sediment delivery from roadsides (Ellis 2008). The width of an adequate sediment buffer is dependent on slope, vegetation, and other site-specific characteristics. In some instances, a 150-foot buffer may not be sufficient to stop concentrated flow of sediment-laden water from a roadside. However, based on experience, a 150-foot buffer is generally more than adequate in the Blackfoot travel planning area watersheds.

Road sediment data – Road sediment surveys were completed by experienced HNF hydrologic technicians and field-validated by the forest hydrologist. Data collected in the road sediment survey were of a degree of precision and accuracy that exceeded the sensitivity of the sediment modeling software.

Road sediment modeling – Road sediment modeling (using WEPP:Road software) was completed by a HNF hydrologist. The accuracy of the model's predictions is dependent on numerous factors, including the limitations of the model in describing physical conditions of the road and soil, and limitations of PRISM-modified local climate data. The WEPP model output used in this analysis is annual average sediment delivery from the road buffer (tons/acre). This average is based on 30 years of simulated weather events. Actual annual sediment delivery from a road segment would vary greatly from year to year, depending on such factors as antecedent moisture, snow cover, storm intensity, and storm duration. For additional detail on the WEPP:Road model, see Elliot et al. (1999).

Assumptions

- This decision includes designation of all routes in the planning area as open, closed, seasonally restricted, stored or decommissioned. For the purpose of this analysis, physical closure method was assumed to be at the 3S level for storage and at the 4 level for decommissioning, as defined in table 4.
- The act of closing a road to all but administrative use without action to stabilize the road (e.g., culvert removal, soil decompaction, seeding) may not result in watershed improvement. It is possible for further compromised watershed conditions because maintenance may be reduced and plugged culverts could fail.
- The act of closing a road to all motorized use, removing culverts, decompacting soil and seeding would result in watershed improvement.
- Any road segment that is currently a source of sediment and is designated for decommissioning would (over the long term) no longer be a source of sediment following decommissioning. However, over the short term, there would be a temporary increase in sediment
- Any route designated as 01-STO: closed to motorized use yearlong would be closed to motorized use, but not fully decommissioned.

- Wheeled, motorized use would be restricted to designated System routes following implementation of either alternative 2 or 3. If other unauthorized routes are discovered that are not currently captured in this analysis (and shown on maps in appendix G and included in summary tables in appendix C), they would be considered non-System routes and would not be open for motorized use. For purposes of this analysis, these non-System routes would be available for future decommissioning.
- Analysis for and decisions on future projects (e.g., Stonewall Salvage) may determine method of closure (e.g., decommissioning) for closed roads within the Blackfoot travel planning area.
- Road maintenance (blading, culvert-clearing) and improvements (surfacing, culvert replacement) may result in temporary increases in sediment delivery to streams, but would result in a long-term (3-5+ year) reduction in sediment delivery from project area roads.
- Proposed activities under alternative 2 and 3 (to include proposed road storage, decommissioning, new road and trail construction) were evaluated for effects to hydrologic resources; emphasis was placed on those actions occurring within 150 feet of streams
- In streams without previously identified water-quality impairment, this analysis will assume that beneficial uses are being fully met, and would continue to be met if the proposed travel plan results in no net increase in sediment delivery from roads.
- The decision is unlikely to result in measurable changes in water yield in any watershed given the relatively small area proposed for restoration and for new routes.
- Best management practices and project design features would be implemented to minimize impacts to hydrologic resources and are considered part of the alternatives; these are described in chapter 2 and appendix H.
- Also, see “Alternative Development” section” in chapter 2 for assumptions common to all resources.

Information Used

Helena National Forest GIS data – Datasets used in this analysis include National Hydrologic Dataset (NHD) streams and 6th-HUC watersheds, roads, and planned road designations. Analysis for this section also used number of road-stream crossings and length of roadway within 150 feet of streams.

Road sediment-source survey – Roads in some watersheds within the Blackfoot travel planning area were evaluated in 2009-12 to determine points where sediment from roads could be transported to streams. Information collected in this survey includes location of sediment transport as well as parameters required to predict sediment delivery using the WEPP:Road model (Elliot et al., 1999).

Roads Analysis Process (RAP) Report – An analysis of the HNF road network was completed in 2004. The analysis designated road risk ratings based on road mileage within riparian habitat conservation areas (RHCA), wet areas, erosive and slide-prone soils, TMDL watersheds, and the number of road-stream crossings (USDA, 2004). The RAP assessment of watershed road risks was compared to up-to-date GIS data on stream crossings and roads within 150 feet of streams, and the two were found to be consistent. Thus, the latter datasets were used. For discussion of the RAP data, see the fisheries section of this EIS.

Over 80 percent of the Blackfoot travel planning area has been surveyed for potential road sediment sources and this information has been used to develop the action alternatives and provide information used in this analysis.

Spatial and Temporal Context for Effects Analysis

The analysis area for the hydrology resource consisted of all 6th-HUC drainages containing roads with potential to be affected in the decision (see table 16). This includes primarily subwatersheds within the Blackfoot River subbasin. The Blackfoot travel planning area includes Nevada, Middle Blackfoot, and Blackfoot Headwaters TMDL planning areas as well as smaller portions of the Little Blackfoot, Dearborn, and Holter TMDL planning areas.

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

The list of past, present and foreseeable actions considered for the watershed cumulative effects analysis is found in appendix D.

Effects Common to All Alternatives

Road maintenance and improvements unrelated to this decision, but carried out as part of routine operations or as part of future projects, would generally reduce sediment delivery from system routes to streams for a period of years following the work.

Effects Common to All Action Alternatives

Either action alternative would designate HNF system routes; roads or trails not designated system routes would, by default, be considered unauthorized routes, and would be available for future decommissioning. The no-action alternative does not designate unauthorized routes as available for decommissioning. Thus, implementation of alternatives 2 or 3 likely would result in improved water quality and riparian conditions within the Blackfoot travel planning area. This conclusion is based on the assumption that unauthorized routes that impact water quality or riparian conditions would be decommissioned as watershed improvement projects in the first few years following the decision.

Water yield would not be meaningfully affected by a decision under any alternative of the Blackfoot Travel Plan, as the area of trees gained would be insignificant with respect to basin water yield at the 6th-HUC scale. Decommissioning several hydraulically connected roads in a watershed might alter the flow regime marginally, as these high-efficiency vectors of runoff (roads) are removed from the landscape, although this too would be difficult to quantify.

Most road-stream crossings have potential for sediment delivery to the streams and sections of road within close proximity to streams also have potential to contribute sediment.

Alternative 1 – No Action

Direct and Indirect Effects

Under alternative 1, no new management actions are proposed. If no new actions are undertaken, no new management-related water resource impacts would occur. Past and ongoing management activities, such as road use, OHV use, mining, and livestock grazing would continue to affect water resources. No new additions to watershed-scale effects would be predicted, because alternative 1 proposed no new management activities.

An irretrievable commitment of the no-action alternative would be continued sediment delivery to streams from the existing road network, and continued impact to riparian areas traversed by roads. There are no irreversible commitments from this alternative.

Cumulative Effects

In addition to the impacts of sediment delivery from roads and road impacts on riparian area and stream form and function, several past and present federal and non-federal activities have affected and continue to affect water quality, water yield, and riparian health and vigor in the cumulative effects analysis area. Past timber harvest has likely caused temporary increases in water yield and sediment delivery in the past, though these effects generally attenuate over time. In the past, mining has contributed metals and sediment to stream channels in the watersheds. In some cases, ongoing mining activity continues to be a chronic source of sediment to streams and riparian degradation. Old mine workings can also pose chronic or episodic water quality problems to forest streams, as in the Beartrap Creek (upper Blackfoot) Mike Horse Dam failure of 1975. In addition, past pulses of elevated sediment (e.g., from timber harvest or mining) can remain stored in stream channels (banks, bed, floodplain) for many years following deposition. Continued grazing in riparian areas and cattle trailing along streams within grazing allotments would likely continue to contribute elevated sediment levels to streams in watersheds containing grazing allotments. In the absence of other reductions to sediment delivery in the watershed, streams in most of the watersheds within the Blackfoot travel planning area would continue to receive elevated levels of sediment.

In Blackfoot travel planning area watersheds, water yield most likely has been and would continue to be affected by large-scale tree mortality. Large-scale loss of live trees reduces the volume of water removed from a watershed by transpiration. Increases in water yield could result in higher peak flows than would otherwise occur—higher flows have the potential to increase stream bank and bed scour.

Extensive tree mortality would also affect stream temperature in streams that cross the affected stands. However, understory vegetation, generally unaffected by insect mortality, would continue to provide shade. In addition, understory and riparian vegetation exposed to increased levels of sunlight (due to loss of overstory canopy) can expand and provide additional shade (Gravelle & Link, 2007).

As discussed in appendix D, reasonably foreseeable federal and non-federal activities that could affect water quality and yield and riparian health and vigor in the cumulative effects analysis area include future timber harvest, small-scale mining or failure of old mines, continued livestock impacts, roads, and fire. Foreseeable timber harvest activities in the analysis area (e.g., Dalton Mountain Forest Restoration and Fuels Reduction Project, Stonewall Vegetation Management Project) are not likely to substantially affect water quality or riparian area viability, assuming compliance with the streamside management zone (SMZ) Law, INFISH standards, and strict adherence to forestry best management practices (BMPs) (USDA Forest Service 2012; Montana DNRC 2010; USDA Forest Service 1995). If the no-action alternative is chosen, it is expected that impacts of roads on water quality would continue at the current levels since no roads would be removed from the road system. Other than road decommissioning, activities that would serve to reduce sediment delivery to streams in project watersheds under the no-action alternative would likely be implemented periodically in the future within the cumulative effects analysis area. Such activities include road maintenance, watershed improvement projects, culvert upgrades, and effectively implemented allotment management plan (AMP) revisions, among others.

Forest Plan Consistency

Implementing alternative 1 would not move the project area toward desired conditions for hydrologic resources, as defined in the Forest Plan; some water bodies in the planning area are not currently meeting state water quality standards (i.e., several streams are on the Montana 303(d) list of WQLS). Under this alternative, the Forest would not move toward meeting this Forest Plan standard because no measures targeted at improving water quality of Blackfoot travel planning area streams would be implemented (see appendix A).

Summary of Effects

Currently, full attainment of all beneficial uses in streams is not being met in several of the 6th-HUC watersheds within the Blackfoot travel planning area. In some of these impaired streams, beneficial uses are compromised due, at least in part, to land-use activities outside of HNF management. Under the no-action alternative, full attainment of all beneficial uses would still not be met in these watersheds. Although effects of forest roads and other management practices in place before April 1993 are exempt from this standard (MCA 75-5-317), in some cases, existing activities (e.g., forest roads) on the HNF managed portions of these watersheds might not meet the state requirement that "all reasonable land, soil and water conservation practices have been applied" (ARM 17.30.602) to minimize pollution. Exemption notwithstanding, many of these roads could be considered to "cause excessive water pollution" (HNF Forest Plan, II/25) and should thus be "corrected where feasible" (ibid.), or stand in violation of the Forest Plan. Finally, planning for road decommissioning in the Blackfoot travel planning area generally cannot move forward in the absence of a travel plan decision. With these matters considered, of the three alternatives, alternative 1 offers the fewest opportunities to reduce the impact of the HNF road network on water quality and riparian conditions.

Alternatives 2 and 3

Project Design Features

Project design features specific to hydrology are listed in chapter 2, page 28, and best management practices are included in appendix G. These design features and best management practices apply to alternatives 2 and 3.

Direct and Indirect Effects

Both action alternatives include the decommissioning of many existing routes. If other unauthorized routes are discovered that are not currently captured in this analysis (shown on maps in appendix G and included in summary tables in appendix C), they would be considered non-System routes and would not be open for motorized use. For purposes of this analysis, these non-System routes would be available for future decommissioning. This would result in benefits to water quality and riparian values throughout the Blackfoot travel planning area through the elimination of several miles of road segments that are connected to stream channels.

In addition, roads proposed for storage would be closed to motorized use, but not fully decommissioned. These roads would be self-maintaining in non-use status for up to 20 years by recontouring access points, improving drainage, and removing culverts. Alternatives 2 and 3 have a greater number of miles of roads in these categories that are within 150 feet of a stream channel than does alternative 1 (table 20). Similarly, roads in these categories under the action alternatives have a higher number of stream crossings than do those under the no-action alternative (table 21). Road decommissioning constitutes a direct effect on water quality. Benefit to watershed values would be realized as a result of this decision to physically close these routes.

The main difference between the two action alternatives is that alternative 3 would designate approximately 31 more miles of road within 150 feet of a stream for decommissioning than would alternative 2 (table 19). Likewise, alternative 3 would restore 104 more stream crossings than alternative 2 on routes available for decommissioning (table 21). In addition, a higher percentage of the surveyed and modeled road sediment sources would be addressed in alternative 3 than alternative 2 resulting in a greater overall decrease in predicted sediment delivery to project area streams (table 20). These differences demonstrate that alternative 3 has the greatest potential to benefit watershed values. Furthermore, table 20 shows estimated annual reduction in sediment from each watershed due

to road decommissioning. This data set is incomplete, as not all roads that would be decommissioned were surveyed or modeled. This information provides a generalized view of the potential this project has for sediment reduction.

Table 20. Current averages of sediment delivery and predicted reduction by alternative from each watershed following road decommissioning

Drainage	Average Sediment Delivery (tons/year)			Reduction in Sediment Delivery (tons/year)		Reduction in Sediment Delivery (percent)	
	Existing	Alt. 2	Alt. 3	Alt. 2	Alt. 3	Alt. 2	Alt. 3
Arrastra	2.9	2.9	2.9	0.03	0.03	1%	1%
Beaver	8.3	8.2	7.4	0.04	0.88	0%	11%
Blackfoot Anaconda	30.6	23.1	1.4	7.52	29.20	25%	95%
Blackfoot Lincoln	0.4	0.4	0.4	0.00	0.00	0%	0%
Blackfoot Willow	2.4	1.4	0.0	1.00	2.40	42%	100%
Buffalo Gulch	0.7	0.7	0.7	0.04	0.04	5%	5%
Copper	55.2	54.6	54.6	0.57	0.57	1%	1%
Hogum	20.1	20.1	20.1	0.00	0.00	0%	0%
Humbug	0.2	0.0	0.0	0.21	0.21	100%	100%
Jefferson	17.2	17.2	17.1	0.00	0.06	0%	0%
Middle Nevada	6.8	5.3	5.2	1.46	1.57	21%	23%
Keep Cool	3.8	3.8	3.8	0.00	0.00	0%	0%
Lincoln Gulch	3.6	3.6	3.6	0.00	0.00	0%	0%
Little Prickly Pear (Marsh)	0.1	0.0	0.0	0.05	0.06	98%	100%
Lower Alice	1.1	1.1	0.9	0.00	0.19	0%	17%
Lower Nevada	2.5	2.5	2.5	0.00	0.00	0%	0%
Nevada Headwaters	0.1	0.0	0.0	0.03	0.03	56%	56%
Poorman	13.1	11.9	11.9	1.21	1.21	9%	9%
Rock Creek	0.2	0.2	0.2	0.00	0.00	0%	0%
Sauerkraut	11.4	11.4	11.4	0.00	0.00	0%	0%
Upper Alice	0.4	0.2	0.2	0.16	0.17	43%	45%
Virginia	93.6	93.0	93.0	0.68	0.68	1%	1%
Willow	10.9	10.5	10.2	0.34	0.63	3%	6%
Totals:	**285.6**	**272.1**	**247.5**	**13.3**	**37.9**	**5%**	**13%**

An irretrievable commitment of the action alternatives would be continued sediment delivery to streams from the existing road network, and continued impact to riparian areas traversed by roads that remain open as a result of implementing either of these alternatives. Another irretrievable commitment to either action alternative may be the potential for greater difficulty in the future to decommission roads known to be water quality problems that are designated as open to wheeled traffic for at least part of the year by this decision. Future closing and decommissioning of any road would not be precluded by an “open” classification in this travel plan under either action alternative;

however, additional analysis may be necessary. There are no irreversible commitments from this alternative.

Table 21. Miles of road within 150 feet of a stream channel that would be decommissioned by alternative and 6th-HUC watershed

HUC 6 Code	HUC 6 Name (see figure 6)	Alternative 1	Alternative 2	Alternative 3
170102030309	Arrastra Creek	0	0	0.1
170102030303	Beaver Creek	0	0	0.2
170102030202	Blackfoot River-Anaconda Creek	0	0	4.6
170102030308	Blackfoot River-Lincoln	0	0	1.9
170102030310	Blackfoot River-Little Moose Creek	0	0	0.8
170102030201	Blackfoot River-Willow Creek	0	0	2.2
170102030103	Copper Creek	0	0	0.1
170102030205	Hogum Creek	0	0	0.5
170102030301	Humbug Creek	0	2.7	2.7
170102030404	Jefferson Creek	0	0	0.2
170102030304	Keep Cool Creek	0	0	1.7
170102030305	Lincoln Creek	0	0	1.1
100301011803	Little Prickley Pear Creek-Marsh Creek	0	0	0.1
170102030204	Lower Alice Creek	0	0	4.4
100301011807	Lower Canyon Creek	0	0	0.2
170102030415	Lower Nevada Creek	0	0	1.0
170102030407	Middle Nevada Creek	0	0	0.6
170102030302	Poorman Creek	0	0	3.4
170102030307	Sauerkraut Creek	0	0.2	0.2
170102030203	Upper Alice Creek	0	0.3	0.3
100301011805	Upper Canyon Creek	0	0	4.2
100301020401	Upper South Fork Dearborn River	0	0	0.7
100301011804	Virginia Creek	0	0	1.4
170102030306	Willow Creek	0	0	0.2
100301011905	Wolf Creek	0	0	1.4
	Total	**0**	**3.2**	**34.4**

Cumulative Effects

As discussed above under alternative 1 cumulative effects section, the main effect this travel plan influences is the decrease in water quality due to sediment flowing from roads. Implementing either alternative 2 or 3 in combination with the implementation of past, present or reasonably foreseeable future actions (appendix D) would reduce the cumulative watershed effects of road sediment delivery through decommissioning of forest roads, specifically those decommissioned that cross or closely parallel stream networks. The impacts of roads on water quality, as outlined in the “Affected Environment” section of this analysis, would be altered as a direct result of either of the action alternatives. Furthermore, through this decision, both action alternatives would allow the decommissioning of unauthorized routes which would also decrease the amount of sediment reaching streams.

Table 22. Number of stream crossings to be decommissioned and restored under each alternative, by 6th-HUC watershed.

HUC 6	HUC 6 Name (see figure 6)	Alternative 1	Alternative 2	Alternative 3
170102030309	Arrastra Creek	0	0	1
170102030303	Beaver Creek	0	0	1
170102030202	Blackfoot River-Anaconda Creek	0	0	16
170102030308	Blackfoot River-Lincoln	0	0	5
170102030310	Blackfoot River-Little Moose Creek	0	0	4
170102030201	Blackfoot River-Willow Creek	0	0	7
170102030103	Copper Creek	0	0	2
170102030205	Hogum Creek	0	0	2
170102030301	Humbug Creek	0	12	12
170102030404	Jefferson Creek	0	0	1
170102030304	Keep Cool Creek	0	0	7
170102030305	Lincoln Creek	0	0	2
170102030204	Lower Alice Creek	0	0	19
100301011807	Lower Canyon Creek	0	0	1
170102030415	Lower Nevada Creek	0	0	2
170102030407	Middle Nevada Creek	0	0	2
170102030302	Poorman Creek	0	0	12
170102030307	Sauerkraut Creek	0	2	2
170102030203	Upper Alice Creek	0	3	3
100301011805	Upper Canyon Creek	0	0	7
100301020401	Upper South Fork Dearborn River	0	0	3
100301011804	Virginia Creek	0	0	8
100301011804	Willow Creek	0	0	2
	Totals	**0**	**17**	**121**

Forest Plan Consistency

The action alternatives are consistent with Forest Plan direction. Some water bodies in the Blackfoot travel planning area are not currently meeting state water quality standards (i.e., several streams are on the Montana 303(d) list of WQLS). Under both action alternatives, the Forest would move toward meeting this Forest Plan standard because measures targeted at improving water quality of Blackfoot travel planning area streams would be implemented (See appendix A).

For more details on compliance with the Forest Plan, see Appendix A and for more details on compliance with other regulations and policy, see the hydrology report (McNamara 2012) in the project record.

Summary of Effects

Alternatives 2 and 3 propose specific road closure, storage and decommissioning measures. Both action alternatives would alleviate current water quality problems in the Blackfoot travel planning area and would provide for future system road decommissioning with implementation of the decision. In addition, both action alternatives would include decommissioning of unauthorized roads, several of

which are water-resource concerns. In contrast to the no-action alternative, the action alternatives represent substantial watershed improvements, and are consistent with the Forest Plan direction on the maintenance of acceptable water quality in Forest streams. Furthermore, the implementation of this plan would move the Forest toward meeting the Blackfoot Headwaters and the Nevada Creek TMDL sediment reduction goals.

Table 23. Summary table comparing alternatives

	Alternative 1	Alternative 2	Alternative 3
Stream Crossings on closed or partially closed roads	0	17	121
Road miles to be closed within 150 feet of streams	0	3.2	34.4
Modeled sediment delivery reduction for closed or partially closed roads (tons/year)	0	13	38

Aquatic Species and Habitat

Affected Environment

This section presents existing conditions and trends for aquatic resources within the Blackfoot travel planning area. Information is organized under subsections: ***fish populations*** and ***western pearlshell mussel***, and ***fish habitat***. The first discusses the status and distribution of fish populations inhabiting the Blackfoot travel planning area; this includes discussions about non-native and native fish populations. The second subsection provides an overview of fish habitat including land-use activities that influence trends in stream habitat conditions.

Fish Populations

Salmonid fishes are the predominant species present on lands administered by the Helena Forest within the project analysis area. Table 24 displays fish species present in various 6th hydrologic unit codes (HUCs). Fish presence and distribution for individual streams is available on fishery maps in Helena Forest Fishery Files, Blackfoot Section 7 Bull Trout Watershed Baseline (USDA 2000a), and in updates based on various past Helena National Forest project-specific consultation documents with the U.S. Fish and Wildlife Service).

Numerous fish species, both native and non-native species, are present within the analysis area. Native fish include westslope cutthroat trout (WCT), bull trout, mountain whitefish, suckers, and several sculpin species (*Cottus*). Bull trout are limited to drainages west of the Continental Divide on the Helena National Forest. Bull Trout are listed as a “Threatened Species” under the Endangered Species Act and westslope cutthroat trout are considered a sensitive species by the northern region of the U.S. Forest Service and a management indicator species in the Helena National Forest Plan (USDA Forest Service 1986). Additionally, there are a number of westslope cutthroat trout populations in the analysis area that have been identified as conservation populations by the Montana Department of Fish Wildlife and Parks.

Non-native brook trout, rainbow trout, and brown trout, are present in many streams throughout the Blackfoot travel planning area, sometimes in conjunction with native species. Of the non-native salmonids, brook trout are much more prevalent than either rainbow or brown trout in streams on lands administered by the Helena National Forest. Except for sculpin, suckers are present in streams on the Helena National Forest, but not commonly found.

Table 24. Salmonid species present and Sediment Rating in the various 6th field HUCs throughout the project area**

HUC 6 ID	HUC 6 Name (see figure 6)	Sediment habitat Indicator Rating**	Salmonid Species Known to be Present
170102030309	Arrastra Creek	Functioning at risk- 34% in the North Fork Arrastra, and 30% on middle Arrastra	Westslope cutthroat trout, brown trout, brook trout, bull trout
170102030303	Beaver Creek	Functioning at Risk- 27% fines in Beaver Creek 31% Stonewall, 34% Klondike Cr, Theodore -32%	Westslope cutthroat trout, brown trout, brook trout, whitefish, bull trout
170102030202	Blackfoot River-Anaconda Creek	Functioning at Unacceptable Risk	Westslope cutthroat trout, brook trout
170102030206	Blackfoot River-Hardscrabble Creek	Functioning at Risk	Brook trout
170102030308	Blackfoot River-Lincoln	Functioning at Unacceptable Risk	Brook trout
170102030310	Blackfoot River-Little Moose Creek	Functioning at Risk- 44% Moose Creek, 54% Little Blackfoot 34% in the Blackfoot River	Westslope cutthroat trout, brown trout, brook trout, whitefish, bull trout
170102030201	Blackfoot River-Willow Creek	Functioning at Unacceptable Risk. Willow 31% Sanbar 35%	Westslope cutthroat trout, brown trout, brook trout,
170102030103	Copper Creek	Functioning at Risk. Sediment averaging between 24% and 35% between 1986 and 2005	Westslope cutthroat trout, bull trout
170102030205	Hogum Creek	Functioning at Risk. Sediment averages varying between 24 and 39% from 1986 to 2005. Hogum Cr- 31% to 35% averages between 1988 and 2005	Westslope cutthroat trout, brown trout, brook trout, bull trout, whitefish
170102030301	Hamburg Creek	Functioning at Risk- 28% fines	Westslope cutthroat trout
170102030304	Keep Cool Creek	Functioning at Unacceptable Risk- Keep Cool 47%, Liverpool 43%, Park Creek 45%,	Westslope cutthroat trout, brook trout
170102030305	Lincoln Creek	Functioning at Unacceptable Risk	Brook trout
170102030204	Lower Alice Creek	Functioning at Unacceptable Risk. Alice 31%, Barlot 43%, Toms Gulch 30%	Westslope cutthroat trout, brown trout, brook trout, whitefish
170102030104	Lower Landers Fork	Functioning at Risk. 37% Seven Up Pete, 29% Landers (Lower)	Westslope cutthroat trout, brown trout, brook trout, whitefish, bull trout
170102030102	Middle Landers Fork	Functioning at Risk	Westslope cutthroat trout, brown trout, brook trout, bull trout whitefish
170102030302	Poorman Creek	Functioning at Risk. Sediment averages varying between 24 and 39% from 1986 to 2005.	Westslope cutthroat trout, brown trout, brook trout, bull trout, whitefish
170102030307	Sauerkraut Creek	Functioning Appropriately- fine sediment average of 19%	Westslope cutthroat trout, brook trout, bull trout
170102030203	Upper Alice Creek	Functioning at Unacceptable Risk	Westslope cutthroat trout,

HUC 6 ID	HUC 6 Name (see figure 6)	Sediment habitat Indicator Rating**	Salmonid Species Known to be Present
			brook trout
170102030306	Willow Creek	Functioning at Unacceptable Risk—35% in the East Fk of Willow and 37% in the West Fk of Willow Cr	Westslope cutthroat trout, brook trout
170102030703	Rock Creek	Functioning at Unacceptable Risk	Westslope cutthroat trout, brook trout
170102030704	Ward Creek	Functioning at unacceptable risk	Brook trout
170102030405	Buffalo Gulch	Functioning at unacceptable risk. Clear Creek-44%, Buffalo 26%, Sheldon Cr- 43%	Westslope cutthroat trout, brown trout, brook trout, rainbow trout
170102030404	Jefferson Creek	Functioning at unacceptable risk. 29% Madison Cr, and 47% in Jefferson Creek	Westslope cutthroat trout,, brook trout,
170102030415	Lower Nevada Creek	Functioning at unacceptable risk. Wasson Creek at 36%	Bull trout, WCT, brown trout, brook trout, whitefish
170102030407	Middle Nevada Creek	Functioning at unacceptable risk. Deer Cr 30%, Chicken Creek 32%, Wilson Creek 28%, and Chimney Creek 47%	Westslope cutthroat trout, brown trout, brook trout, whitefish
170102030401	Nevada Creek Headwaters	Functioning at unacceptable risk. Clear Creek-44%, Buffalo 26%, Sheldon Cr- 43%	Westslope cutthroat trout, brown trout, brook trout, rainbow trout
170102030403	Washington Creek	Functioning at unacceptable risk lower reaches of Washington with 34%	Westslope cutthroat trout, brook trout
100301020201	Green Creek	Functioning at Risk based on visual estimates	Rainbow and brook trout
100301020203	Middle Fork Dearborn River	Functioning at Risk based on visual estimates	Rainbow and brook trout
100301020401	Upper South Fork Dearborn River	Functioning at Risk based on visual estimates	Rainbow and brook trout
100301011803	Little Prickle Pear Creek-Marsh Creek	High sediment measured at over 40% in Marsh Creek Functioning at Unacceptable Risk. Little Prickly Pear Cr -34%	Extensively hybridized westslope cutthroat trout, brook trout, brown trout, rainbow trout
100301011807	Lower Canyon Creek	Functioning at Unacceptable Risk. Canyon Creek- 42%	Westslope cutthroat trout, brook trout, rainbow trout, brown trout
100301011805	Upper Canyon Creek	Functioning at Unacceptable Risk. Trout 42%, Rooster Bill 26%	Westslope cutthroat trout, brook trout, rainbow trout
100301011804	Virginia Creek	Functioning at Unacceptable Risk. Trout 42%, Rooster Bill 26%	Westslope cutthroat trout, brook trout, rainbow trout

****(FA= Functioning appropriately, FAR= Functioning at Risk, and FUR= Functioning at Unacceptable Risk). I**ncludes percent fine sediment less than ¼-inch in spawning gravels. Sediment ratings are described in FWS Matrix of Diagnostic Indicators and Pathways (USDI 1998). Ratings assigned to 6th code HUCs were derived from field observations and sometimes quantitatively measured levels of sediment in stream substrates. The ratings in the table below for streams in the Columbia River Basin are from the watershed baselines (USDA 2000a and USDA 2000b). Note: not all species are present in every stream within a specific 6th code.

Native species under the category of "threatened, endangered, or sensitive" (TES) species status include WCT and bull trout. In addition, an invertebrate species, western pearlshell mussel has also been added to the U.S. Forest Service Northern Region list of aquatic sensitive species. Further discussion about sensitive WCT and listed bull trout including the western pearlshell mussel follows under separate sections addressing each species.

Westslope Cutthroat Trout (Oncorhynchus clarki lewisi) – Forest Service Sensitive

Status Overview

Westslope cutthroat trout (WCT) is Montana's state fish and one of several distinct interior subspecies of cutthroat trout (Behnke 1992, pp. 2-5). Currently westslope cutthroat trout are referred to as a *Species of Concern* by the State of Montana, a *Special Status Species* by the Bureau of Land Management (BLM), and a *Sensitive Species* by the Northern Region of the Forest Service. On the Helena National Forest, westslope cutthroat trout have been identified as the fish "management indicator species." Factors associated with declines in WCT that lead up to these special categories include introductions of non-native fish, habitat loss or degradation, and over-exploitation (Hanzel 1959, Liknes and Graham 1988, Behnke 1992, McIntyre and Rieman 1995).

In May 1997, the Fish and Wildlife Service was petitioned to list westslope cutthroat trout as "threatened" under the Endangered Species Act. In 2000, several environmental groups brought suit to compel the FWS to issue its final determination to the species' listing. After the FWS determined listing WCT was "not warranted" at that time, plaintiffs later filed suit claiming the FWS failed to reconcile its recognition of hybridization as a threat to WCT viability. Subsequently, the FWS initiated a new comprehensive status review for WCT in 2002 and determined, based on best scientific information available, that introgressed WCT with less than 20 percent of their genes derived from another taxon would still conform morphologically to the taxonomic description of WCT. After considering evidence supporting its morphology-based approach to classifying WCT populations (including wide WCT distribution, habitat available on public lands, and state and federal conservation efforts underway), the District Court for the District of Columbia in its Memorandum Opinion concluded in March, 2007 in favor of the Reconsidered Listing Determination from the Fish and Wildlife Service that westslope cutthroat trout is not warranted for listing at this time.

The WCT status assessment by Shepard et al. (2003) estimates that of the 39 percent of historical habitat WCT currently occupy in Montana, the decline of the WCT subspecies is most pronounced east of the Continental Divide. East of the Divide, genetically pure WCT populations occupy less than 5 percent of their historical habitat (Shepard et al. 2003, pp. 87-90), and most of those populations have been restricted to headwater streams primarily above barriers. Consistent with this figure for WCT east of the Divide, WCT in the Upper Missouri sub-basin side of the Continental Divide travel area account for only 5.5 percent of the fish bearing habitat. These isolated resident WCT populations (isolates) are considered extremely important to the conservation and restoration of WCT in Montana.

Management and conservation actions undertaken on behalf of WCT in Montana include: more restrictive fishing regulations; accelerated WCT surveys and inventories; non-lethal genetic testing protocols; development of captive brood stocks for stocking/recovery programs; education programs; and stepped-up compliance with water and habitat protection laws, policies and guidelines; non-native species removals; and habitat improvement. These efforts culminated in a formalized Montana *MOU and Conservation Agreement for WCT* (MDFWP 1999) co-signed by nine government agencies and conservation groups including the U.S. Forest Service and Bureau of Land Management. That initial MOU/conservation agreement was a five-year agreement, which expired in 2005, and has been superseded by the 2007 MOU/Conservation Agreement (MDFWP 2007) to expedite conservation

measures for WCT *and* Yellowstone cutthroat trout throughout their respective historical ranges in Montana.

One outcome of the latest WCT status review and MOU/Conservation Agreement is the designation of three categories of cutthroat trout populations:

- ***Core populations*** – Cutthroat populations having no evidence of hybridization (i.e. genetically pure) that can serve as donors for restoration efforts.
- ***Conservation populations*** – *Populations* that include all the "core" populations as described above *plus* those that have unique ecological and behavioral traits of the subspecies. Introgressed conservation populations will typically be less than 10 percent introgressed.
- ***Sportfish populations*** – Wild or hatchery-sustained cutthroat populations that are managed especially for the benefit of recreational fisheries. Some wild sportfish populations may have conservation value.

All *conservation* populations of WCT merit additional management emphasis on preserving them (Shepard et al. 2003 p. 8). Conservation coordination focuses on *species* management with the Montana Fish Wildlife and Parks (FWP) as the lead agency, and *habitat* management on NFS/BLM lands with land management agencies taking lead responsibility. Regional/sub-basin scale conservation plans developed by FWP in cooperation with land management agencies will identify management needs of WCT conservation populations required to accomplish the conservation and restoration objectives outlined in the 2007 WCT MOU/Conservation Agreement across each 4th field HUC or sub-basin.

Distribution

On the Helena National Forest, WCT are found in the Blackfoot River, Little Blackfoot River portion of the Upper Clark Fork River, Upper Missouri River, Dearborn River, Smith River, and Boulder River 4th field HUCs. Distribution of westslope cutthroat trout within these 4th code hydrologic units extends into a number of streams on the Helena National Forest with many more streams supporting WCT west of the Continental Divide than east of the Divide. Although the Dearborn River supports WCT in its headwaters on the Lewis and Clark Forest, there are no known WCT on Helena Forest streams within the Dearborn 4th field HUC. The WCT distribution information is detailed on 4th field hydrologic unit maps available through the Helena Forest Supervisors Office Fishery Files and the Montana Department of Fish, Wildlife, and Parks. Many of the streams on the Helena Forest that support WCT, are small with many young-of-the-year and yearling WCT found in streams less than 18 inches in width.

Habitat Relations

Waters inhabited by WCT generally are cold and nutrient poor. Growth varies widely, but is probably strongly influenced by habitat productivity. Generally growth is higher for migrant forms that spend some period of time in larger rivers (fluvial) or lakes (adfluvial). Although WCT can be found throughout large river basins spawning and early rearing generally occurs in headwater streams. Spawning habitat has been characterized as gravel substrates ranging in size from 2mm to 75mm, mean water depths ranging from 17cm to 20cm, and mean velocities of 0.3 to 0.4 m/sec.

Substrate composition is believed to strongly influence survival. Highly embedded substrates may be particularly harmful to juveniles that typically over-winter between spaces in stream cobbles and rubble. Evidence for the negative influence of fine sediment is widespread and, in general, increased sediment in substrates must be viewed as an increased risk for any WCT population.

Westslope cutthroat trout micro-habitats are associated with velocities ranging 0.1 to 0.3 m/s. WCT less than 100mm in length are generally found in pools and runs while larger cutthroat trout are found in pools. Generally stream reaches with numerous pools support the highest densities of fish. Habitats that provide some form of cover also seem to be preferred. In winter, small fish tend to use areas where cover is provided by the interstitial spaces in the stream substrates. Larger fish congregate in pools during the winter.

The aquatic species and habitat report (Rief 2012) in the project record provides more detailed information on this species, including general life history characteristics and biotic interactions.

Bull Trout (Salvelinus confluentus) - Threatened

Status Overview

On July 10, 1998, bull trout were listed as a “Threatened Species” within the Columbia River Basin by the United States Fish and Wildlife Service (USFWS). Section 7(a) (2) of the Endangered Species Act (ESA) of 1973, as amended, requires all federal agencies to review actions authorized, funded, or carried out by them to ensure such actions do not jeopardize the continued existence of listed species.

The distribution of bull trout is limited to drainages west of the Continental Divide on the Helena National Forest with the strongest populations present in the Blackfoot River drainage. Table 24 above shows the 6th field HUCs with the streams known to support bull trout.

Under INFISH (USDA 1995) priority drainages for bull trout were established. On the Helena National Forest, priority drainages include Copper Creek/Landers Fork in the Blackfoot drainage. Besides priority drainages, a secondary tier of bull trout “Special Emphasis Watersheds” were established as a means of identifying a refugia network of streams that would assist in the protection and recovery of bull trout as specified under *Additional Agency Commitments* in the 1998 Biological Opinion for continued Land and Resource Management Plans (USDI 1998 p. 24). On the Helena National Forest “special emphasis watersheds” include Arrastra Creek, Beaver Creek, Moose Creek, Willow Creek, Poorman Creek, Hogum Creek, Alice Creek, and upper Nevada Creek in the Blackfoot drainage.

In the 2010 Final Rule on Bull Trout Critical Habitat, the USFWS classified the Blackfoot River, and its tributaries, Poorman Creek, and Copper Creek as bull trout critical habitat.

A Draft Bull Trout Recovery Plan, completed in 2005, has not yet been finalized, as well as, the U.S. Forest Service’s Draft Bull Trout Conservation Strategy. Under the Draft Bull Trout Recovery Plan, bull trout within various drainages are organized by “core populations” with local populations included within those core populations. The following section discusses the core and local populations pertinent to the Blackfoot travel planning area. Much of the information on the core populations below is based on local biologists’ knowledge and familiarity with local conditions.

Bull trout in the Blackfoot River are included as a core population in the Draft Bull Trout Recovery Plan (2005). There are several local populations identified within the Blackfoot Core Bull Trout Population; including the North Fork of the Blackfoot River, Monture Creek, Landers Fork/Copper Creek, Cottonwood Creek, Belmont Creek, and Gold Creeks. A biological assessment that discusses effects to bull trout and critical habitat will be prepared and filed with the Aquatic Habitat and Species Report (Rief 2012) in the project file.

Distribution

Based on redd counts and limited electro-fishing efforts, it is likely there are somewhere between 400 to 500 adult bull trout between the 6 local populations. Additional adult bull trout are in numerous other streams throughout the core population area, and in some of the designated INFISH Priority Watersheds and Special Emphasis Watersheds, as well as, in undesignated streams. The overall number of bull trout adults included in all streams throughout the Blackfoot drainage is probably less than 800 when combined with the adults in the local populations. Recent redd surveys suggest that four of the five Local Populations are declining somewhat while the Copper/Landers population is improving (USDA Forest Service 2000).

General Habitat Requirements for Bull Trout

Bull trout may suffer from some competition with brown trout and predation in the main stem Blackfoot River although there is no field documentation of this hypothesis. Both species occupy some of the same habitat and eat some of the same foods and both species are highly piscivorous. Consequently, the hypothesis seems reasonable. With temperatures rising in the main stem Blackfoot River, based on information collected by FWP over the last 10 years (Pierce et al. 2008, pp. 32 and 33), brown trout may be gaining some competitive edge over bull trout.

Interactions of bull trout with brook trout occur mostly in tributary streams rather than the main stem Blackfoot River. Brook trout are present in some of the local bull trout populations and many of the other streams in the Blackfoot River drainage so there is some additional threat of decreased bull trout production due to hybridization.

The Aquatic Habitat and Species Report (Rief 2012) in the project record provides more detailed information on this species, including more detail about habitat requirements.

Western Pearlshell Mussel (*Margaritifera falcata*) – Forest Service Sensitive

Status Overview

The Western pearlshell mussel has been listed as a Tier I invertebrate species of greatest conservation need during completion of the 2005 Montana Comprehensive Fish and Wildlife Conservation Strategy. Subsequently, the Montana Natural Heritage Program launched a comprehensive survey plan in 2007 to determine the distribution and population viability of all three mussel species native to Montana, including the western pearlshell mussel. A report documenting populations of these freshwater mussels was completed in 2010 by Stagliano (2010). Information in this segment is based primarily on findings from Stagliano (2010) including information online from the Montana Natural Heritage Program site and the 2005 Comprehensive Fish and Wildlife Conservation Strategy.

The western pearlshell mussel was added to Montana's Species of Concern (S2) list in 2008 due to declining and/or very limited numbers, range, and/or habitat, making it vulnerable to extirpation in Montana. Mussel beds previously reported in larger rivers (Blackfoot, Big Hole, and Clark Fork River) are extirpated or at such low densities that long-term viability is questionable. Surrounding states listed it as state-threatened or unranked, and declining in Wyoming, Idaho, and Oregon (NatureServe 2005, online at http://www.natureserve.org/explorer).

Distribution

The Montana Natural Heritage database contains no records for this species in the project area, although they have been found in the Blackfoot River downstream of the project area. Habitats

suitable for mussels are present in the project area where Westslope cutthroat trout are present .Based on this information; we believe pearlshell mussels may exist in the analysis area.

Western pearlshell mussels are one of five freshwater mussels of the family *Margaritiferidae* in North America. Their range is reported in Pacific drainages from California to southern Alaska. In Montana, the western pearlshell is the only freshwater mussel found in cold water trout streams west of the Continental Divide and east of the Divide in headwater streams of the Missouri River basin (MFWP 2005).

For areas in and around the Helena National Forest, the latest surveys by Stagliano (2010) found six of western pearlshell mussel occurrences in the Blackfoot drainage; four in the Smith River; three in the Boulder River; and one each in Deep Creek and Dry Creek of the Big Belts range.

The Aquatic Species and Habitat Report (Rief 2012) in the project record provides more detailed information on this species, including more detail about habitat requirements and distribution.

Habitat Relations

Threats to western pearlshell mussel populations include extensive damming, diversions, hydroelectric, and other water supply projects that have substantially reduced the range of this species. Agricultural runoff (eutrophication), unstable substrate, and siltation have also been cited as major problems to the species (Western Pearlshell – MT Field Guide, online at http://fieldguide.mt.gov/detail_IMBIV27020.aspx). This species has been added to the Sensitive Species list by USFS Northern Region (R1) due to the ongoing disruptions of western pearlshell habitats and the most recent delineation of the species viability in Montana (Stagliano 2010).

Fisheries Habitats

Existing fisheries habitat conditions throughout areas west of the Continental Divide and within the analysis area have been described in the following document: The Watershed Baseline Condition for the Blackfoot River Section 7 Watershed (USDA 2000). As discussed in the Information Used portion of this document, the baseline and updates to the baseline are assumed to depict the effects of past and ongoing activities. The habitat element related to fisheries assumed to be most at risk to be affected (via the travel planning decision) is the sediment habitat indicator. It is commonly accepted among fishery professionals that elevated sediment levels in stream substrates can have negative effects to salmonid fishes. Consequently stream sediment is used as an overall means to estimate effects to fisheries for this project. The rating for sediment in each 6th code HUC is depicted in table 24 above. Other aspects of existing fish habitat conditions throughout drainages east of the Continental Divide and within the project analysis area are available in the fishery files with Helena National Forest fishery personnel. In general, many of the streams have been substantially impacted by a variety of human related activities, and habitats are substantially less than what would be considered optimum for salmonids. As shown in table 24, sediment levels are judged to be functioning at risk or unacceptable risk for all the streams east of the Continental Divide in the project area.

Trout habitat is essentially the product of interactions among underlying geologies, soils, topography, vegetation, climate, and hydrology, unique to the area's watersheds (Meehan 1991, p.5; Swanston 1991, p. 139). These drainage characteristics and processes remain fairly constant setting up conditions for optimum production of aquatic life forms (Meehan 1991, p.5). When natural disturbance reshapes stream channels, the actual effects on aquatic organisms are often short-lived. In their natural context, accessory processes like fire, flood flows, insect infestations, disease, wind throw, and animal activities (e.g. beaver) operate on the stream system to produce improved habitat quality and productivity in the long term (Swanston 1991, pp. 139-142).

Human land-use activities can disrupt the delicate balance of these interactions producing persistent changes in habitat that can reduce natural fish production and population viability (Meehan 1991, pp. 1-6; Waters 1995, pp. 1, 17). The Blackfoot travel planning area traditionally has been managed for non-fishery resources. These include timber harvest, mining, livestock grazing, forest transportation and recreation. Other human activities that affected fish habitat included beaver removal, irrigation withdrawals, development activities on private inholdings, and utility corridors.

Cumulatively, these activities impair natural stream functions to varying degrees in the analysis area by accelerating erosion and sedimentation, altering surface flows, reducing vegetation cover, and destabilizing or degrading stream channels. In general, any ground disturbing activity has potential to increase erosion and exacerbate excess sediment delivery within a watershed, in turn lowering the natural fish production capabilities (carrying capacity) of streams (Hicks et al. 1991). Hence, excessive sediment delivery that persists beyond natural background levels becomes the common denominator of various land-use activities affecting fish habitat (Meehan 1991).

Forest roads have been tagged as producing the majority of excess sediment amongst forest activities and management practices (Anderson 1971, Anderson et al. 1976, Cederholm et al. 1981, Furniss et al. 1991, Waters 1995) followed by past mining disturbance and streambank destabilization/degradation in active grazing allotments. The degree which road construction/maintenance has on altering sediment production in a watershed varies substantially and is not possible to quantify accurately. In general, the magnitude and risk for sediment delivery from roads, including other land use activities, is a function of the amount of surface disturbance (acres disturbed) and proximity to streams within a given sub-watershed. The specific effects on trout and trout habitat from excessive erosion and sedimentation are discussed in more detail under the Environmental Consequences section.

The road-fisheries relationship extends beyond the risk of chronic excess sedimentation. A second risk element is road proximity to streams. When roads are constructed adjacent to a stream they constrain the channel resulting in a stream limited in its ability to access its historic floodplain and often result in the removal of riparian vegetation to accommodate the road right-of-way. Such roads change the physical attributes of trout habitat by reducing pools, meanders, undercut banks, streamside vegetation/shading, large woody debris recruitment, and result in higher energy gradients all rendering the stream less productive for fisheries.

Stream crossings represent a third road risk factor to fish habitat and fish populations. Roads that cross streams most frequently rely on culverts that often disrupt upstream fish migration. This limits a fish population’s access to habitat types needed to fulfill their life stage requirements for spawning, rearing, feeding, over-wintering, security and escapement. Additionally, stream crossings, particularly culverts, can result in chronic sedimentation impacts during typical water years and catastrophic effects when floods trigger crossing failure (USDA –FS 1998, p. 2). Ford crossings, especially unimproved fords, directly alter the bed and banks of fish habitat and act as chronic sources of sediment. Ford crossings located in or near spawning and nursery areas are particularly risky to sensitive incubating salmonid embryos and fry due to direct vehicular disturbance to the streambed and banks, and traffic generally causes the streambanks to widen as the banks break down and wash away (Clarkin et al. 2006. p. 5-1).

Environmental Consequences

Methodology

This report follows procedures outlined in Report FS-683, *Roads Analysis: Informing Decisions about the National Forest Transportation System* (USDA Forest Service, 1999) customized to local situations. The effects section takes the broad-scale forest wide roads analysis down to the finer sub-watershed scale (6th field hydrologic unit code) specific to the Blackfoot travel planning area.

Forest roads can contribute to increased soil erosion, increased sediment delivery and peak flows that could impact water quality and aquatic habitat, especially if road densities in a watershed are high. These effects would vary depending on the location of a road on the landscape (sloped or flat ground), their proximity to streams or drainages, and timing of precipitation events.

To address the proposed road and trail changes on sediment and changes in road stream relationship that may affect fisheries and other aquatic species habitat, indicators were used as follows:

Measurement Indicators:

- Road sediment reduction estimates resulting from road storage or decommissioning in tons per year
- Miles of road or trail reclaimed in the 150-foot buffer along streams (riparian habitat conservation areas)
- Number of road stream crossings and relationship to fish bearing streams
- Miles of high/moderate risk roads and relationship to fish bearing watersheds
- Consistency of alternatives with Forest Plan guidance for threatened, endangered and sensitive fish and aquatic species

This GIS-based analysis systematically examined the transportation system aimed at the measures for evaluating potential effects on fish habitat. Determining miles of high risk road required buffering the stream coverage by a 150-foot distance and clipping out only those road segments within the buffer assuming this approach gives a reasonable approximation of the length of roads within 150 feet of a waterbody. The distance of 150 feet was chosen as the threshold for negative road-stream interaction because this distance generally affords a buffer of sufficient width to minimize sediment delivery from roadsides (Ellis, 2008). Stream-road intersection points were produced by intersecting the road and stream layers and placing the intersection nodes into a point-coverage.

Streams delineated on topographic maps may, however, under-represent actual streams; conversely crenulated contour coverage may over-represent streams depending on the rules applied and individual crenulator (USDA Forest Service, 1999, pp. 140 and 180). The accuracy of the indicators in this analysis is probably moderate at best. Past travel plan analyses found that comparing GIS based *stream-route intersections* with actual on-the-ground measurements amongst four arterial routes within the North Belts Travel Plan area indicated the GIS coverage over-represent this indicator on average about 30 percent. Conversely, field checking *stream-road intersections* for the Cabin Gulch Vegetation Treatment project found that GIS-based *stream-road intersections* were under-represented up to 45 percent of the actual number of intersections in East Cabin Gulch, yet GIS coverage over-represented this indicator 21 percent in the North Fork Deep Creek. Therefore, this analysis more appropriately gives a reasonable measure of relative differences between the alternatives.

Assumptions

Although forest management activities may differ widely, they impact streams principally in the following ways:

- Increased sedimentation, from a variety of activities, into trout spawning and rearing habitat; including a substantial contribution due to location and use of existing roads
- Alterations of channel morphology that increase slope and energy, reduce pool habitat, reduce cover, destabilize banks, and disconnect floodplains from active channels.
- Loss of habitat connectivity that limits fish migration over their life cycles (includes culverts associated with roads)

By far, roads produce the most sediment generated amongst forest activities, particularly if located near streams (Anderson 1971, Anderson et al. 1976, Cederholm et al. 1981, Furniss et al. 1991), and they often create conditions for mass soil failures and landslides (Waters 1995). Alterations in channel morphology also can result wherever roads are built parallel to streams and at flow restrictions such as culverts that commonly end up being fish migration barriers (Furniss et al. 1991). Ford crossings also present their own risks since they provide a direct linkage of the road to surface water where vehicles directly drive through the channel. In such cases traffic generally causes the stream to widen and can direct kill fish larvae or fry it located in or close to sensitive spawning and rearing areas.

This analysis draws upon the following assumptions:

- The primary effect to salmonid fish and habitat is associated with sediment delivery from high risk roads and the presence of stream-route intersections.
- Sediment delivery and deposition in stream channels is an important source of mortality to trout. Other variables (dissolved oxygen, food, cover, and angler harvest) are outside the scope of this analysis.
- Critical channel reaches (core sampling reaches) within a watershed can be used to estimate sediment effects on the entire stream.
- The act of closing a road to all but administrative use without action to stabilize the road (e.g., culvert removal, soil de-compaction, seeding) may not result in watershed improvement. It is possible for further compromised watershed conditions because maintenance may be reduced and plugged culverts could fail.
- The act of closing a road to all motorized use, removing culverts, de-compacting soil and seeding would result in watershed improvement.
- This decision includes designation of all routes in the Blackfoot travel planning area as open, closed, seasonally restricted, stored or decommissioned. For the purpose of this analysis, physical closure method was assumed to be at the 3S level for storage and at the 4 level for decommissioning, as defined in table 4. These categories could be refined in the future based on additional field analysis by experienced hydrologic technicians.
- Any road segment that is currently a source of sediment and is designated for decommissioning would no longer be a source of sediment over the long term following decommissioning. However, over the short term, there would be a temporary increase in sediment.
- Wheeled, motorized use would be restricted to designated System routes following implementation of either alternative 2 or 3. If other unauthorized routes are discovered that are not currently captured in this analysis (and shown on maps in appendix G and included in summary tables in appendix C), they would be considered non-System routes and would not be open for motorized use. For purposes of this analysis, these non-System routes would be available for future decommissioning.

- Road maintenance (blading, culvert-clearing) and improvements (surfacing, culvert replacement) may result in temporary increases in sediment delivery to streams, but would result in a long-term (3-5+ year) reduction in sediment delivery from project area roads.
- The decision is unlikely to result in measurable changes in water yield in any watershed given the relatively small area proposed for restoration and for new routes
- Approximately 30 miles of new trail construction would be for non-motorized use only and would be a narrow trail, designed only for non-motorized use. Some of these routes fall on state and private land.

For the watershed baselines cited in the "Information Used" section of this report, the habitat indicators are assumed to be adequate to describe existing habitat conditions for bull trout, westslope cutthroat trout, other salmonid species, as well as other fish species. These are baseline conditions for streams west of the Continental Divide. The conditions detailed in those baselines are present as a function of all past and ongoing activities, including the ongoing existing winter travel activities in this project analysis area.

Information Used

Information on the status of fish habitat and populations in the Blackfoot travel planning area was drawn from a variety of sources including: sediment and riparian monitoring data, fish habitat condition surveys, fish species and distribution surveys, road sediment inventories, the Forest Roads Analysis (USDA 2004), watershed and fisheries risk assessments of roads to fish in the Roads Analysis (USDA 2004), culvert inventories/ assessments, previous biological assessments and evaluations, and previous biological opinions.

Substantial portions of the resource information were collected by U.S. Forest Service fisheries personnel over the past 15-20 years. Additionally, there is a substantial pool of information (especially in the Blackfoot River drainage) that has been collected by a variety of state and federal agencies and private individuals. Pertinent information on fish species composition, distribution and abundance, and habitat condition, from various agencies such as FWP, as well as, the Montana Department of Environmental Quality is used when available.

For streams in the Blackfoot River drainage, a "baseline" for areas within the proposed project area is included in the Watershed Baseline for the Blackfoot River Bull Trout Section 7 Watershed (USDA 2000). There have been updates to those various watershed documents that were submitted to the USFWS as various federal projects were proposed and those updates are also used.

Relevant to measures used to evaluate effects of roads on fisheries resources, GIS road and stream coverage helped to estimate the number of *stream-road intersections* and *high risk roads* (those inside 150-foot of streams as related to INFISH buffers). Field data from road sediment inventories and culvert inventories/assessments were completed in 2012 by experienced Helena National Forest hydrologic technicians and field-validated by the forest hydrologist. Data collected in the road sediment survey were of a degree of precision and accuracy that exceeded the sensitivity of the sediment modeling software.

Spatial and Temporal Context for Effects Analysis

The analysis area includes numerous 6th code hydrologic units (HUCs) in the headwaters of the Blackfoot River portions of the following drainages in the Upper Missouri River 4th code hydrologic unit: the Middle and South Fork of the Dearborn, Canyon Creek, and Little Prickly Pear Creek (table 24).

As part of the Interior Columbia Basin Ecosystem Management Project analysis, the Blackfoot River watershed was divided into 6th- field sub-watersheds or HUC's. These HUC's have been characterized in terms of natural processes, land use activities as well as, fisheries and habitat conditions as part of the Watershed Baseline Condition for the Blackfoot River Section 7 Watershed (USDA 2000).

The Dearborn and the Upper Missouri River drainages have also been partitioned into 6th-field Hydrologic Units (HU's) by the Natural Resource Conservation Service (NRCS). There are portions of two HU's in the Dearborn; one in the Middle Fork, and one in the South Fork. These include: North and South Forks of Little Prickly Pear Creek, Marsh and North Marsh Creek drainages, Virginia Creek drainage, and the Canyon Creek drainage.

All alternatives include drainages where the proposed project has potential to affect bull trout critical habitat and bull trout local populations identified in the Draft Bull Trout Recovery Plan. Additionally, all alternatives include habitats supporting conservation populations of westslope cutthroat trout. Discussion of westslope cutthroat trout conservation populations will be addressed further in this analysis in relation to the updated Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana signed by various agencies and private groups (MDFW&P 2007).

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Past, present and foreseeable actions are described in appendix D. Several past and present Federal and other ownership activities have affected, and would continue to affect, water quality, water yield, and riparian health and vigor in the cumulative effects analysis area for the foreseeable future. Federal and private roads and culverts constructed at road/stream crossings in the project area have affected streams and riparian areas. There are several sediment delivery points on existing roads as described previously, and culverts represent a permanent grade control in the stream channels where they reside. These existing roads also have several road/stream crossings. Past management activities in the project area that affect baseline water quality, riparian, and aquatic habitat to varying degrees include road construction and maintenance, wildfire and prescribed fire, timber harvest, grazing, mining, and dispersed recreation. Forest and county road systems can adversely affect streams by increasing sediment loads, changing runoff rates, and altering stream channel morphology. Incorrectly installed or undersized culverts may be fish passage barriers that prevent upstream fish passage, which limits the amount of available, suitable fish habitat. Undersized culverts can affect the stream's ability to convey water and sediment, and represent an increased risk of failure and subsequent erosion and deposition of sediment into stream channels. Culverts directly interact with channels and can affect channel morphology and channel migration patterns, and local hydraulics that may influence the stream channel.

Timber harvest has occurred throughout the proposed project area that may modify the way water is transported, change hillslope processes, and potentially increase upland sediment yields. Timber harvest may also increase the rate and timing of snowmelt runoff by compacting soil, removing vegetation, and leaving forest openings that increase snow retention. These changes can modify fluvial processes and change channel morphology.

Continued grazing in riparian areas and cattle trailing along streams within grazing allotments would likely continue to contribute elevated sediment levels to streams in the watershed; although, adaptive management provisions in allotment management plans should be implemented where necessary to reduce livestock impacts. In the absence of other reductions to sediment delivery in the watershed, streams in several of the watersheds where treatment is planned would continue to receive sediment from anthropogenic sources.

In the past, mining has contributed sediment to stream channels in the watersheds. Additionally, abandoned mines can pose chronic or episodic water quality problems to forest streams.

Effects Common to All Action Alternatives

Either action alternatives (alternatives 2 and 3) would designate Helena National Forest system routes; roads or trails not designated system routes would, by default, be considered unauthorized routes, and would be available for future decommissioning. Both action alternatives include the decommissioning of certain System routes. This would result in benefits to water quality and riparian values throughout the Blackfoot travel planning area through the elimination of several miles of road segments that are connected to stream channels. Additionally the Helena National Forest would continue with routine road and trail maintenance on system roads and trails. Although Road and trail maintenance may generate small amounts of sediment in the short term, the long term benefit is improved surface drainage. Thus, implementation of alternatives 2 or 3 likely would result in improved water quality and riparian conditions within the Blackfoot travel planning area.

Under alternative 2 – proposed action and alternative 3, wheeled motorized vehicle travel for camping would be allowed (and parking associated with camping) within 300 feet of designated system routes, including roads and trails (unless signed otherwise) as long as: no new permanent routes are created by this activity, no damage to existing vegetation, soil, or water resource occurs, travel off-route does not cross streams, and travel off-route does not traverse riparian or wet areas.

Approximately 30 miles of new trail construction would be for non-motorized use only and would therefore be a narrow trail, designed only for non-motorized use. Some of these routes fall on state and private land. While most of the proposed mountain bike trail system (89 miles) would be on existing roads and trails under both of these alternatives, there are many areas where short segments of new trail construction would be required to connect areas. Trails would be planned and constructed to avoid sensitive areas, using all INFISH and BMP guidelines to minimize impacts to habitat.

Alternative 1 – No Action

Direct Effects and Indirect Effects

Under alternative 1, no new management actions are proposed and current conditions would continue. For more information on sediment modeling see the Hydrology Section starting on page 62.

Measurement Indicators:

- Road sediment reduction estimates resulting from road storage or decommissioning in tons per year
    - There would not be any roads put into storage or decommissioned under this alternative, therefore, there would not be any corresponding reductions in sediment generated from roads. As shown in the hydrology section of this chapter, project area roads are contributing approximately 285.6 tons of sediment per year. Fisheries in-stream habitats would remain at risk of sediment altering spawning habitat and pool depths.
- Miles of road or trail reclaimed in the 150-foot buffer along streams (riparian habitat conservation areas)
    - There would not be any road or trail reclaimed in the 150-foot buffer along streams. Roads located within the 150-foot buffer would remain hydrologically connected to

streams, contributing sediment, altering riparian habitat, and floodplain connectivity and function.

- Number of road stream crossings and relationship to fish bearing streams
    - No roads stream crossings would be removed. Undersized culverts that are at risk of failure from flooding would continue to be sources of erosion. Culverts that currently block fish passage would continue to limit salmonid migrations for spawning feeding and rearing.
- Miles of high/moderate risk roads and relationship to fish bearing watersheds
    - High/moderate risk roads in fish bearing watersheds would remain in the landscape. These roads are located on high/moderate erosive soils that contribute sediment to streams, have high number of culverts that reduce stream capacity, are located in RHCAs and impair riparian habitat and reduce floodplain connectivity and function.
- Consistency of alternatives with Forest Plan guidance for threatened, endangered and sensitive fish and aquatic species
    - The no-action alternative is not consistent with the Forest Plan for TES fish and aquatic species. The current road system condition and its location have negative impacts to fisheries and aquatic species due to culverts that block fish passage and are at risk or failure, and sedimentation from roads within 150 foot of streams that reduce riparian and floodplain connectivity and function.

Cumulative Effects

Appendix D provides a summary of past, present and future action relevant to this analysis. Implementing alternative 1 in combination with these other actions such as road use, OHV use, mining, and livestock grazing would continue to affect water resources and riparian areas. Reasonably foreseeable federal and non-federal activities that could affect water quality and yield and riparian health and vigor in the cumulative effects analysis area include future timber harvest, small-scale mining or failure of old mines, continued livestock impacts, roads, and fire. Foreseeable timber harvest activities in the analysis area (e.g., Dalton Mountain Forest Restoration and Fuels Reduction Project, Stonewall Vegetation Project, and the Helmville Face Fuels Reduction Project) are not likely to substantially affect water quality or riparian area viability, assuming compliance with the Streamside Management Zone (SMZ) Law, INFISH standards, and strict adherence to forestry Best Management Practices (BMPs) (USDA Forest Service 2012; Montana DNRC 2010; USDA Forest Service 1995). If the no-action alternative is chosen, it is expected that impacts of roads on water quality would continue at the current levels since no roads would be removed from the road system.

Alternative 2 – Proposed Action

Project Design Features

Project design features specific to aquatic species and habitat are listed in chapter 2 starting on page 28, and apply to alternatives 2 and 3.

Direct and Indirect Effects

Table 25 summarizes alternative 2 effects to the measurement indicators for water quality and fisheries. For more information on the sediment modeling information presented in table 25 see the Hydrology Section starting on page 62.

Table 25. Summary of actions under alternative 2, by 6th-HUC watershed

Drainage	Reduction in Sediment Delivery (tons/year)	Miles of road within 150-feet of a stream channel that are available to be decommissioned	Number of stream crossings to be decommissioned and restored
Arrastra	0.03	0	0
Beaver	0.04	0	0
Blackfoot Anaconda	7.52	0	0
Blackfoot Lincoln	0.00	0	0
Blackfoot Willow	1.00	0	0
Buffalo Gulch	0.04	0	0
Copper	0.57	0	0
Hogum	0.00	0	0
Hamburg	0.21	2.7	12
Jefferson	0.00	0	0
Middle Nevada	1.46	0	0
Keep Cool	0.00	0	0
Lincoln Gulch	0.00	0	0
Little Prickly Pear (Marsh)	0.05	0	0
Lower Alice	0.00	0	0
Lower Nevada	0.00	0	0
Nevada Headwaters	0.03	0	0
Poorman	1.21	0	0
Rock Creek	0.00	0	0
Sauerkraut	0.00	0.2	2
Upper Alice	0.16	0.30	0
Virginia	0.68	0	0
Willow	0.34	0	0
Totals	**13.3**	**3.2**	**17**

Measurement Indicators:

- Road sediment reduction estimates resulting from road storage or decommissioning in tons per year

The total reduction in average annual sediment transport from roads to streams for alternative 2 was modeled to be roughly 13.3 tons per year less than the existing condition. Trout use redds (nests dug by fish in streambed gravels) in flowing waters for their reproductive strategy. When excessive sediment accrues to spawning and rearing sites, trout embryo and fry success decline below natural rates. Additionally, other trout life history elements such as juvenile survival, growth, and adult survival also can be at risk if excess sediment reduces cobble spaces in riffle areas and pool volumes. Everest et al.1987, pg 133 concluded that salmonid species can cope with the natural variability in sediments, but their populations can be reduced substantially by persistent sedimentation that exceeds the natural levels under which they evolved. Average fine sediments in trout spawning habitat within streams in the Blackfoot travel planning area may show short-term increases in fines at depth. In the long term, stream channels would show measurable decreases in the levels of fines as project area roads would deliver roughly 13.3 tons less sediment per year. The long-term benefits from decreased annual sediment loads would outweigh the short term increases in sediment from ground disturbance

as culverts are removed and stream channels reconfigured. For the road segments to be decommissioned, the reduction in sediment delivery would be permanent.

- Miles of road or trail reclaimed in the 150-foot buffer along streams (riparian habitat conservation areas)

When roads are constructed adjacent to streams, riparian vegetation is often removed to accommodate the road right-of-way, improve visibility, and reduce the hazard of trees falling on the roadway. This action can reduce shading of the stream, however, causing increased stream temperatures, reduced potential for recruiting large woody debris in the stream, reduced leaf fall and riparian invertebrates, and loss of habitat for aquatic and riparian species. Roads located within the 150-foot buffer are hydrologically connected to streams, contributing sediment, altering riparian habitat, and floodplain connectivity and function.

Three of the project area HUCs (Hamburg, Sauerkraut, and Upper Alice) would have reductions in the miles of road within 150 feet of streams for a total reduction of 3.2 miles. These HUCs would have the potential for a reduction in sediment entering the streams thus benefiting fish habitat. As the stored and decommissioned roads re-vegetate, riparian areas would begin to function properly, limiting sediment delivery to streams and providing shade and woody debris to streams.

- Number of road stream crossings and relationship to fish bearing streams

Culverted road-stream crossings can cause large inputs of sediment to streams when flow capacity is exceeded, or the culvert inlet is plugged and stream flow overtops the road fill. The result is often erosion of the crossing fill, diversion of stream flow onto the road surface or inboard ditch, or both. Culverted road-stream crossings can sometimes block the migration of fishes and other organisms in streams, which can have serious consequences on fish life histories and populations. Sometimes maintaining barriers at road crossings is desirable where such barriers prevent invasions by unwanted aquatic species. Most culvert migration blockages prevent or restrict upstream migration, though sometimes downstream migration through a culvert can pose hazards to the fish from poor outlet conditions (for example, high perch with no outlet pool). Blockages at the crossing may be partial or total; they can affect adult spawners, migrating juvenile fish, or both

Two of the HUCs in the project area (Hamburg and Sauerkraut) would have culverts removed for a total of 17 culverts removed and channels restored. Hamburg Creek contains westslope cutthroat trout and Sauerkraut Creek contains bull trout and westslope cutthroat trout. Removing culverts currently undersized and at risk of failure from flooding would remove sources of erosion. Removal of culverts that currently block fish passage would restore migrations for spawning and rearing for bull trout and westslope cutthroat trout, and should trend toward increases in population numbers with increases in habitat length and quality. The 17 culverts removed and associated instream channel work would likely be implemented over several years to limit impacts of sediment generated on any watershed. Sediment would be generated during culvert removal; however, in long-term benefits fish migration and decreased erosion would far outweigh the short-term negative effects.

- Miles of high/moderate risk roads and relationship to fish bearing watersheds

The Watershed/Fisheries portion of the Helena Forest Roads Analysis (USDA Forest Service 2004) identified the miles of all existing Helena Forest system roads that poses high risk to watersheds and fisheries throughout the Forest. For this project area there are substantial miles of road that pose high risk for sediment delivery and many sediment delivery points. Stream crossings occur throughout the project area and roads are located near and parallel to streams in some instances. These roads are located on high/moderate erosive soils that contribute sediment to streams, have high number of

culverts that reduce stream capacity, are located in RHCAs and impair riparian habitat and reduce floodplain connectivity and function.

The Forest RAP (USDA 2004) identified roads in the Beaver Creek watershed to have high potential to modify surface and subsurface hydrology; it also had high mileage on erosive soils. The RAP also identified roads with high mileage on slide-prone soils in the Willow, Sauerkraut, Poorman, Nevada, Alice, Upper Blackfoot River, Hogum, Copper, Virginia, and the North Fork Little Prickley Pear. Alternative 2 proposes decommissioning of 3.2 miles of roads including roads in Alice, Hamburg and Sauerkraut watersheds that are rated high/moderate risk roads in fish bearing watersheds.

- Consistency of alternatives with Forest Plan guidance for threatened, endangered and sensitive fish and aquatic species.

Alternative 2 is consistent with the Forest Plan for TES fish and aquatic species. Alternative 2 would reduce sedimentation from roads with 150 feet of streams that reduce riparian and floodplain connectivity and function.

Cumulative Effects

The main effect this travel plan influences is the decrease in water quality due to sediment flowing from roads. Alternative 2 would reduce the cumulative watershed effects of road sediment delivery through decommissioning of forest roads, specifically those decommissioned that cross or closely parallel stream networks. The impacts of roads on fisheries habitat, as outlined in the Affected Environment section of this report, would be improved as a direct result of this action alternative. Furthermore, through this decision, this alternative would allow the decommissioning of unauthorized routes that currently do not receive annual maintenance, which would also decrease the amount of sediment reaching streams.

Alternative 2 would potentially influence stream temperature along and downstream from segments of stream where roads and crossings are decommissioned and native riparian vegetation and floodplain connectivity are restored.

Alternative 3

Direct Effects and Indirect Effects

Table 26 summarizes alternative 3 effects to the measurement indicators for water quality and fisheries. For more information on the sediment modeling and information presented in table 26 see the Hydrology Section starting on page 62.

Table 26. Summary of actions under alternative 3, by 6th-HUC watershed

Drainage	Reduction in Sediment Delivery (tons/year)	Miles of road within 150-feet of a stream channel that are available to be decommissioned	Number of stream crossings to be decommissioned and restored
Arrastra	0.03	0.1	1
Beaver	0.88	0.2	1
Blackfoot Anaconda	29.20	4.6	16
Blackfoot Lincoln	0.00	1.9	5
Blackfoot Willow	2.40	2.2	7
Buffalo Gulch	0.04	0.8	4

Drainage	Reduction in Sediment Delivery (tons/year)	Miles of road within 150-feet of a stream channel that are available to be decommissioned	Number of stream crossings to be decommissioned and restored
Copper	0.57	0.1	2
Hogum	0.00	0.5	2
Hamburg	0.21	2.7	12
Jefferson	0.06	0.2	1
Middle Nevada	1.57	0	2
Keep Cool	0.00	1.7	7
Lincoln Gulch	0.00	1.1	2
Little Prickly Pear (Marsh)	0.06	0.1	0
Lower Alice	0.19	4.4	19
Lower Nevada	0.00	1.0	2
Nevada Headwaters	0.03	0.6	2
Poorman	1.21	3.4	0
Rock Creek	0.00	0	0
Sauerkraut	0.00	0.2	2
Upper Alice	0.17	0.3	3
Virginia	0.68	1.4	8
Willow	0.63	0.2	2
TOTALS:	**37.9**	**34.4**	**121**

Measurement Indicators:

- Road sediment reduction estimates resulting from road storage or decommissioning in tons per year

The total reduction in average annual sediment transport from roads to streams for alternative 3 was modeled to be roughly 37.9 tons per year less than the existing conditions. Trout use redds (nests dug by fish in streambed gravels) in flowing waters for their reproductive strategy. When excessive sediment accrues to spawning and rearing sites, trout embryo and fry success decline below natural rates. Additionally, other trout life-history elements such as juvenile survival, growth, and adult survival also can be at risk if excess sediment reduces cobble spaces in riffle areas and pool volumes. Everest et al.1987, pg 133 concluded that salmonid species can cope with the natural variability in sediments, but their populations can be reduced substantially by persistent sedimentation that exceeds the natural levels under which they evolved. Average fine sediments in trout spawning habitat within the project area streams may show short-term increases in fines at depth. In the long term, stream channels would show measurable decreases in the levels of fines as project area roads would deliver roughly 37.9 tons less sediment per year. The long-term benefits from decreased annual sediment loads would lead to substantial benefits in bull trout and westslope cutthroat trout habitat, and would outweigh the short-term increases in sediment from ground disturbance as culverts are removed and stream channels reconfigured. For the road segments to be decommissioned, the reduction in sediment delivery would be permanent.

- Miles of road or trail reclaimed in the 150-foot buffer along streams (riparian habitat conservation areas)

When roads are constructed adjacent to streams, riparian vegetation is often removed to accommodate the road right-of-way, improve visibility, and reduce the hazard of trees falling on the roadway. This

action can reduce shading of the stream, however, causing increased stream temperatures, reduced potential for recruiting large woody debris in the stream, reduced leaf fall and riparian invertebrates, and loss of habitat for aquatic and riparian species. Roads located within the 150 foot buffer are hydrologically connected to streams, contributing sediment, altering riparian habitat, and floodplain connectivity and function.

Twenty two of the project area HUCs (table 26) would have reductions in the miles of road within 150 feet of streams for a total reduction of 34.4 miles. These HUCs would have the potential for a reduction in sediment entering the streams thus benefiting fish habitat. As the obliterated/ stored roads re-vegetate, riparian areas would begin to function properly, limiting sediment delivery to streams and providing shade and woody debris to streams. Road decommissioning and storage implementation would be completed over several years, staggering the impacts of the sediment generated from ground disturbing activities.

- Number of road stream crossings and relationship to fish bearing streams

Culverted road-stream crossings can cause large inputs of sediment to streams when flow capacity is exceeded, or the culvert inlet is plugged and stream flow overtops the road fill. The result is often erosion of the crossing fill, diversion of stream flow onto the road surface or inboard ditch, or both. Culverted road-stream crossings can sometimes block the migration of fishes and other organisms in streams, which can have serious consequences on fish life histories and populations. Sometimes maintaining barriers at road crossings is desirable where such barriers prevent invasions by unwanted aquatic species. Most culvert migration blockages prevent or restrict upstream migration, though sometimes downstream migration through a culvert can pose hazards to the fish from poor outlet conditions (for example, high perch with no outlet pool). Blockages at the crossing may be partial or total; they can affect adult spawners, migrating juvenile fish, or both

The Helena Forest Roads Analysis Process (USDA Forest Service 2004) identified roads in the Nevada Creek watershed to have high number of road stream crossings with the potential to modify surface and subsurface hydrology. Six culverts in the Nevada watersheds would be removed under this alternative. Twenty of the HUCs (table 26) in the project area would have culverts removed for a total of 121 culverts removed and channels restored. Fish known to present in these watersheds include bull trout and westslope cutthroat trout. Undersized culverts at risk of failure from flooding would remove sources of erosion. Removal of culverts that currently block fish passage would restore migrations for spawning and rearing of bull trout and westslope cutthroat trout and should trend toward increases in population numbers with increases in habitat length and quality. Sediment would be generated during culvert removal; however, the long-term benefits of fish migration and decreased erosion would far outweigh the short-term negative effects. Additionally the culvert removals would not be implemented in the same year, thus staggering the amount of sediment input to watersheds.

- Miles of high/moderate risk roads and relationship to fish bearing watersheds

The Watershed/Fisheries portion of the Helena Forest Roads Analysis (USDA Forest Service 2004) identified the miles of all existing Helena Forest System roads that pose high risk to watersheds and fisheries throughout the Forest. For the Blackfoot travel planning area there are substantial miles of road that pose high risk for sediment delivery and many sediment delivery points. Stream crossings occur throughout the area and roads are located near, and parallel streams in some instances. These roads are located on high/moderate erosive soils that contribute sediment to streams, have high number of culverts that reduce stream capacity, are located in riparian habitat conservation areas, and impair riparian habitat and reduce floodplain connectivity and function.

The Helena Forest Roads Analysis Process (USDA Forest Service 2004) identified roads in the Beaver Creek watershed to have high potential to modify surface and subsurface hydrology; it also had high mileage on erosive soils. Also identified were roads with high mileage on slide-prone soils in the Willow, Sauerkraut, Poorman, Nevada, Alice, Upper Blackfoot River, Hogum, Copper, Virginia, and North Fork Little Prickley Pear watersheds. Alternative 3 proposes decommissioning of 121 miles of roads including roads in all of these rated high/moderate risk watersheds and additional fish bearing watersheds listed in table 24.

- Consistency of alternatives with Forest Plan guidance for threatened, endangered and sensitive (TES) fish and aquatic species

Alternative 3 is consistent with the Forest Plan for TES fish and aquatic species. Considering both action alternatives, Alternative 3 would restore the greatest amount of riparian areas and stream channels, improving RMOs and removing negative impacts to fisheries and aquatic species due to culverts that block fish passage and are at risk or failure. Alternative 3 would have the most reduction in sedimentation from roads within 150 feet of streams that reduce riparian and floodplain connectivity and function.

Cumulative Effects

Implementing alternative 3 in combination with other past, present and future actions (appendix D), would result in a reduction in cumulative watershed effects of road sediment delivery through decommissioning of forest roads, specifically those decommissioned that cross or closely parallel stream networks. The impacts of roads on fisheries habitat, as outlined in the Affected Environment section of this report, would be improved as a direct result of this action alternative. Furthermore, through this decision, this alternative would allow the decommissioning of unauthorized routes that currently do not receive annual maintenance, which would also decrease the amount of sediment reaching streams.

The proposed alternative 3 would potentially influence stream temperature along and downstream from segments of stream where roads and crossings are decommissioned and native riparian vegetation and floodplain connectivity are restored.

Summary of Effects for Alternatives 2 and 3

When combining all measurement indicators, the greatest beneficial effect would occur under implementation of alternative 3. It would entail the most stream crossings restored, and the most reduction in miles of road within 150 feet of streams; thereby, reducing the annual sediment contribution from roads by 34.4 tons per year. The aquatic environment of would benefit from the reduction in sediment.

Table 27. Summary table comparing alternatives

	Alternative 1	Alternative 2	Alternative 3
Stream Crossings on closed or partially closed roads	0	17	121
Road miles to be closed within 150 feet of streams	0	3.2	34.4
Modeled sediment delivery reduction for closed or partially closed roads (tons/year)	0	13	38

Drainages where fish populations have highest potential to benefit from reductions in sediment in the Blackfoot River drainage include Lower Alice, Anaconda, Lincoln, Willow, Poorman, and Sauerkraut

watersheds. Other drainages with somewhat lesser benefit, but still considered to have improved conditions are Beaver, Arrastra, Keep Cool, and Nevada watersheds. As habitat conditions and fish passages improve, there would likely be increases in the species abundance.

Table 28. Effects projected for Westslope Cutthroat Trout, Bull Trout and Western Pearlshell Mussel Habitat Common to Alternatives2 and 3.

Fish Species and Habitat	Effects Determination
Bull Trout	**May Affect, Likely to Adversely Affect bull trout** determination based on the existing road network and impacts from roads that would remain open and continue to deliver sediment, and the magnitude of short-term increases in sediment as roads are decommissioned and in-stream work of culvert removal for the 6th field HUCs west of the Continental Divide.
Westslope Cutthroat Trout	**May Impact Individuals, but will not likely contribute to a trend toward federal listing or loss of viability of the population or species** for populations both sides of the Continental Divide.
Western Pearlshell Mussel	**May Impact Individuals, but will not likely contribute to a trend toward federal listing or loss of viability of the population or species** for populations both sides of the Continental Divide..

WCT Population Viability at the Project Level:

Westslope cutthroat trout are the fish management “indicator species” for the Helena National Forest. They represent a measure of the effects of management activities on habitat with the objective of ensuring population viability (Forest Plan p. II-17). Westslope cutthroat trout are found in the Blackfoot travel planning area, and therefore, serve as the proxy population for viability analysis in fulfillment of the National Forest Management Act viability requirement.

Formal population viability analyses (PVA) are intensive quantitative exercises that incorporate comprehensive data about many factors influencing probability of extinction for a population. Hence, they can be expensive requiring substantial data to build an appropriate model that has proven infeasible for general management purposes. Moreover, there are no consensus guidelines on when and how quantitative PVA should be applied (Ralls et al. 2002, p. 521), and estimations of parameters used in model development when data is unavailable result in model outputs no more accurate than verbal (qualitative) models to aid biologists. In practice, agency biologists assess whether a proposed action increases the likelihood of loss of viability or leads to a trend toward federal listing of a sensitive species with limited information and resources.

This analysis uses a practical approach outlined in Ruggiero et al. (1994) and Region 1 guidance (Draft 01/30/2004) in conjunction with criteria established by Rieman et al. (1993). Simply put, “…an analysis of population viability is about birth, death, immigration, and emigration rates and how environmental or ecological factors affect these rates over time” (Ruggiero et al. 1994, p. 366). Select habitat attributes considered both ecologically significant to fish and sensitive to land management disturbances are borrowed from Overton et al. (1995, p. 1) and Region 1 guidance (Draft 1/30/2004).

The discussion under the Fish Habitat subsection of the Affected Environment section provides rationale for why sediment was used as the key indicator of concern for fisheries. In summary, sediment in stream substrates was described being the attribute most responsive to disturbance from this project.

Research has shown how increasing and decreasing levels of sediment in trout reproductive habitat affect trout embryo and fry survival rates negatively or positively respectively. When fine sediments

elevate beyond natural levels in trout spawning habitat, the reproductive quality of that habitat diminishes resulting in a corresponding decrease in fry production. Estimates of changes in the rates of embryo survival are not necessarily accurate, but are meant to help determine the amount of changes in sediment yield upon WCT populations in question.

This analysis, therefore, predicts a short-term change in substrate composition risks, some minor downward trend in incubation and fry emergence success (birth rate) to the population before recovering to an improved trend over baseline after 3 years. WCT recruitment is likely more than adequate to offset minor short-term sediment increases near the populations in the project area watershed.

In the long term, treating hydrologically connected roads helps recover gravel quality slightly over baseline conditions. Therefore, there is some minimal risk to viability for this WCT population in the short-term with a long-term trend of maintaining reproductive habitat within the acceptable range of variation (32.7 percent plus or minus 9.9 percent)

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

Three government agencies share responsibility for managing aquatic resources. The US Fish and Wildlife Service is a regulatory agency for federally listed species that seeks to recover these species in conjunction with other agencies. The Montana Department of Fish, Wildlife and Parks (MDFWP) have primary responsibility for managing fish populations. Management of fish and amphibian habitat on National Forest System lands is largely a U.S. Forest Service responsibility. All three agencies cooperate in research and monitoring efforts.

Sensitive species are administratively designated by the Regional Forester and managed under the authority of the National Forest Management Act. Sensitive species present in the project area westslope cutthroat trout and western pearlshell mussel. The U.S. Forest Service is required to protect their habitat and prevent population declines that would lead to listing under the Endangered Species Act (FSM 2670). The sensitive species analysis in this document is the biological evaluation as outlined in the requirements of FSM 2672.42.

Helena National Forest Plan

Direction for fisheries management under the Helena National Forest Plan emphasizes “maintenance or enhancement” of cold-water habitat and water quality to meet the needs of fisheries, (Forest Plan pp. II-1 and II-4). The general forest wide standard (p. II-22) states: “Maintain quality water and habitat for fish by coordinating activities and by direct habitat improvement.”

Fisheries research and investigations focus on the pervasiveness of *excessive* sediment generated by human (anthropogenic) activities in mountain watersheds. The major threat to fish is to their reproductive success and loss of rearing habitat. The ultimate objective for fisheries management is to promote effective management of sediment inputs to streams to preserve biological productivity. Any in-stream work must provide maximum protection of spawning habitat and not impede upstream fish migration.”

Especially pertinent to travel planning projects are the road standards; page II-30, road management standards on pages II-30 and II-31, and road maintenance standards on page II-32, the Plan states, “Unacceptable damage to soils, watershed, fish, wildlife, or historical/archaeological sites will be mitigated by road restrictions or other road management actions as necessary. Forest specialists representing soils and watershed shall provide input to the road

maintenance planning process to verify standards, identify rehabilitation needs, and designate roads that should be permanently closed for resource protection." Although no standards for sediment were established, the monitoring section of the Forest Plan called for evaluation of intra-gravel sediment from 30 stream sections annually to ensure spawning habitat quality is being maintained.

In riparian areas, page II-35 of the Forest Plan specifies, "wet meadows and wet areas are closed to ORV use. Construction of roads will avoid stream course encroachment and channelization, including the avoidance of all riparian areas except to cross them." In addition, the Plan states, "the Forest will provide for vegetative cover adjacent to streams to serve as a filter strip for sediment and maintain optimum water temperatures, as well as provide large debris for long-term in-stream fish cover and pooling." For stream crossings, Plan standards call for stream crossing structure design that allows free water flow and fish passage.

The Helena Forest Plan was amended on August 30, 1995 by the Inland Native Fish Strategy (INFISH) (USDA Forest Service 1995). This interim strategy was designed to provide additional protection for existing populations of native trout, outside the range of anadromous fish, on 22 National Forests in the Pacific Northwest, Northern and Intermountain Regions. Implementing this strategy was deemed necessary as these species were at risk due to habitat degradation, introduction of exotic species, loss of migratory forms and overfishing. As part of this strategy, the Regional Foresters designated a network of priority watersheds. Priority watersheds are drainages that still contain excellent habitat or assemblages of native fish, provide for metapopulation objectives, or are watersheds, which have excellent potential for restoration. Copper Creek, in the Blackfoot River drainage is the priority watershed on the Lincoln Ranger District.

INFISH also established Riparian Management Objectives (RMOs) and Riparian Habitat Conservation Areas (RHCA). RMOs are habitat parameters that describe good fish habitat. Where site-specific data is available, these RMOs can be adjusted to better describe local stream conditions. These RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of riparian goals is measured. RHCAs are portions of watersheds where riparian dependent resources receive primary emphasis. The RHCAs are defined for four categories of stream or water bodies dependent on flow conditions and presence of fish. The RHCAs are areas within specific management activities are subject to standards and guidelines in INFISH in addition to existing standards and guidelines in the Helena Forest Plan. Especially pertinent to this travel plan project are the INFISH standards required for roads; specifically standards for road management RF-2 (c3, c4, c5, c6, and c7 as well as RF-2d) and RF-3; especially RF3c. These standards are in addition to and reinforce Forest wide standards discussed for road related activities on pages II-30 to II-32 of the Helena Forest Plan to help ensure risk to native fishes are minimized.

A biological assessment has been prepared for this project and provides more detailed analysis of effects to aquatic TES species, including compliance with laws and regulations for these species. The Aquatic Habitat and Species Report (Rief 2012) provides additional details on applicable laws and regulations. Appendix A provides more detail regarding how the alternatives comply with direction in the Forest Plan.

Heritage (cultural resources)

Affected Environment

Introduction

The prehistory and history of the Helena National Forest, including the Blackfoot travel planning area are described in a variety of academic reports, cultural resource management overviews, and local historical sources and is therefore not repeated in detail here.

Briefly, archaeological research, ethnographic data, and tribal oral tradition confirm that American Indian peoples have occupied or used the upper Blackfoot River Valley of southwestern Montana for thousands of years. Prior to Euro-American settlement and during the historic period, Indian groups living in what would become Idaho and western Montana made seasonal trips over the Continental Divide Range at Rogers, Lewis and Clark, and other mountain passes en route to hunt bison, trade, socialize, and raid on the Montana plains. After ca. 1720 A.D., these seasonal journeys were facilitated by horse-drawn travois, which transported supplies, hides and meat. As a result of these treks, Indian trails became equestrian thoroughfares or, quite literally, “roads”. The upper Blackfoot River Valley area was also used for hunting, wild plant food collecting, tool stone quarrying, and other cultural activities. Today, the Salish, Kootenai, Blackfeet, Shoshone, and other tribes attach cultural significance to archaeological sites found throughout the Blackfoot travel planning area.

A portion of the Blackfoot travel planning area lies within the Alice Creek Historic District, which was listed on the National Register of Historic Places on June 6, 2007. The National Register is the Nation’s official list of historic properties worthy of preservation. The district contains prehistoric and historic resources that indicate the area has been a major travel corridor for at least 5,000 years. The resources include trail segments of the Cokahlarishkit (“road to the buffalo”), associated cultural features such as scarred trees, rock cairns, various archaeological sites, and a distinct historic landscape. This corridor followed the most advantages route through the drainage and basin, across the Lewis and Clark Pass and the Continental Divide, and into the plains of central Montana. The cultural resources of the district are intricately tied to this transportation corridor and show a consistency of land use dictated by the historic landscape.

The Euro-American settlement of the upper Blackfoot River valley mirrors that of Montana in general. The Lewis and Clark Expedition of 1804-1806 gave way to fur trapping and trading, then early military expeditions and railroad route explorations. A gold strike in Abe Lincoln Gulch near present day Lincoln brought permanent settlement. Nearby placer mining in Jefferson, Nevada and Washington Creeks attracted more people who eventually established small communities that were supported by mining, farming, ranching and logging. Early in the 20th Century, federal administration of mountain forests and surrounding lands, and increased public participation in outdoor recreation, added other dimensions to this rural lifeway. This natural resource and tourist-oriented economy still characterizes the sparsely populated upper Blackfoot River valley.

The prehistory and history of the Blackfoot travel planning area is best described as a lengthy, multi-layered story that spans thousands of years. The distinct period of significance is the period from 5,000BP to 120BP, (3,000 B.C. to A.D. 1842) which spans the prehistory, the 1805-1806 timeframe of Lewis and Clark and the Corps of Discovery, and 1841-1842, which marks the beginning of the Jesuit Missionary presence in Western Montana.

Some key features of the heritage resources record within the analysis area include:

- The Blackfoot travel planning area encompasses the Cokahlarishkit/Lewis and Clark Trail (24LC1210), which extended through the upper Blackfoot Valley and over the Continental Divide into central Montana. Called the “River of the Road to the Buffalo” by the Salish and other American Indian groups, this ancient travel route undoubtedly accounts for some (but not all) of the prehistoric (archaeological) properties within the analysis area.
- The Salish Tribe has identified (through the efforts of tribal elders, tribal historic preservation office, and Salish Culture Committee) various geographical areas and landmarks within the upper Blackfoot River drainage that are culturally important. These have Salish place-names that are associated with families and events in traditional Salish life. This place-name information is highly regarded and confidential but may come to bear in future consultations regarding projects that are generated by this analysis.
- The later settlement of the greater Lincoln community is also reflected by homestead entries, mining claims, access roads, utility corridors, dispersed recreation sites and other evidence. This history has been little researched or documented by the Helena National Forest but the Upper Blackfoot River Valley Historical Society members have been very active in identifying and recording this history.

A total of 58 cultural resources are currently identified within or near roads and trails in the Blackfoot travel planning area. The historical or scientific value of many cultural resources in the analysis area has not been determined. The exceptions are historic mines, which have been the focus of NHPA Section 106 compliance for mine reclamation work and the Alice Creek Historic District nomination for the National Register of Historic Places. For purposes of this NEPA analysis, all identified cultural resources are treated as eligible (significant) for listing in the National Register of Historic Places, in accordance with FSM 2363.22.

Environmental Consequences

Methodology

Assumptions

We assumed that GIS maps showing known cultural resource distributions and existing inventory (field survey) data, provide an adequate means of assessing the general effects of the three travel plan alternatives on cultural resources (see Methodology section).

The 2001 Tri-State OHV plan describes a range of OHV impacts to cultural resources on public lands across Montana. These data are largely anecdotal rather than quantitative, and no attempt was made to compare OHV damage to cultural resources with other recreational and non-recreational activities, such as horseback riding, livestock grazing or minerals exploration. Still, it is apparent from this data that cultural resources common to the Helena National Forest are similarly exposed and vulnerable to OHV travel. Specifically, OHVs cause compaction, rutting, erosion and other disturbances atop cultural resources. They are able to access otherwise remote areas, and leave archaeological and historic ruins exposed to the effects of uncontrolled riding, vandalism, artifact-collecting and theft. Therefore, this analysis assumes that motorized recreation has the potential to cause similar impacts to cultural resources on the Helena National Forest. It also assumed that non-motorized recreation (i.e., hiking, biking, and skiing) has lesser capacity to cause similar damage to cultural resources.

Information Used

For this analysis, we relied on cultural resource inventory data and site records on file at the Helena National Forest (HNF) Supervisor’s Office. These data were generated through project- and

reconnaissance-level field inventories completed from 1979 to 2012. Cultural resource site and inventory records are contained in Infra, GIS and hard copy records at the HNF Supervisor's Office.

Background context for the project area are available in various archaeological and historical documents pertinent to the Blackfoot Valley areas (i.e., Beck 1989; Knight 1989).

Methodology

This analysis focuses on cultural resources identified within the Blackfoot travel planning area. We used GIS data layers, currently known distribution of cultural resources as identified during previous project inventories, laid atop the road and trail system proposed under each alternative to determine where there were overlaps. Cultural resource size and boundary data are not always precise, particularly in absence of intensive surface investigation and mapping (historic sites) or subsurface testing (archaeological sites). For this reason, GIS analysis identified all sites within 600 feet of the roads and trails in each alternative.

Approximately 60 percent of the identified cultural resources in the Blackfoot travel planning area are either bisected by or lie within 100 feet or less of existing road and trails. These cultural resources could be directly affected by closures, seasonal restrictions, or permanent road use and maintenance. For example, a road built through an ancient Indian camp exposes stone artifacts, bone debris, fire hearths, and other archaeological evidence in its tread. A road that originated as a result of mining activity may be surrounded by dilapidated ruins.

The remaining cultural resources are located at further distances (100-600 feet) from existing roads or trails. These could be indirectly affected by road and trail use or closure. Specifically, these routes provide access to cultural resources and thus invite vandalism, artifact collecting, arson, and other resource-depreciative behaviors.

The effects of the Blackfoot Travel Plan on cultural resources were evaluated on this basis:

- Permanent effects to cultural resources from road and trail closures in each alternative
- Effects to cultural resources from road and trail operations and management

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Appendix D has a list of past, present, and foreseeable activities considered for the cumulative effects analysis.

Effects Common to All Alternatives

In the Blackfoot travel planning area, 60 percent of the roads and trails often bisect prehistoric (American Indian) and historic archaeological sites, exposing artifacts in their tread. The exposed archaeological remains become highly visible and vulnerable to illegal collection, crushing by vehicles, erosion damage and other processes. Permanent closures have the potential to eliminate some of these problems.

Effects Common to All Action Alternatives

Implementing alternatives 2 or 3 would reduce the amount of motorized travel on some routes. The proposed motorized route closures would be beneficial to cultural resources by preventing easy vehicle access to sensitive cultural resources which helps to abate vandalism and artifact theft. Reducing motorized routes available to the public within the Blackfoot travel planning area would restrict the public access to archaeological sites and historic ruins vulnerable to vandalism, artifact

collecting and arson, and other depreciative behaviors. Cultural resources bisected by roads and trails are vulnerable to erosion and degradation caused by road maintenance and use. Further, some roads retain historical value by virtue of their linkage to specific cultural resource sites. Their permanent closure, and potential decommissioning, may diminish the historical value of some of these cultural resources. For example, historic mining buildings accessible by motorized routes in the Blackfoot travel planning area have been dismantled to obtain antique wood for various decorative uses such as in home remodeling and picture frames. Mining equipment, such as ore carts and old equipment parts, has found new homes as lawn and landscaping ornaments. Valuable artifacts are collected for sale in antique shows and on the Internet.

Fall to spring road and trail closures provide limited beneficial effects to cultural resources since public use of National Forest land diminishes during this time period and cultural resources are usually blanketed in snow or are otherwise inaccessible due to poor road conditions. However, once these roads are open from late spring through early fall, cultural resources become vulnerable to artifact collection, vandalism, arson, and other depreciative behavior.

At the same time, road and trail closures would limit opportunities for the public to visit interesting historic ruins, which is an important part of the recreational experience in the West. From a cultural resource perspective, road closures make investigation, protection, interpretation, and monitoring more difficult and costly.

Various cultural resources in the Blackfoot travel planning area are currently exposed in forest roads and trails. Road and trail improvements and maintenance continue to degrade some of these cultural resources. Therefore, implementing either of the action alternatives would provide the opportunity to identify those cultural resource protection problems and identify best management practices in the Memorandum of Understanding for Road Maintenance between Heritage and Engineering. The methods used for proposed road closure, storage and decommissioning (table 4) could have adverse effects to cultural resources depending on proximity to known sites and methods used. Implementation of project design features (see chapter 2) would minimize the potential for adverse effects. For example, road segments within identified archaeological sites could be buried with soil, as opposed to being ripped and seeded. As an outcome of road and trail closures, any future decommissioning would require careful long-range planning to insure that cultural resource inventory, evaluation and treatment precede such undertakings (ground-disturbance), in accordance with Section 106 of the National Historic Preservation Act (NHPA), as amended.

Alternative 1 – No Action

Direct and Indirect Effects

Alternative 1 falls under the purview of the 2001 Tri-State OHV Decision and would continue to prohibit cross-country travel. It provides the same level of protection to the cultural resources base within the travel plan area as currently exits. The numerous open roads and trails provide ample access to cultural resources for purposes of monitoring, scientific investigation and potential interpretation, which is a beneficial effect.

Road maintenance has the potential to degrade cultural resources that are intersected by roads in the Blackfoot travel planning area that have not been identified in the Memorandum of Understanding for Road Maintenance between Heritage and Engineering.

The existing condition protects many vulnerable cultural resources by confining motorized travel to designated routes. It would preclude the opportunity to further protect cultural resources that may

currently be vulnerable to vehicle traffic, artifact collecting and natural deterioration in undesignated routes.

Since no actions associated with this project would occur, there would not be a need to inventory the project area. Therefore, additional cultural resources data would not be realized.

Cumulative Effects

This alternative is the existing condition and does not improve cultural resource protection in the Blackfoot travel planning area. Past, present and reasonably foreseeable future actions relevant to this analysis are described in appendix A. Those most relevant to cultural resources are described below.

Past Actions – The Upper Blackfoot Valley and adjacent foothills and mountains has supported livestock grazing, logging, mining, recreation and utility development during the last 140 years. These activities and particularly the road construction associated with them, have exposed and in some cases damaged cultural resources. However, it is difficult to quantify the effects of these past actions on cultural resources in the Blackfoot travel planning area.

Since the late 1970s, cultural resource inventories have preceded all ground-disturbing Forest Service projects in the Blackfoot travel planning area including vegetation treatments, livestock grazing, restoration, and recreation development. We discovered the majority of the cultural resources described in this travel plan analysis as a result of these compliance inventories. We found many archaeological sites because they were exposed in old road and trail beds. In most cases, we would reconfigure project boundaries and treatments to avoid impacting significant cultural resources; therefore, the cumulative effect of these actions on cultural resources would be relatively minor.

Present Actions – Cultural resource inventory and evaluation has preceded restoration work—fencing, weed treatment, road and trail repairs, reforestation and stock watering repairs. Ongoing forest activities would continue to have a cumulative effect on cultural resources. All forest actions require NEPA and consultation; therefore the effects on cultural resources would be mitigated through project redesign or avoidance. Roads and trails have been constructed through archaeological and historic sites over a period of many years. Regardless of alternative, road use has the potential to degrade cultural resources, particularly prehistoric archaeological sites. Cultural resources exposed in roadbeds and borrow pits invite illegal artifact collecting.

Reasonably Foreseeable Future Actions – Future actions in the analysis area focus on public safety and environmental health and include fire and watershed restoration, hazardous fuels reduction, abandoned mine reclamation, and minor recreation developments, and mineral operations. In all likelihood, the effects of these projects on cultural resources can be mitigated through project re-design and avoidance.

Summary of Effects

Alternative 1 is the existing condition. This alternative would continue to provide the maximum number of motorized roads and trails and thereby presents the greatest amount of risk to cultural resources of the three alternatives. By the same token, it would allow the greatest opportunity to visit historic sites for educational and recreational purposes.

Alternative 1 would continue to implement the 2001Tri-State OHV Decision by prohibiting cross-country travel and confining motorized travel to designated routes. It does not increase protection of cultural resources by closing numerous open roads and trails but it does provide ample access to cultural resources for purposes of monitoring, scientific investigation and potentially interpretation.

Alternative 2 – Proposed Action

Project Design Features

Project design features specific to cultural resources are listed in chapter 2 starting on page 28. These design features apply to alternatives 2 and 3.

Direct and Indirect Effects

Alternative 2 would close additional miles of unauthorized and System roads and trails to wheeled vehicles that pass closely or directly through identified cultural resources. Permanent closures would protect these cultural resources from ongoing damage by continued wheeled vehicle traffic and public use, and be a beneficial effect. At the same time, permanent closures would constrain public access for purposes of agency or agency-authorized scientific investigation, monitoring and protection-related activities. It may also limit access by forest visitors who enjoy visiting and photographing historic ruins on public lands as a recreational and educational experience.

Alternative 2 would improve cultural resource protection over alternative 1 by decreasing road access across the Blackfoot travel planning area. This, in turn, would reduce cultural resource exposure to artifact collecting, vandalism and other depreciative behavior.

Cumulative Effects

This alternative improves cultural resource protection in the Blackfoot travel planning area in the short and long term. Implementing alternative 2, in combination with other past, present and reasonably foreseeable future actions would result in the same cumulative effects as described for alternative 1.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The Forest Plan requires the integration of cultural resources in project planning and forest management. Compliance inventory, evaluation of site significance and project effect, consultation with the Montana State Historic Preservation Office and Tribal Historic Preservation Officers, and implementation of design features for project-affected cultural resources would comply with the National Historic Preservation Act and its implementing regulations in 36 CFR 800, as well as Helena National Forest Plan (USDA 1986) standards and guidelines. Therefore, the results of this travel planning on cultural resources would remain within Forest Plan standards because NHPA Section 106 would be completed prior to implementation and mitigation would be done to avoid adversely effecting cultural resources within the Blackfoot travel planning area.

For more details on compliance with the Forest Plan, see appendix A in this document. For more details on compliance with other regulations and policy, see the Hydrology Report (McNamara 2012) in the project record.

Summary of Effects

Alternative 2 would provide added protection benefits to cultural resources when compared to alternative 1 due to the closure, storage and decommissioning of roads while still providing reasonable access opportunities for people to visit historic ruins for educational and recreational activities.

Alternative 3

Direct and Indirect Effects

Alternative 3 would close additional miles of unauthorized and System roads and trails yearlong to wheeled, motorized vehicles that pass closely or directly through identified cultural resources. These various closures would benefit cultural resources by limiting public access. At the same time, permanent closures would constrain access for purposes of agency or agency-authorized scientific investigation, monitoring and protection-related activities.

Alternative 3 would improve cultural resource protection over alternatives 1 and 2 by decreasing road access across the Blackfoot travel planning area. This, in turn, would reduce cultural resource exposure to artifact collecting, vandalism and other depreciative behavior.

Cumulative Effects

This alternative improves cultural resource protection in the Blackfoot travel planning area in the short and long term. Implementing alternative 3, in combination with other past, present and reasonably foreseeable future actions would result in the same cumulative effects as described for alternative 1.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

See discussion for alternative 2 above.

Summary of Effects

Alternative 3 would result in more protection benefits to cultural resources when compared to alternative 1 and 2 due to the closure, storage and decommissioning of the most roads while still providing reasonable access opportunities for people to visit historic ruins for recreational and educational activities. Alternative 3 would have the most beneficial effect to cultural resources.

Livestock Grazing and Minerals

Livestock Grazing

There are 15 livestock grazing allotments on the Lincoln Ranger District and within the Blackfoot travel planning area. There are four allotments north of Highway 200, and the rest of the allotments are south of Highway 200. These allotments are occupied at various times of the year, but the most consistent months are June, July, August and September. During these months inspections are done in a consistent pattern, starting with pre-inspections (before cows are allowed on the allotment) and ending with post- inspections (after the cows come off the allotments). All of these allotments have access roads. Table D- 1 lists each allotment, the 5th hydrologic unit code (HUC) it occurs in, and the acres of the allotment and road miles occurring within each HUC 5. Primary access to each allotment is as follows:

- Alice Creek - Alice Creek Road (FR 293)
- Arrastra Creek - Arrastra Creek Road or the road into Patterson Prairie (both private roads)
- Keep Cool Liverpool, Canyon Creek and Horsefly - Sucker Creek Road (FR 1800); North Fork of Keep Cool Road (FR 1821); Horsefly Creek which (private road); Black Diamond Road (FR 4113)

- Chimney Creek - Nevada Ogden Road (FR 1163) and FR 1803
- East Shingle Mill - located off Highway 141 and is only accessed through private lands
- East Nevada - Nevada Creek Road (FR 296), Washington Creek Road (FR 4196), and Jefferson Creek Road (FR 1894 off the Dalton Mountain Road (FR 4195)
- Gould Creek - Gould Creek Road and the Fools Hen Creek Road (FR 1848)
- Marsh Creek - Marsh Creek Road (FR 485)
- Moose Creek - Nevada Ogden Road (FR 1163) and FR 1823 and 1893
- Poorman/Willow - Dalton Mountain Road (FR 4195) and Sauerkraut Roads (FR 329, 4135 and 1892)
- Stonewall - Beaver Creek Road (FR 4106), Park Creek Road (FR 607), Stonewall Creek Road (FR 607 E1), and Lincoln Ditch Road
- Tarhead - access through private and BLM lands
- West Nevada - Dalton Mountain Road (FR 4195), the Buffalo Gulch Road (FR 1830), the Madison Gulch Road (FR 1829), the Shelton Road (FR 1822) and various other roads such as FR 1822, 1833, 1891, 1837 and the Deer Creek Road (FR 1830)

None of the alternatives would result in measurable changes to the primary access routes into these allotments, therefore, livestock grazing is not discussed further in this document and the focus of the rest of this section is on minerals.

Minerals

Administration of mineral permits includes evaluating proposals submitted by the mining applicant, coordination and preparation of NEPA analysis, mitigation measures, negotiation for modifications with the miner if needed, calculating bond and processing approval NEPA and Decision letters for the District Ranger or Forest Supervisor.

Affected Environment

The Blackfoot travel planning area includes the analysis area for minerals as shown on alternatives 1-3 maps; effectively, the area that is the Lincoln Ranger District. Known mineral resources of this area have been identified and presented in numerous professional publications and the area includes historic mining districts. The most comprehensive assessment of mineral resources is the 1996 U.S. Geological Survey Open File Report 96-683-A which compiled other references and samples to provide maps of mineral resources occurrence. The other direct method for determining mineral resources occurrence are the actual project areas of recent interest as indicated by areas with a concentration of active mining claims.

Locatable minerals

Mineral activities tend to occur in areas of historic mining and most of these areas have patented mining claims in their vicinity and active unpatented mining claims. Actual project sites often change but the areas of interest tend not to. Table 29 shows areas with substantial current or recent (last 20 years) locatable mineral project proposals, unpatented mining claim activity and known mineral deposits (*see also Map 1 in the Minerals Specialist Report in the project files*).

In addition, the forest has had ongoing small scale locatable minerals projects that have a Notice of Intent (NOI) or have been authorized with a plan of operations. Table 29 is a summary of these projects by project name, location and size of disturbed area. More detailed descriptions of the projects are found in the 2810 Locatable minerals project files at the ranger district offices.

All of the project areas on NFS lands have resulted in no more than 2 acres of disturbance on a site in the past 20 years with the exception of the Beaver #1-#3 project in Lincoln Gulch which is about 5 acres, and the Pardner project in American Gulch which is about 3 acres. All are currently at a low level of prospecting and no recorded production from any of the lode or placer mines has occurred for at least 20 years. The recent spiking in the price of gold could result in increased interest in prospecting activity by small scale parties and potentially an increase in interest by larger gold mining entities. The most likely areas for larger gold exploration activities are the Virginia-Gould Creek area and the Seven-Up Pete area. The Upper Blackfoot River area hosts a relatively large porphyry copper-molybdenum deposit on mixed federal and private lands.

Locatable mineral activities are occurring largely on the open route system of the Blackfoot Travel area. Mineral exploration activities have also occurred on private land within or in proximity to NFS lands in the travel plan area. Some of the mineral project activities are currently occurring in areas of closed roads. Authorization for locatable projects to utilize a closed road is done through submittal of a Plan of Operation by the mineral proponent and a review and evaluation/approval process by the Forest Service. Depending on the complexity of the project, the review and evaluation process can take from a week to several months. Generally, if the only activity that needs authorization is access on a closed road, the authorization timeframe for a plan of operation is a matter of days. If the mineral activity is more substantial and access on a closed road is needed, a more comprehensive environmental review, public comment opportunity, and likely a reclamation performance bond would be needed.

Closed roads in general are a barrier to mineral prospecting activities as the equipment and tools utilized during prospecting ventures are heavy and it makes walking great distances largely unfeasible. Decommissioned roads would make most levels of mineral activity impractical.

Mineral Materials

Mineral material activities have included development of localized pits by the Forest Service for road maintenance, and public use pits for hand-scale extraction of various rock types for primarily decorative building purposes. Forest Service borrow pits are generally small (less than 0.25 acre) and most have been reshaped and closed.

Leasable Minerals

The Helena Forest conducted a forest-wide analysis for oil and gas leasing and an EIS for the project was completed in 1998. Portions of the Blackfoot Travel area were made available for lease and leases were issued in 2000 for many acres of the area east of the Landers' Fork and Highway 279. These leases expired in 2010. There have been no subsequent requests for leases in the Blackfoot Travel area. The Helena Forest would need to conduct a leasing analysis using the NEPA process prior to making any areas available for geothermal leases.

Abandoned/Inactive Mine and Reclamation Areas

There are numerous inventoried abandoned mine sites in the Blackfoot travel planning area and some reclamation is occurring. The State of Montana and Forest Service conducted reclamation of about 10 acres impacted by placer mining activities on private and NFS lands in Washington Gulch in the early 2000s.

Additional reclamation could be expected for this area based on the investigation results in the site inventories, and the results of the Total Maximum Daily Load (TMDL) prepared by the State of Montana for this watershed. Reclamation work would be reliant on availability of funding.

The Mike Horse Dame/Upper Blackfoot Mining District Complex is a State CECRA (state superfund) area and includes several mines on NFS lands as well as the Mike Horse dam, an unstable feature. The Forest Service and State of Montana are reclaiming this area as part of an environmental settlement with a now bankrupt mining company. As part of reclamation, road improvements were made to the Meadow Creek road to the Mike Horse dam in 2010. Additional temporary road construction may occur in the project area to facilitate the reclamation activities.

The decision for the upcoming reclamation of the Mike Horse dam and its associated wastes in the Upper Blackfoot Mining Complex area was originally made in July, 2007 and amended in September 2011. This project is authorized under CERCLA. It will be conducted over a period of 7-10 years starting in 2010 with the construction of a project area haul access road. Generally, the need for construction of access and haul roads was included in the analyses for this project. However, site specific road needs are currently being developed in the design-level planning for the project. Because of the scale, complexity and need to ensure public safety during this project, most of the roads on NFS lands in this area will not be available for public use during the primary construction years, regardless of the decision on this travel plan.

Environmental Consequences

This analysis does not consider effects to mineral material sites as these resources are usually utilized by the agency for road maintenance activities. Their use is opportunistic based on road needs. This analysis will not consider effects to oil and gas activities as there are none proposed and there are currently no leases.

Effects of implementing alternatives 2 and 3 on locatable minerals is described below by two indicators : (1) Effect of the action alternative on motorized access to a known mineralized area as identified in table 29 and table 30, and (2) Effect of the action alternative on motorized access to a currently permitted project as identified on table 29. Table 29 and table 30 identify the effect the action alternatives would have for motorized access to a currently permitted project. The measure of the effect is whether there is a change to the currently open motorized routes to the area. There is a negative effect to current and potential mineral operations by the closure of roads. The negative effect is based on the additional regulatory process steps to conduct the activity. An explorationist or miner would have to make contact with a minerals administrator, submit a plan of operation proposal and wait for review and authorization before utilizing the closed road as opposed to not having to do these steps for a project using an open road. The extra time needed and associated costs are an additional burden to get work accomplished during an already limited mountain field season. In the end, a negative change in motorized access to a project or resource area would result in additional time and expense on the part of the mineral company to conduct activities. The assumption for closure method is that any closed road would require authorization for use of the road by a mineral permittee.

This analysis does not consider effects of the travel planning action alternatives in a general sense on mine reclamation activities or the maintenance and monitoring of completed projects. These large-scale projects would have their own site-specific analysis including any needed road improvements and decommissioning as part of the project, which would be managed under a separate NEPA decision or process.

Methodology

Much of the information presented in this analysis comes directly from review and administration of actual mineral permits, and inventory, monitoring and reclamation planning activities for the areas' abandoned/inactive mines. In addition, this analysis refers to the occurrence and development

potential of mineral resources. Mineral potential information comes from the US Geological Survey report by Tysdal and others, 1996. The minerals specialist has also conducted field inspections of various mineral operations in the Blackfoot area and consulted the forest minerals administrator on project activities. The change in motorized route miles available for mineral activities is from the transportation analysis for this project.

Assumptions

Locatable mineral activities have been at low ebb since the early 1990s and new projects have been at the individual prospector/miner scale. Currently gold prices are at record highs and there is the always the possibility of industrial level exploration proposals in the near future. However, few gold exploration companies reside in Montana due to a State law banning the use of cyanide for new extraction processes and a perceived extreme regulatory environment by the mineral industry. The travel plan area is locally mineralized and could see a higher level of mineral activity in the next few years as long as gold prices remain high. There are three substantial ore bodies located within the travel plan area: 1. The Heddleston copper-molybdenum porphyry, 2. Seven Up Pete epithermal deposit intrusive-extrusive rocks in Seven Up Pete Gulch, and 3. the McDonald Gold epithermal deposit in volcanic rocks in the Landers' Fork of the Blackfoot River. All of these mineral deposits occur primarily on private land, however access near or through National Forest System lands (NFS) may be needed to develop the deposit.

Mineral material activity would probably remain low as the resources within the Travel Plan area are not unique and are available widely. Decorative boulders or other building materials are a potential for new project proposals if the area sees an influx in new home construction. The Forest Service also develops localized rock sources for road maintenance and other projects. To date, there are a limited number of these types of developments and all are reclaimed to some extent.

There are currently no active oil and gas leases in the travel plan area. The most recent leases expired in 2010. A request for a new lease could occur at any time. The State of Montana has leased numerous State sections near NFS lands; particularly east of Rogers' Pass. Proposed activity on these leases could result in requests for access across NFS lands.

Information Used

Information used includes published mineral resources reference material, the Bureau of Land Management's lands records database (LR2000), Montana Bureau of Mines and Geology Inventory of Abandoned and Inactive mines in the Blackfoot and Little Blackfoot drainages (Metesh, 1999), the Abandoned Mine Reclamation Bureau's Priority Mine Sites Inventory (MDSL, 1995), 2810 and 2850 project files from the Lincoln Ranger District and Forest Supervisors' Office, and BLM lease records for oil and gas. The BLM also recently prepared an EIS for geothermal resources for the western United States which identified areas of potential geothermal resources. Project files from the Lincoln Ranger District are the record of proposals and activities on Forest Service lands where the mineral activity was larger than minor hand scale operations. The 1998 Helena National Forest and Elkhorns Portion of the Beaverhead Deerlodge National Forest Oil and Gas Leasing EIS was also utilized for this analysis,

Spatial and Temporal Context for Effects Analysis

The analysis area includes the Blackfoot Travel area as shown on Alternatives 1-3 maps, effectively the area that is the Lincoln Ranger District. Known mineral resources of this area have been identified and presented in numerous professional publications and the area includes historic mining districts. The most comprehensive assessment of mineral resources is the 1996 U.S. Geological Survey Open

File Report 96-683-A which compiled other references and samples to provide maps of mineral resources occurrence. The other direct method for determining mineral resources occurrence are the actual project areas of recent interest as indicated by areas with a concentration of active mining claims.

Effects Common to All Alternatives

All alternatives include currently gated, closed roads which are passable by a wheeled motorized vehicle. Prospecting activity on closed but drivable roads is authorized by an approved plan of operations. A plan of operations requires review by the mineral administrator and approval by the District Ranger, at a minimum. For increasing project complexity and disturbance, a separate NEPA evaluation, public involvement and resources review may be needed the project.

Oil and gas activities, geothermal and salable mineral activities require separate NEPA analysis and authorization which would likely not change between the alternatives. Oil and gas activities are not discussed further as there are no proposals currently under consideration.

The amount of minerals that are removed from Forest Service public lands through alternatives 1-3 on the road system, whether open or closed but drivable, is an irreversible and irretrievable commitment of mineral resources. The amount of material removed is currently minimal and is expected to largely remain that way in the near future due to the complexity and cost of large-scale mineral extraction activities. Thus, these effects are not discussed further.

Alternative 1 – No Action

Direct Effects and Indirect Effects

The effect of the current transportation on the currently permitted projects is described in table 29. Locatable mineral operators and mineral material collectors currently have an established road system of drivable, open and closed roads that could be utilized by a full size vehicle. Locatable mineral operators currently submit a plan of operation for using closed roads to access their mineral activity areas, even if they are not planning on doing any physical work. At a minimum, the plan form requires time on their part to fill out, and review and approval time by the Forest Service. Because of the relatively short operating season, project delays can result in loss of time to prospect and money to a mineral proponent. There are three recurring projects that are authorized this way and annually there may several more minor projects authorized on closed routes. Under alternative 1, access to mineralized areas as described in table 29 is relatively good as most of these areas also have blocks of private land with open roads to access to them (table 30).

Cumulative Effects

Combining the effect of implementing alternative 1 with other past, present and reasonably foreseeable future actions (appendix D) would have minimal effect on mineral prospecting as most of these other actions are routine and recurring management activities. Routine road maintenance and road improvement projects on forest access routes helps facilitate mineral activities. In 2011, heavy snow and runoff conditions resulted in roads staying closed by snow longer as well as delays in road maintenance which negatively affected the ability of claimants to access their project areas. These conditions are not predictable and are part of the unknowns of working in a mountainous environment.

The Helena Forests' Roadside Hazard Tree removal activities have the potential to facilitate mineral prospecting in the short term as vegetation removal provides an opportunity to see potential mineral

resources. This effect would be short term as the understory vegetation would eventually thicken and negate the visibility provided during hazard tree removal.

Any proposed mineral activities in the Upper Blackfoot Mining Complex/Mike Horse area would likely be time consuming and costly to get permitted and bonded for reclamation as the site is currently undergoing large scale reclamation.

Alternative 2 – Proposed Action

Project Design Features

There is no specific project design feature tied to the minerals resource. For a full list of project design features see chapter 2, page 28

Direct Effects and Indirect Effects

Alternative 2 includes fewer open, motorized route miles that would be available for mineral prospecting and development activities than alternative 1, which is a negative effect, as described above. The Heddleston, Seven-Up Pete and Virginia-Stemple-Gould Creek areas would have reductions in the number of miles of open motorized routes. These would negatively impact explorationists as they would have to apply for and wait for authorization of a plan of operation for access in these areas (table 29). Three currently permitted small-scale projects would have direct, negative effects from changes in the motorized transportation system including two projects in Saurkraut Creek and one near Poorman Creek (table 30). The Ranger District would work with the operator to mitigate these impacts in the short term by negotiating the timing of decommissioning or modify a local portion of the project.

Cumulative Effects

Cumulative effects for alternative 2 are the same as those described for alternative 1.

Alternative 3

Direct Effects and Indirect Effects

Alternative 3 has the greatest negative effect on mineral resources exploration and development activities. It includes fewer motorized route miles than alternative 2 and would result in the loss of more miles of drivable routes to decommissioning. Alternative 3 would have a greater impact on the Heddleston area than alternative 2 as many of the routes would be decommissioned. In addition, the Seven Up Pete area has one primary access route would be converted to a trail. There is also a unique, beneficial road opening in the Seven-Up Pete area. Several segments of road would be decommissioned in Lincoln Gulch but the overall net reduction in drivable road miles would be relatively minor as the area has a dense network of open roads. Access to the valley bottom deposits in the placer gulches of Poorman, Willow, Saurkraut and Stonewall would be mostly the same as in alternative 2.

Three currently permitted projects would have negative effects from implementation of alternative 3 as the routes to their project areas are identified to be decommissioned or converted to a nonmotorized trail, including the Butterfly lode project and Horse Laugh placer projects in Poorman Creek and the Baldy Mountain lode in Humbug Creek. The Lincoln Gulch projects would need to be reviewed in detail with the claimants to make sure the residual open routes would be adequate for access. The impact of road closures and decommissioning can be mitigated by working with the claimants on project timing and/or negotiating the closure as part of the mineral project; this has been

identified as a project design feature for this project, as described in chapter 2. The road to the White Hope project would be open to motorized vehicles yearlong in this alternative.

Cumulative Effects

Cumulative Effects for alternative 3 are the same as those described for alternative 1.

Conclusions and Tabular Summary of Effects by Alternative

The Blackfoot Travel Plan area is a naturally mineralized area with an extensive mining history.

Locatable and mineral materials activities have occurred historically at high levels and more recently at a relatively low level in the Blackfoot Travel Plan area due to the intrinsic geology of the area. Larger deposits and projects have not been conducted and are not currently being contemplated in part due to the regulatory climate in Montana and metals prices. However, the unpatented mining claims are still being maintained in the areas of known mineral deposits pending favorable future conditions. Road closures have negative consequences to mineral exploration and development activities and companies because there would be the need for a plan of operations to authorize motorized access. The authorization process adds time and costs for a project proponent during the relatively short season. Road decommissioning has an even greater negative consequence because there would be even more costs associated with the time and money needed for a plan of operations to be approved.

Alternative 1 is the most favorable for mineral exploration and development activities as it includes the greatest number of open motorized routes. Alternative 2 is less favorable than alternative 1 but better than alternative 3 because there are fewer miles of route that would be decommissioned. Specific permitted projects are negatively affected by alternatives 2 and 3 as shown on table 29. Mitigating these impacts may be possible and would have to be done on a case by case basis with the claimant. The result is more administrative work for the area minerals administrator.

Table 29. Effects by alternative on areas of potential locatable mineral activity

Project Name/Area	Drainage	Deposit Type, Status	Alternative 1	Alternative 2	Alternative 3
Heddleston Mining District/Upper Blackfoot-Mike Horse area	Upper Blackfoot River and headwaters	Porphyry copper deposit in historic mining area, mixed NFS and private land; Area is a State Comprehensive Environmental Cleanup and Responsibility Act (CECRA) site and currently being reclaimed.	Numerous open motorized routes	Numerous routes would be converted to motorized trails – negative impact on access for mineral prospecting and exploration	Same as Alt 2 and many routes would be decommissioned – negative impact on access for mineral prospecting and exploration
Copper Creek-Green Mountain	Copper Creek	Stratabound copper-silver deposits relatively small and disseminated. Relatively small	Motorized open routes	Same as Alternative 1	Same as Alternative 1

Project Name/Area	Drainage	Deposit Type, Status	Alternative 1	Alternative 2	Alternative 3
		scale mineral development in the past and prospect level activity currently with several active unpatented mining claims			
Lincoln Gulch	Lincoln Gulch	Gold placers worked mostly before the turn of the century and a low grade bedrock gold deposit near the mouth of Lincoln Gulch. Small scale placer project ongoing on NFS lands in this area and a handful of active unpatented mining claims.	Motorized open routes with some seasonal restrictions	Mostly the same as Alternative 1 with a few route segments designated open year round	Mostly the same as Alternative 1 but some routes decommissioned-minor negative effect.
Saurkraut, Willow, Stonewall, Poorman Creeks areas	Saurkraut, Willow, Stonewall, Poorman Creeks	Historic through recent placer gold mining has left overburden piles and disturbed valley bottom areas. Remnant waste piles and culturally interesting stacked rock bedrock drain in Saurkraut Creek.	Generally good access to these historic placer mined areas, private land important for access	Little change from Alternative 1	Little change from Alternative 1, many routes would be decommissioned in upland areas
McDonald Gold – Seven Up Pete Areas	Seven Up Pete, Hogum Creeks, McDonald Gold portion is just north of Blackfoot River and Aspen Campground	Historic gold and silver mining area. Recent exploration resulted in identification of 10 million tons of gold ore at the Seven Up Pete area and 8.2 million ounces of gold in the McDonald Gold	Generally good access to this area on open and closed roads, includes a block of private land	Primary access across NFS to private land would be converted to a motorized trail (routes 1841, 1841-B1, 1841-J1) and low standard non-System route would be decommissioned –negative impact.	Non-System route would be decommissioned – negative impact, north half of road 1841 (closed yearlong on Alternative 1) would be open to motorized use – positive impact

Project Name/Area	Drainage	Deposit Type, Status	Alternative 1	Alternative 2	Alternative 3
		project area			
Stemple - Gould-Virginia Creek area	Gould, Virginia and Foolhen Creeks	Underlain by the Silver Bell stock which has resulted in historic mining of primarily gold and silver. There are numerous active unpatented mining claims in this area.	Good yearlong motorized access to many portions of the mineralized area	Numerous short connector spurs would be closed yearlong but put in storage. Negative impact as potential operators would have to get a Plan of Operations for access.	Same as Alt 2.

Table 30. Mineral activity table effects by alternative for Blackfoot travel planning area

Project/Mining Claim Name and Type (placer or lode)	Area/drainage	Disturbance Area	Alternative 1	Alternative 2	Alternative 3
Butterfly/Lode	Poorman Creek area	< 1 acre	Motorized Access with seasonal closure	Same as Alternative 1	Road to project would be decommissioned, negative impact
Hawkeye-Sterling/Placer	Lincoln Gulch	< 1 acre	Motorized access with seasonal closure	Same as Alternative 1	Some roads in project area would be decommissioned. Alternate route to project area would need to be found or this alt would have a negative impact.
Hennesy/Placer	Stonewall Cr	< 1 acre	Motorized access	Same as Alternative 1	Same as Alternative 1
Sunshine Lodes 1-3/Lode	Saurkraut Cr	1-2 acres	Motorized access road then non-System road access to site	Motorized access road, unauthorized route would be decommissioned, negative impact	Same as Alternative 2
Colby #1 and #2 / Placer	Washington Cr	<1 acre	Motorized access	Same as Alternative 1	Same as Alternative 1
Sahan Daywi/ Placer	Lincoln Gulch	<1 acre	Motorized access with seasonal restriction	Same as Alternative 1	Some roads in project area would be decommissioned. Alternate route to project area would need to be found or this alt would have a negative impact.

Project/Mining Claim Name and Type (placer or lode)	Area/drainage	Disturbance Area	Alternative 1	Alternative 2	Alternative 3
Gary's Load/ Placer	Washington Cr	2 acres	Motorized Access	Same as Alternative 1	Same as Alternative 1
Baldy East (13)	Humbug Cr	<1 acre	Motorized access with seasonal restrictions	Same as Alternative 1	Same as Alternative1
Baldy Mountain Group 1-4/Lode	Humbug Cr	2 acres	Motorized Access with seasonal restriction	Motorized access in part on a closed road put in storage – would need Plan of Operations for access at a minimum	Motorized access with seasonal restriction in part, other part of road would be decommissioned – negative impact
White Hope/Lode	Beartrap Cr	2 acres	Motorized access on closed road via Plan of Operations	Same as Alternative 1	Road would be open to motorized vehicles. Public benefit, miner would likely see that as a negative impact.
Pardner/Exploration	American Gulch	3 acres	No public access to project area – by landowner permission only	Same as Alternative 1	Same as Alternative 1
Horse Laugh/Placer	Poorman Cr	< 1 acre	Motorized access	Route would be a designated motorized trail. Negative impact.	Route would be a nonmotorized trail – negative impact.
Lost Gold Placer #1/Placer	Nevada Cr	< 1 acre	Motorized Access	Same as Alt 1	Same as Alt 1
Stockton/Lode	Nevada Cr	< 1 acre	Motorized access	Same as Alternative 1	Same as Alternative 1
Lil Brown/Placer	Moose Cr	<1 acre	Motorized access on closed roads authorized by Plan of Operations	Same as Alternative 1	Same as Alternative 1
Pistol Pete/Placer	Moose Cr	< 1 acre	Motorized access on closed roads authorized by Plan of Operations	Same as Alternative 1	Same as Alternative 1
Beaver #1, #2, #3/Placer	Lincoln Gulch	5 acres	Motorized access with seasonal restriction	Same as Alternative 1	Some roads in project area would be decommissioned. Existing Alternate

Project/Mining Claim Name and Type (placer or lode)	Area/drainage	Disturbance Area	Alternative 1	Alternative 2	Alternative 3
					route to project area would need to be found or this alt would have a negative impact.
Rollin Dream Placer/placer	Saurkraut Cr	<1 acre	Motorized access road then non-System road access to site	Motorized access road, non-System route would be decommissioned, negative impact	Same as Alternative 2
Cotter Project/lode	Cotter Cr	2 acres	Motorized Access	Same as Alternative 1	Same as Alternative 1

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

All alternatives are consistent with the standards of the Helena Forest Plan, 1986 (pages II-26-27) for the most part, because they would not result in removal of a mining claimants rights to enter public land for prospecting or working valid existing mining claims. However, alternatives 2 and 3 make access for mineral activities incrementally more difficult due to road closures and decommissioning which is somewhat inconsistent with Forest Plan Standard #1 – "Consistent with the Mining and Mineral Policy Act of 1970, continue to encourage the responsible development of mineral resources on National Forest lands. Concurrently, require mitigation measures to protect surface resources. The site specific project access issues may be mitigated through negotiations with the claimant on timing and scope of their activities on a case by case basis."

All alternatives are consistent with the Forest Plan standard for future locatable and mineral materials (page II-27) where access for development of locatable and leasable minerals would be allowed on a case by case basis, minimizing resources impacts.

For more details on compliance with the Forest Plan, see appendix A and for more details on compliance with other regulations and policy, see the Minerals Report (Ihle 2012) in the project record.

Recreation

Affected Environment

Existing Condition

Forest Service recreation management is guided by the Recreation Opportunity Spectrum (ROS), which allocates and manages outdoor recreation opportunities and activities by natural resource setting. The distribution of summer ROS classes in the Blackfoot project analysis area is shown in the following table.

Table 31. Summer ROS distribution in the Blackfoot travel planning area

Category	Acres	Percent
Primitive	2,084	<1
Semi-primitive Non-motorized	29,536	13
Semi-primitive Motorized	80,242	33
Roaded Natural	129,324	54
Rural	159	<1
Total	**241,345**	**100**

The area within the Blackfoot Travel Plan offers opportunities for both motorized and non-motorized recreation across the Recreation Opportunity Spectrum (ROS). The ROS provides the framework for inventorying, planning and managing the recreation resource. The Travel Plan area predominately falls into the Roaded Natural, Semi-primitive Motorized, and Semi-primitive Non-Motorized categories due to past and current development, such as roads associated with timber harvest and mining activity, within and near the analysis area. The largest tracks of semi-primitive non-motorized areas are the Inventoried Roadless Areas (refer to the Roadless Area section).

The project area is popular for recreation throughout the year. This is due in large part to the proximity of the large communities of Helena, Great Falls, and Missoula. Lincoln is centrally located to the project area and residents contribute heavily to visitation throughout the four seasons. In addition, Forest visitors from the local communities of Helmville, Ovando, Elliston, Avon, Canyon Creek, Wolf Creek and others use the area for recreational and other purposes. Because of the tremendous fishing and hunting opportunities, the congressionally designated Scapegoat Wilderness adjacent to the project area, and the presence of a National Scenic Trail, visitors from outside the local area are common. The project area typically receives the heaviest recreation use during the late summer and fall big game hunting seasons. Winter and summer visitation is slightly less, while the spring snow melt season sees the least visitation. Firewood harvesting has increased dramatically in the area due to the availability of dead timber in close proximity to many Forest roads.

The majority of outdoor recreation in the project area occurs without benefit of developed facilities in dispersed recreation settings accessed by improved and unimproved roads. There are two developed fee campgrounds and two non-free campgrounds within the area and are popular at certain times during the use season. The popular Cummings cabin is the lone public recreation rental cabin in the area. Granite Butte lookout and Nevada Creek cabin are two administrative facilities that may be added to the Forest public rental cabin system in the future.

Motorized Use

Most non-winter motorized use takes place on open roads with the exception of a few system trails including Sauerkraut (401), Ogden Mountain (404), Stonewall (417), Stonewall Mountain (418), Gould/Helmville (467), Stonewall/Copper (485), and portions of Prickly/Nevada (487) and the CDNST (440).

Currently the Blackfoot travel planning area does not have wheeled, motorized trails identified on the Forest Transportation Inventory. However, there are approximately 53 miles of NFS trail that are currently open year-long to wheeled motorized vehicles 50 inches in width or less. In addition, there about 7 miles of unclassified trails open to wheeled, motorized travel year-long. It is important to note that the wheeled, motorized use allowed on a motorized trail, whether motorcycle, ATV, or utility terrain vehicle (UTV), must fit the existing tread width. A problem with this approach is that unless a

motorized user contacts a USFS employee or somebody with local knowledge of the trail they desire to ride, they have no way to determine the tread width from looking at the most current travel map (2006).

Non-Motorized Use

Within the BNWTP area, there are currently 69 miles of NFS non-motorized trail and an additional 2 miles of unclassified trail open to non-motorized use. There are currently no restrictions on non-motorized use, i.e. mountain bikes and stock use, within the category; hikers, stock users, and mountain bikers are currently allowed on any and all non-motorized trails with no restrictions. In addition, the Scapegoat Wilderness portal trails are currently open to mountain bikers. These portal trails are very popular with stock users headed into the Scapegoat.

Environmental Consequences

Methodology

Data was gathered to describe the existing condition and for use as baseline information to analyze direct, indirect, and cumulative effects among the alternatives. The primary information sources are listed in the References section. In addition, observations and trends noted by HNF employees are vital to this analysis.

Key recreation issues and concerns were identified as a result of public and internal scoping for this project. These then became the focus of this recreation analysis and were tracked and addressed through every alternative. Key issues include providing for quality motorized and non-motorized trail systems and determining the managed use of the CDNST within the Project area.

A trail-by-trail review was undertaken for each alternative to determine current status and effects by alternative. This analysis was predicated on GIS generated maps for each alternative and forest data.

The alternative effect analysis is both quantitative and qualitative. The extent of effects on trails and other recreation opportunities is necessarily a qualitative assessment based on past forest visitor patterns, historical trends, and the experience of the recreation specialists completing this analysis.

Effects Common to All Alternatives

The effects of implementing a designated route system for travel are common to all alternatives. Even the no-action alternative would continue to limit motorized travel to previously existing routes, as a result of the 2001 Tri-State Off-Highway Vehicle decision. Law enforcement efforts would address travel violations under any scenario.

Implementation of any travel alternative would result in the displacement of an undetermined number of Forest visitors. Displacement is the movement of one or more types of recreational user to other locations better suited to their activity of choice. Overcrowding, lack of opportunities, and a desire to avoid certain types of recreational activities are typical reasons for user displacement. Non-motorized users often wish to recreate in areas free of motorized travel. Motorized users may be displaced to other areas for their activities. The degree of user displacement would be dependent upon the travel alternative selected and cannot be predicted precisely.

Trails would be managed to established Forest Service standards to ensure consistency, user convenience, and resource protection. Designated trails, existing and proposed, would require some level of construction or improvement. Few system trails currently meet all Forest Service trail standards. The length of time required to improve all trails to existing standards can’t be determined.

While it is reasonable to assume it could take 10 years or longer, the timetable is dependent upon unknown factors such as: agency funding, supplemental grant funding, partnership/volunteer contributions, and natural environmental events.

Trailhead development would also be needed to accommodate use of the trail system. Improved trailhead facilities, primarily consisting of a graveled parking lot and signing, would greatly enhance user convenience and mitigate resource impacts. In addition, the construction of portal facilities (signing, maps, information) at several key locations may facilitate visitor use.

Each alternative allows for administrative use on routes closed to motorized use by the public. Examples of appropriate administrative use include: law enforcement, firefighting, search and rescue, noxious weed control, and reforestation. In the past, some publics have been critical of administrative use. They believe any route closed to motorized travel for the public should also be closed for administrative purposes. The fewer the number of motorized routes provided under any given alternative, the greater the likelihood for increased administrative use in the future. Each request for administrative use would be evaluated and approved on a case by case basis.

Roads that are part of the HNF road system are commonly used by motorized trail users as a link between trails open to motorized use. Currently, and under both action alternatives, all open roads identified on the HNF transportation system within the project area would be open to licensed vehicles only. Motorized mixed use is defined as designation of a NFS road for use by both highway-legal and non-highway-legal motor vehicles. Designating NFS roads for motorized mixed use requires an engineering analysis and must be completed by a qualified engineer. As it relates to the travel plan, analysis would occur on a road by road basis after completion of the planning process and implemented over time. Many forest visitors mistakenly believe that low standard roads are open to motorized mixed use. Violations resulting from OHV use of unlicensed vehicles on system roads would continue and likely increase as overall OHV use increases.

Effects Common to All Action Alternatives

Changes to management of motorized and non-motorized routes within the BNWTP area would require a period of adjustment for Forest visitors. It is reasonable to assume there would be increased violations during the initial years of implementation. Enforcement of new travel restrictions would require additional emphasis by the Helena National Forest, with assistance from Montana Fish, Wildlife and Parks, and the public. Motorized routes that are clearly identified on a MVUM should greatly reduce any confusion involving motorized travel provided that: 1) there is signage on the ground, 2) the signage matches the MVUM, and 3) users have readily available access to a MVUM and utilize the map.

New travel restrictions on non-motorized trails should enhance available opportunities for non-motorized recreation by proactively addressing conflict issues on certain trails among user groups. Under a multifaceted non-motorized travel management approach, it would be important to ensure the Forest Visitor Map is updated to reflect changes to the non-motorized trail system given that these routes are not designated on a MVUM. Additional signage of affected non-motorized routes would also be critical to gaining compliance from users.

Designation, development, and maintenance of travel routes would be more costly than under the existing condition. All action alternatives designate a greater number of system trails than currently exist. Both new and existing trails require construction/reconstruction, additional signing, and some level of route decommissioning or closing.

Spatial and Temporal Context for Effects Analysis

The cumulative effects analysis area for trails travel management is the boundary of the HNF and the trails wholly or partially within that boundary.

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Past travel decisions on the Helena National Forest for the North and South Belt Mountains and the future HNF Divide Travel Plan

Alternative 1 – No Action

Direct and Indirect Effects

Motorized Use

No changes would be made to the existing system of available public motorized routes within the analysis area. Off-route travel by wheeled motorized vehicles would only be authorized within 300 feet of existing routes to access dispersed campsites. Alternative 1 would allow the continued use of motorized vehicles on 53 miles of system trail and 7 miles of unclassified trail.

Non-Motorized Use

As explained in chapter 1, no changes would be made to the existing system of available public non-motorized routes within the Blackfoot travel planning area. As described in chapter 2 for alternative 1, approximately 71 miles of non-motorized trail would be available to hikers, stock users, and wheeled non-motorized recreationists.

Trails of Interest

Under alternative1, trails of interest in the project area (CDNST, Helmville/Gould, and Stonewall) would be managed as they are currently; no changes are proposed (see appendix G for a map of these trail corridors and the types of uses that would continue to be permitted and a summary by trail section in appendix C). The CDNST would continue to be a mix of motorized and non-motorized sections; Flesher Pass to Stemple Pass would continue as a motorcycles-only trail and Stemple Pass to the junction with the Helmville/Gould trail (467) would continue as a motorized trail (open to vehicles less than 50 inches in width with no seasonal restrictions). There would be no increase in motorized use along the CDNST. The open roads that are part of the CDNST would continue to be open to legal highway vehicles.

The management direction of the CDNST discussed in the Regulatory Framework section condones motorized use of specific trail segments if the designated vehicle class and width were allowed on that segment prior to November 10, 1978, and the use would not substantially interfere with the nature and purposes of the CDNST (FSM 2353.42). HNF map data prior to 1978 indicates the Flesher Pass to Stemple Pass segment was open to motorized use. Though it isn’t explicitly stated, the particular type of motorized use would have been two-wheel motorized because 4-wheel OHVs were not on the recreation scene yet and motorized trail vehicle width was limited by the Forest to 40 inches. The Continental Divide trail (440) between Stemple pass and the junction with the Helmville/Gould trail (467) utilized constructed roads to connect trail segments prior to November 10, 1978. Any new construction that would have occurred after 1978 to re-route the trail off an existing road would only be within the spirit of current CDNST management direction if it is open solely to non-motorized use, which is not how this segment is currently managed.

Another issue that complicates management of the CDNST between Stemple Pass and the Helmville/Gould trail is the proposed 500 acre Granite Butte Research Natural Area (RNA). This RNA is a designated N-1 area under the 1986 Helena National Forest Plan. Forest direction for N-1 areas asserts, “Dispersed recreation facilities, such as trails or trailhead developments would not be allowed”. The Forest Plan was amended to add the proposed Granite Butte RNA.

The Helmville/Gould (467) and Stonewall (417) trails (see appendix G for a map) would continue to be managed as motorized trails (open to vehicles less than 50 inches in width with no seasonal restrictions). Management of both trails is a contentious issue due to resource protection concerns. Additionally, the Helmville/Gould trail traverses the core of the Nevada Mountain Inventoried Roadless Area (IRA). Part of the Nevada Mountain IRA is designated R-1 under the 1986 Forest Plan. Current management direction does not prohibit motorized trails within designated IRAs; however, R-1 management areas include the following standard for recreation: “Motorized vehicles are not allowed in the management area. Exceptions may be allowed on a case-by-case basis where motorized vehicles are needed for legitimate mineral use.” Currently segments of trail 467 are either located within, just outside of, or serve as the boundary of this R-1 area. It appears continued motorized travel on the Helmville/Gould trail conflicts with Forest Plan management direction.

Travel Plan Complexity

Forest visitor maps would remain somewhat confusing in regard to allowable use of motorized trails, but system trails, unlike roads, currently have no seasonal use restrictions to complicate understanding and compliance.

Displacement

Displacement of non-motorized users on strictly non-motorized trails would not be an expected concern under alternative 1 unless the popularity of mountain biking increases dramatically within the Blackfoot travel planning area. It is reasonable to project the continuation or increase of motorized use on existing routes could displace an unknown percentage of non-motorized recreationists to other areas. Because there are abundant non-motorized opportunities available in the analysis area, displaced recreationists who prefer to recreate in areas with no motorized use could find other suitable areas to recreate. If motorized use in the analysis area increased substantially, some motorized users also could be displaced to other locations. Suitable areas for displaced motorized users would depend largely upon other travel plan decisions made on the Helena National Forest, adjacent National Forests, and other public lands. There are currently few public motorized recreation opportunities available on public lands near the analysis area. If sufficient OHV opportunities are not provided on the HNF, motorized enthusiasts would be forced to travel longer distances to participate in their recreational pursuits.

Cumulative Effects

Combining the effects of implementing alternative 1 with other past, present and future actions (appendix D) would not measurably affect any particular recreation user group. Ample access would remain into the analysis area as guided by the 2001 Tri State OHV Decision. Prior to 2001, most Forest System lands were open to motorized travel unless specifically closed. Through the Tri-State OHV Decision, management direction changed to prohibit off-route wheeled motorized travel. There was sound resource rationale for that decision, but it greatly altered opportunities for motorized recreation on the Helena National Forest. Wheeled motorized travel is now authorized only on existing designated routes.

Other travel decisions on the Helena National Forest for the North and South Belt Mountains resulted in new motorized use restrictions. Those decisions and future travel decisions (such as for the Divide travel plan currently in the planning stage) could result in an increase of both legitimate and unauthorized motorized use within the Blackfoot travel planning area.

Alternative 2 – Proposed Action

Project Design Features

There is no specific project design feature tied to the recreation resource. For a full list of project design features see chapter 2, page 28

Direct and Indirect Effects

Motorized Use

Alternative 2 would designate approximately 90 miles of existing roads and trails as motorized trail. The existing roads that would be designated as trails are a mix of open System and unauthorized roads (both year-long and seasonal) and closed System and unauthorized roads. There would be 2 miles of new motorized trail constructed to access viewpoints and make connections with existing roads and/or trails. Though there would be a net increase of approximately 30 miles of motorized trail opportunity, approximately 14 miles of motorized trail would be converted to non-motorized use. Unlike Alternative 1, designated motorized trails would be further split and shown on an MVUM as a trail open to vehicles less than 50 inches or open to two-wheel motorized. Within the *less than 50 inches* designation, trails would be further divided to include those open year-long and others with seasonal restrictions.

Non-Motorized Use

Miles of non-motorized trails available for quiet recreation under alternative 2 would increase in the near term from 71 to 122. The additional 51miles of non-motorized trail would be comprised of segments of previously closed and open roads in addition to some motorized trails. An additional 31 miles would be added to the total of newly constructed non-motorized trails. It is anticipated that the bulk of the new construction would not be fully implemented for 10 to 20 years due to funding constraints.

Motorized system trails proposed for conversion to non-motorized use are: Sauerkraut (401), Ogden Mountain (404), Stonewall/Copper (485), and Stonewall Mountain (418) from Snowbank Lake to the junction with Stonewall (417) trail. A 0.8 mile unclassified trail (U-447) at the head of Copper Creek currently open to motorized would also be converted to non-motorized use.

As stated previously, new travel restrictions on non-motorized trails should enhance available opportunities for non-motorized recreation by proactively addressing conflict issues on certain trails among user groups.

Table 32. Alternative 2 – proposed action: non-motorized trails by allowed use

Type of Use	Alternative 1 Existing Condition (miles)	Alternative 2 Proposed Action (miles)*
Foot only	0	0
Foot, Stock only	0	0
Foot, Mountain Bike only	0	21
Foot, Stock, Mountain Bike	71	101
Total	**71**	**122**

*Miles of new non-motorized construction are included

Trails of Interest

The CDNST, Helmville/Gould, and Stonewall trails would be managed the same under alternatives 1 and 2. The same direct and indirect effects apply under the proposed alternative (see discussion of direct and indirect effects for alternative 1).

Table 33. Alternative 2 – Proposed action: trails of interest by allowed use

Type of Use	Alternative 1 Existing Condition (miles)			Alternative 2 Proposed Action (miles)		
	CDNST (440)	Helmville/Gould (467)	Stonewall (417)	CDNST (440)	Helmville/Gould (467)	Stonewall (417)
Non-Motorized						
Foot, Stock only	0	0	0	0	0	0
Foot, Stock, Mountain Bike	31.69	0	0	31.69	0	0
Motorized						
Vehicles less that 50" - no seasonal restrictions	5.76	12.87	4.18	5.76	12.87	4.18
Vehicles less than 50” - closed 9/1-6/30	0	0	0	0	0	0
Single track - no seasonal restrictions	11.32	0	0	11.32	0	0

Travel Plan Complexity

The Travel Plan becomes more detailed in regard to trail management under alternative 2. A motor vehicle use map would be developed under the proposed action and should help alleviate the added complexity. Designating motorized trails and clearly depicting them on an MVUM would take away any speculation by the public as to the allowable use, and dates of open use.

Alternative 2 proposes a more intensively managed non-motorized trail system, thus it would be important to ensure the forest visitor map is updated to reflect changes to the non-motorized trail system given that these routes are not designated on a MVUM. Additional signage of affected motorized and non-motorized routes would also be critical to gaining compliance from users.

Displacement

Both motorized and non-motorized trail opportunities would increase under alternative 2. Additional miles of motorized routes on converted roads would be somewhat offset by a loss of single and two-track opportunities. Motorized users would be displaced from approximately 14 miles of trail available to them under the existing condition. Unless the roads being converted to motorized trails were reconstructed in a manner to create more of a trail experience, more adventurous users may look elsewhere for their experience. Overall, the motorized trail system could be characterized as less challenging under alternative 2. That being said, many inexperienced users and other OHV enthusiasts prefer less challenging routes.

There would be no displacement issues among non-motorized user groups on the 71 miles of pre-existing non-motorized system trails. However, the additional 51 miles of opportunities that would result from incorporating select roads and new non-motorized construction would not be uniformly available for all types of non-motorized use. Though all non-motorized users would benefit from additional opportunities under the proposed action, hikers and mountain bikers would realize the greatest benefit.

Cumulative Effects

Implementing alternative 2 in combination with the effects of other past, present and future actions (appendix D) would cumulatively increase transportation routes managed under the Forest system of trails. Motorized recreationists would lose approximately 14 miles of trail currently available to them, but would realize a net increase in 30 miles of designated trail that would be open to OHV less than 50 inches in width. This enlarged motorized trail system could help to absorb displaced OHV enthusiasts from other areas where motorized use has been restricted. The more extensive non-motorized trail system proposed under alternative 2 would likely result in an increase in non-motorized use, particularly mountain biking. Additional mountain bike tourists and motorized recreationists would provide economic benefits to Lincoln and other area communities.

Alternative 3

Direct and Indirect Effects

Motorized Use

As described in chapter 2, alternative 3 would designate 43 miles of existing roads and trails as motorized trail open to seasonal use only. The existing roads that would be designated as trails are a mix of open system and unauthorized roads (both year-long and seasonal) and closed system and unauthorized roads. There would be 3 miles of new motorized trail constructed to make connections with existing roads and/or trails. Approximately 47 miles of motorized trail would be converted to non-motorized use. Alternative 3 would result in a net decrease of 14 miles of motorized trail opportunity. Similar to alternative 2, designated motorized trails would be shown on an MVUM as open to vehicles less than 50 inches; however, there would be no designated two-wheel motorized trails. Unlike other alternatives, all designated motorized trail use would be restricted to July 1 - August 31 for additional resource protection during the various hunting seasons that commence September 1.

Non-Motorized Use

Miles of non-motorized trails available for quiet recreation under alternative 3 would increase from 71 to 159. The additional miles of non-motorized trail would be comprised of segments of previously closed and open roads in addition to some motorized trails. An additional 31 miles would be added to

the total of newly constructed mountain bike trail. It is anticipated that the bulk of the new mountain bike construction would not be fully implemented for 10 to 20 years due to funding constraints.

Motorized system trails proposed for conversion to non-motorized use are: Sauerkraut (401), Ogden Mountain (404), Stonewall Mountain (418), Helmville/Gould (467), Stonewall/Copper (485), and all the motorized segments of Prickly/Nevada (487) and the CDNST (440). A 0.8 mile unclassified trail (U-447) at the head of Copper Creek currently open to motorized would also be converted to non-motorized use.

Foot and stock use only would be a new allowable use category added to the trail management scheme under alternative 3. Alternative 3 would close Scapegoat Wilderness portal trails to mountain bikers. Closing the portal trails to mountain bikers would reduce conflict among non-motorized user groups and minimize wilderness trespass from wheeled non-motorized recreationists. Effected portal trails include: Silver King (420), Landers Fork (438), CDNST (440), Lone Mountain (477), Mainline (481), Arrastra Creek (482), Dry Creek (483), Porcupine Basin (488), Alice Creek (490), and Lewis & Clark Pass (493).

Table 34. Alternative 3: non-motorized trails by allowed use

Type of Use	Alternative 1 Existing Condition (miles)	Alternative 3 Proposed Action (miles)*
Foot only	0	0
Foot, Stock only	0	47
Foot, Mountain Bike only	0	18
Foot, Stock, Mountain Bike	71	94
Total	**71**	**159**

*Miles of new non-motorized construction are included

Trails of Interest

The CDNST, Helmville/Gould, and Stonewall trails would be managed differently under alternative 3. Helmville/Gould would convert entirely to a non-motorized trail open to all categories of non-motorized uses throughout the entire length of trail. A 1 mile motorized segment would remain open on the CDNST between NFS road 485 and the junction of the Helmville/Gould trail. This segment is on a road that existed prior to November 10, 1978, thus continued motorized use here would be compliant with National CDNST management direction. The remainder of the CDNST would be open to a mix of non-motorized uses depending upon the segment. With the exception of the (approximate) 1-mile segment of the CDNST within the proposed Granite Butte RNA, alternative 3 is congruent with Forest Plan and National direction regarding management of the both the CDNST and the Helmville/Gould trail. The only change to the Stonewall Trail would be limiting wheeled motorized use to the open period of July 1 - Aug 31.

Table 35. Alternative 3: Trails of Interest by Allowed Use*

	Alternative 1 Existing Condition (miles)			Alternative 3 (miles)		
Type of Use	**CDNST (440)**	**Gould/Helmville (467)**	**Stonewall (417)**	**CDNST (440)**	**Gould/Helmville (467)**	**Stonewall (417)**
Non-Motorized						
Foot, Stock only	0	0	0	19	0	0
Foot, Stock, Mountain Bike	32	0	0	28	13	0
Motorized						
Vehicles less that 50" - no seasonal restrictions	6	13	4	0	0	0
Vehicles less than 50” - closed 9/1-6/30	0	0	0	1	0	4
Single track - no seasonal restrictions	11	0	0	0	0	0

Travel Plan Complexity

Like alternative 2, alternative 3 results in a more complex travel plan in regard to trail management than the existing plan. The travel plan with respect to motorized would be simpler than alternative 2 because all motorized use would be limited to one time period (July 1 - August 31), and there would be only one use category (vehicles less than 50”) . With respect to non-motorized use, the travel plan is more complex due to the addition of another allowable use category (foot and stock use only). Though more complex in nature than alternative 1, alternative 3 does considerably more to address potential site-specific conflict between non-motorized and motorized recreationists on select trails, and among the different user groups on non-motorized trails.

Displacement

Alternative 3 has the most substantial changes proposed to both the motorized and non-motorized system of trails. The proposed changes would be expected to produce the greatest amount of user displacement.

Motorized trail opportunities would decrease under alternative 3 by 14 miles. Aside from the aforementioned (approximate) 1 mile of CDNST that would remain open to motorized use, the only other currently existing system trail that would remain available to motorized use is the Stonewall (417) trail. The additional miles of motorized trails from converted roads would offset, to a degree, the loss of previously open system trails. Two-wheel motorized enthusiasts would continue to have access to all designated motorized trails; however, with the loss of a segment of the CDNST, no designated motorized single track opportunities would be available. Overall, the motorized trail system could be characterized as having fewer, and less challenging opportunities than under the other alternatives. An unknown number of both 4-wheel and 2-wheel motorized recreationists would probably be displaced to other parts of the Forest, neighboring Forests, or other public lands.

All non-motorized users would benefit to some extent from additional opportunities under alternative 3 compared to the existing condition. An unknown number of mountain bikers would be displaced from all non-motorized wilderness portal trails, but would have ample alternative non-motorized routes available. As with alternative 2, additional opportunities offered by incorporating select roads and new non-motorized construction would not occur uniformly for all types of non-motorized use.

Once constructed, stock users would be prohibited from using 18 miles of new non-motorized trail. Overall stock user access is the same for both action alternatives and includes exclusive use with hikers on the wilderness portal trails.

Cumulative Effects

Alternative 3 reduces the amount of OHV opportunities in the Blackfoot travel planning area, so when combined with other past, present, and future actions (appendix D) would result in a cumulative decrease of motorized transportation routes managed under the Forest system of trails. Alternative 3 increases the amount of non-motorized opportunities in the analysis area, thus it would result in a cumulative increase of non-motorized transportation routes included in the National Forest System of trails.

The more extensive non-motorized trail system proposed under alternative 3 would likely result in an increase in non-motorized use, particularly mountain biking. Additional mountain bike tourists would provide economic benefits to Lincoln and other area communities; however, fewer OHV trail opportunities may displace some motorized users from the Blackfoot travel planning area taking with them their associated economic benefit to local communities.

Irreversible and Irretrievable Commitments

There are no known irreversible or irretrievable commitments associated with any of the alternatives.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

Forest Plan: All alternatives are consistent with the Forest Plan, with the possible exception of motorized use within RNAs in alternatives 1 and 2; the need for Forest Plan amendments are possible as discussed in more detail in chapter 2. :

Alternatives 1 and 2

The existing Nevada Mountain IRA is designated R-1 under the 1986 Forest Plan. R-1 management areas include the following standard for recreation: “Motorized vehicles are not allowed in the management area. Exceptions may be allowed on a case-by-case basis where motorized vehicles are needed for legitimate mineral use.” Currently segments of trail 467 are either located within, just outside of, or serve as the boundary of this R-1 area. It appears continued motorized travel on the Helmville/Gould trail conflicts with Forest Plan management direction

The CDNST between Stemple Pass and the Helmville/Gould trail is within the proposed 500 acre Granite Butte Research Natural Area (RNA). This RNA is a designated N-1 area under the 1986 Helena National Forest Plan. Forest direction for N-1 areas asserts, “Dispersed recreation facilities, such as trails or trailhead developments would not be allowed”. The Forest Plan was amended to add the proposed Granite Butte RNA. It appears that continued motorized travel on the CDNST conflicts with Forest Plan direction for the RNA and as such a Forest Plan amendment may be necessary (see chapter 2).

CDNST Comprehensive Plan, as amended: Management of the CDNST under alternatives 1 and 2 is not in accordance, to some degree, with National management direction in the CDNST Comprehensive Plan, as amended by Forest Service Manual (October 6, 2009).

Forest Service/BLM OHV Record of Decision 2001 (2001 Tri State OHV ROD): All alternatives are consistent with the ROD.

2005 Travel Management Rule, November 2005 (2005 Travel Rule): All alternatives are consistent with the 2005 Travel Management Rule.

For more details on compliance with the Forest Plan, see Appendix A and for more details on compliance with other regulations and policy, see the recreation report (Mullin 2012) in the project record.

Roadless Areas

Affected Environment

The seven inventoried roadless areas (IRAs) within the Blackfoot travel planning area are:

1. Bear-Marshall-Scapegoat-Swan (Silver King-Falls Creek) - There are approximately 88 miles of road and trail in this IRA of which 77 miles are managed by the Forest Service. The roadless area report (Payne 2012) in the project record provides more detail on how each road and trail is managed.
2. Lincoln Gulch - There is approximately 3 miles of road and trail in this IRA and all are managed by the Forest Service. The roadless area report in the project record provides more detail on how each road and trail is managed.
3. Anaconda Hill - There is approximately 48 miles of road and trail in this IRA of which 39 miles are managed by the Forest Service. The roadless area report in the project record provides more detail on how each road and trail is managed.
4. Specimen Creek - There is approximately 13 miles of road and trail in this IRA of which 11 miles are managed by the Forest Service. The roadless area report in the project record provides more detail on how each road and trail is managed.
5. Crater Mountain - There is approximately 14 miles of road and trail in this IRA of which 13 miles are managed by the Forest Service. The roadless area report in the project record provides more detail on how each road and trail is managed.
6. Ogden Mountain - There is approximately 22 miles of road and trail within this IRA, all of which are located within the forest boundary and managed by the Forest Service. The roadless area report in the project record provides more detail on how each road and trail is managed.
7. Nevada Mountain - There is approximately 46 miles of road and trail within this IRA within the forest boundary, and of this, about 45 miles are located on and managed by the Forest Service. The roadless area report in the project record provides more detail on how each road and trail is managed.

These seven IRAs were analyzed using the same characteristics of the roadless area inventory (RARE II). Additionally, there is one small but contiguous unroaded area located outside of the Specimen Creek IRA, which was also analyzed using the same characteristics as the roadless area inventory (RARE II).

Direction for the evaluation of unroaded lands for potential wilderness can be found in Forest Service Handbook (FSH) 1909.12(72). This handbook direction specifically defines wilderness characteristics for potential wilderness and how they should be evaluated.

No Forest Service regulations or laws prohibit development of unroaded areas. In addition, there are no forestwide or management area standards specific to unroaded areas. Although the one small

contiguous unroaded area is not designated as wilderness or located within IRAs, the effects of the Blackfoot Travel Plan Project is assessed using the wilderness attributes identified in FSH 1909.12 and the 1964 Wilderness Act.

These seven unroaded areas were identified as IRAs in the Helena Forest Plan, but they were not recommended as wilderness. For more details on each of these IRAs, see appendix C of the Helena National Forest Plan Final EIS. The forest plan also provides management direction that applies to these IRAs (pages III/1 through III/97).

Approximately 54 percent of the project area is located within the “Roaded Natural” recreation opportunity spectrum category, meaning that timber harvest or other surface use practices are evident and motorized vehicles are permitted on all parts of the road system.

Roadless Area Review and Evaluation (RARE II)

The RARE II inventory was completed in anticipation of development of the forest plan, which was completed in 1986. Appendix C of the forest plan EIS analyzed all of the IRAs and rated them for wilderness suitability. Some of the lands were ultimately selected in the forest plan decision as recommended wilderness (P-3 management areas totaling 32,900 acres). These were in addition to the designated wilderness areas (Scapegoat and Gates of the Mountains totaling 111,600 acres). Some inventoried lands were not recommended for wilderness, but instead have forest plan direction to maintain their unroaded character for semi-primitive recreation and for wildlife values (R-1 totaling 34,300 acres and E-2 totaling 22,200 acres). There are two R-1 areas within the project boundary (Silver King/Falls Creek and Nevada Mountain). These R-1 areas were designated as undeveloped land suited for dispersed recreation. They provide opportunities for semi-primitive non-motorized recreation and are characterized predominantly by natural or natural-appearing environments where there is a high probability of isolation from man’s activity. Both R-1 management areas are located within designated IRAs.

2001 Roadless Rule

The 2001 Roadless Rule provides management direction for timber cutting, sale, or removal, and road construction/reconstruction (36 CFR 294 Subpart B (66 FR 3244) January 12, 2001). Although the Roadless Rule has been subject to continuous litigation, at the writing of this report it remains in effect. The Roadless Rule does not apply to motorized or non-motorized trails (66 FR 3251).

Environmental Consequences

Methodology

We used Helena National Forest GIS data and local resource-specific knowledge of the Blackfoot Travel Plan project area in this analysis.

Unroaded landscapes have a number of values or features which may separate them from other forest landscapes. The purpose of the analysis on the roadless resource is to disclose potential effects to roadless and wilderness attributes and determine if, or to what extent, it might affect future consideration for wilderness recommendations.

FSH 1909.12 (72) identifies characteristics used to determine the capability of an unroaded area to be considered for future wilderness designation. The project area uses these characteristics as indicators which measure effects of the project upon unroaded lands within the project area. However, there are

no established thresholds that apply to these indicators. Rather, the indicators are evaluated along a continuum to determine the amount of change and potential affects upon wilderness characteristics.

- Natural – The extent to which long-term ecological processes are intact and operating.
- Undeveloped – The degree to which the impacts documented in natural integrity are apparent to most visitors.
- Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation – Solitude is a personal, subjective value defined as the isolation from sights, sounds and presence of others, and from developments and evidence of humans. Primitive recreation is characterized by meeting nature on its own terms, without comfort and convenience of facilities.
- Special Features – Unique ecological, geographical, scenic, and historical features of an area.
- Manageability – The ability to manage an area for wilderness consideration and maintain wilderness attributes.

This analysis focuses on the potential effects of project activities on wilderness characteristics as defined in FSH 1909.12 (72.1) by comparing the alternatives to the existing baseline. It is recognized that expanses of unroaded lands, whether officially "inventoried" or not, provide other resource values as well. In addition to wilderness attributes, the IRAs and contiguous unroaded area may contain roadless characteristics. Table 36 shows the crosswalk between the wilderness attributes and the roadless area characteristics. Potential project effects to other roadless values are evaluated elsewhere as they relate to specific resources. This analysis focuses on wilderness characteristics and compares any changes to the existing conditions of the IRAs, as well as the one contiguous unroaded area within the project boundary.

Table 36. Crosswalk between wilderness attributes and roadless area characteristics

Wilderness Attributes	Roadless Area Characteristics
Natural (ecological systems are substantially free from the effects of modern civilization and generally appear to have been affected by forces of nature)	High quality or undisturbed soil, water and air; Sources of drinking water; Diversity of plant and animal communities; Habitat for threatened, endangered, proposed, candidate, and sensitive species for those species dependent on large, undisturbed areas of land; Reference landscapes
Undeveloped (degree to which the area is without permanent improvements or human habitation)	Natural-appearing landscapes with high scenic quality
Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation Solitude: opportunity to experience isolation from the sights, sounds, and presence of others from the developments and evidence of humans Primitive and Unconfined Recreation: opportunity to experience isolation from the evidence of humans, to feel a part of nature to have a vastness of scale, and a degree of challenge and risk while using outdoor skills	Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation
Special Features and Values (capability of the area to provide other values such as those with geologic, scientific, educational, scenic, historical, or cultural significance)	Traditional cultural properties and sacred sites; and other locally identified unique characteristics

Wilderness Attributes	Roadless Area Characteristics
Manageability (the ability of the Forest Service to manage an area to meet the size criteria and the elements of wilderness)	No criteria

The purpose of this analysis is to evaluate the environmental consequences of the proposed action and alternatives on wilderness characteristics of IRAs and contiguous roadless area expanse.

Semi-primitive motorized recreation is an acceptable activity within IRAs, as motorized trails and associated use are not prohibited within IRAs under the 2001 Roadless Rule (66 FR 3251).

This effects analysis considers the seven IRAs (and one contiguous unroaded area) within the Blackfoot travel planning area. Effects are measured using the following indicators:

1. miles of motorized routes (roads or trails open to wheeled motorized travel) in IRAs,
2. miles of non-motorized routes in IRAs, and
3. potential changes to wilderness attributes of IRAs and unroaded areas.

Effects Common to All Alternatives

Routine maintenance and reconstruction and construction of non-motorized and motorized trails could include the use of both mechanized equipment and hand tools. This could indirectly affect the sense of solitude and naturalness while these activities occur. The effect of trail work would be short-term and result in minimal impacts to wilderness characteristics. However, the better the condition of the trails, the more popular they often become. Increased use of trails within IRAs could impact the opportunity for solitude.

Effects Common to All Action Alternatives

Under the two action alternatives, some of the wilderness characteristics within IRAs and contiguous unroaded areas would be impacted. The extent of those impacts is dependent upon the number of motorized and non-motorized routes that would be authorized under each alternative. Any change in the type and amount of trail use within IRAs or unroaded area may cause some displacement of forest users.

Alternative 1 – No Action

Direct and Indirect Effects

The no-action alternative would leave the current unroaded character unchanged from the descriptions presented in the Affected Environment section. Existing wilderness characteristics would not be enhanced or diminished in any of the IRAs or unroaded areas.

Measurement Indicators

There are approximately 76 miles of motorized routes in IRAs currently and approximately 71 miles of non-motorized routes and this would not change with implementation of alternative 1.

Cumulative Effects

Because there would be no direct or indirect effects from implementing alternative 1, there would be no cumulative effects.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The Blackfoot Travel Plan project area consists of forest plan management area designations which allow for wheeled motorized routes. As described in more detail in chapter 2, the current travel plan is not in compliance with forest plan direction in management areas N-1 and R-1. A forest plan amendment may be necessary under alternative 1 to ensure consistency with the Helena Forest Plan. Compliance of all forest plan standards associated with recreation could be achieved through the travel plan decision or a revision of the existing standards.

Potential effects from this travel plan proposal would not harm or degrade the identified wilderness characteristics of the IRAs.

Other Relevant Mandatory Disclosures

There would be no irreversible or irretrievable commitments with implementing alternative 1 because any roads or trails authorized under this travel plan decision could be obliterated and revegetated.

Summary of Effects

Alternative 1 would not alter the existing conditions of the seven IRAs and one contiguous unroaded area.

Alternative 2 – Proposed Action

Design Features and Mitigation Measures

There are no project design features specific to unroaded areas; all design features are listed in chapter 2.

Direct and Indirect Effects

Under alternative 2, there would be an overall decrease of 18 miles of motorized routes within IRAs and an increase of 18 miles of non-motorized routes. This change would enhance the undeveloped character and opportunity for solitude within several of the IRAs. If alternative 2 were implemented, there would be a total of 58 miles of motorized routes in IRAs and approximately 89 miles of non-motorized routes in IRAs. A discussion of the proposed changes in each IRA, including effects to wilderness attributes, is included below. The alternative maps in appendix G show the boundaries of each IRA.

Bear-Marshall-Scapegoat and Silver King-Falls Creek IRA

The miles of motorized routes within this IRA would decrease by approximately 8 miles (this involves the closure of several small road segments along the IRA boundary) and the miles of non-motorized routes would increase by approximately 10 miles (this involves the Stonewall/Copper #485 and Stonewall Mountain #418 trails).

Implementation of alternative 2 would result in the designation of about 10 miles of mountain bike routes within this IRA and includes 1 mile of new trail designated solely for mountain bikes and pedestrians.

Wilderness Attributes

Implementing alternative 2 would not change the natural character or the special features and values of the Bear-Marshall-Scapegoat and Silver King-Falls Creek IRA. The undeveloped character would change somewhat because approximately 1.5 miles of existing road would be stored and 4.8 miles would be decommissioned, enhancing the undeveloped character of this IRA.

With a reduction in motorized routes and an increase in non-motorized trails, the opportunity for solitude and primitive recreation would be enhanced under alternative 2. In the long term, the reduction in motorized access into this IRA would most likely facilitate improved management of the IRA. Initially the Forest Service may need to increase signing and enforcement to ensure compliance of any new motorized restrictions.

Lincoln Gulch IRA

There is currently only 0.2 mile of motorized route within this IRA and implementing alternative 2 would eliminate this route. Implementation of alternative 2 would result in the designation of about 5 miles of new mountain bike routes within this IRA designated solely for mountain bikes and pedestrians.

Wilderness Attributes

Implementing alternative 2 would not change the natural character, special features and values or manageability of the Lincoln Gulch IRA. The undeveloped character would change somewhat because approximately 0.3 mile of existing road would be stored, slightly enhancing the undeveloped character of this IRA but the construction and use of 5 miles of new mountain bike trail would slightly decrease the undeveloped character.

Although mountain biking is a non-motorized activity, that use may diminish the opportunity for solitude and primitive recreation in a portion of the IRA.

Anaconda Hill IRA

The miles of motorized routes within this IRA would decrease by approximately 4.4 miles; only short spurs, about 0.4 mile in total length, which are currently present along the west border of the IRA, would continue to be open for motorized travel. The existing 11-mile segment of the Continental Divide National Scenic Trail, which passes through this IRA (Rodgers Pass to Flesher Pass), would continue to be managed for non-motorized use as currently exists. There are no designated mountain bike trails within this IRA and this would not change with implementation of alternative 2.

Wilderness Attributes

Implementing alternative 2 would not change the natural character or the special features and values of the Anaconda Hill IRA. The undeveloped character would change somewhat because approximately 4.4 miles of existing road would be closed and 8.6 miles of existing road would be stored, enhancing the undeveloped character of this IRA.

With a closure and storage of existing roads, the opportunity for solitude and primitive recreation would be enhanced under alternative 2, but this closure would reduce the ability to manage this IRA and protect existing wilderness characteristics.

Specimen Creek IRA

The miles of motorized routes within this IRA would decrease by approximately 0.75 mile. The Continental Divide National Scenic Trail passes through this IRA and would continue to be managed

for non-motorized use (including mountain bikes) and motorcycles. Because this segment of trail was open to single-track motorized use (less than 40 inches wide) prior to 1978, keeping this use under alternative 2 remains consistent with current management direction for this trail; mountain bike use proposed for this segment of the Continental Divide National Scenic Trail is also consistent with national direction since this use would not interfere with the nature and purpose of the trail.

Implementation of this alternative would result in the designation of about 3.6 miles of mountain bike routes within this IRA.

Wilderness Attributes

Implementing alternative 2 would not change the natural character or the special features and values of the Specimen Creek IRA. The undeveloped character would change somewhat because approximately 0.9 mile of existing road would be stored, slightly enhancing the undeveloped character of this IRA.

The designation of 3.6 miles of mountain bike routes may decrease somewhat the opportunity for solitude and primitive recreation, but the small reduction of motorized routes could slightly improve the ability to manage the IRA to protect its wilderness character.

Crater Mountain IRA

The miles of motorized routes within this IRA would decrease by approximately 1 mile and non-motorized routes would increase; implementing alternative 2 would result in the designation of about 6.7 miles of new mountain bike routes with most of this (6.6 miles) being new construction.

Wilderness Attributes

Implementing alternative 2 would not change the natural character or the special features and values of the Specimen Creek IRA. The undeveloped character would change somewhat because approximately 1 mile of existing road would be stored and approximately 2.9 miles or existing road would be decommissioned, enhancing the undeveloped character of this IRA.

Although mountain biking is a non-motorized activity, this use may diminish the opportunity for solitude and primitive recreation in this IRA. But the reduction of motorized routes through storage and decommissioning could slightly improve the ability to manage the IRA to protect its wilderness character.

Ogden Mountain IRA

The miles of motorized routes would decrease by approximately 4 miles and two existing trail segments (Sauerkraut Trail # 401 and Ogden Mountain Trail # 404) would be managed for non-motorized use. There would be no designated mountain bike routes within this IRA.

Wilderness Attributes

Implementing alternative 2 would not change the natural character or special features and values of the Ogden Mountain IRA. The undeveloped character could change somewhat because approximately 1.2 miles of existing road would be stored. The Roadless Report (Payne 2012) in the project record provides more detail on how each road and trail is managed.

The reduction of about 4 miles of motorized routes could enhance the wilderness character by increasing opportunities for solitude and primitive recreation and improving the ability to manage the IRA and protect its wilderness characteristics.

Nevada Mountain IRA

The miles of motorized routes would decrease by only 0.2 mile and non-motorized routes would increase by about 1 mile, to a total of 18 miles of non-motorized trails. The popular Helmville/Gould Trail # 467 would be managed for both motorized use and mountain bikes. Implementing alternative 2 would however, result in the designation of about 11.6 miles of new mountain bike routes in the IRA, including approximately 0.5 mile of new trail designated solely for mountain bikes and pedestrians.

Wilderness Attributes

Implementing alternative 2 would not change the natural character, special features or manageability of the Nevada Mountain IRA. The undeveloped character could change somewhat based on the storage of 0.2 mile of existing road.

The designation of about 12 miles of mountain bike routes within this IRA could increase use and thereby reduce the opportunity for solitude.

Cumulative Effects

The cumulative effects analysis area boundary for the unroaded analysis is the same as the boundary for the IRAs.

Implementing alternative 2 in combination with other past, present, and reasonably foreseeable future actions (appendix D), would result in some minor impacts to roadless character and wilderness characteristics. While implementing alternative 2 would impact forest resources through road closure, storage and decommissioning, and new road and trail construction, these effects would not result in an overall negative impact to the roadless character of the seven IRAs and, for several of the IRAs (as discussed above), these actions would result in an overall beneficial impact to wilderness characteristics. Combining these direct and indirect effects with other activities described in appendix D would result in cumulative effects, as follows:

Livestock grazing - Livestock affects wilderness character by the presence of structures used to manage the livestock: gates, fences, and water improvements. The presence of livestock also affects the characteristics of remoteness and solitude. In addition, as a result of the grazing, landscapes may appear to have shorter grasses. However, overall, these impacts would have minimal effects to the wilderness characteristics of the IRAs. The amount of grazing which occurs in the Bear-Marshall-Scapegoat-Swan IRA and Nevada Mountain IRA is minimal.

Noxious Weed Treatments - Noxious weeds are typically treated along roads using mechanized equipment. Hand treatments can occur in patches that are off the roads. Livestock and biological agents may also be used. The presence of mechanized equipment and livestock could affect a user's sense of remoteness and solitude. Using hand treatments and biological agents would have a minimal effect. The sight of dead weeds, regardless of treatment type, may also affect one's sense of remoteness and solitude. However, overall, these effects would have minimal impacts to the wilderness characteristics of the IRAs.

A Record of Decision for Noxious Weed Treatment on the west side of the Helena National Forest was signed in November 2006. That decision did allow aerial spraying of noxious weeds in the Ogden Mountain and Nevada Mountain IRAs. When that activity occurs, about every three years, solitude within those IRAs would be diminished.

Hazard Tree Removal - In an effort to ensure public safety, a Forestwide Hazardous Tree Removal Project was initiated. Approximately 12 miles of National Forest System roads within the project area IRAs were approved for hazard tree removal. Hazard trees within 125 feet on either side of the road were felled. If hazard trees were removed along the entire 250–foot-wide segment of those 12 miles of road, approximately 364 acres of IRAs would be impacted. It's important to note that hazard trees were not uniformly present along all 12 miles of those roads.

Roadside hazard tree removal opens the road corridor, making the road(s) more visible from within and around the IRAs. The sights and sounds of the mechanized equipment used during operations also have a short-term impact. These could affect the sense of naturalness and solitude. Over time, as the vegetation and trees grow back within the road corridor, the effects would decrease.

Road Maintenance - There are numerous roads within and adjacent to the IRAs which require periodic road maintenance. The sight and sound of operating road equipment may indirectly affect the sense of solitude or remoteness. However, these effects are short-term and the overall wilderness character would not be affected by these activities.

Private Timber Harvest - Private timber harvest on lands within sight distance of IRAs would further reduce the natural integrity and feelings of solitude and remoteness. Associated harvest activities, including hauling, would have an impact upon the natural integrity, and sense of solitude and remoteness in adjacent IRAs.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The Blackfoot Travel Plan project area consists of forest plan management area designations which allow for wheeled motorized routes. As described in more detail in chapter 2, the current travel plan is not in compliance with forest plan direction in management areas N-1 and R-1. A forest plan amendment may be necessary under alternative 2 to ensure consistency with the Helena Forest Plan. Compliance of all forest plan standards associated with recreation could be achieved through the travel plan decision or a revision of the existing standards. Potential effects from this travel plan proposal would not harm or degrade the identified wilderness characteristics of the IRAs.

Other Relevant Mandatory Disclosures

There would be no irreversible or irretrievable commitments with implementing alternative 2 because any roads or trails authorized under this travel plan decision could be obliterated and revegetated.

Summary of Effects

As shown in the summary table at the end of chapter 2 and described in detail above, alternative 2 would improve three wilderness characteristics of the IRAs. Reducing the number of miles of wheeled motorized routes would enhance the following wilderness characteristics: natural, undeveloped, and outstanding opportunities for solitude. The manageability of the IRAs would not substantially change due to the presence of remaining roads, private lands, mining claims, and topography. However, alternative 3 would improve the quality of wilderness characteristics more than alternative 2, because it provides a greater reduction in the number of wheeled motorized routes within the IRAs.

Alternative 3

Design Features and Mitigation Measures

There are no project design features specific to unroaded areas; all design features are listed in chapter 2.

Direct and Indirect Effects

Under alternative 3, there would be an overall decrease of 45 miles of motorized routes within IRAs and an increase in 24 miles of non-motorized routes; an increase of approximately 6 miles more than alternative 2.

This change would enhance the undeveloped character and opportunity for solitude within several of the IRAs. If alternative 3 were implemented, there would be a total of 31 miles of motorized routes in IRAs and approximately 95 miles of non-motorized routes in IRAs. A discussion of the proposed changes in each IRA, including effects to wilderness attributes, is included below. The alternative maps in appendix G show the boundaries of each IRA.

Bear-Marshall-Scapegoat and Silver King-Falls Creek IRA

As with alternative 2, the miles of motorized routes within this IRA would decrease by approximately 11 miles under alternative 3 (this involves the closure of several small road segments along the IRA boundary). Some existing spur roads in the Alice Creek drainage would be closed and decommissioned. The miles of non-motorized routes would increase by approximately 10 miles (this involves the Stonewall/Copper #485 and Stonewall Mountain #418 trails).

Implementation of alternative 3 would result in the designation of about 10 miles of mountain bike routes within this IRA and includes 1 mile of new trail designated solely for mountain bikes and pedestrians.

Wilderness Attributes

Implementing alternative 3 would not change the natural character or the special features and values of the Bear-Marshall-Scapegoat and Silver King-Falls Creek IRA. The undeveloped character would change somewhat because approximately 1.3 miles of existing road would be stored and 7.3 miles would be decommissioned, enhancing the undeveloped character of this IRA.

With a reduction in motorized routes and an increase in non-motorized trails, the opportunity for solitude and primitive recreation would be enhanced under alternative 3. In the long term, the reduction in motorized access into this IRA would most likely facilitate improved management of the IRA. Initially, the Forest Service may need to increase signing and enforcement to ensure compliance with any new motorized restrictions.

Lincoln Gulch IRA

There is currently only 0.2 mile of motorized route within this IRA, and implementing alternative 3 would eliminate this route. Implementation of alternative 3 would result in the designation of about 4 miles of new mountain bike routes within this IRA

Wilderness Attributes

Implementing alternative 3 would not change the natural character, special features and values, or manageability of the Lincoln Gulch IRA. The undeveloped character would change somewhat

because approximately 0.3 mile of existing road would be stored and approximately 1.6 miles would be decommissioned, enhancing the undeveloped character of this IRA.

Although mountain biking is a non-motorized activity, that use may diminish the opportunity for solitude and primitive recreation in a portion of the IRA.

Anaconda Hill IRA

The miles of motorized routes within this IRA would decrease by approximately 3.4 miles; the remaining 1.4 miles of open motorized routes would be located near the middle of the IRA. The existing 11-mile segment of the Continental Divide National Scenic Trail, which passes through this IRA (Rodgers Pass to Flesher Pass), would continue to be managed for non-motorized use as currently exists. There are no designated mountain bike trails within this IRA, and this would not change with implementation of alternative 3.

Wilderness Attributes

Implementing alternative 3 would not change the natural character or the special features and values of the Anaconda Hill IRA. The undeveloped character would change substantially because approximately 3.4 miles of existing road would be closed and 25.1 miles of existing road would be decommissioned. However, the presence of 1.4 miles of road near the middle of this IRA could somewhat negate this benefit.

With the closure and decommissioning of existing roads, the opportunity for solitude and primitive recreation would be greatly enhanced under alternative 3.

Specimen Creek IRA

The miles of motorized routes within this IRA would decrease by approximately 6 miles; only a short 0.2-mile segment of motorized trail would remain open to wheeled motorized use on the border of the IRA. The 5-mile Continental Divide National Scenic Trail segment located between Flesher Pass and Stemple Pass through this IRA would be closed to motorized vehicles (motorcycles). Although motorcycle use on this trail segment is likely not frequent, it has been an established activity for over 30 years and this would change with implementation of alternative 3.

Like alternative 2, implementation of this alternative would result in the designation of about 3.6 miles of mountain bike routes within this IRA.

Wilderness Attributes

Implementing alternative 3 would not change the natural character or the special features and values of the Specimen Creek IRA. The undeveloped character would change somewhat because approximately 6 miles of existing road would be stored, 9.4 miles of road would be decommissioned, and motorcycle use along the Continental Divide National Scenic Trail in this IRA would be prohibited, enhancing the undeveloped character of this IRA. These changes would also increase the opportunity for solitude and primitive recreation and improve the ability to manage the IRA to protect its wilderness character.

Crater Mountain IRA

Like for alternative 2, the miles of motorized routes within this IRA would decrease by approximately 1 mile under alternative 3 and non-motorized routes would increase; implementing alternative 3 would result in the construction and designation of about 6 miles of new mountain bike routes.

Wilderness Attributes

Implementing alternative 3 would not change the natural character or the special features and values of the Specimen Creek IRA. The undeveloped character would change somewhat because approximately 1 mile of existing road would be stored and approximately 11.5 miles or existing road would be decommissioned, enhancing the undeveloped character of this IRA.

Although mountain biking is a non-motorized activity, this use may diminish the opportunity for solitude and primitive recreation in this IRA, but the reduction of motorized routes through storage and decommissioning could improve the ability to manage the IRA to protect its wilderness character.

Ogden Mountain IRA

As with alternative 2, the miles of motorized routes would decrease by approximately 4 miles under alternative 3 and two existing trail segments (Sauerkraut Trail # 401 and Ogden Mountain Trail # 404) would be managed for non-motorized use. There would be no designated mountain bike routes within this IRA.

Wilderness Attributes

Implementing alternative 3 would not change the natural character or special features and values of the Ogden Mountain IRA. The undeveloped character could change somewhat because approximately 1.2 miles of existing road would be stored and approximately 1.6 miles of road would be decommissioned. The Roadless Report in the project record provides more detail on how each road and trail is managed.

The reduction of about 4 miles of motorized routes along with decommissioning could enhance the wilderness character by increasing opportunities for solitude and primitive recreation and improving the ability to manage the IRA and protect its wilderness characteristics.

Nevada Mountain IRA

The miles of motorized routes would decrease by approximately 15 miles (primarily reflected in changes to the Helmville/Gould Trail #467 and Prickly/Nevada Trail #487; both trails would be managed for non-motorized use) and non-motorized routes would increase by about 17 miles, to a total of 32 miles of non-motorized trails. Motorized use on the Helmville/Gould Trail # 467 has been popular but controversial over the past 30 years; this trail provides a key link to other motorized opportunities on the Lincoln and Helena Ranger Districts. Prohibiting motorized use under alternative 3 would displace existing users to other areas.

As with alternative 2, implementing alternative 3 would result in the designation of about 11.6 miles of new mountain bike routes in the IRA, including approximately 0.5 mile of new trail designated solely for mountain bikes and pedestrians.

Wilderness Attributes

Implementing alternative 3 would not change the natural character or special features of the Nevada Mountain IRA. The undeveloped character could change somewhat based on the storage of 0.2 mile of existing road and the decommissioning of 1.9 miles of existing road. The reduction of approximately 15 miles of motorized routes would enhance the undeveloped character and increase the manageability of wilderness characteristics, but the opportunity for primitive recreation may be limited if the Helmville/Gould trail becomes a popular mountain bike route.

Cumulative Effects

Cumulative effects would be the same as those described for alternative 2.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The Blackfoot Travel Plan project area consists of forest plan management area designations which allow for wheeled motorized routes. As described in more detail in chapter 2, the current travel plan is not in compliance with forest plan direction in management areas N-1 and R-1. A forest plan amendment may be necessary under alternative 3 to ensure consistency with the Helena Forest Plan. Compliance of all forest plan standards associated with recreation could be achieved through the travel plan decision or a revision of the existing standards.

Potential effects from this travel plan proposal would not harm or degrade the identified wilderness characteristics of the IRAs.

For more details on compliance with the Helena Forest Plan, see appendix A; and for more details on compliance with other regulations and policy, see the roadless area report (Payne 2012) in the project record.

Other Relevant Mandatory Disclosures

There would be no irreversible or irretrievable commitments with implementing alternatives because any roads or trails authorized under this travel plan decision could be obliterated and revegetated.

Summary of Effects

As shown in the summary table at the end of chapter 2 and described in detail above, alternative 3 would improve three wilderness characteristics of the IRAs. Reducing the number of miles of wheeled motorized routes would enhance the following wilderness characteristics: natural, undeveloped, and outstanding opportunities for solitude. The manageability of the IRAs would not substantially change due to the presence of remaining roads, private lands, mining claims, and topography. However, alternative 3 would improve the quality of wilderness characteristics more than alternative 2 because it provides a greater reduction in the number of wheeled motorized routes within the inventoried roadless areas.

Terrestrial Wildlife

This section analyzes the potential effects of the proposed Blackfoot Travel Project on terrestrial wildlife and their habitats including the following:

- Federally-listed threatened, endangered, candidate and proposed species
- Forest Service Rocky Mountain Region (R1) sensitive species
- Helena National Forest Management Indicator Species (MIS)
- Other species of concern
- Migratory birds

Forest roads and overall road density have the potential to affect the quality of wildlife habitat, including habitat security for a variety of species such as grizzly bears, mountain goats and elk. Forest roads and overall road density have the potential to affect the quality of wildlife habitat used for

dispersal and travel. All are addressed in this section, which summarizes the wildlife specialist report and biological evaluation in the project record.

We discuss the species considered and evaluated for this project. Next we explain how roads, trails and vehicles affect wildlife in general. Unless noted, these effects apply to all species discussed. Then for each species or group of species, we describe habitat. We then state the direct, indirect and cumulative effects common to all species, followed by the anticipated effects from each alternative and cumulative effects for all alternatives, by specie. Finally, we summarize species determinations.

Regulatory Framework

Current management direction regarding desired future conditions for threatened, endangered and sensitive species, as well as MIS and migratory birds, on the Helena National Forest can be found in the following documents, on file at the District office:

- Forest Service Manual and Handbooks (FSM/H 2670);
- National Forest Management Act 1976 (NFMA);
- Endangered Species Act (ESA) and the Joint Counterpart Endangered Species Act Section 7 Consultation Regulations (50 CFR Part 402);
- National Environmental Policy Act 1969 (NEPA);
- Migratory Bird Treaty Act of 1918 as amended (16U.S.C.668-668d);
- Northern Region (R1) Sensitive Species List (02/2011 update); and
- Helena National Forest Land and Resource Management Plan (LRMP). The Helena National Forest Plan provides standards and guidelines that set the framework for management of wildlife species. Forestwide standards provide direction for wildlife management and are identified on pages II/17 – II/21. The standards that apply to the alternatives are analyzed for all alternatives. This plan also identifies Management Areas (MAs), and provides direction for each. MA direction relative to wildlife is summarized below:
    - M-1 - Management practices to maintain or improve wildlife habitat will be permitted where necessary to meet the objectives of adjacent management areas.
    - N1 – contains Research Natural Areas (RNAs); wildlife habitat improvements are not permitted.
    - L-1 - Specific wildlife and fisheries needs will be identified and considered when developing allotment management plans, provided the needs are compatible with area goals. Habitat improvement projects will be scheduled when they would help achieve area goals.
    - L2 – Wildlife habitat improvement practices, including road management, prescribed fire, and other techniques, may be used to maintain and/or enhance the quality of big game winter range. Projects will be coordinated for livestock and big game needs. Maintain adequate thermal and hiding cover adjacent to forage areas. Generally this means providing at least 25 percent thermal cover, where available, on identified winter range.
    - R1 – Habitat improvement projects, such as prescribed fire and water developments, may be used to maintain or improve the fish and wildlife habitat, if the projects are compatible with the area’s goals.
    - P1 – within Scapegoat wilderness, not within project area, but used as wildlife analysis area for various species

- A1 – includes Lincoln Ranger District office area; habitat improvement activities will emphasize non-game species
- T-1 - Wildlife and fisheries habitat improvement projects may be implemented, provided they are compatible with the management area goals.
- T-3 - Maintain a minimum of 35 percent hiding cover for big game. Maintain thermal cover adjacent to forage areas. Wildlife habitat improvement practices, including road management, prescribed fire, and timber harvest, may be used to maintain and/or enhance the quality of big game summer habitat. Openings created by timber harvest will be reforested to the extent necessary to meeting hiding cover requirements of big game before harvesting adjacent areas.
- T4 – Where elk, habitat exists, project design will incorporate management practices to maintain or enhance summer and winter habitat, to the extent that the VQOs for the area are met. Wildlife and fisheries habitat improvement projects may be implemented, provided they are compatible with the management area goals.
- T-5 - Wildlife and fisheries habitat improvement projects may be implemented, provided they are compatible with the management area goals. Maintain adequate thermal and hiding cover adjacent to forage areas, provided timber harvest volumes are not significantly reduced over the rotation period.
- W-1 - Wildlife habitat improvement practices, including road management, prescribed fire, and other techniques, will be used to maintain and/or enhance the quality of big game and nongame habitat. Maintain adequate thermal and hiding cover adjacent to forage areas. Generally this means providing at least 25 percent cover, where available, on identified winter range.
- W-2 - Most new roads and about 50 percent of existing roads will be closed, at least seasonally. Wildlife habitat improvement practices, including road management, prescribed fire, and other techniques, will be used to maintain and/or enhance the quality of big game calving and summer habitat. Maintain adequate thermal and hiding cover adjacent to forage areas.

Species Considered and Evaluated

Table 37 that follows lists the species considered for this project. The list is comprised of threatened, endangered, candidate, proposed, Forest Service Regional Forester's (R1) Sensitive species, as well as Management Indicator Species (MIS) listed in the Forest Plan (1986) and migratory bird species, which may occur within the project area. The list was derived from:

- The USFWS Threatened, Endangered, and Proposed Species list (November 29, 2012);
- USDA Forest Service Regional Forester's (R1) Sensitive Species (02/2011);
- Migratory Bird Treaty Act (MBTA) of 1918 and Executive Order 13186; and
- Management indicator species (MIS) list from the Helena National Forest Plan (1986).

This document evaluates impacts only for species with the potential to occur on the Helena National Forest, Lincoln Ranger District. Criteria used to exclude species from further analysis included the following: (1) no habitat exists for the species, (2) it is unlikely (based on known habitat requirements) that the species existed in the area, and (3) potentially suitable habitat for the species within the project area would not be affected by the project.

No further analyses will be done for excluded species: bald eagle (*Haliaeetus leucocephalus*); peregrine falcon (*Falco peregrinus anatum*); Harlequin duck (*Histrionicus histrionicus*); northern bog lemming (*Synaptomys borealis*); Townsend's big-eared bat (*Plecotus townsendi*); northern leopard frog (*Rana pipiens*); plains spadefoot (*Spea bombifrons*); and bighorn sheep (*Orvis Canadensis*).

The status codes for table 37 are as follows: T=Threatened; S=Sensitive; C= Candidate; MIS= Management Indicator Species; and SOC=Species of Concern

Table 37. Species known or suspected to occur within the influence area of the proposed action

Species	Status	Occurrence in Project Area	Species Excluded	Rationale
Grizzly Bear *(Ursus arctos horribilis)*	T	Potential for transient or resident bears throughout the project area. North half of project area within NCDE Recovery Zone, south half within mapped grizzly bear distribution zone.		
Canada Lynx *(Lynx Canadensis)*	T w/ Critical habitat	Potential for transient or resident lynx throughout the project area. Project area within “occupied” lynx habitat and designated “critical” habitat.		
Gray wolf *(Canis lupus)*	S	Known packs are present within the project area.		
Fisher *(Martes pennant)*	S	Prefer moist mixed coniferous forested types (including mature and old-growth spruce/fir at low- to- mid elevations), riparian/forest ecotones, and secure denning habitat. Rare occurrences on the Helena NF. Habitat suitability low, likelihood of occurrence low. Three documented occurrences within past 10 years along western edge of project area.		
Wolverine *(Gulo gulo)*	S & C	Confirmed wolverine occurrences and potential denning in project area. The greatest concentration of modeled denning habitat occurs within the Scapegoat Wilderness and along its southern boundary.		

Species	Status	Occurrence in Project Area	Species Excluded	Rationale
Bald eagle *(Haliaeetus leucocephalus)*	S	Occasionally reported in the Blackfoot landscape but only as transients. Potential nesting, roosting, and foraging habitat is available on the Forest, in particular, along the upper Little Blackfoot River, but to date no eagles have chosen to occupy it. The Montana Bald Eagle Management Plan contains guidelines for road management and human access around nest sites that would guide management if eagles were to establish themselves in this part of the Forest. One known reproductive territory in Blackfoot Valley on State owned lands outside project boundary.	X	The single known nest location is approximately 0.50 mile from a county road that remains open yearlong to wheeled vehicles. Bald eagles would not be deterred from foraging and using potential nesting habitat along the Blackfoot river as normal vehicle use would occur in the river/Hwy corridor west of Lincoln. Primary foraging substrate is water. There are no access changes along river corridor because it is privately owned and, therefore, there would be no habitat effect.
Peregrine falcon *(Falco peregrinus anatum)*	S	Reported in the Blackfoot landscape but only as migrants. Most observations have been during the spring and fall migration periods, and no eyries are known to have been established. Since 1989, when the falcons returned to the HNF, all known eyries have been in the Big Belt Range.	X	Management of these birds focuses on keeping recreationists off the cliffs where the eyries are established. Travel management is seldom an issue.
Harlequin duck *(Histrionicus histrionicus)*	S	Suspected to be present on the Lincoln District of the HNF, but none have been reported in the Blackfoot landscape.	X	Only marginal habitat is present. Motorized recreation would have no impact upon habitat suitability.
Flammulated owl *(Otus flammeolus)*	S	Insectivorous seasonal migrant.		
Black-backed woodpecker *(Picoides arcticus)*	S	Some winter residents may occur in recent burn areas or areas of high beetle caused mortality.		
Northern bog lemming *(Synaptomys borealis)*	S	Habitat is present but highly fragmented and very limited in the project area. Bog lemmings may be present on the HNF but they have not yet been identified as such.	X	The best habitat is on the Lincoln Ranger District, within the Indian Meadows RNA, where no motorized travel occurs. Management of roads and motor trails in higher elevation riparian and wetland areas is directly related to the welfare of this species.

Species	Status	Occurrence in Project Area	Species Excluded	Rationale
Townsend's big-eared bat *(Plecotus townsendi)*	S	Species has not been found in the Blackfoot landscape. Bat surveys conducted on the HNF in recent years have found big-eared bats in the Big Belt Range to the east but not in the Blackfoot landscape [Point Observation Database, Montana Natural Heritage Program (http://mtnhp.org/tracker/HNTMap.aspx)].	X	Road construction may destroy potential roosting sites in large decadent trees, but once in place, roads and motor trails have not been demonstrated to have any direct effect on these bats. Indirect effects may occur where travel routes facilitate human access to bat caves, abandoned mines, and large snags.
Western toad *(Bufo boreas)*	S	Identified at a number of breeding sites across the Blackfoot landscape. Active during motorized recreational period. Hibernate in mud or burrows.		
Northern leopard frog (*Rana pipiens*)	S	Once relatively common in and around the HNF, including the Blackfoot landscape, has not been reported in this part of Montana in nearly 20 years. It has almost certainly been extirpated, probably as a result of global factors (increased ultra-violet radiation, global warming, and the spread of pathogenic chytrid fungus) on top of local habitat change. Leopard frogs are still relatively common in parts of eastern Montana.	X	Standard management for the common spotted frog and the western toad would take care of habitat needs for leopard frogs, if they are in fact still present. This species hibernates in stream, pond, or lake bottoms and would not be impacted by motorized recreation.
Plains spadefoot *(Spea bombifrons)*	S	Found only along the Missouri River below Meriwether Canyon in the Big Belt Mountains. Its range just barely edges onto the HNF in an area where there are no roads.	X	The Blackfoot landscape is outside of its known distribution range. No suitable habitat exists within the project area and no species are present.
Bighorn sheep (Orvis Canadensis)	S & MIS	Not present on the Blackfoot landscape. Habitat suitability is low with no established populations within or near the project area. Bighorn sheep are typically poor colonizers of unoccupied habitats minimizing the potential for future establishment. Males are known to undergo relatively long extra-home range movements, particularly during the summer months, however females exhibit strong site fidelity and remain localized within home ranges.	X	Not present on the Blackfoot landscape. Habitat suitability is low with no established populations within or near the project area.
Elk *(Cervus elaphus)*	MIS	Present throughout project area.		
Mule deer (*Odocoileus hemionus)*	MIS	Present throughout project area.		

Species	Status	Occurrence in Project Area	Species Excluded	Rationale
Marten *(Martes Americana)*	MIS	Patchy distribution within project area.		
Northern goshawk *(Accipiter gentilis)*	MIS	Seasonal migrant, present during non-winter recreation period.		
Pileated woodpecker *(Dryocpus pileatus)*	MIS	Present during non-winter recreation period.		
Hairy woodpecker *(Picoides villosus)*	MIS	Present during non-winter recreation period.		
Mountain goat (*Oreamnos americanus)*	SOC	Numbers throughout the state seem to be declining for reasons not fully known. Reintroduced population. Primary areas of use include Red Mtn. and Stonewall Mtn. and ridgeline along Wilderness boundary.		

How Routes and Vehicles Affect Wildlife

The following is a description of the overall ecological footprint of roads on general forested habitat. The concepts of fragmentation, edge, and habitat loss apply to both the general forested environment as well as old growth.

Roads can affect the way many animals use an area. In general, roads may cause concentrations of humans and human disturbance into habitats. The disturbance may be temporary or long term depending on the severity of the disturbance and the species affected. Human activities can impact wildlife and their habitat through four primary means: exploitation, disturbance, habitat modification, and pollution. Wildlife behavior may take the form of avoidance, habituation, or attraction (Knight and Cole 1995). Roads are known to cause displacement of some animals; others become habituated to traffic but then may experience higher rates of human-caused mortality.

Motorized activities such as ATV travel and snowmobiling have short duration, high intensity, and large geographic scope (50 miles or more per day). Non-motorized activities such as cross country skiing, hiking, horseback riding, and mountain biking generally have longer duration, low intensity, and small geographic scope (10-20 miles per day). Using motorized means to reach a non-motorized recreation area combines aspects of each of the two previous means of recreation, but is highly localized in geographic scope, moderate to high intensity, and long in duration. All of these things would have different effects upon different parts of the biological world.

Motorized and non-motorized human presence raises heart rates and causes wildlife species to abandon nests/dens, change movement patterns, and alter foraging behaviors (Knight and Cole 1995). Some species are more tolerant of humans than others, but negative effects are generally true for the majority.

Many responses of animals, especially small animals, to off-route use may be short lived. However, long-term and cumulative effects are not readily understood and may include abandonment and behavioral alterations (Knight and Cole 1991). Montana has a statewide OHV plan within which the Helena National Forest currently operates (See alternative 1).

Motorized use within 300 foot buffers (600 feet total) directly impacts wildlife through mortality especially for small mammals, amphibians, and reptiles (Fahrig et al. 1995). This use indirectly affects wildlife by decreasing habitat effectiveness through disturbance, displacement, and habitat loss (Busak and Bury 1974 as cited in USDA and USDI 2001). Disturbance and displacement are more pronounced in open habitats versus forested habitats (e.g. sagebrush, grasslands) since more of the area is accessible to off-route use. Habitat loss in the form of fragmentation and creation of edge may be more pronounced in forested habitats. Habitat is also lost through the spread of noxious weeds which is facilitated by off-route use (USDA and USDI 2001) and through firewood cutting that removes down logs and snags (Bate and Wisdom 2002a, Bate and Wisdom 2002b, McShane et al. 2003).

Habitat Loss

The presence of roads and trails on the landscape represents a direct loss of habitat. In some cases, this could represent a permanent loss if the road surface prevents vegetation from becoming re-established. Also, as long as the road is in use and is not revegetated the habitat is lost to use by wildlife species. Some animals are more vulnerable to habitat loss; generally large, long-lived species with large area requirements, low densities and reproductive rates tend to be

more vulnerable (Forman et al. 2003). Interior forest species are also particularly vulnerable to habitat loss and subsequent declining patch sizes due to increases in edge habitat.

Fragmentation

Fragmentation has two components: reduction of total available habitat and apportionment of remaining habitat into smaller, more isolated patches (Meffe and Carroll 1994). It is a change in the landscape structure that includes smaller patch sizes, less interior habitat, and greater distances between patches which in turn can lead to subpopulation isolation (Reed et al. 1996, Tinker et al. 1998, Temple and Wilcox 2000). Fragmentation can affect animal populations by decreasing species diversity and densities due to creation of smaller patches of habitat.

Roads present demographic barriers that cause habitat (and population) fragmentation. The extent of impacts depends on the species, its size, home range, and dispersal habits, as well as the juxtaposition of habitat. Roads generally have less of a fragmentation effect on species with large home ranges and great mobility depending on the spatial arrangement of habitat. Species with small home ranges and limited mobility generally are more susceptible to the barriers and subsequent fragmentation created by roads (Meffe and Carroll 1994). While metapopulation theory suggests that barrier effects from roads are mitigated by the mobility of a species, it doesn’t take into account the condition of the surrounding landscape relative to providing habitat for a particular species (Forman 1995). Overall, long term effects of roads on population dynamics and genetic structure are unknown; as such, at this point, isolation effects are generally inferred.

Edge Effects

Roads fragment habitat by dissecting larger patches into smaller ones; as a result edge habitat is created. For species that can’t live in forested edge, the habitat loss due to roads is more extensive than the actual removal (Meffe and Carroll 1994); the virtual footprint is large (Forman et al. 2003). Road edges increase soil erosion and decrease soil moisture, increase disturbance by human activity, noise, exotic species introductions, evapotranspiration, temperature, and incident solar radiation (Trombulak and Frissell 2000, Forman et al. 2003). Some wildlife may benefit from the additional habitat created by road corridors (Forman et al. 2003). For example, raptors may use roadsides more than adjacent habitat because of greater availability of perch sites.

The effects of edge on the adjacent forest depend on how much of the original canopy and understory remains. Edge zones tend to be drier and less shady than interior forests and tend to favor shade-intolerant plants. For example, increases in incident light in the adjacent forest would favor those species the preferentially grow where light levels are high such as early successional, disturbance related species (Trombulak and Frissell 2000). Edge-associated species benefit by creation of edge habitat but interior habitat species are generally impacted (Reed et al 1996). Road edge habitat is different from natural edges or those created by clearcuts; those edges would become less distinct overtime while road edges tend to exist long term (Reed et al. 1996).

Some wildlife species prefer roads (Knight and Kawashima 1993, Knight et al 1995) and are not hindered by their presence. For example, ravens are more abundant along roadsides than away from roadsides. This is attributed to greater food availability associated with road killed animals. Some bird species do not perceive roads as any more of a barrier than natural barriers (St. Clair 2003). Lynx cross roads at frequencies that do not differ from random expectations (Ruggerio et al. 2000). Some species are attracted to roadside vegetation which in turn attracts other species

not commonly found along roadsides. For example, big game species – elk and deer – may be drawn to the forage opportunities afforded by roadside vegetation. Wolves subsequently are drawn to these areas for the prey (Thiel 1985, Mech et al. 1988).

Roads can present barriers, bottlenecks, and otherwise impede movement especially for smaller animals or animals with limited mobility (Mader 1984, Swihart and Slade 1984). The extent to which a road acts as a barrier depends on an animal's behavior, dispersal ability, and population density. The presence of roads can affect animal movement, behaviorally. Some animals avoid crossing roads and may extend their movements to compensate (Trombulak and Frissell 2000). For some species, the mere presence of a road acts as a barrier; for others, the width of the road and associated clearing may represent the barrier (Oxley, et al. 1974).

Connectivity is important because it allows animals to move between different habitats to meet their daily and lifetime needs (Forman et al. 2003). It also allows for repopulation of unoccupied areas. Reduced movement results in empty habitats or habitats that have smaller populations than they can actually support. This increases the risk of local extinction in that area and subsequently results in a lower regional population and lower long-term population persistence. This also could increase isolation and result in decreased gene flow (Forman et al. 2003).

Snags and down logs

Direct effects to snag and down log habitat occur when habitat is converted to non-habitat through road construction (Hann et al. 1997, Reed et al. 1996, Trombulak and Frissell 2000). New road and motorized trail construction directly reduce habitat based on the amount of vegetation removal necessary to meet standards for construction.

Bate and Wisdom (2002a) found only a third as many snags near roads when comparing snags in roaded and un-roaded landscapes. Snag attrition was highest within 150 feet of roads and generally became insignificant beyond 600 feet, if there were no other roads in the vicinity. Effects were greater in ponderosa pine communities than in other mixed coniferous forests (Bate and Wisdom 2002b).

Loss of snags means loss of nesting, roosting, foraging, hiding and thermal cover. It is difficult to determine the extent of impacts to the various wildlife species that depend on snags. The extent of the effects on snag associated species would vary depending on the availability of habitat in the surrounding area, the degree of mobility (and type of mobility – e.g. flying versus walking where ambulatory animals may be more susceptible to direct mortality while traversing to available habitat) (Forman 1995). Animals may respond to reduced habitat quality either numerically (decreases in abundance or density) or behaviorally (road avoidance) (Forman et al. 2003).

Effects on down logs are the result of snag attrition and removal for firewood. Bate and Wisdom (2002b) found that log densities along open roads were significantly lower than densities along closed roads. Coefficients have not been developed to determine percentages of down logs remaining post firewood gathering.

Loss of down logs includes loss of foraging sites, hiding and thermal cover, denning, nesting, travel corridors and vantage points for predator avoidance (Rose et al. 2001). As with the snag discussion above, loss of these structures and resultant effects on habitat quality depend on the species and its ecology. The effects described above are linear in nature and the extent to which various species are affected would also in part depend on home range configuration. Also, if firewood gatherers select sound, large logs for firewood, logs in advanced decay classes should

remain on the landscape. However, removal of sound logs affects long term recruitment of any decay class.

Formal studies that quantify the indirect impacts of roads on snags and down logs have been lacking until two recent studies conducted in Montana and Oregon that quantify the effects of roads on these structures (Bate and Wisdom 2002a, 2002b). The results from these studies are the basis from which this analysis is conducted and is described in more detail in “Analysis methodology for effects of rods on snags and down logs” in the project file.

Methodology and Assumptions

Appendix E summarizes the assumptions and methodologies used in the analysis of different alternatives for each wildlife parameter. The scale of analysis varies between species and is explained in appendix E under each species. More detailed information as to the construction and application of habitat models for threatened, endangered, and sensitive species and for management indicator species (including elk) is included in the project file.

Affected Environment

The Blackfoot travel planning area covers the entire Lincoln Ranger District, including that portion of the Scapegoat Wilderness occurring on the Helena National Forest (figure 1) and encompasses a wide range of wildlife habitats and wildlife species associations. Not all of these habitats and species groups are affected by Forest travel management in ways that are measurable or meaningful (in terms of individual species behavior, survivorship, or productivity). As a result, not all of the wildlife parameters (species, habitats, habitat components) tallied in table 37 are analyzed and discussed in the body of the report that follows—though they may receive some mention.

Parameters not carried forward in the report are those for which there are either no anticipated impacts associated with alternatives or for which the impacts are addressed via analysis of a surrogate species. The information presented in this analysis comes from survey and observation in the field, accumulated professional experience, discussion with other professionals and field-going personnel, examination of current scientific literature, GIS modeling analyses, and conservation strategies and recovery plans.

Research Natural Areas (RNA): There are two designated RNA’s in the project area. Both RNA’s adjoin the southern boundary of the Scapegoat Wilderness. The Indian Meadows RNA encompasses 949 acres of which 106 acres occur within the Scapegoat Wilderness. The Red Mountain RNA encompasses 1,870 acres. Designated RNA’s are administratively close to all motorized use under all alternatives. Designated RNA lands are included as non-motorized acres throughout this document for analysis purposes.

The ‘Proposed’ Granite Butte RNA is in the southern portion of the Lincoln District, south of Stemple Pass. Because Granite Butte has only been ‘proposed’ and is not actually a designated RNA, it is not administratively closed. The ‘proposed’ RNA is open to motorized use under the existing condition and proposed action alternatives. These lands are included as motorized acres throughout the document for analysis purposes.

Threatened and Endangered Species

Threatened, endangered, candidate, and proposed species are managed under the authority of the Federal Endangered Species Act (PL 93-205, as amended) and the National Forest Management

Act (PL 94-588). Under provisions of the Endangered Species Act (ESA), Federal agencies shall use their authorities to carry out programs for the conservation of listed species, and shall insure any action authorized, funded, or implemented by the agency is not likely to: (1) adversely affect listed species or designated critical habitat; (2) jeopardize the continued existence of proposed species; or (3) adversely modify proposed critical habitat (16 USC 1536).

The federally listed species shown in table 37 were confirmed by accessing the U.S. Fish and Wildlife Service (FWS) Montana Ecological Services Field Office website (11/29/2012).
In accordance with the Endangered Species Act (ESA), its implementation regulations (50 CFR 402.12) and FSM 2671.4, the Helena National Forest is required to request formal consultation with the FWS with respect to the determination of potential effects on grizzly bears. In accordance with the ESA, its implementation regulations (50 CFR 402.13) and FSM 2671.4, the Helena National Forest is required to request written concurrence from the FWS with respect to determinations of potential effects on Canada lynx, and critical habitat for lynx. This biological assessment (BA) would consider best current data and scientific information available. A revised BA must be prepared if: (1) new information reveals effects, which may impact threatened, endangered, and proposed species or their habitats in a manner or to an extent not considered in this assessment; (2) the preferred alternative is subsequently modified in a manner that causes an effect, which was not considered in this assessment; or (3) a new species is listed or habitat identified, which may be affected by the action. Potential effects on threatened and endangered species have been assessed in light of current conservation strategies and guidelines including the Northern Rockies Lynx Management Direction (NRLMD 2007), Grizzly Bear Recovery Plan (1982, 1993) and, Interagency Grizzly Bear Guidelines (1986). To date, consultation has not been initiated.

Grizzly Bear (Ursus arctos)

Forest Plan Direction and Access Management

The Helena Forest Plan (1986) provides direction and guidelines for the management and conservation of grizzly bear habitat. This direction is described in the Forestwide Goals (FP-II/1), Forestwide Objectives (FP II/4), Forestwide Standards (FP II/17, 19), Individual Management Area direction (FP III/56, 59, 60), Forest Plan Monitoring Requirements (FP IV/8) Forest Plan Appendix A (resolution of Issues and Concerns), Appendix D (Guidelines for Management of Grizzly Bear Habitat), and Appendix E (direction for grizzly bear management outside the recovery zone).

For HNF lands within the recovery zone access management is addressed in accordance with the North Continental Divide Ecosystem Grizzly Bear Access Management Protocol and the Flathead NF Amendment 19 (the accepted Motorized Access Density Analysis & Security Core Area Analysis for Grizzly Bear within the NCDE). The moving windows analysis is used to measures the density of roads and the amount of secure habitat within the respective subunits of a Bear Management Unit (BMU) using three criteria: (1) Total Motorized Road Density (TMRD), (2) Open Motorized Road Density (OMRD), and (3) Security Core habitat. BMU subunits are evaluated against these three criteria to determine if they meet the guidelines or are in a degraded condition not meeting the guidelines.

Relevant Forest Plan direction for T&E species specific (II/19) to grizzly bear management on the HNF include:

- In occupied grizzly habitat, to minimize man-caused mortality the open road density would not exceed the 1980 density of 0.55 miles per square mile, which was determined to have little effect on habitat capability.
- Apply the guidelines in Appendix D to the Management Situation 1 and 2 (referred to essential and occupied prior to 1984) grizzly bear habitat on the Forest.
- Initiate field studies to in undesignated areas known to be used by grizzlies, to determine if areas should be designated as grizzly habitat. Until sufficient evidence is available to determine the status of these areas, manage them according to Appendix E, Grizzly bear Guidelines Outside the Recovery Areas.

Appendix D of the Helena FP (1986) identifies FS lands within the recovery zone as either Management Situation (MS) 1 or MS 2 lands in accordance with the Interagency Grizzly Bear Management Guidelines (IGBC 1986). No Management Situation designations were made for HNF lands outside the recovery zone. Only MS 1 and MS 2 lands are identified in Appendix D of the Helena FP. Management Situation 1 lands include the Scapegoat Wilderness, Alice Creek non-motorized area, and the upper reaches of the drainages encompassing headwaters of the Copper creek drainage. The remaining lands within the recovery zone are classified as MS 2 lands. The following is a description of MS 1 and 2 lands:

Management Situation 1 – This area contains grizzly population centers and habitat components needed for survival and recovery of the species. Grizzly habitat maintenance and improvement, and grizzly and human conflict minimization would receive the highest priority and management decisions would favor the needs of the grizzly bear over other land uses (USDA Forest Service 1986). The probability is very great that major federal activities or programs may affect the grizzly.

Management Situation 2 – The area lacks distinct grizzly population centers. Highly suitable habitat does not generally occur, although some grizzly habitat components exist and grizzlies may be present occasionally. Habitat maintenance and improvement, and grizzly and human conflict minimization may be, in some cases, important but not the most important management considerations. The effects of major Federal activities or programs on the conservation and recovery of the species are not generally predictable.

In addition to the above management situations descriptions, Appendix D identifies the following coordination dates for grizzly habitat use:

- Spring habitat (concentrated use areas) – April 1 to June 30
- Breeding areas - May 1 to July 15.
- Alpine feeding areas - July 1 to September 15.
- Subalpine fir/whitebark pine habitats - August 1 to November 30.
- Denning habitat - October 15 to March 31.

More recently, the NCDE Access Technical Group (unpublished report 2002) suggested that “grizzly bear access management apply during the non-denning period, and include April 1 through November 30 of each year.” In addition, the dates of March 31 for ending of denning and April 1 for the start of the spring season were discussed and agreed upon (for consistency among Montana National Forests) by an interagency team of U.S. Forest Service and U.S. Fish and Wildlife Service biologists (the “Montana Level 1 Biologist Team, unpublished notes, 12/9/2003). The chronology of these dates is consistent with the best available scientific information such as the work of Mace and Waller (1997) and other grizzly bear denning studies.

Appendix E of the Helena Forest Plan provides direction for grizzly bear management outside the recovery zone (Grizzly Bear Management Outside of Recovery Areas). Appendix E provides guidance for identifying grizzly bear habitat that is not currently inventoried and determining levels of bear activity to base management on those findings (USDA 1986, pages E/1-E/2). Management guidance applies to areas of known grizzly bear activity. Currently, there are no known grizzly bear biological activity centers (BAC)[1] in the distribution zone as defined in Appendix E of the Helena Forest Plan.

Collectively, the Forest Plan guidelines, *North Continental Divide Ecosystem Grizzly Bear Access Management Protocol* (19/19/68 guidelines), coordination dates, seasonal use considerations and human activity guidelines are used to maintain grizzly bear habitat and reduce impacts to bears.

In addition, the Forest Plan identifies forest-wide standards that directly or indirectly benefit grizzly bears and help to minimize effects of roads on grizzly bears across the Helena National Forest. Standards that are directed at maintaining or improving seasonal habitat or security areas for big game species (for example, elk) would indirectly benefit grizzly bears and black bears by improving security and potentially improving the forage base.

Species Status and Biology

The grizzly bear was listed as threatened throughout its range in the lower 48 states on July 28, 1975. The Grizzly Bear Recovery Plan was approved in 1982, updated in 1990 and 1992, and revised in 1993 (USDI 1993). There are currently five occupied grizzly bear ecosystems addressed in the Recovery Plan. The southern end of the Northern Continental Divide Ecosystem (NCDE) encompasses Helena National Forests north of Hwy 200. The overall goal of the Grizzly Bear Recovery Plan is to remove the grizzly bear from threatened status in each of the occupied or reintroduced ecosystems in the 48 conterminous States. A Conservation Strategy for grizzly bears in the NCDE is currently being developed in anticipation of future delisting efforts.

Project area lands north of Highway 200 are within the Monture-Landers Fork Bear Management Unit (BMU) of the NCDE recovery zone. The BMU includes three subunits on the HNF including: Arrastra Creek, Red Mountain, and Alice Creek subunits. Project area lands south of Hwy 200 are outside the NCDE recovery zone but within the mapped Grizzly Bear Distribution Zone (USDA et al. 2002). Grizzly bear management direction that applies within the recovery zone does not apply to the grizzly distribution zone. The Grizzly Bear Recovery plan (USDI 1993 p. 18) notes that “bears can and are expected to exist outside recovery zone lines in many areas. However, only the area within the recovery zone would be managed primarily for grizzly habitat.” While grizzly bears both inside and outside the recovery zone are listed as threatened and would receive full protection under the Endangered Species Act (ESA), only lands inside the recovery zone are considered essential to, and therefore managed for, recovery and survival of the grizzly bear population.

For the purposes of the effects discussion for grizzly bears “recovery zone” would refer to those lands north of Hwy 200 and “distribution zone” would be used in reference to project area lands outside the recovery zone or south of Hwy 200. These references apply only to those lands within the project area.

[1] Biological Activity Center (BAC) is defined in Appendix E of the Forest Plan as “verified grizzly bear observations over the last 10 years (6 year out of 10). Observations must include females with cubs or yearlings at least 5 of the10 years.

Grizzly bears have the potential to occur throughout the project area. In recent years, grizzly bears have continued to expand their range with numerous occurrences documented south of Hwy 200, within and beyond the project area.

Grizzly bears are considered habitat generalists, using a broad spectrum of habitats. They are opportunistic feeders and will prey or scavenge on almost any available food; grizzly bear movements are determined largely by their search for food. For example, upon emergence from the den in the early spring, grizzlies move to lower elevations and drainage bottoms in search of plants that are greening up. Throughout the late spring and early summer they move towards higher elevations, often following the snow line as food becomes available. Spring habitat tends to be at lower elevations. Therefore, increased potential exists for conflict between bears and humans in these areas. In addition to their importance for foraging, riparian zones are also used extensively as travel corridors by grizzlies (Moss and LeFrance 1987 in USDA Forest Service 2005).

Coniferous forest cover is very important to grizzly bears. Ninety percent of aerial radio relocations of 46 radio-collared grizzlies were in forest cover too dense to observe the bear. Dense forests are also important for thermal cover, hiding cover, and day beds; most beds are located within six feet of a tree. The importance of open grassy parks with coniferous forest cover has also been documented (USDI Fish and Wildlife Service 1993).

Grizzly bear habitat is best described in terms of the availability of large tracts of relatively undisturbed land that provides some level of security from humans (USDI Fish and Wildlife Service 1993). Effective habitat is often described in terms of core habitat or areas free of motorized access during the non-denning period. Open and total road densities are also important measurements in determining core areas and understanding the extent of habitat security for bears (USDI Fish and Wildlife Service 1993).

The Grizzly Bear Recovery Plan (USDI Fish and Wildlife Service 1993) indicates the most important element in grizzly bear recovery is securing adequate effective habitat. This is a reflection of an area's ability to support grizzly bears based on the quality of the habitat and the type/amount of human disturbance in the area. Controlling and directing motorized access is one of the most important tools in achieving habitat effectiveness and managing grizzly bear recovery (USDI Fish and Wildlife Service 1993).

Canada Lynx (*Lynx canadensis*)

The U.S. Fish and Wildlife Service (FWS) listed Canada lynx as a threatened species under the Endangered Species Act (ESA) in March 2000. Following the listing, the Forest Service (FS) signed a Lynx Conservation Agreement with the FWS in 2001 to consider the Lynx Conservation Assessment and Strategy (LCAS) during project analysis, and the FS agreed to not proceed with projects that would be “likely to adversely affect” lynx until the plans were amended. The Conservation Agreement (CA) was renewed in 2005 and added the concept of occupied mapped lynx habitat. The FWS issued a Recovery Outline for Canada lynx (USDI FWS 2005) in September 2005 to serve as an interim strategy to guide and encourage recovery efforts until a recovery plan is completed. In 2006, the CA was amended to define occupied habitat and to list those National Forests that were occupied; it was also extended for 5 years (until 2011), or until all relevant forest plans were revised to provide guidance necessary to conserve lynx (USDA FS and USDI FWS 2000, 2005, 2006a, 2006b). In March 2007, Forest Plans were amended with the Northern Rockies Lynx Management Direction (NRLMD) Record of Decision. In February

2009, the FWS designated revised critical habitat in Montana, Wyoming, Idaho and Washington and other states.

The Northern Rockies Lynx Management Direction applies to mapped lynx habitat on all National Forest System lands that are known to be “occupied” by Canada lynx, as defined by the Amended Lynx Conservation Agreement between the Forest Service and the FWS (USFS and USFWS 2006). With the exception of two disjunct mountain ranges, the Elkhorn Mountains and Big Belt Mountains that are defined as “unoccupied”, the remainder of Helena National Forest System Lands are defined as “occupied” (USFS and USFWS 2006). The conservation agreement defines “occupied” as (1) there are at least two verified lynx observations or records since 1999 on national forest unless they are verified to be transient individuals; or (2) there is evidence of reproduction on the national forest.

The NRLMD modified direction in existing plans and includes the overriding goal, objectives, standards, and guidelines related to all activities (ALL), vegetation management (VEG), grazing management (GRAZ), human uses (HU), and linkage (LINK). The goal, to conserve the Canada lynx, is a general description of the desired results. Objectives are descriptions of desired resource conditions; standards are management requirements designed to meet the objectives; and guidelines are management actions normally taken to meet the objectives.

Lynx analysis units (LAUs) were identified and mapped on National Forest lands within the project area in accordance with previous direction contained in the LCAS. The size of an LAU represents the approximate size of area used by an individual lynx, not an actual home range, and encompasses all seasonal habitats. LAUs are intended to provide the fundamental or smallest scale with which to begin evaluation and monitoring of the effects of management actions on lynx habitat (Ruediger et al. 2000). For large scale actions such as travel management, the LAU may not provide a large enough analysis area within which to address direct, indirect, and cumulative effects therefore, project impacts must be assessed within the context of multiple LAUs (Ruediger et al. 2000). For the purposes of this analysis potential effects will be addressed for the entire Blackfoot travel planning area. The project area includes fifteen LAUs.

Lynx Biology

Typically, lynx breed through March and April with females giving birth from late April through early June. In Montana, female lynx stayed in natal dens on average 21 ± 17 days, and subsequently used an average of 3 ± 2 maternal dens in a given year (Olson et al. 2011). While their kittens were newborn to 2 months old, 9 female lynx exhibited roughly equal levels of activity from dawn to dusk, with more activity during the day than pre- or post-denning, and travelled shorter daily distances than before kittens were born (Olson et al. 2011).

In Montana, activity patterns of lynx varied by sex, season, and reproductive status, and were not consistently synchronous with the activity patterns of their primary prey snowshoe hares (Kolbe and Squires 2007) which forage primarily at dusk and dawn, remaining largely inactive during daylight hours (Foresman and Pearson 1999, Abele 2004). Female lynx rearing kittens were most active during daylight hours when the mean ambient temperature was highest. Males demonstrated seasonal differences in activity patterns being most active during daylight hours with peaks in the afternoon or early evening during the winter while in summer, they tended to be more crepuscular in their activities (Kolbe and Squires 2007). A female lynx without kittens had crepuscular patterns of activity similar to those of male lynx during summer (Kolbe and Squires 2007).

Daily movement distances by lynx varied by gender, season, and in relation to prey (Fuller and Harrison 2010). The movement paths of female lynx raising kittens reflected a preference to remain in habitats with dense horizontal cover and good accessibility to prey. In contrast, males appeared to make more linear movements and tended to use skid trails and areas with less dense understory more frequently than females (Fuller and Harrison 2010).

Ward and Krebs (1985) documented an increase in the radius of daily movements from 1.6 miles during periods of moderate to high hare densities, to 3.2 miles during periods of low hare densities. Parker et al. (1983) reported a female's daily movement distance as 5.3 miles in winter and 6.2 miles in summer.

Individual lynx are known to make exploratory long-distance movements beyond identified home range boundaries lasting days to a few months and then return to their original home range. Of two studies in Minnesota, one found exploratory movements were greatest for males during the breeding season in March (Burdett et al. 2007) while the other reported long distance movements at all times of the year (Moen et al. 2006). Lynx also made long distance movements throughout the year often returning to reoccupy their home range in northwestern Maine (Vashon et al. 2012).

Research documented exploratory movements during the summer months by resident lynx in Montana, Wyoming, and southern British Columbia (Apps 2000, Squires and Laurion 2000, Squires and Oakleaf 2005). In Montana, distances ranged from about 9–25 miles, and duration away from the home range was 1 week to several months (Squires and Laurion 2000). Over three consecutive summers, a resident lynx was documented to travel a similar exploratory path (minimum path distance of 452 mi) from its home range in the Wyoming Range to the Wind River and Teton Ranges in western Wyoming (Squires and Oakleaf 2005). Summer exploratory movements were not detected in northcentral Washington (Koehler 1990*a*), nor has it been recorded from the taiga (Mowat et al. 2000). Aubry et al. (2000) speculated that these movements might be more likely to occur in areas with high spatial heterogeneity of habitat.

In the taiga, adult and subadult lynx of both sexes were documented making long-distance movements during periods of prey scarcity (Slough and Mowat 1996, Poole 1997). In the Yukon, rates of emigration in which lynx left established home ranges increased during the cyclic low of hare numbers (O'Donoghue et al. 2001). Dispersal distances of up to 620 mi have been recorded (Mech 1980, Slough and Mowat 1996, Poole 1997). During dispersal, the minimum daily travel rate was1–5 mi per day (Ward and Krebs 1985), suggesting dispersing lynx did not travel farther per day than resident lynx (Mowat et al. 2000).

Mortality of dispersing lynx appears to be high, particularly for those individuals moving long distances into adjacent states that lack lynx habitat or resident populations (McKelvey et al. 2000*b).* The extent to which lynx dispersing from the north can successfully colonize habitat in the south is unknown.

Population and Habitat Status

Canada lynx is a medium-sized cat associated with boreal forests. Their distribution and abundance are linked to those of snowshoe hare, their primary prey (Ruediger et al. 2000). In the conterminous U.S, remnant lynx populations persist in some high-elevation boreal forests of the western and Great Lakes states, tied chiefly to the distribution and abundance of snowshoe hares (Koehler and Aubrey 1994). Although records document lynx occurrence from central through

western Montana (Foresman 2001 pages 186-187; MTNHP 2005, 2005a), lynx and their preferred habitats are largely confined to the Rocky Mountains of western Montana.

Lynx habitat generally consists of lodgepole pine, subalpine fir, and Engelmann spruce; while dry forest types (for example, ponderosa pine, climax lodgepole pine) do not provide suitable habitat (Ruediger et al. 2000). East of the Continental Divide, lynx occur in higher elevation coniferous forests with a mix of seral stages, but primarily subalpine fir. In the Northern Rockies lynx habitat is generally found at mid to upper elevations. Lower elevations range from about 3,500 in the north to 7,000 feet in the southern parts of their range within the NRLMD planning area (NRLMD 2007).

Prior to the winter of 2011/2012 when the most extensive lynx research was conducted within the project area, the nearest studied population of lynx was near Seeley Lake, Montana, approximately 40 miles northwest of Lincoln (Squires and Laurion 1999). Kohler and Aubry (1994) suggested that lynx living at the southern extent of their range had larger home ranges, and their suggestion is supported by research in Montana and Wyoming (Squires and Laurion 1999). Lynx are highly mobile and capable of dispersing long distances across habitats generally considered unsuitable (Tumlison 1987, Kohler and Aubry 1994, USDI 2003). Evidence suggests that dispersal events following crashes in snowshoe hare populations may facilitate colonization or re-colonization of marginal habitat, isolated habitat, or habitat of insufficient size to sustain populations (Schwartz et al. 2002, USDI 2003). Dispersal events may also explain synchronization of population dynamics of lynx in geographically distant areas.

Within the project area lynx have been documented on either side of Montana Highway 200 for years. Currently the most persistent and concentrated use by lynx is in the Dalton Mountain area south of Hwy 200 where researchers trapped and collared four individuals, 2 males and 2 females, during the 2011/2012 winter. The researchers also captured and collared a male in the Alice creek drainage in the northeastern part of the project area. During this effort a male and female were also captured and collared in the Monture creek drainage on the Seeley district of the Lolo NF. This research confirmed reproduction in 2012 by one female in the Dalton Mtn. area and the female in Monture creek. The collared lynx in Monture creek were predominantly using habitat created by the 1988 Canyon creek fire that extends eastward across much of the lower Scapegoat Wilderness within the project area. Much of the burned habitat now supports healthy hare populations and lynx tracks and observations of individuals have been reported in the area in recent years. Prior to the 2003 Snow Talon fire which burned 34,000 acres, the Copper creek drainage was known to support the highest hare and lynx densities within the project area. Although lynx have since occurred within the Snow Talon burn area forest regeneration is currently not mature enough to support the high hare densities needed to sustain lynx use. Other known lynx occurrences within the project area include an incidental trapping of a lynx in the Stemple pass area around 2002 and various track observations north of Hwy 200 primarily in the upper Beaver creek

Lynx Critical Habitat

In February 2008 the FWS released a revised lynx critical habitat proposal in response to court rulings. Critical habitat was designated on February 25, 2009 when the FWS published the *Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx; Final Rule* (USDI 2009). The Final Rule became effective on March 27, 2009.

The entire action area is within lynx critical habitat. Designated critical habitat incorporates all Helena National Forest lands north of Hwy 12.

Critical habitat is one of several provisions of the ESA that aid in protecting the habitat of listed species until populations have recovered and threats have been addressed so that the species can be removed from the list of threatened and endangered species. Critical habitat designation is intended to assist in achieving long-term protection and recovery of lynx and the ecosystems upon which they depend. Section 7(a)(2) of the ESA requires consultation for Federal actions that may affect critical habitat to avoid destruction or adverse modification of this habitat. Under the Act, effects are determined on the basis of whether, with implementation of the proposed federal action, the affected critical habitat would remain functional (or retain the current ability for the PCE and its attributes to be functionally established) to serve its intended conservation role for the species (USDI 2009 p. 8644).

Critical habitat is by definition the areas that are essential for recovery of the species. In defining lynx critical habitat, the Service identified the physical and biological features essential to the conservation of the species that may require special management considerations or protections. The physical and biological features are represented by the primary constituent element (PCE) and its attributes laid out in a specific quantity and spatial arrangement to be essential to the conservation of the species. Based on current knowledge of the life history, biology, and ecology of the species, the Service defined the primary constituent element as ***boreal forest landscapes supporting a mosaic of differing successional forest stages*** and containing:

a. Presence of snowshoe hares and their preferred habitat conditions,
b. which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multistoried stands with conifer boughs touching the snow surface;
c. Winter snow conditions that are generally deep and fluffy for extended periods of time;
d. Sites for denning that have abundant coarse woody debris, such as downed trees and root wads; and
e. Matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.

Lynx use habitat at a landscape scale, which means that no single locality (small scale) contains all of the required habitat elements that lynx need to ensure survival and reproduction. Therefore, individual portions of each unit (for example, an individual forest stand) may not contain all of the attributes of the PCE listed above, however, each unit, as a landscape, does contain each of the attributes of PCE and it is the landscape as a whole that contains the PCE (USDI 2009, p. 8638).

It is recognized that LAUs contain a mix of lynx habitat and matrix as defined in the final rule designating lynx critical habitat. Matrix (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range), such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range. Since the matrix provides limited snowshoe hare resources or other life requisites for lynx, there are no

conservation measures specifically aimed at management of matrix habitat, except as related to maintaining connectivity.

Sensitive Species

Gray Wolf (*Canis lupus*)

Gray wolves are capable of inhabiting virtually any kind of natural habitat occupied by ungulates or other large prey in temperate regions. Acceptable habitat includes forests of all types: rangelands, shrubland, steppes, deserts, wetlands, alpine regions, tundra, and barren ground areas, as well as human-influenced environments such as agricultural lands and logged forests. Wolves do not have any particular habitat requirement other than a preference for avoiding areas with heavy human use whenever possible (USDI 1987).

Wolf packs occupy specific territories, typically ranging from 125 km2 to 550 km2 (Mech 1970 cited in Tucker 1988; Peterson 1977 cited in Tucker 1988). The number of individuals in a pack and the availability of prey determine territory size (USDI et al. 2003). Daily pack movements vary, as do seasonal movements: distances traveled are greater in winter than in summer. Lone wolves cover larger areas than packs, and their ranges may overlap two or three pack territories (Mech 1973 cited in Tucker 1988; Fritts and Mech 1981 cited in Tucker 1988).

Wolves are generally not considered migratory but they may wander great distances within their home ranges searching for prey. When local population increases, young adults disperse to new areas—the primary source of new wolves that appear regularly in the Blackfoot landscape. Vegetative cover affects wolf survival by providing shelter for prey such as deer and elk and as a means for quickly eluding humans. In general, healthy wolves themselves need little cover to deal with heat, cold, or severe weather (Mech 1970 cited in Tucker 1988).

Wolf dens, for bearing and protecting pups, may be inhabited year after year, though pups are sometimes moved from one den to another. Den sites are typically dug in sandy and well-drained soils near water, although they can be located in a variety of landforms (Mech 1970 cited in Tucker 1988; Fritts 1982 cited in Tucker 1988). Aside from these local site conditions, the primary condition allowing successful wolf reproduction is isolation from human meddling.

Wolves typically hunt in packs but they may do so individually as well (Mech 1970 cited in Tucker 1988; Fritts 1982 cited in Tucker 1988). Wolves prey primarily on large wild mammals such as deer, elk, moose, bison, and bighorn sheep (Kunkel et al. 1999; MFWP 2003). However, they are opportunistic foragers and will take advantage of other foods, including domestic livestock, dogs, small and midsized mammals (such as ground squirrels or beavers) , birds (particularly grouse and waterfowl), fish, green vegetation, and fruits, depending on their availability and ease of capture (Kunkel et al. 1999). Wolves are also successful scavengers.

Wolf Recovery Plan

The Northern Rocky Mountain gray wolf (*Canis lupus irremotus*) was listed as an endangered species in 1973. Since 1987, wolf recovery has proceeded according to steps outlined in the *Northern Rocky Mountain Wolf Recovery Plan* (USDI 1987). The Plan was designed to provide direction and coordination for recovery efforts. It is not a decision-making document, however, and has been subject to modification as new information has become available, species status has changed, and tasks have been completed.

The Blackfoot travel planning area is located in the southwestern sector of the Northwest Montana Recovery Area.

In assessing the potential impacts of HNF projects on wolves in this area, we apply relevant provisions of the Wolf Recovery Plan and look to the most recent research findings and management advice from MFWP and USFWS wolf biologists to deal with specific local issues. In general, we focus on (1) protecting active denning and rendezvous sites from human interference, (2) maintaining abundant big game (particularly elk) as a prey base, (3) reducing factors that might lead to negative confrontation with humans (open roads, untended livestock), and (4) retaining sufficient distribution of forest cover to provide for local screening and concealment (Oakleaf et al. 2006; USDI 1987).

Wolf Dispersal

The wolf population in Montana has increased from around 35 animals in 1990 to 653 (39 breeding pairs) in 2011. Overall the population trend has been steadily increasing, with a 15 percent increase in 2011(Sime et al. 2010). Yearly increases in population have occurred in spite of a number of wolves being killed each year, mostly by USDA Wildlife Services, to reduce livestock losses: In Montana, this amounted to 110 of 168 known mortalities in 2008 and 145 of 255 mortalities in 2009. So, the annual increment in surviving young has been more than sufficient to overcome losses to natural and human-generated mortality to this point—including the loss of 72 animals during Montana's first annual wolf hunting season in the fall of 2009. The relisting of the wolf as a threatened/ endangered species eliminated the 2010 regulated wolf hunts in Montana and Idaho. But in spite of the resurrection of the hunts in 2011—with 165 wolves killed in Montana—MFWP has estimated a 15 percent rise in the counted population.

The Blackfoot Travel Plan project area lies entirely within the Northwest Montana Recovery Area. A natural southward migration of wolves from Canada has been gradually populating this region since the mid-1980s—and continues to do so [Rocky Mountain Wolf Recovery Annual Reports 1995-2011; Interagency Annual Reports (Sime et al. 2007, 2008, 2009, 2010). Individual wolves began to be regularly reported in the Blackfoot landscape in the late 1980s.The number of packs within the project area has grown steadily in recent years with most non-hunting mortality stemming from management actions by State and Federal agencies attempting to minimize predation on livestock. Until 2010, all verified packs on the HNF had been located in the Blackfoot and Divide landscapes, which provide the primary north-south dispersal zone for wolves moving southward from northern populations.

Recent Actions

By the end of 2002, the biological requirements for wolf recovery in the northern Rockies had been met (at least 10 breeding packs each in Montana, Idaho, and Wyoming for 3 consecutive years). A state management plan for Montana was in place by 2004, and in 2004-2005, day-to-day management of wolves in Montana was transferred from the USFWS to MFWP.

The USFWS initially removed the northern Rocky Mountain gray wolf from the Endangered Species list in February 2008. Litigation led to a court injunction and restoration of wolves to the list in October 2008. The USFWS, after revising its original delisting order, once again removed the wolf from the Endangered Species List in May 2009. Environmental groups again took the USFWS to court seeking to reinstate endangered species status, and in August 2010, Federal District Court in Missoula ruled that the Service could not drop the wolf from the List in some states (Montana and Idaho) and continue to list it in another (Wyoming). The wolf thus returned to its pre-May-2009 status as an "endangered" species in the Blackfoot landscape. In April 2011,

after a negotiated agreement between environmental groups and the USFWS to again delist the wolf was scuttled by Federal District Court, the U.S. Congress approved a measure to remove the wolf from the Endangered Species List in Montana, Idaho, and parts of Washington, Oregon, and Utah as of June 2011. On the HNF, wolves are again classified as a “sensitive” species.

Fisher (*Martes pennanti*)

Fishers are small to mid-sized carnivores strongly associated with structurally complex forest stands, most often at low and middle elevations rather than in high montane forests (Powell and Zielinski 1994). In the Rocky Mountains, fishers most often use stands dominated by grand fir, Engelmann spruce, and lodgepole pine (Jones 1991). Old-growth and mature riparian forests provide particularly good habitat. Fishers make use of hollow logs, standing tree cavities, and dense tree crowns (often witch’s brooms) for denning, rearing young, resting, and general refuge (Jones 1991). They prey on a variety of small and mid-sized mammals (snowshoe hares, porcupines, squirrels, voles), as well as birds, and carrion (Heinemeyer and Jones 1994).

Fisher habitat is generally defined as mesic, low-to-mid elevation lands with dense canopy forests. Fishers appear to use landscapes at different spatial scales for different behaviors and activities (Powell and Zielinski 1994; Weir and Harestad 2003). Fisher habitat needs are related to their life history needs, including the need to locate and capture prey, locate resting sites, and defend their territory. Seasonally, fishers may need to travel farther or more frequently to find enough food to raise young, locate mates, or establish new territories (Lofroth et al. 2010). To meet those needs, fishers probably make decisions based on location and abundance of prey, environments in which they can hunt effectively (i.e. snows not too deep), and environments that provide escape cover from potential predators.

Studies of fisher habitat use have mainly been conducted using radio telemetry to study fisher movements and habitat selection. In a review of fisher habitat studies conducted in western North America, Lofroth et al. (2010) found the following generalities:

- Fisher occur in a variety of low and mid-elevation forested plant communities.
- Fisher are associated with moderate to dense forest canopy.
- Fisher home ranges include a diversity of forest successional stages and plant communities.
- Active fisher are frequently associated with complex forest structure.
- Fisher rest sites are strongly associated with moderate to dense forest canopy and elements of late-successional forests.
- Fishers typically rest in large deformed or deteriorating trees and logs.
- Cavities in large trees are a critical resource.

In the west, optimum habitat appears to be late-successional coniferous forests in summer and young to mature conifer forests in winter. Preference for lower elevation areas may be seen, due to difficulty in traveling in deep snow (Vinkey 2003). Complex forest structure is important for providing cover and supporting prey species. Snags, woody debris, and hollow logs, and tree cavities provide rest sites and winter den sites.

Forest plant communities occupied by extant fisher populations in western North America range from pure hardwood to mixed conifer-hardwood, to pure conifer stands, and for the most part, fisher home range composition tends to reflect the forested plant communities found in the study

areas (reviewed in Lofroth et al. 2010). Fisher habitat in USFS Region One includes spruce-fir, Douglas fir, cedar-hemlock-Douglas fir, grand-fir-Douglas-fir, and pine-Douglas-fir (reviewed in Lofroth et al. 2010). Hardwoods may be an important component of fisher habitat where they are available, but their importance should not be overemphasized relative to conifers (Zielinski et al. 2004).

The most consistent predictor or fisher occurrence at large spatial scales is moderate to high amounts of contiguous canopy cover (Lofroth et al. 2010). In Idaho, Jones (1991) found that fishers avoided openings and forested areas with 40 percent or less canopy cover.

The structural diversity of forest stands may be a more important factor for fisher than are plant community types. Nearly all studies have shown a positive relationship with mid-successional and/or late-successional forests, and an avoidance of the youngest successional stages in their home ranges (e.g., non-forested and herb-shrub areas; reviewed in Lofroth et al. 2010). However, some studies have shown positive association with young successional stages such as pole-sapling and young forest (e.g., Jones 1991), possibly because of prey resources associated with these environments. In particular, Jones (1991) observed fisher shifting their use of habitat seasonally, with mature and old-growth forests being used in the summer, and young forest cover types used in the winter. Younger stands have high prey availability that can help sustain fishers in the winter months, although denning and resting sites in these areas may not be as abundant (Jones 1991; Jones and Garton 1994).

Fishers appear to be more flexible in their use of various forest successional stages when active, i.e. for foraging or moving, than when resting or denning (reviewed in Lofroth et al. 2010). Resting sites provide thermoregulatory benefits, protection from predators, proximity to prey, and secure locations for consuming prey (Zielinski et al. 2004; Aubrey and Raley 2006). In a meta-analysis of resting site habitat from the Pacific coastal states and provinces[2], Aubrey et al. (in review) found that fishers selected resting sites in areas that had denser overhead cover and contained a greater volume of logs and a higher prevalence of large trees and snags (i.e. greater basal areas of large conifers, hardwoods, and snags, and larger diameter conifers and hardwoods) than available sites. Fishers also selected resting sites located on relatively steep slopes and that were close to water, patterns that have also been reported in other studies (Zielinski et al. 2004).

Various studies have reported fisher associations with water or riparian areas (reviewed in Lofroth et al. 2010). The majority of fisher locations from studies in the Northern Rockies were near riparian areas: 65 percent of locations were within 650 feet of water in the Cabinet Mountains (Heinemeyer 1993), and 70 percent of locations were within 330 feet of riparian areas in central Idaho (Jones 1991). Thus we can see that riparian habitats may be especially useful for fishers, but we did not want to overlook upland habitats. Aubrey et al. (in review) hypothesize that the selection of sites near water may reflect selection for attributes such as a greater availability of prey and alternative resting structures, or their use as travel corridors. Whatever the causal factors, multiple studies have observed patterns of association with steep slopes, proximity to water, and drainage bottoms.

[2] Data analyzed came from 8 studies ranging from the spruce-dominated boreal forests of British Columbia through the mixed-conifer forests of SW Oregon and NW California to mixed conifer-hardwood forests of the Sierra Nevadas. Additionally, study areas including high levels of genetic variation among the fisher populations studied. Thus, the authors suggest broad applicability of results to fishers throughout their range.

Fishers rest primarily in live trees, and will often select trees with rust brooms or mistletoe, which are structural features that provide rest platforms (reviewed in Lofroth et al. 2010). Snags are used less often as resting sites; when snags are used, they are usually large snags with large cavities. Coarse down wood is also used as rest structures, including hollow portions of logs or spaces created by coarse down wood under the snow.

Fishers are obligate users of tree cavities for reproductive dens (Powell and Zielinski 1994; Lofroth et al. 2010). Cavities in both live and dead trees are utilized, and provide both thermal insulation and security from potential predators for kits. Females utilize internal cavities with relatively small openings for natal dens (using openings as small as 3-4 inches); openings may be created by branches breaking away from the bole, fire scares, cracks in the bole, and pileated woodpecker excavations (reviewed in Lofroth et al. 2010). Size of trees used for natal and/or post-reproductive dens ranged in size from 13 inches d.b.h. to greater than 30 inches d.b.h. (reviewed in Lofroth et al. 2010).

Like lynx and marten, fishers avoid large openings (parks, meadows, early-seral clearcuts, and burns). Also, like other forest carnivores, fishers maintain low population densities and range widely in search of prey and of key habitats (structurally complex forest) (Powell and Zielinski 1994). Because of their aversion to openings, they seek out forested connections between the habitat sites in which they focus activity (Powell and Zielinski 1994). These connecting habitats may consist of any number of forest formations and seral stages and do not necessarily exhibit the complex structure and prey density of preferred habitat sites (Heinemeyer and Jones 1994).

The importance of riparian and wetland forest has been noted by researchers in several areas of North America, including Montana (Heinemeyer and Jones 1994). In Montana, fishers prefer areas within 200 meters of water (Heinemeyer and Jones 1994). Investigators have documented that riparian corridors are often used as travel routes (Heinemeyer and Jones 1994). Jones (1991) suggests that preferred resting habitat and prey are more available within forested riparian areas.

Beginning in the 19th century, fisher populations were decimated throughout most of western North America by trapping, which continued unabated into the 1930s, and by loss of key habitat to logging. Fisher populations have rebounded naturally in some areas and have been reintroduced in others (as in the Cabinet Range of northwest Montana, 1988-90). Still, fisher numbers remain low in the northern Rockies, leaving local populations more vulnerable to decimating factors than species with larger, more diverse populations.

In June 2011, the US Fish and Wildlife Service determined that listing the fisher as threatened or endangered was not warranted at the time (50 CFR Part 17). This finding was in response to a petition to list a distinct population segment (DPS) of the fisher in its U.S. Northern Rocky Mountain range, including portions of Montana, Idaho, and Wyoming. The USFWS determined that fishers in the Northern Rocky Mountains met the definition of a DPS because they are geographically separated from other fisher populations, and because the loss of this population would result in a significant gap in the range of the species and the loss of a unique genetic identity found nowhere else within the range of the species. Based on the existence of fisher throughout much of its historic range in Montana and Idaho, the USFWS determined that “the existing state of the regional landscape is conducive to supporting fisher, but it is not clear what the capacity of the system is to support, in the long-term, a self-sustaining population or a number of interacting subpopulations” (USDI Fish and Wildlife Service 2011).

The most recent known fisher trapped in the project area was in December 2001along the western edge of the project area. Annual surveys conducted on the HNF by Wild Things

Unlimited since 2006, have not detected fishers although FS hair snag surveys in 2008 detected two individual fishers along the western portion of the project area. Subsequent FS hair snare surveys conducted by FS personnel in 2011 and 2012 failed to detect fisher in either the Lincoln or Seeley RD. Reports of fishers in the Blackfoot landscape have been rare, and have not been sufficient to allow an estimation of population numbers. The HNF is on the eastern edge of the distributional range of this species. Action alternatives would minimize the potential for disturbance or displacement and overlap with reproductive period. Primary threat to individuals is trapping.

In the Blackfoot landscape, most suitable habitat—low/mid elevation mature and old-growth riparian forest—is present only in relatively small plots, with more marginal habitat available in larger blocks. This habitat is patchy in that it is separated, often by some distance, from other such tracts; but these sites are usually interconnected via forest habitat that, while unsuitable for long-term residence, provides an adequate travel environment.

The ongoing bark beetle epidemic across the Blackfoot landscape is resulting in an increasing snag and log density (both key habitat elements) while also eliminating live forest canopy cover. Its impact will be limited since most habitat changes are occurring in drier upland pine forests, rather than in riparian sites.

The Region One Fisher Habitat Model (USDA Forest Service 2012) was used to estimate fisher habitat for the analysis area. Fisher ranges in Montana and Idaho are among the largest home ranges reported for fishers, with females averaging approximately 10,000 acres, and males averaging approximately 22,000 acres (Jones 1991). Based solely upon home range sizes, the analysis area could be capable of supporting several males and females, providing that the majority of land is suitable fisher habitat.

Harvest data from Montana have been used to suggest population trend, although such results should be interpreted cautiously, given the inherent biases of trapping, and the lack of rigor for determining scientifically valid population estimates. Trapping records from Montana show a consistent yearly harvest of roughly seven to nine individuals, with 198 fishers trapped in Montana since 1983 and the continual presence of a high proportion of younger animals in the harvest (MFWP 2010). These data suggest that reproduction is occurring in Montana. MFWP (2010) suggests that the younger age male dominated harvest is indicative of a low harvest rate, and MFWP further interprets that limited track survey data and harvest records indicate a consistent population status over time.

Harvest records provide the most reliable information on the occurrence of fisher. Harvest records indicate two fisher were trapped in1997 and 1998 near Lincoln and another is known from 2001 and noted above. Fishers are very uncommon east of the Continental Divide, as seen in the trapping records and recent fisher surveys. Probable reasons for this observation include very limited habitat and drier forest conditions.

Fishers have more recently been recorded on the Forest through survey efforts conducted in 2007, 2008, and 2009 (See data and results in district files). Potential habitat – post kill (which considers the current pine beetle epidemic throughout the forest) has been estimated in the project area based on methods described in the *Methodologies and Assumptions* section. Habitat has been modeled for both summer and winter habitat (See *Criteria for Wildlife Models Helena National Forest* for definitions). Potential fisher summer habitat has been modeled within the project area, approximately 5,120 acres and winter habitat is approximately 117,087 acres. There

are an estimated 59,511 acres of fisher summer habitat and 212,008 acres of winter habitat across all Helena National Forest landscapes.

Primary fisher habitat on the Forest is patchy but widely distributed. It is increasing as forests age. Insect-generated mortality in mature forest is creating more open canopy (unfavorable) but more snags and woody debris (favorable). Primary habitat is interconnected by forested travel habitat. Population is widely distributed but small; precise numbers are unknown.

Threats can affect an individual, a population, or the environments that support a species. For fishers, there is no single dominant threat to their distribution or abundance. Rather, a host of anthropogenic and natural events can have negative effects on fishers. Some threats to fisher include: Forest vegetation management, prescribed fire, climate change, roads, wildfire, disease, trapping, and other predators.

Wolverine (*Gulo gulo*)

The wolverine is a Region 1 Forest Service Sensitive species and a USFWS candidate species.

Wolverine is a solitary and highly mobile species that tends to inhabit remote areas and occurs at relatively low densities (Banci 1994, Pasitschniak-Arts and Larivière 1995). Wolverines range widely from subalpine talus slopes to big game winter ranges, occupying higher ranges in the summer and riparian habitats in the spring. Ruggiero and others (1999) found that wolverines used higher elevations in the snow-free season to avoid high temperatures and human activity. In the northern Rocky Mountains, wolverines make extensive use of coniferous forest (Foresman 2001; Hornocker and Hash 1981). While wolverines are generally regarded as wilderness animals, they may include clear-cut areas in their home ranges (Hornocker and Hash, 1981) and are reported to scavenge around northern Canadian communities (Banci 1994). Wolverines exhibit some fidelity to particular areas for months or years, however, the species is thought to have a flexible behavioral system when changing environmental conditions (e.g., food supply), supersedes boundary considerations (Hatler 1989).

Wolverine habitat is best defined in terms of adequate year-round food supplies in large sparsely inhabited areas, rather than in terms of particular types of topography or plant associations. No particular habitat components or habitat management techniques can presently be singled out for wolverine; success of wolverine may relate to the availability of large areas of remote, rugged uplands that are difficult to access by humans (Hatler 1989). Wolverines occur in low densities in all places they have been studied (Ruggiero et al. 1994). This is generally attributed to naturally low reproductive rates and delayed sexual maturity of the species. Food availability seems to be the primary factor determining movement and specific habitat use.

The wolverine is primarily a scavenger, although it will acquire most of its own food during the summer months. They are opportunistic feeders, consuming a variety of small and large animals. The eggs and young of ground nesting birds, burrowing rodents, snowshoe hares and berries are favorite summer foods. Large mammal carrion is an important dietary component, particularly in winter when other prey is scarce (Banci 1994, Pasitschniak-Arts and Larivière 1995); therefore they rely heavily on the presence of other predators. Wolverines will also search for caches made by itself, other wolverines, or other carnivores during the winter.

Female wolverines use two kinds of dens for reproduction. Females use natal (birthing) dens to give birth and raise kits early postpartum, prior to weaning, females may move kits to one or multiple alternative den sites, which are referred to as maternal dens. The movement of kits from natal to maternal dens may be a response by the female to den disturbance, better food

availability in the new location, predation risk, or deteriorating den conditions in the natal den (Magoun and Copeland 1998). Female wolverines use natal dens that are excavated in snow. Persistent, stable snow greater than 5 feet deep appears to be a requirement for natal denning, presumably because it provides security for offspring and buffers cold winter temperatures (Copeland 1996; Magoun and Copeland 1998; Banci 1994; Inman et al. 2007).

Post-weaning dens are called rendezvous sites. These dens may be used through early July. Females leave their kits at rendezvous sites while foraging, and return periodically to provide food for the kits. These sites are characterized by natural (unexcavated) cavities formed by large boulders, downed logs (avalanche debris), and snow (Inman et al. 2007).

Wolverine natal denning habitat was modeled based on Hillis and Kennedy (2003) which focused on areas of late season snow persistence. All modeled natal denning habitat occurs north of Hwy 200. Approximately 14,734 acres of modeled habitat occurs within the project area in one large block along the Scapegoat Wilderness boundary. The Scapegoat Wilderness contains an additional 26,000 acres that occur in two large blocks of continuous habitat to equal approximately 40,840 acres.

On December 14, 2010 the U.S. Fish and Wildlife Service announced a 12-month finding on a petition to list the North American wolverine (*Gulo gulo*) as an endangered or threatened species under the Endangered Species Act of 1973, as amended. After review of all available scientific and commercial information, the USFWS found that the North American wolverine occurring in the contiguous United States is a distinct population segment (DPS) and that addition of the DPS to the List of Endangered and Threatened Wildlife is warranted, but precluded, making it a candidate species (USDI Fish and Wildlife Service 2010) as well as a sensitive species. The following analysis for wolverine includes excerpts of information from the USFWS 12-month finding (incorporated by reference) that are relevant to Montana and represent the best available scientific information available.

In summary, the USFWS concluded that the impacts of climate change constitute a threat to the contiguous U.S. DPS of the wolverine. Wolverine populations in the remaining U.S. range appear to be at numbers so low that their continued existence could be at risk. These risks come from three main factors: (1) small total population size; 2) effective population below that needed to maintain genetic diversity and demographic stability; 3) fragmented nature of wolverine habitat in the contiguous United States that results in smaller, isolated island patches separated by unsuitable habitats. These other threats are secondary and only rise to the level of threats to the DPS as they may work in concert with climate changes to affect the third risk factor; habitat. In their finding on the wolverine DPS, the USFWS discussed a variety of impacts to wolverine habitat including: (1) climate change, (2) human use and disturbance, (3) dispersed recreational activities, (4) infrastructure development, (5) transportation corridors, and (6) land management. The primary impact of climate change on wolverines is expected to be changes to the availability and distribution of wolverine habitat.

The analysis area is the entire project area and is large enough to potentially support several individuals. The analysis area serves to adjoin habitats and /or populations to the north and south. Wolverines are known to occur throughout various parts of the project area. Higher elevations that support late season snowpack both within and outside the Scapegoat Wilderness have the greatest potential to provide wolverine denning habitat.

In the 12-month finding, the USFWS stated that wolverines likely exist as a metapopulation in the contiguous United States (ibid). A metapopulation is a network of semi-isolated populations,

each occupying a suitable patch of habitat in a landscape of otherwise unsuitable habitat. Individual subpopulations may go extinct or lose genetic viability, but are then ‘‘rescued’’ by immigration from other subpopulations, thus ensuring the persistence of the metapopulation as a whole. If metapopulation dynamics break down, either due to changes within subpopulations or loss of connectivity, then the entire metapopulation may be jeopardized. The USFWS believes this outcome is likely for wolverine in the long-term, due to their naturally low reproductive rates, low densities, and habitat that may become increasingly more isolated due to climate change, as described below.

Wolverines naturally occur in low densities of about 1 wolverine per 58 mi2 with a reported range from 1 per 25 to 130 mi2 (Hornocker and Hash 1981, Squires et al. 2002, Copeland and Yates 2006). No systematic population census exists over the entire current range of wolverines in the contiguous United States, so the current population level and trends remain unknown. However, based on current knowledge, the USFWS estimates that the wolverine population in the contiguous United States numbers approximately 250 to 300 individuals (USDI Fish and Wildlife System 2010).

As stated in the 12-month finding, “Wolverine records from 1995 to 2005 indicate that wolverine populations currently exist in the northern Rocky Mountains”…and that “the bulk of the current population occurs in the northern Rocky Mountains.”…“Within the area known to currently have wolverine populations, relatively few wolverines can coexist due to their naturally low population densities, even if all areas were occupied at or near carrying capacity.

“Given the natural limitations on wolverine population density, it is likely that historic wolverine population numbers were also low” (ibid).

The USFWS believes that densities and population levels in the northern Rocky Mountains where populations currently exist are likely not substantially lower today than they were historically. “The northern Rocky Mountain population (north of Wyoming) was reduced to historic lows or possibly even extirpated during the early 1900s, and then increased dramatically in the second half of the 1900s as predator control efforts subsided and trapping regulations became more restrictive (Aubry et al. 2007). This increase likely indicates a population rebound from historic lows” (ibid).

As stated in 12-month finding (USDI Fish and Wildlife System 2010): “Despite the impacts of trapping on wolverines in the past, trapping is no longer a threat within most of the wolverine range in the contiguous United States. Montana is the only State where wolverine trapping is still legal.” Legal trapping in Montana in the recent past (before 2004) removed an average of 10.5 individuals from this population each year, and harvest mortality has been reduced due to regulatory changes in 2008. Again, from the 12-month finding: “For the 2008–2009 trapping season, Montana Department of Fish, Wildlife, and Parks adjusted its wolverine trapping regulations again to further increase the geographic control on harvest to prevent concentrated trapping in any one area, and to completely stop trapping in isolated mountain ranges where small populations are most vulnerable (MDFWP 2010). The new regulations spread harvest across three geographic units (the Northern Continental Divide area, the Greater Yellowstone area, and the Bitterroot Mountains), and establish a statewide limit of 5 wolverines. The 2008–2009 and 2009–2010 trapping seasons have resulted in four and three wolverines harvested, respectively (MDFWP 2010).” The USFWS concluded that, “in the absence of other threats, trapping would not be likely to threaten State-wide wolverine populations in Montana, or to threaten the continued existence of the wolverine population in the contiguous United States…[and] the additive mortality caused by trapping could become a concern in the future as

the size of the wolverine population shrinks in response to the loss of habitat due to climate change"(USDI Fish and Wildlife System 2010). The 2012-2013 trapping season for wolverine was suspended by MT FWP.

Wolverines are known to occur in the project area. Wild Things Unlimited has conducted winter backtracking while collecting hair, scat, or urine samples for DNA analysis on portions of the Helena NF in each consecutive year since the 2006/2007 winter. Initial efforts were primarily focused around the MacDonald Pass area on either side of Hwy 12. During the 2009/2010 winter, survey efforts were expanded to include lands within the project area.

To date, survey efforts by Wild Things Unlimited have yielded DNA confirmation of four individual wolverines on the Forest. Two males were identified south of the project area and a male and female were identified in the southern half of the project area. Various other samples collected during backtracking efforts did not contain sufficient quality DNA for species identification or in some cases individual and gender recognition. One sample collected in the northern half of the project area was confirmed as wolverine but individual and gender recognition was not able to be determined from the sample. Numerous samples were also collected during the 2010/2011 winter although DNA analysis results are not anticipated until fall 2012. Survey efforts have not covered the entire project area so there is a high probability of other individuals occurring within the project area as well.

Another wolverine confirmation within the project area was from February of 2009 when a female wolverine was incidentally caught in a leg hold trap south of Hwy 200. Since the individual was trapped within WMU4 which is closed to wolverine trapping, that individual was released and assumed to have survived.

Wolverines have few natural predators although both interspecific and intraspecific mortalities have been documented. Human-caused mortality is the primary factor affecting wolverine survivorship, with fur harvest being the leading cause of mortality in areas where trapping occurs (Banci 1994).

More than any other factors, wolverines are susceptible to mortality through hunting and trapping and human-caused disturbance near den sites (Hornocker and Hash 1981; Copeland 1996; Weaver et al. 1996). Wittmer et al. (1998) suggested long-term conservation of wolverine in the analysis area through maintenance of large, remote areas of habitat and engaging in management activities that do not decrease ungulate prey density.

Flammulated Owl (*Otus flammeolus*)

Flammulated owls are small insect-eating raptors with specialized habitat requirements. They are secondary cavity nesters in mature or old-growth ponderosa pine and Douglas-fir stands. Occasionally, they are found in mature aspen or cottonwood. They forage for large insects at twilight and after dark in open-grown forest formations with productive understories (tall grass, brush, young conifers) (McCallum 1994). This vegetation pattern is key to maintaining an adequate supply of insect prey while providing the owls with perches from which to forage and a substrate for large nesting cavities. Patches of denser trees or multi-storied vegetation within or near the open stands are important for roosting (Morgan 1994). Because of the nature of their food base, flammulated owls migrate south in the winter.

Flammulated owls are unevenly distributed—a function of the spotty dispersion of suitable habitat—and numbers now substantially lower than under historic conditions. Primary threats to flammulated owls are habitat loss to logging and human settlement and the transformation of

open-grown ponderosa pine stands into dense interior forest as a result of fire prevention (Morgan 1994). The scarcity of large open-grown ponderosa pine and Douglas-fir at mid-low elevation limits habitat opportunities throughout the Blackfoot landscape, and as a result, the owls sometimes take advantage of less-traditional habitat formations: aspen stands or small patches of open-grown ponderosa pine adjacent to dense stands of Douglas-fir, for example.

Management strategy involves maintaining open-grown old-growth ponderosa pine and Douglas-fir forest at low and middle elevation with lightly grazed grasses and shrubs in the understory. The stands should contain a number of large snags with cavities similar to those that would support pileated woodpeckers and northern flickers (Bull et al. 1990). These conditions would not evolve naturally in the short term, and management needs to eliminate dense second-growth within these stands and burn away needle accumulations so that native grasses and shrubs can flourish and provide an environment for large insect prey (Morgan 1994). Retention of large trees, spaced fairly widely, should provide adequate perching and nesting sites for owls. Inclusions of denser tree growth are important for providing roosting habitat.

The flammulated owl is classified as a sensitive species in Region 1 because of population viability concerns—some of which stem from obvious habitat problems and some of which are a function of insufficient field information. Information about population patterns is beginning to accumulate, primarily from research on the Bitterroot and Lolo National Forests, but also from recent wide-ranging survey work throughout Region-1 National Forests [see Climburg 2006; Smucker and Climburg 2008]. Because of their diminutive size, reclusive daytime habits, and low population densities, flammulated owls are seldom seen and can normally be detected only through specialized survey methods. These efforts suggest that, in most areas, populations are small and fragmented (primarily because of the scarcity of suitable habitat).

Region-wide survey efforts, 2005-2008, have found that the HNF supports the highest flammulated owl densities of the 5 National Forests located east of or astride the Continental Divide—with overall densities more characteristic of the westside Forests (Lolo, Bitterroot, Nez Perce, Kootenai) (Climburg 2006; Smucker and Climburg 2008). The surveys found, however, that the most robust HNF populations were on the Lincoln Ranger District, west of the Divide. During the Oct 2008 surveys by the Avian Science Center, owls were recorded in three separate locations within the Blackfoot landscape. Table 38 shows the locations and number of detections. Potential flammulated owl habitat has been modeled– post-kill (which considers the current pine beetle epidemic throughout the forest (identified above in the *Methodologies and Assumptions* section) within the project area. The model identifies approximately 27,209 acres of potential habitat.

Table 38. Recorded locations and detections of flammulated owls within the Blackfoot landscape

Location	Number of Detections
Ogden Mountain Rd	2
Road 1163	2
Road 1830	13

The current mountain pine beetle outbreak presents habitat opportunities for flammulated owls wherever it creates large ponderosa pine snags in open forest stands away from roads. The snags provide new cavity nesting substrate, and the selective loss of live overstory trees may open up forest canopies in a manner that makes them more conducive for occupancy by the owls—

allowing development of more vigorous ground vegetation and opening up understory flyways. Meanwhile, nearby Douglas-fir stands remain intact as a source of roosting habitat.

Black-backed woodpecker (*Plecotus arcticus*)

Black-backed woodpeckers are primary cavity nesters in coniferous forests. They excavate their own nest cavities in a variety of live or dead tree species and, as with many woodpeckers, play a key role in creating holes later used by other birds and mammals (secondary cavity nesters) (Dixon and Saab 2000). Engelmann spruce, Douglas fir, lodgepole pine, ponderosa pine, and western larch are all used as nest trees. Black-backed woodpeckers forage almost exclusively on the larvae of bark beetles and wood-boring beetles that inhabit dying and newly-dead trees. Home range size varies from around 180 to 810 acres depending on habitat quality.

Black-backed woodpeckers are largely restricted to early post-fire forests (Hutto 1995), and while they can survive in other habitats in low numbers, they appear to require a regular recurrence of new burns for long-term survival (Kotliar et al. 2002). They arrive in burned-over forest within the first year following a fire and remain for up to 6 years—as long as the post-fire supply of wood-boring insects remain sufficient—but their local population usually peaks in 3-4 years (Hutto 1995). The woodpeckers are far more abundant in burned forests than in any other forest configuration. They are much less frequently observed in live mature forests, even those where snags are common.

For many decades in the 20th century, black-backed woodpecker populations were depressed by effective fire suppression, frequent salvage logging, and, to a lesser extent, by insect eradication (Hutto 1995). In the last few years, as crown fires have increased in size and intensity on the HNF and throughout the west in general (due to suppression-generated fuel build-ups), habitat opportunities for black-backed woodpeckers have been increasing.

Black-backed woodpeckers also occur in unburned landscapes where insect infestations, severe winter weather, or other phenomena have produced high densities of dead or dying trees with bark beetles and woodborer beetles. But, population density in these habitats is inevitably low with one possible explanation being that the largely black birds are less visible in fire-blackened snag aggregates (Dixon and Saab 2000) and thus less vulnerable to predation than in other snag-rich habitats. Whatever the reason, recent research focused in Montana suggests that networks of recently burned forest—not just recently dead trees—are the key to long term survival of these birds (Hutto 1995).

Over the last 25 years, large stand-replacing fires have provided an abundance of suitable habitat for black-backed woodpeckers on the HNF. These include the Warm Springs (1988) and Boulder (2000) fires in the Elkhorn Range; the North Hills (1984), Cave Gulch (2000), Maudlow-Toston (2000), Jimtown (2003), Meriwether (2007), and Lakeside (2010) fires in the Big Belt Range; and the EF (2012), Davis (2010), Moose-Wasson (2003) and Snow-Talon (2003) fires in the Blackfoot landscape. These fires, as well as a number of smaller burns, have accounted for hundreds of thousands of acres of burned forest in this landscape.

Other than the 1988 Canyon Creek fire that burned over 250,000 acres, the Blackfoot landscape normally has not experienced fires of this magnitude since the early 20th century, and thus has not provided viable habitat for resident black-backed woodpecker populations. The 2012 EF, 2010 Davis, 2003 Moose-Wasson and Snow-Talon fires are the only recent “large” fires that are providing some habitat. The current bark beetle outbreak is rapidly expanding habitat opportunities for a number of the more versatile woodpeckers, such as hairy and downy

woodpeckers, red-naped sapsuckers, northern flickers, and even pileated and northern three-toed woodpeckers. Regionally there are several thousand acres of recently burned forest providing habitat for black-backed woodpeckers.

Western toad (*Bufo boreas*)

The Western toad (*Bufo boreas*) is widely distributed in the Rocky Mountains and the Pacific Northwest. The Montana subspecies is the "boreal toad" (*Bufo boreas boreas*)—a name often applied to it in this area. Western toads are found most often in mountainous terrain—up to 9,220 ft. They are capable of breeding in shallower reaches of any clean standing water ranging from roadside ditches and gravel pits, to temporary ponds, or large lakes (Werner et al. 2004). Eggs are laid in May or June (depending on elevation), and tadpoles and young toads are present in and around aquatic sites through the summer. Recent research in western Montana (Schmetterling and Young 2008) suggests that the toads may also make use of calm pockets of water in mountain streams for breeding.

Adults are largely terrestrial and, outside of breeding season, may wander considerable distances from their aquatic breeding sites. Females generally range farther from water than do males (Werner et al. 2004). Both juvenile and adult toads have been documented using small, fast-flowing streams as movement corridors as well (Schmetterling and Young 2008). Western toads occupy a variety of terrestrial habitats from valley bottoms to high elevation slopes—including both forested and non-forested sites. The quality of ground-level microhabitat is more important than large-scale vegetation structure. When not feeding, toads may seek cover in rodent burrows or under logs.

Western toads, once relatively common, have declined dramatically throughout Montana—and most of the West—over the last 25 years (Reichel 1996). Some decimating factors are local: draining and alteration of aquatic habitat, proliferation of cattle in breeding sites, pollution of aquatic habitat, introduction of predatory fish, fragmentation of upland habitats and travel routes. Others are probably continental or global—most prominently, the proliferation of lethal chytrid fungus. The most likely scenario is that the fungus is the primary source of mortality while local human-generated activities are acting as contributing factors (Bartelt et al. 2004).

Western toads have been identified at a number of breeding sites across the Blackfoot landscape. Occasionally they are observed in upland habitats, but their relatively low densities in these areas and their tendency to burrow under cover (in logs, under litter, in dense vegetation) make them difficult to discover. Population numbers are unknown, but it is assumed, given region-wide trends, that their numbers are lower than they have been historically.

Management Indicator Species

Elk (*Cervus elaphus*) and Mule deer (*Odocoileus hemionus*) – Hunted Species Group

A variety of big game species occur throughout or in the vicinity of the project area. These include elk, mule deer, mountain goats, mountain lions, black bears, and moose. This analysis focuses on elk and mule deer due to their role as a management indicator species and the accompanying assumption that an indicator species can be used to monitor the effects of land management on a variety of species. Subsequently, it is assumed that effects to elk or mule deer generally pertain to other big game species although there may be species-specific effects not reflected in the following elk analyses. These different effects, where present, are assumed to be

minimal and are described in Appendix E - Wildlife Analysis Approach Table. The rationale for not carrying these analyses forward is also described there.

Elk

Elk serve as a management indicator for hunted species. They are managed to achieve particular population goals. Elk are one of the more manageable species because their habitat requirements are well studied, and they respond to habitat and population management (Cooperrider 2002). Elk are very adaptable and occur in a variety of habitats ranging from high mountainous areas to highly managed forests to cold deserts (Skovlin et al. 2002). Elk used to be widespread prior to the settlement of North America. However, due to habitat alterations and exclusion from areas of human settlement, elk are now found primarily in coniferous forests (Skovlin et al. 2002).

Management for elk and elk habitat has become increasingly more complex as human activities affect habitat quality and access. It requires meeting basic elk habitat requirements and understanding the socioeconomic value of elk and the attendant public demands. Primary considerations in elk management include (Lonner 1991)

- Maintaining habitat security to minimize elk vulnerability during the hunting season
- Preserving/recovering desired elk population characteristics as determined by elk managers and distributions relative to land management
- Satisfying the growing demand for quality hunting and non-hunting experiences.

Population Status and Habitat in the Project Area

The Montana Natural Heritage database lists the global status of elk as ‘G5’ and the statewide status as ‘S5’ which are both defined as follows: “common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range”. See http://fieldguide.mt.gov/displayClasses.aspx?Kingdom=Animalia

Elk migrate seasonally across elevation gradients. Elk extensively use the Forest during spring, summer, and fall. During the spring, elk distribution is dependent on the availability of new forage and therefore fluctuates year to year based on snow melt. During the summer, elk use the project area widely although as summer continues, higher elevations of cool, moist, areas are frequently used. Elk winter range generally occurs at lower elevations and on south facing slopes that remain relatively snow free during the winter. Along the east, west, and southern boundaries of the project area the majority of winter range occurs on private land. More limited winter range occurs along the Blackfoot valley within the project area supporting relatively low numbers of elk throughout the winter.

Methodologies have been developed that measure elk vulnerability – the relationship between elk and land management practices and the demand for elk hunting and non-hunting experiences. These methodologies generally reflect seasonal habitat needs. These different seasonal habitat needs are the focus of the affected environment discussion and include summer range, security habitat during the hunting season, and winter range. The project area is located within eight elk herd units (EHUs): Arrastra Creek, Beaver Creek, Keep Cool, and Landers Fork north of Highway 200, and Flesher Pass, Nevada Creek, Ogden Mountain, and Poorman Creek south of Highway 200.

Summer Range

Long-term productivity of elk is in part based on the quality of summer range. Some research indicates that the quality of summer range is one of the more important variables in determining annual variation of herd growth. The quality of summer range is measured in terms of percent of hiding cover on summer range and habitat effectiveness which is a measurement of open road densities during the summer.

Hiding Cover

For summer range, FP Standard 3 requires maintaining a minimum of 35 percent hiding cover within a herd unit when applying the FS hiding cover definition (a timber stand which conceals 90 percent or more of a standing elk at 200 feet). The FP also recognizes the FWP definition of hiding cover (a stand of coniferous trees having a crown closure of greater than 40 %). The corresponding requirement for Standard 3 using the FWP definition of hiding cover is to maintain a minimum of 50 percent hiding cover within a herd unit (see FP page II/18). Both definitions require a minimum 40 acres patch size. For this project, hiding cover was identified using the FWP definition. Therefore, for this analysis, Standard 3 requires maintaining a minimum of 50 percent summer range hiding cover per elk herd unit.

Table 39 below, summarizes the amount of summer range hiding cover per EHU and whether the current condition meets Forest Plan standard 3. The total summer range acres (i.e., elk herd unit acres), hiding cover acres and percentages for each herd unit as displayed serve as the baseline for this project analysis. The figures in table 39 remain unchanged under the action alternatives.

Table 39. Acres of hiding cover on summer range by EHU

Elk Herd Unit	Total Acres Summer Range*	FP Hiding Cover Acres	Percent FP Hiding Cover	Meets FP Standard #3
Arrastra Creek	27,738	11,540	42	No
Beaver Creek	32,406	17,683	55	Yes
Flesher Pass	91,093	39,847	44	No
Keep Cool	44,325	15,768	36	No
Landers Fork	136,516	59,695	44	No
Nevada Creek	38,824	25,029	64	Yes
Ogden Mountain	56,310	24,432	43	No
Poorman Creek	67,425	42,560	63	Yes
Total	**494,637**	**236,554**	**48**	**N/A**

* Total summer range acres represent the entire herd unit including private lands outside the project area boundary

As reflected in table 39, using the FWP definition of hiding cover only three of the eight project area elk herd units meet the FP standard 50 percent requirement. EHUs meeting FP standard 3 include: Beaver Creek, Nevada Mountain, and Poorman Creek. Based on the total acres of summer range and hiding cover for the eight herd units combined, the percent hiding cover is 48 percent. Although the total percent hiding cover falls below the 50 percent requirement, the value is low due to the inclusion of private lands within the herd unit boundaries. The majority of private land included in the hiding cover assessment occurs outside the project area boundary and is only utilized as elk winter range, not summer range. These lands are largely dominated by native grasses or open forest conditions that do not meet the FP definition of hiding cover.

Habitat Effectiveness

Elk generally avoid human disturbance and/or exhibit physiological stress when exposed to human activity (Cassirer et al. 1992). In forested landscapes, open road density is used as an easily-measured variable to assess levels of human disturbance upon elk and is calculated as elk habitat effectiveness (Christensen et al. 1993; Lyon 1983).

Habitat effectiveness (Lyon 1983) analyzes how well summer range meets the needs of elk for growth and welfare during the non-hunting season. Habitat effectiveness includes an assessment of cover, forage, water, seclusion, and special features, but is primarily related to open road density. Habitat effectiveness is determined by a curve generated by the Montana Elk-Logging study which recommends a minimum of 50 percent habitat effectiveness on elk summer range. The recommended minimum of 50 percent habitat effectiveness represents a road density of 1.75 miles per square mile.

While habitat effectiveness is not a FP standard requirement it is a valuable tool for addressing elk security during the summer period, particularly with respect to managing motorized access.

Habitat effectiveness considers the open road density for roads open to motorized use between May 16 and October 14 for the eight herd units in the project area as disclosed in table 40 below. The recommended minimum value for habitat effectiveness is 50 percent (Lyon 1983). Road densities are determined across the entire herd unit including private lands and associated roads.

Table 40. Existing habitat effectiveness – summer open road density (miles/square mile)

Herd Unit	Square miles in EHU	Miles open road in EHU	Miles open road per square mile	Percent Habitat Effectiveness*
Arrastra Creek	43	42	1.0	60
Beaver Creek	51	82	1.6	51
Flesher Pass	142	167	1.2	58
Keep Cool	69	103	1.5	52
Landers Fork	213	100	0.5	73
Nevada Creek	61	64	1.0	60
Ogden Mountain	88	164	1.9	48
Poorman Creek	105	185	1.8	49

*The percent habitat effectiveness is estimated from Lyons 1983.

As shown in table 40, under the existing condition six of the eight herd units meet the 50 percent habitat effectiveness recommendation. The Ogden Mountain and Poorman Creek herd units are only slightly below. The Landers EHU has a very high habitat effectiveness value due to a large size of the herd unit and the fact that much of the herd unit falls within the Scapegoat Wilderness.

Elk Vulnerability during Hunting Season

Hunting Season Elk Vulnerability (Security)

The following addresses Forest Plan Standard 4a. For purposes of this analysis, Standard 4a is addressed as Elk Vulnerability to avoid confusion with the Hillis et al. (1991) habitat security model which is also used in this analysis and addressed as elk security.

Table 41. Forest Plan hiding cover/open road densities

Percent Hiding Cover (MDFWP Definition)	Maximum Open Road Density
80	2.4 mi/mi2
70	1.9 mi/mi2
60	1.2 mi/mi2
50	0.1 mi/mi2

During the hunting season, management of elk includes balancing the need to provide for and protect certain sex and age classes of elk and to provide hunting opportunities. While these parameters are a management function of Montana Fish, Wildlife, and Parks, the Helena National Forest strives to complement these objectives for elk vulnerability through management of open road densities relative to the amount of hiding cover in an elk herd unit. The table *Forest Plan Hiding Cover/Open Road Densities* is from page II/18 of the FP and shows the relationship between hiding cover requirements relative to open road densities for Forest Plan standard 4(a) using the MDFWP hiding cover definition. Table 42 below, summarizes the amount of Forest Plan hiding cover by EHU, associated open road densities during hunting season, and whether the current conditions meet Forest Plan standards for elk vulnerability.[3]

Table 42. Elk vulnerability - hiding cover relative to open road density[4]

Elk Herd Unit	Total Square Miles	Acres FP Hiding Cover	Percent FP Hiding Cover	Miles Open Road During Hunting Season	Open Road Density During Hunting Season	Meets FP Standard #4a
Arrastra Creek	43	11,540	0.42	42.2	1.0	No
Beaver Creek	51	17,683	0.55	72.3	1.4	No
Flesher Pass	142	39,847	0.44	139.6	1.0	No
Keep Cool	69	15,768	0.36	90.7	1.3	No
Landers Fork	213	59,695	0.44	95.1	0.4	No
Nevada Creek	61	25,029	0.64	57.0	0.9	Yes
Ogden Mountain	88	24,432	0.43	103.6	1.2	No
Poorman Creek	105	42,560	0.63	150.4	1.4	Yes

[3] Implement an aggressive road management program to maintain or improve big game security (p. II/17). The existing hiding cover to open road density should be determined over a large geographic area, such as a timber sale analysis area, a third order drainage, or an elk herd unit (p. II/18). See *Assumptions, Information Used, and Methodologies/Scientific Accuracy* Section for more information.

[4] Our open road density calculations are more conservative than the Forest Plan intended since we are weighting local roads by a factor of one rather than by a factor of 0.25 which is the factor upon which the Plan was crafted.

As shown in table 4, under the existing condition only Nevada Mountain and Poorman Creek EHUs meet Forest Plan Standard 4(a). The Beaver creek EHU has greater than 50 percent hiding cover but does not meet the road density portion of the hiding cover to open road density ratio. Five of the eight herd units do not meet the 50 percent hiding cover requirement. Because of this, even if all roads within those herd units were closed to motorized use, the low hiding cover values will preclude these EHUs from meeting FP standard 4(a). Since hiding cover would not change under either of the action alternatives, none of the alternatives meet the Forest Plan standard.

Hunting Season Elk Security

The relationship between open road densities and hiding cover serves as the basis for Forest Plan standard 4a. While this relationship is important, it does not take into account the spatial arrangement and size of unroaded patches, weather-driven road access, or forage condition during any given autumn—and it is not necessarily an accurate indicator of elk security during the hunting season. Conversely, stands that may not meet the definition of hiding cover may well prove to be secure areas for elk, given local conditions of topography, remoteness, and vegetation structure (such as heavy downfall) that make hunter access difficult. Therefore, hiding cover is not synonymous with security (Lyon and Canfield 1991; Lyon and Christensen 1992; Christensen et al. 1993).

In the past, high hunter numbers, high road densities, and reduced hiding cover across the West have resulted in rapid bull harvests and substantially reduced hunter opportunities (Lonner and Cada 1982). Hillis et al. (1991) concluded that maintaining greater than 30 percent of each herd unit as security areas at least 0.5 miles from open roads (areas where elk can evade hunters), would slow the elk harvest rate and increase the probability that some bulls would be available for harvest even late in the season. Hillis et al. (1991) acknowledged that their model was most applicable on densely-forested, steep topography on the Lolo and Deerlodge National Forests, and might be less applicable on more open forests east of the Continental Divide. Christensen et al. (1993) conclude that “as you move east…over the Continental Divide, cover considerations (regarding elk security) become more important because cover is less abundant and less contiguous.” Christensen et al. (1993) further conclude that roads more than any other factor affect hunting opportunity suggesting the Hillis et al. (1991) model might be conservative. Burcham et al. (1999) concluded that where posted private lands occur within the herd unit, many elk may move to private land during the hunting season in spite of there being large blocks of security on public lands.

Elk security under the existing condition is disclosed in table 43 that follows. The minimum recommended level of elk security habitat per EHU is 30 percent. Currently three of the five herd units meet the recommended security habitat level.

Table 43. Elk security habitat – existing condition

Herd Unit	Herd Unit Acres	Acres Security Habitat	Percent Security Habitat
Arrastra Creek	27,738	8,796	32
Beaver Creek	32,406	8,493	26
Flesher Pass	91,093	26,486	29
Keep Cool	44,325	11,828	27
Landers Fork	136,516	95,930	70
Nevada Creek	38,824	13,569	35

Herd Unit	Herd Unit Acres	Acres Security Habitat	Percent Security Habitat
Ogden Mountain	56,310	9,809	17
Poorman Creek	67,425	12,250	18
Total	**494,637**	**186,621**	**38**

Elk Winter Range and Thermal Cover

Winter range is an important element of elk habitat. Areas with minimal human activities and adequate forage would reduce the energetic costs associated with overwinter survival. During the winter, snow and cold temperatures push elk onto low elevation habitats, predominantly southern aspects. Elk have a strong fidelity to a given winter range with most cows returning year after year to the same general area.

Quality winter range within the project area is very limited supporting relatively small numbers of wintering elk. Much of the summer elk population within the project area moves to private lands outside the project area or utilizes lower elevation FS lands adjacent to private lands. Some of the summer elk population from Arrastra creek, Beaver Creek, Keep Cool, Flesher Pass, and Poorman Creek EHUs overwinter in the Blackfoot Valley. The Landers Fork population predominantly winters on the eastern front outside the project area. The Nevada Creek and Odgen Mountain populations winter on the western edge of the project area with the majority of available forage occurring on private lands.

Thermal cover as defined in the FP is very limited in both abundance and distribution within the project area. Recent research indicates that classic thermal cover (conifer stands more than 40 feet tall with canopy closure of at least 70 %) is probably of little value to wintering elk except in extreme conditions (Cook et al. 1998, p. 41-48). This is due to the fact that elk are better able to maintain body condition by taking advantage of solar radiation in open habitats. In addition, recent studies on Montana winter range indicate that, when in forest habitats, elk prefer stands with more open or patchy canopies capable of supporting suitable forested forage (Thompson et al. 2005). Forage in dense thermal cover stands is usually too sparse to sustain elk during severe winter conditions.

Definitions for elk thermal cover (Thomas 1979) are based upon what elk were assumed to prefer in the mid-1970s in northeast Oregon. Unfortunately, in droughty, interior forests, the Forest Plan definition of thermal cover (greater than or equal to 70% crown closure) generally exceeds what the sites are capable of growing or what can be sustained over time given inevitable, natural disturbances. In addition, the recent mountain pine beetle infestation has substantially reduced elk thermal cover throughout the project area and across the Forest.

Forest Plan Direction

Standard 3 (Summer Range and Hiding Cover)

Forest Plan Standard 3 states the elk summer range will be maintained at 35 percent (50 percent if canopy cover is used to identify hiding cover) or greater hiding cover. Hiding cover is below Forest Plan Standard 3 in five of the eight herd units. Consequently, the existing condition does not comply with Standard 3.

Standard 4a

Forest Plan standard 4a limits the hunting season open road density based upon the existing percentage of hiding cover. The existing hunting season open road densities are only met in two of the eight herd units. Consequently, the existing condition does not comply with Standard 4a.

Standard 3 (Winter Range Thermal Cover)

Forest Plan Standard 3 requires 25 percent thermal cover within each EHU. Thermal cover is defined as a vegetated stand with 70 percent canopy cover. None of the elk herd units within the project area meet the thermal cover requirement. This is due in part to the loss of canopy cover due to the MPB outbreak.

Standard 4c

All winter range areas will be closed to vehicles between December 1 and May 15. Exceptions (i.e., access through winter range to facilitate land management or public use activities on other lands) may be granted. Under the existing condition motorized use is only allowed on designated routes through identified winter range. The existing condition complies with the Standard.

Elk Population Information

Elk occurred across much of North America prior to European settlement. By the early 1800s, subsistence, market, and hide hunting almost eliminated elk east of the Mississippi River. By 1910, there were fewer than 50,000 elk in North America. As a result of management, elk increased across the west and in Montana. Statewide post-season elk numbers increased from 8,000 in 1922 to 55,000 in 1978 to about 160,000 in 2005 (MDFWP 2004, pp. 4-5). Today, the reestablishment of wolves combined with the predation effects of grizzlies, black bears, and lions in Montana have affected elk distribution and in some places elk numbers are declining.

Montana Elk Management Plan summary

The *Montana Elk Management Plan* 2004 provides detailed information on the EMUs relative to goals, objectives, and management challenges. Hereafter, Elk Plan is used interchangeably with Montana Elk Management Plan (2004).

Since completion of the 2004 MT Elk Management Plan wolves have become very well established within the project area. The FWP 2012 Annual wolf report recognized a minimum of six different wolf packs with territories overlapping the project area. The Elk Plan recognized potential future impacts of wolves may influence future elk populations, their distribution and management (MTFWP 2004 pgs. 114, 197). Since then, wolves along with other predators have had a very noticeable impact upon elk and deer populations in just the past several years within the project area. The very rapid expansion of wolves was largely in response to abundant elk and deer populations within the project area. While information provided in the 2004 MT Elk Management Plan is dated with respect to recent declines in project area elk populations largely due to increased predation, it serves to provide pertinent baseline information for the existing condition prior to the rapid expansion in wolf numbers.

Hunting Districts 281 and 293 are the two primary HDs within the project area and are therefore the primary focus of the project effects analysis. The Elk Plan noted that wintering elk were near modern day highs in HD 281 (MDFWP 2004). Although cow permits were available in prior years, MDFWP modified the 2008 hunting regulations in HD 281 to increase cow harvest by allowing hunters to shoot either sex with a general license (bull tag) during the third week of the season. At that time population objectives were exceeded with satisfactory calf recruitment.

Since that time however, agency and public concern about the impact of wolves and other predators on the elk population along with notably low calf recruitment resulted in no cow tags being issued for HD 281in 2012. In HD 293, trend surveys for the EMU were at the management objective (MTFWP 2004). Cow harvest was also permitted in HD 293 to help maintain population numbers in part to minimize game damage on private winter range lands. Likewise, cow permits are no longer available for HD 293 except for depredation hunts on private lands to minimize game damage.

The vast majority of the project area falls within Hunting Districts (HDs) 281 and 293. North of Hwy 200, project area lands west of the divide are within HD 281 while those lands east of the divide are in HD 422. HNF lands in the Scapegoat wilderness are within HD 280. South of Hwy 200, lands west of the divide are within HD 293 while those lands east and south of the divide fall within HD 423, HD 339, and HD 343. HD 284 is an archery only zone along the Blackfoot river occurring entirely on State and private lands. Hunting Districts 281, 280, and 422 are within the Bob Marshall Wilderness Complex Elk Management Unit (EMU). Hunting Districts 284, 293, 339 and 343 are within the Granite Butte EMU. Hunting District 423 occurs within the Birdtail Hills EMU.

Bob Marshall Wilderness Complex EMU (BMWC EMU)

The management plan identifies HD 281 and 422 as two of three HDs supporting the largest amount of elk habitat on private land. In HD 422, 85 percent of the winter range is on private land. Public access to or through some private lands across the eastern front and the Blackfoot Valley is limited or non-existent. In parts of the BMU, including the Blackfoot Valley, excessive road densities were a concern in the 1992 Elk Plan (FWP 2004). Currently, however, road closures due to endangered species management have reduced open road densities in most areas to the point where security for elk is no longer a significant concern (FWP 2004). For HD 281 the Elk Plan notes that access to elk hunting is most significantly affected by the remote character of Lolo and Helena NF lands outside the wilderness boundary and walk-in hunting on heavily roaded Plum Creek Timber Company (PCT) and other private parties managed through the block management program (MT FWP 2004).

More than 80 percent of the elk observed in this EMU use Wilderness habitats during at least a portion of the year. Eighty percent of the elk that utilize wilderness areas migrate to non-Wilderness winter areas. HD 280 is almost entirely within the Scapegoat Wilderness, does not support any winter range, and is only accessible by foot or horseback on the HNF. Radio telemetry data indicates up to 50 percent of elk wintering to in HD 281 and 422 migrate into HD 280 in early summer and accomplish the reverse migration in early winter (MT FWP 2004). Based on herd counts the Elk Plan (2004) noted that elk populations wintering in HD 281 and 285 (extending northwest for the eastern edge of the project area to Seeley Lake) were near modern day highs with about 650 post season wintering elk counted. Of this about 200 elk were counted in the Beaver creek wintering area which is within the project area. The remainder, were counted in the Marcum Mountain and Ovando Mountain wintering areas outside the project area. The population objective for HD 281 is to maintain less than 200 elk observed on private ranches during post season aerial trend surveys (MTFWP 2004 p. 119).

As noted in the 2004 Elk Plan (p. 113), motorized access for hunters in this BMU was reduced by extensive road closures over the past decade. Road closures that PCT and the FS implemented in the 1990’s went beyond FWP objectives for maintaining and enhancing elk habitat security, bull survival, and walk-in hunting opportunities in many of the Region 1 and 2 HDs within the BMU. Correspondingly, relevant access strategies identified in the Elk Plan include: 1) cooperate

and review USFS road management and travel plans to maintain reasonable and effective public hunting access; 2) maintain elk habitat security and associated walk in hunting opportunities (via enforcement of existing road closures and retention/recruitment of effective cover blocks) in selected areas of HD 281 and 285 (MTFWP 2004).

Granite Butte EMU (GB EMU)

This EMU includes 4 hunting district encompasses 1,113 square miles of which79 percent is available elk habitat. Summer range in this EMU is almost entirely on public lands. Areas used during fall area generally also on public lands unless weather induces elk to move to lower elevation winter areas on private land. Elk do winter in HD 293, particularly during mild to moderate winters, but a significant portion move into 339 and 33 during more severe winters to take advantage of east slope Chinook winds (FWP 2004). The Elk Plan (2004) notes that past off-road motorized travel and the pioneering of new routes in this BMU has reduced habitat security and habitat effectiveness. The 2004 Elk Plan notes that at that time elk were at the BMU management objectives after declining slightly from recent highs in 2003.

From 1999-2003, the annual average bull harvest for the first week of the season was 36 percent, meeting the BMU objective of less than 40 percent bull harvest during the first week of the general season.

Birdtail Hills EMU

This EMU only includes 2 hunting district (423 and 421) encompassing 542 square. The EMU is 90 percent private lands and supports about 273 sq. mi of elk habitat. Throughout the year nearly all elk are associated with private land (FWP 2004). HD 423 includes a small portion of project area lands extending east from the south side of Hwy 200 at Rogers Pass along the Divide to approximately half way between Rogers and Flesher Pass. Access in this EMU is extremely limited. This creates management challenges to achieve sufficient hunter harvest to maintain elk populations at population objectives to reduce elk damage issues with private landowners (FWP 2004).

Due to the variety of forest and non-forest communities utilized, virtually all of the project area provides suitable deer habitat. Like elk, effects are analyzed by looking at changes in cover, summer and winter forage availability, displacement, and hunting vulnerability. For the purpose of this analysis, available mule deer cover is expected to be similar to that described for elk.

Suitable habitat and use is widespread. In Montana the average deer home range is less than 500 acres (Riley and Dodd 1984), and the project area contains summer, winter and transition range. Direct, indirect and cumulative effects are evaluated across the project area.

Mule Deer

Species Status and Biology

In Montana mule deer are ranked as S5 indicating they are common, widespread and abundant. Although they may be rare in parts of their range, mule deer are not considered vulnerable (MNHP 2011).

Mule deer are habitat generalists, mobile, adaptive and wide ranging. As a result they use a wide variety of habitats from open to dense montane and subalpine coniferous forests, aspen, shrub communities and brushy areas. In summer they are widely distributed in forest and subalpine habitats, and in winter use lower-elevation, open, shrub-dominated areas (MNHP 2011). Within

woody vegetation types, mule deer use all seral stages and do best in areas where there is a mix of seral communities.

Food habitats vary seasonally and by year. Preferred forage species include bitterbrush, mountain mahogany, chokecherry, serviceberry, grasses and forbs. Forbs are most important in summer, whereas shrubs are used year-round but are important in fall, winter and spring (MNHP 2011). Competition with elk can be significant because elk have a more varied diet and on shared range, mule deer are most often negatively impacted (MNHP 2011; Frisina et al. 2006).

Optimum deer habitat contain a mixture of forage and cover habitat that is well interspersed and generally, a mixture of 40 percent cover and 60 percent forage is considered optimum (Thomas 1979; Knight 2011). Available cover should include a combination of hiding, thermal and fawn rearing cover. Because deer cover and forage requirements are very similar to elk, the discussion of preferred hiding cover and forage for elk, would also apply to mule deer. Since deer are smaller, the height and density of vegetation suitable for cover (hiding and thermal) would be less than that required by elk (Thomas 1979). Also like elk, deer require water (particularly on summer range) (Julander 1966 in Thomas 1979) and optimum habitat occurs within approximately 0.5 mile of water (Mackie 1970 in Thomas 1979). Consequently riparian areas can be particularly important.

Fawning habitat for mule deer consists of foraging areas with hiding and thermal cover, and is typically on spring transition range with gentle slopes with abundant succulent vegetation within 600 feet of water. While many habitats are used for fawning and rearing fawns, those providing relatively large quantities of herbaceous vegetation are most important.

While deer numbers and herd health are affected by a number of factors, forage is often most limiting on carrying capacity (Knight 2011), particularly on winter range. Equally important to forage quantity is forage quality and reproduction and animal condition is best maintained if high quality (i.e., nutritious and palatable) forage is available. As a result, a combination of herbaceous and woody vegetation needs to be available.

Mule deer occupy nearly all habitats within the project area at nearly all elevations during summer and fall, although they are most abundant where large quantities of nutritious forage is available. Transition range is found at the lower elevations of the summer range and contains abundant grass and forbs, intermixed with the shrub and aspen communities.

Marten (*Martes americana*) - Mature Forest Dependent Species Group

While the *Helena Forest Plan* uses the American marten as an indicator for the integrity of large blocks of mature forest cover in general, marten appear to be dependent primarily on mature forests with a relative abundance of large woody debris and an adequate distribution of standing snags. While marten will travel through forest habitats with “clean” understories, they need logs, stumps and snags for resting, denning, protection from the elements, and prey habitat. This is particularly important in winter, when marten live in a subnivean (under-snow) environment where woody debris provide needed structure and shelter (Thompson and Colgan 1994; Coffin et al. 2002). The upshot is that research now indicates marten are not an accurate management indicator for all mature forests. Chapin et al. (1997) found that vertical and horizontal structure was more important than age or species composition.

Marten population densities and trends are notoriously difficult to evaluate: long-term data sets are rare, and populations often fluctuate dramatically over short periods of time, in large part because of variable trapping pressure. Where reasonably accurate data have been obtained,

population densities have been very low compared to most other mammals—generally in the range of 0.4 to 2.4 marten per km² (Buskirk and Ruggeiro 1994). Marten home ranges are large by mammalian standards, although they tend to be smaller in areas of high prey density (Buskirk and Ruggiero 1994) and larger in areas of fragmented habitat (Coffin et al. 2002).

Fragmentation of coniferous cover by logging has reduced habitat suitability. Marten appear sensitive to patch size and usually avoid clearcuts because these areas don't provide functional subnivean zones or offer protection from predators—although they will cross (as quickly as possible) open areas up to 91 meters wide. Thompson (1994) concluded that higher marten densities in unlogged forests might be due to lower predation rates.

Marten are found throughout the Blackfoot landscape wherever suitable habitat occurs—primarily in mid-high elevation forests with a strong component of subalpine fir, Engelmann spruce, and lodgepole pine with pockets of coarse woody debris. Marten are rare in lower elevation ponderosa pine and dry Douglas-fir forests (Buskirk and Ruggiero 1994), although these habitats sometimes provide linkage between forests suitable for long-term occupancy.

Potential marten habitat has been modeled– post-kill (which considers the current pine beetle epidemic throughout the forest (identified above in the *Methodologies and Assumptions* section) within the project area. The model identifies approximately 63,104 acres of potential marten habitat and is composed of an infinite number of small polygons creating a virtually contiguous habitat across the Blackfoot landscape, enabling martens to roam between these linkage habitats across the landscape.

The current pine beetle epidemic is changing potential habitat patterns for marten in the Blackfoot landscape wherever lodgepole pine is a predominant component. The bounty of large snags and logs is highly beneficial to marten but the natural thinning, and in some cases, outright loss of the forest canopy as trees fall creates a less favorable environment for them. The proliferation of dead trees in ponderosa pine stands is of much less importance to marten since they seldom inhabit these relatively dry lower elevation forests.

The presence of marten have been confirmed within various locations throughout the Blackfoot landscape from past winter tracking surveys by MFWP, past tracking records, recent tracking surveys in the project area by Wild Things Unlimited beginning in 2009 and Forest Service surveys. Winter hair snare DNA surveys were conducted by Forest Service personnel in 2011 and 2012, which also confirmed the presence of marten within the project area. These observations are insufficient to derive population parameters but they give a general picture of marten distribution and habitat use and show that marten population densities are stable throughout much of the landscape.

MFWP, relying on trapping data and snowcourse surveys, allows trapping in the Blackfoot landscape (which is split by Trapping District 4, east of the Divide and District 2 on the west side. There are no harvest quotas set for marten in Montana, the statewide marten harvest continues to remain relatively stable (MDFWP 2009c) and trapping pressure is usually driven by fur prices. In Lewis-and-Clark and Powell counties, which cover the Blackfoot landscape (along with portions of the Lewis-and-Clark and Beaverhead-Deerlodge NFs), trapping pressure in recent years has been relatively light and few marten have been caught. Since 1996, an average of 5.2 marten per year has been reported trapped in Powell County (range: 0-19 animals). None were reported from Lewis and Clark County. MDFWP has recorded an average of 3 trappers taking marten in these areas since 1996 [MDFWP trapping website].

Northern goshawk (*Accipiter gentilis*) – Old-growth Dependent Group

Goshawks are the only large diurnal raptors adapted to interior forest environments in the northern Rockies. Key elements of goshawk habitat are extensive blocks of older forest with tight groups of mature nesting trees, abundant prey (squirrels, hares, larger songbirds, grouse), and mid-level flyways. In the northern Rockies, *optimal* habitat for goshawks is provided by old-growth Douglas-fir and ponderosa pine forest—and for that reason; the species was chosen as a management indicator for those habitats in the *Helena Forest Plan*. Since the early 1980s, prodigious field research and survey work have demonstrated that goshawks are considerably more versatile in their use of habitat than was believed at the time. Goshawks have specific requirements for nesting and post-fledging habitat (closed-canopied mature forest) but otherwise have been shown to be forest generalists—and not particularly useful as Douglas-fir old-growth indicators (Braun et al. 1996; Reynolds et al. 1992; Clough 2000; McGrath et al. 2003).

Surveys over the past 15 years on the Helena, Beaverhead-Deerlodge, Lewis and Clark, and Medicine Bow National Forests have found that goshawks will nest and forage in stands of mature lodgepole pine as long as the basic structural attributes they need are in place and prey is adequate (Lemke 1994; Squires and Ruggiero 1996; Clough 2000). In the more fragmented forest environments east of the Continental Divide where mountains and plains intermingle, goshawks often occupy mosaics of forest and grassland or a mixture of different forest seral stages. They are capable of foraging through open parks and woodlands and along forest edges (Younk and Bechard 1994). But regardless of the structural diversity of foraging habitat and of goshawk ranges in general, nesting and post-fledging habitat inevitably requires solid blocks of mature interior forest.

Extensive survey work over the past 15 years has demonstrated that goshawks are widespread across the Helena National Forest. They maintain large home ranges (estimated at 5,820 acres per pair) (Reynolds et al. 1992; Clough 2000), and population densities are naturally low, even where appropriate habitat is abundant. In areas with high prey populations and optimal habitat structure, home ranges may be smaller or overlap. The optimal size of a goshawk nesting stand is estimated to be about 15-30 acres; optimal post-fledging areas (PFAs) are about 620 acres (and contain several potential nest stands). Nest stands and substantial portions of PFAs need to be densely forested with mature trees in order to provide effective nesting sites, suitable microclimate, abundant prey, and security from open-forest predators. The remainder of the home range consists of foraging habitat and inclusions of unsuitable habitat. Foraging habitat, while dominated by mature forest, often includes a variety of tree densities and age classes along with forest openings (Reynolds et al. 1992). Goshawks can make use of these environments as long as prey is adequate.

Loss of habitat to clearcut logging and stand-replacing fire are the primary threats. Goshawks are sensitive to human disturbance of nest sites and can be very aggressive in defending the nest and the larger area within which newly fledged young are operating (post-fledging area) (personal observation). They may occupy the same nest stand in consecutive years but rarely the same nest (although they may return to an old nest 2 or 3 years later). Just as often, they move to a new stand elsewhere in the home range. Because of their large home ranges and their natural tendency to cycle among different nest sites between years, they are able to adapt too many environmental changes (such as fire and timber harvest) by moving to adjacent undisturbed sites.

In spite of the fact that goshawks maintain naturally low population densities (active nests on the HNF are typically 2-3 miles apart), they are fortuitously observed and reported on a regular basis across the Blackfoot landscape each year. The Blackfoot landscape currently contains 7 active

goshawk nests. The HNF has actively surveyed for goshawks each year since 1995. Because of the rarity of stand replacing-fire in recent decades, the Blackfoot Travel Plan Area has been dominated by mature forests that provide widespread opportunities for goshawk occupancy. Potential goshawk habitat has been modeled– post-kill (which considers the current pine beetle epidemic throughout the forest (identified above in the *Methodologies and Assumptions* section) within the project area. The model identifies approximately 61,291 acres of potential goshawk nesting habitat, potential foraging habitat of 116,994 acres within the project area.

The character of much of this habitat is changing as large numbers of lodgepole and ponderosa pine trees die and forest canopies open up as a result of ongoing bark beetle infestation. In the short term, this phenomenon is likely to improve goshawk foraging opportunity, but eventually it would measurably reduce the suitability of numerous nesting stands, as well as foraging habitat.

Pileated woodpecker (*Dryocpus pileatus*) – Old-growth Dependent Group

The pileated woodpecker serves as an indicator of the health and availability of old-growth forests because of its need to nest in large diameter snags that occur most frequently in old-growth stands (Bull and Holthausen 1993). As well, it is often described as a “keystone species” because of the disproportionate effect it has on its environment, in spite of its inevitably low population density. Pileated woodpeckers create numerous large excavations in dead trees that are then used by a variety of secondary cavity dwellers; they enlarge cavities in living trees providing unique habitat for other species; they hasten the decay process in the live trees they excavate and in the logs they break apart while foraging (Bull and Jackson 1995). This “ecosystem engineering” alters the physical structure of the environment in ways that influence habitat opportunity for other species and general ecosystem processes (Aubry and Raley 2002).

In the Northern Rockies, pileated woodpeckers tend to use mature cottonwood bottoms, mixed conifer, ponderosa pine, among other habitat types (Hutto 1995). Forests with a component of western larch, ponderosa pine, or black cottonwood are also used in the northern Rocky Mountains (McClelland and McClelland 1999).

For nesting and roosting, pileated woodpeckers require large standing dead trees [typically >30 inches diameter breast height (d.b.h.)]. They have a strong preference for ponderosa pine and western larch as nest trees. Foraging sites are provided by standing trees (dead and alive) and by large logs and stumps, where the woodpeckers feed on a variety of wood-boring insects, preferably carpenter ants (Bull 1987; Bull et al. 1997). The pileated woodpecker is powerful enough to excavate deep foraging cavities in undecayed living conifers (Bull and Jackson 1995)—which opens up a wider range of feeding possibilities than is immediately available to other local woodpeckers.

Pileated woodpeckers are very mobile and are considered a large-patch-size species. Their home ranges are extensive and require a generous percentage of unlogged or partially logged forest with a reasonable distribution of large trees. The average size of 27 home ranges (sometimes referred to as “territories”) in good quality habitat in the Pacific Northwest has been calculated at 1,234 acres (just under 2 mi^2) (Bull and Holthausen 1993; Mellen et al. 1992). This translates to relatively low population density even in optimal habitat. Pileated woodpeckers have seldom been studied in more marginal habitats that characterize much of the east slope of the northern Rockies in Montana, but field observation suggests that population densities are appreciably lower in these environments.

Potential pileated woodpecker habitat has been modeled– post-kill (which considers the current pine beetle epidemic throughout the forest (identified above in the *Methodologies and Assumptions* section) within the project area. The model identifies approximately 65,728 acres of potential habitat.

Hairy woodpecker (*Picoides villosus*) – Snag Dependent Species Group

The hairy woodpecker is a management indicator for species dependent on snags. Snags provide the essential substrate for excavating cavity nests and the primary food source in the form of wood-boring and bark-dwelling insects. Hairy woodpeckers inhabit a wide spectrum of habitats ranging from open snag fields created by stand replacing fire to interior forests with a smattering of snags and other insect-prone trees (Hutto and Young 1999). Hairy woodpeckers are year-round residents in the northern Rockies and primary cavity nesters. The cavities that they excavate are eventually available to a myriad of other small birds and mammals.

Woodpeckers require dead or decaying trees at least 10 inches in diameter for nesting (Thomas et al. 1979), but they may forage on smaller trees. They feed on insects—wood borers, bark beetles, ants, and grubs—as well as on fruits, berries, and sometimes, seeds. These resources are gleaned from variety of substrates: dead and dying trees, live trees, logs, stumps, and the ground—anything with a supply of appropriate insects or other suitable food.

The primary habitat component on which hairy woodpeckers depend is ephemeral—more so than key habitat features required by most non cavity-dependent species. While fire killed trees may remain standing for up to several decades and continue to supply a potential base for nest cavities, their ability to support the insects on which the woodpeckers depend for food deteriorates quickly (typically, within 5-8 years). Trees killed by insects or disease may remain upright for only 2-3 years after becoming suitable for cavity excavation. As the supply of dead trees waxes and wanes in a given area, the hairy woodpecker population follows.

The woodpeckers reach their highest population densities in new burns and areas of insect outbreaks, responding to the increased food source (Sousa 1987). In these cases, they may be the most common woodpecker present. As the abundance of wood-boring insects in a burned-over area begins to decline, the population density of hairy woodpeckers also drops and home ranges expand. Given the range of habitats and food supplies that hairy woodpeckers are capable of exploiting, their population densities and their home range sizes can vary dramatically. Typical home ranges run from around 2.5 mi^2 to more than 37 mi^2 depending on habitat quality and food abundance. Hairy woodpeckers can be found with regularity in any forest habitat with a modicum of dead trees for nesting and enough insect-prone trees to provide feeding substrate (Hutto and Young 1999).

Potential hairy woodpecker habitat has been modeled– post-kill (which considers the current pine beetle epidemic throughout the forest (identified above in the *Methodologies and Assumptions* section) within the project area. The model identifies approximately 65,797 acres of potential habitat.

We have no population density estimates for hairy woodpeckers in the Blackfoot Travel Plan Area. But, past wildlife surveys by HNF biologists and numerous point-count surveys by the Northern Region Landbird Survey Program over the past 15 years indicate that the hairy woodpecker is common in the Blackfoot landscape and on the HNF as a whole.

With the ongoing proliferation of beetle-killed pine trees over several hundred thousand acres across the HNF, nesting and foraging opportunities for hairy woodpeckers and other cavity

dependent species are now increasing dramatically, and their populations can be expected to do likewise over the next few years.

Species of Concern

Mountain Goat (*Oreamnos americanus*)

There is no special status designation for the mountain goat. In Montana, it is a hunted species throughout much of its range by draw permit only, regulated by MT FWP. Currently there are no hunting permits issued for the mountain goat population within the project area. One designated mountain goat hunting district (HD 280) overlaps a portion of the project area however no permits have been issued for HD 280 for the past several years. HD 280 lies predominantly within the Scapegoat Wilderness although it does extend to Hwy 200 along the continental divide.

The mountain goat was originally distributed from southern Alaska through the Yukon and Northwest Territories and British Columbia and Alberta, reaching southern Oregon, western Montana and southern Idaho. Since the 1930s individuals have been introduced into additional mountain ranges in Oregon, Montana, Washington, Wyoming, Utah, Nevada, South Dakota, Colorado, Texas, and the Olympic Peninsula of Washington (Foresman 2001). In Montana, reintroduction efforts have brought mountain goats into many isolated mountain ranges in western and central Montana where historically none lived (Mussehl and Howell, 1971, as cited in Foresman 2012).

Mountain goats occupy mountainous terrain; typically the highest rockiest, and most rugged peaks where talus slopes and sheer cliffs predominate. In parts of their range mountain goats occur at elevations exceeding 13,000 feet. Although they sometimes descend to sea level in coastal areas, they are primarily an alpine and subalpine species. Mountain goats typically stay above tree line throughout the year but will migrate seasonally to higher or lower elevations within their range. During spring and summer when mountain goats require additional sodium in their diets, they will occasionally travel several miles through forested areas in search of mineral licks.

Movement patterns

Daily movements by individual mountain goats are primarily confined to areas on the same mountain face, drainage basin, or alpine opening. Daily movements reflect an individual's needs for foraging, resting, thermoregulation and security from predators or disturbance. Seasonal movements primarily reflect nutritional needs (e.g., movements to and from mineral or salt licks), reproductive needs (i.e., movement of pre-parturient females to "kidding" areas; movement to rutting areas), and climatic influences (i.e., movement to areas in response to foraging conditions). In general, seasonal movements are likely to exhibit a strong elevation component, whereby lower, forested elevations are used during the spring-summer to access lower elevation mineral licks, and higher elevation steep windblown slopes are used during winter to access forage. The farthest movements are expected to be by dispersing mountain goats. Such movements are likely to involve mountain goats crossing forested valleys as they move between mountain blocks.

Home ranges of mountain goats vary dependent upon habitat quality and seasonal forage availability. Annual home range sizes are similar for both sexes varying from roughly 4 to 15 square miles across different mountain ranges in Montana (Foresman 2012). Based upon FWP

aerial survey locations of collared goats from 2002-2006, goats within this population appeared to be utilizing approximately a 13 sq. mile area during this time.

Diet

Mountain goats are herbivores and spend most of their time grazing. Diet varies seasonally, and by site, based upon availability. Their diet includes grasses, herbs, sedges, ferns, moss, lichen, twigs and leaves from the low-growing shrubs and conifers of their high-altitude habitat.

Foraging patterns vary among different mountain goat populations with some populations primarily foraging in early to mid-morning and toward evening along ledges and among rock outcrops, as conditions permit. Other populations have been observed foraging at all hours of the day, at intervals of 1.5-3 hours and may forage into the night. During snow-free months animals forage in alpine meadows and along ridges; as snows accumulate, mountain goats retreat to steeper terrain and talus slopes where stepped ledges are blown free of snow.

Life cycle and Mating

In the wild, mountain goats usually live twelve to fifteen years, with their lifespan limited by the wearing down of their teeth.

Both male and female mountain goats reach sexual maturity at two years of age. Breeding in Montana occurs in late October through early December with the greatest activity occurring in November through early December. Nannies in a herd undergo synchronized estrus during the breeding season. Both males and females usually mate with multiple individuals during breeding season, although some billies try to keep other males away from certain nannies. After the breeding season is over, males and females move away from each other, with the adult billies breaking up into small bands of two or three individuals. Nannies form loose-knit nursery groups of up to 50 animals.

Kids are born in the spring (late May or early June) after a six month gestation period. Nannies give birth, usually to a single offspring. Kids weigh a little over 7 pounds at birth and begin to run and climb (or attempt to do so) within hours. Although they are mostly weaned within one month, kids follow their mothers closely for the first year of life (or until the nanny gives birth again, if this does not occur the next breeding season); nannies protect their young by leading them out of danger, standing over them when faced by predators, and positioning themselves below their kids on steep slopes to stop free falls.

During spring and summer adult males are primarily solitary, although groups of two or three occur. Adult females form larger, mixed groups including their offspring and nonrelated sub-adults although even here group sizes generally remain small. Larger groups may occur when food is limited or individuals concentrate at desired salt licks.

Population and Habitat Status

Within the project area mountain goats are only present along the southern boundary of the Scapegoat Wilderness where they are considered indigenous (FWP 2001). The general range over which goats from this population have been documented in recent years is from the Arrastra creek drainage to the west, to the Falls Creek drainage to the east. These drainages are approximately 13 air miles apart. The most consistent concentrated use occurs in the Stonewall Mountain area and the Red Mountain/Sourdough basin area based upon repeated observations.

It is believed that the former population went extinct by 1980 with excessive legal and illegal harvest suspected to be a primary contributing factor. In the summer and fall of 1989, FWP attempted to transplant 14 mountain goats at lower elevation sites outside the wilderness boundary, but the strategy proved unsuccessful. Only two mountain goats were observed in the area during a 2000 aerial survey. Data from the 1989 transplant indicates that many transplanted goats, particularly females, emigrated out of the area and never contributed to re-establishing the population (FWP 2001).

Today the mountain goat population in the area continues to grow following reintroductions by MT FWP in 2002 (ten goats) and 2005 (five goats). Unlike earlier efforts, goats were released on top of Red Mountain during the winter months while snowpack limited the potential for emigration from the area. All of the released goats were fitted with color coded collars and ear tags to assist with future identification. Three nannies from each of the two releases (six total) were also fitted with radio collars to monitor their movements.

Following the 2002 release, population monitoring was conducted through a cost share agreement between the Helena NF and FWP along with other contributors. In 2002, on the ground summer monitoring along with aerial surveys located 9 of the 10 released goats within the study area. These surveys also confirmed one unmarked male in the study area and kids accompanied four of the transplanted females. A similar monitoring effort, both on the ground and aerial, was also conducted in 2004. This study found similar results in terms of numbers and reproduction. In 2005, five more goats were released into the population. FWP consistently used aerial surveys to monitor the population through 2006 with only occasional, infrequent aerial monitoring since. Aerial surveys consistently located collared goats in the Stonewall and Red Mountain/Sourdough areas. Aerial surveys also located collared goats in the Bighorn lake area to the northwest, Arrastra Mountain to the west, and Falls Creek to the east.

In addition, to the monitoring efforts discussed above, the Stonewall lookout tower is occupied by a FS employee each summer from July through September. A subgroup of the goat population consistently uses the Stonewall mountain area and annual observation reports by the lookout have noted consistent reproduction and a gradual increase in numbers. In recent years, several unmarked nannies with kids have been observed near the Stonewall lookout confirming that the population is successfully reproducing and increasing in numbers. In 2012, the permitted wilderness outfitter in the area reported seeing a group of 15 goats traveling through forested habitats toward Red Mountain in July and in September observed a group of 24 goats including billies, nannies, and young of the year in the Sourdough drainage (personal communication). Various publics have also reported seeing goats in the head of the Arrastra creek drainage, Baking Powder drainage to the east and various locations in between.

Migratory Birds

The memorandum of understanding (MOU) with the USDI Fish and Wildlife Service on the Migratory Bird Treaty Act identifies key principles and directs the Forest Service to (1) focus on bird populations; (2) focus on habitat restoration and enhancement where actions can benefit specific ecosystems and migratory birds dependent on them; (3) recognize that actions taken to benefit some migratory bird populations may adversely affect other migratory bird populations; and (4) recognize that actions that may provide long-term benefits to migratory birds may have short-term impacts on individual birds. The parties agreed that through the NEPA process, the Forest Service would evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors.

Migratory birds and their habitats including species with viability concern (TES) and priority species are evaluated in the habitat and species-specific sections of this report.

Environmental Consequences

Direct and Indirect Effects Common to All Species

Since 1986, the Helena National Forest has closed several miles of roads and areas forest-wide to motorized use. However, the remaining roads still present impacts to wildlife species that are sensitive to the disturbance associated with human activity along roads as well as any direct effects to their habitats. Road density standards have been developed through research and are recommended for many species. These analyses are used where appropriate and are discussed below under the respective species.

Many of the roads are located within Riparian Habitat Conservation Areas (RHCAs) that provide important biological necessities for many wildlife species. RHCAs are of varying buffer widths as defined by the Inland Native Fish Strategy (INFISH 1995). The location of these roads and user created routes reduces the habitat effectiveness of the riparian areas. Table 44 summarizes the number of total open motorized route miles and those located within RHCAs by alternative.

Table 44. Miles of open motorized routes, total and within RHCAs, by alternative

Alternative	Miles of Open Motorized Routes within the Forest Boundary	Miles/(Percentage) of Open Motorized Routes in RHCAs
Alternative 1	446	115 (20%)
Alternative 2	348	100 (19%)
Alternative 3	307	79 (18%)

The effects of off-route motorized use described below for each alternative are a reflection of the total miles of open routes in combination with allowable activities within RHCAs (these vary in width from the 50 to 300 feet depending on stream and fishery values as defined by INFISH). The species-specific discussions provide more information about road effects.

Table 45 summarizes the miles and associated acres of new road and trail construction by alternative, and also summarizes the acres of potential losses of snags and down logs as a result of direct removal of these structures. The amount and distribution of these structures across the following acres is not quantified. Rather, the data reflect the amount of total acres of forested habitat affected through construction and any associated snags and down logs. The data do not reflect the absence of these structures due to already existing roads and trails.

Table 45. Direct habitat loss of old growth habitat (measured as goshawk nesting habitat) due to new road and trail construction

Old Growth Habitat	Alternative 1	Alternative 2	Alternative 3
New Road Construction (miles/acres)	0/0	0/0	.04/3
New Trail Construction (miles/acres)	0/0	.61/44	.92/67

The following table summarizes the remaining miles of roads and those proposed for decommissioning through both general forested and old growth habitat. Note that the edge effects of decommissioning would disappear over time. New road information is summarized above.

Table 46. Miles of open and decommissioned roads through old growth habitats

Old growth habitat	Alternative 1	Alternative 2	Alternative 3
Miles of decommissioned roads	0	2.4	42.2
Miles of roads remaining on landscape	446	346	258

For alternative 1, decommissioned road miles reflect those already decommissioned by recontouring and include no proposed new decommissioning. For the remaining alternatives, decommissioned road miles would occur as part of implementation of that alternative if selected and includes those miles of decommissioning that would be ripped, seeded and slashed and/or recontoured.

Direct and Indirect Effects, Alternative 1

There are currently 446 miles of open motorized routes in the project area. Of these, 115 miles are in RHCAs. Under the existing condition, the Statewide Off-Highway Vehicle EIS and Decision are in effect which restricts motorized vehicles to existing roads and trails and allows motorized travel up to 300 feet off designated routes to reach dispersed campsites.

Under this alternative, off route use would continue to impact wildlife and their habitats especially in sensitive areas such as riparian habitats. As mentioned above, riparian areas are important to a variety of wildlife. About a quarter of the open motorized routes in the project area are located within RHCAs. This is because of the location of RHCAs (drainage bottoms) and their desirability as camping sites and other recreational festivities. Immediate effects to wildlife include disturbance and displacement associated with dispersed camping and access. However, in some cases, wildlife may have become habituated to human activity if the activity is constant.

Indirect effects on general forested habitat and old growth include disturbances to wildlife due to human activity. Habitat fragmentation and edge effects will continue to be expressed on the landscape associated with existing roads. Conversely, existing fragmentation and edge effects will decrease over time on roads proposed for decommissioning.

Direct and Indirect Effects, Alternatives 2 and 3

Project Design Features

Project design features specific to terrestrial wildlife are listed in chapter 2 starting on page 28, and numbered 17-19. These design features also apply to alternative 3.

Under alternative 2, there would be 348 miles of open motorized routes in the project area. Of these, 100 miles are in RHCAs. Under alternative 3, there would be 307 miles of open motorized routes in the project area. Of these, 79 miles are in RHCAs. Under the existing condition, the Statewide Off-Highway Vehicle EIS and Decision are in effect which restricts motorized

vehicles to existing roads and trails and allows motorized travel up to 300 feet off designated routes to reach dispersed campsites.

Under this alternative, off route use would continue to impact wildlife and their habitats especially in sensitive areas such as riparian habitats. As mentioned above, riparian areas are important to a variety of wildlife. Under alternative 2, approximately 19 percent of the open motorized routes in the project area would be located within RHCAs. Under alternative 3, over half (18%) of the open motorized routes in the project area would be located within RHCAs. This is because of the location of RHCAs (drainage bottoms) and their desirability as camping sites and other recreational festivities. Immediate effects to wildlife include disturbance and displacement associated with dispersed camping and access. However, in some cases, wildlife may have become habituated to human activity if the activity is constant.

Habitat loss occurs as a result of off-route use. Resources may be damaged, trees and down logs may be consumed as firewood, and noxious weeds may be spread into these areas—eventually reducing native vegetation and the niche it provides. New road and trail construction would have direct effects on forested habitat or old growth habitat by removing canopy, structure, hiding cover, fragmentation, edge effects, denning, and foraging habitat.

Under this alternative, 2.4 miles of roads are proposed for decommissioning within old growth and forested habitats, which would decrease fragmentation and edge effects as well as diminishing disturbance effects over time.

Under alternative 3, 0.04 miles of new road construction would occur within old growth, resulting in approximately 3 acres of disturbance or habitat removal. Also under this alternative, 42.2 miles of roads are proposed for decommissioning within old growth habitats, which would decrease fragmentation and edge effects as well as diminishing disturbance effects over time. In the short term positive direct effects include creating more suitable habitat for host plant regeneration by closing areas, decrease in human disturbance, allowing for various species to utilize the affected areas immediately. In the long term a beneficial effect would be the addition of potential habitat after passive restoration has occurred on the decommissioned routes.

New motorized and non-motorized trail construction would also be accomplished under both alternatives, although trail construction would not be as intrusive as road construction upon individual habitat, trails could still cause disturbance and habitat issues. Under alternative 2 non-motorized trail construction would occur over 0.61 miles within old growth, resulting in approximately of disturbance or habitat removal. Under alternative 3 motorized trail construction would occur over 0.92 miles within old growth, resulting in approximately 67 acres of disturbance or habitat removal. These are not contiguous miles of disturbance or habitat removal as the habitat is little polygons broken up throughout the Blackfoot landscape.

Indirect effects on general forested habitat and old growth include disturbances to wildlife due to human activity. Habitat fragmentation and edge effects would continue to be expressed on the landscape associated with existing roads. Conversely, existing fragmentation and edge effects would decrease over time on roads proposed for decommissioning.

Indirectly, roads negatively impact snags and down logs by providing access for firewood retrieval (Hann et al. 1997, Joslin and Youmans 1999, Bate and Wisdom 2002a, 2002b). Traditionally, these effects were limited to the distance a person could cut and carry firewood to his/her vehicle. These days firewood retrieval is enhanced through increased technology (e.g., cable systems) and increased access through off-road driving (Bate and Wisdom 2002a).

Cumulative Effects Common to All Species, for All Alternatives

The cumulative effects analysis is based on those past, present, and reasonably foreseeable projects that may contribute to the effects associated with motorized use within 300 feet of open motorized routes, forested and old growth habitats. The effects analysis is common to all alternatives. The scope of the analysis includes the Blackfoot landscape and surrounding lands.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or will have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek and Hogum burning projects. Project specific analysis addresses direct, indirect and cumulative effects.

Continued private land development could result in increased off-route use if these developments lead to increases in road densities and/or vehicle use and are adjacent or within the National Forest. Increased vehicle use on private land could spill onto the National Forest.

Continued private land development will continue to impact forested habitat. Vegetation management on private and other lands could increase fragmentation and edge effects as well as direct loss of habitat in the long-term.

Threatened and Endangered Species

Grizzly Bear

General Effects of Roads to the Grizzly Bear

Access Management

Grizzly bear habitat across the region is best described in terms of the availability of large tracts of relatively undisturbed land that provides some level of security from human uses (including roading, logging, grazing, and recreation) (USDI Fish and Wildlife Service 1993). To that end, ‘effective’ habitat is often described in terms of core areas, areas free of motorized access for each season of use (IGBC 1994). Open motorized route densities (OMRD) and total motorized routes densities (TMRD) are important measurements in determining security core areas and understanding the extent of habitat security for grizzly bears. Research has indicated that grizzly bears underutilize habitat near roads or other human activities (Mace and Waller 1996, McLellan and Shackleton 1989). Therefore, managing motorized winter access during the spring emergence period can aid in minimizing negative effects on bears and provide for secure habitat (IGBC 1994).

Access within the NCDE Recovery Zone is measured according to Forest Plan standards and the Northern Continental Divide Ecosystem Grizzly Bear Access Management Protocol and Flathead National Forest Amendment 19 (USDA Forest Service 2002a). These guidelines incorporate relatively recent science regarding access management and grizzly bears, and serve as benchmark thresholds for access management within the NCDE Recovery Zone. The Helena NF has incorporated this methodology to determine access management effects to grizzly bears

within the NCDE Recovery Zone in addition to HNF Forest Plan Standards. This methodology serves as guidelines and does not replace HNF Forest Plan Standards.

Many studies have found that grizzly bears will generally avoid areas with open roads. Mace and Manley (1993) found that adult grizzly bears used habitat with open road densities greater than 1 mi/mi2 less than expected. All sex and age classes of grizzly bears used habitat with total road densities greater than 2 mi/mi2 less than expected. Grizzly bears generally adjust to disturbance associated with roads by avoiding the area that in turn results in a reduction in the amount of habitat available to the bears. Roads also provide increased access into previously remote areas that in turn encourages human settlement, recreational use including OHV use, snowmobiling, and other land uses. These activities can increase the frequency of human-bear interactions and ultimately reduce habitat availability and grizzly populations.

Seasonal habitat use by grizzly bears is also an important consideration in access management. When bears emerge from the den, they tend to search for food in lower elevations, drainage bottoms, avalanche chutes, and ungulate winter ranges (USDI Fish and Wildlife Service 1993). Throughout the late spring and early summer they move towards higher elevations as food becomes available and by December most bears are in their dens. Because spring habitat tends to be at lower elevations, early season OHV use during the spring emergence period has the potential to disturb bears traveling to lower elevation habitats or may displace bears from suitable low elevation spring habitats. Early season OHV use in big game winter ranges is restricted to designated routes that would minimize disturbance or displacement of bears in search of carrion from winter kill ungulates. The greatest potential for disturbance or displacement would be associated with lands adjacent to designated routes.

Direct and Indirect Effects, All Alternatives

The following effects indicators were used to focus the analysis and disclose relevant environmental effects:

- Open and total road densities and availability of security habitat.
- Consistency with Forest Plan standards/guidelines and USFWS recommendations related to the grizzly bear would be met;
- Potential effects associated with key grizzly bear habitats and seasons of use.

The effects analysis area is the Blackfoot Landscape Area.

Common to all alternatives:

Various methods are used to address grizzly bear habitat quality relative to motorized access. This section provides a collective comparison of each of each of the alternatives with respect to road density measurements and habitat security. In the following analysis discussion both route and road refer to motorized roads and trails.

Moving Window Analysis

The moving windows analysis measures motorized access as total route density (TRD), motorized open route density (ORD), and the percentage of a subunit in security core areas (CORE). The guidelines to effectively manage access and core areas for grizzly bears per the North Continental Divide Ecosystem Grizzly Bear Access Management Protocol and the Flathead National Forest Amendment 19 are described in the table 47 footnotes. Table 47

summarizes route density and security core areas for the Monture-Landers Fork BMU subunits on Helena National Forest.

Non-motorized trail use such as hiking, horseback riding, and mountain biking may also indirectly reduce the amount of habitat available to grizzly bears. Mace and Waller (1996) suggested bears may avoid high use hiking trails; although the presence of visual cover may reduce bears response to hikers (McClellan and Shackleton 1989). Similarly, visual cover may reduce the response of bears to non-motorized uses. Currently, the level of hiking, horseback riding and mountain biking is limited within the project area.

Table 47. Route density and core security areas – Monture/Landers Fork BMU subunits (percent of area meeting guideline)

Subunit	Alternative 1			Alternative 2			Alternative 3		
	OMRD	TMRD	CORE	OMRD	TMRD	CORE	OMRD	TMRD	CORE
Alice Creek[1]	9	17	70	15	13	75	11	10	78
Arrastra Mountain	17	21	73	17	18	74	17	17	76
Red Mountain	25	24	56	24	23	61	20	21	64
BMU average	17	21	66	19	18	70	16	16	73

OMRD - Open motorized route density guideline: ≤19% of each subunit with >1.0 mile/mi2; if <75% FS land management, then no net increase in >1.0 mile/mi2 open motorized route density class due to FS actions.

TMRD - Total motorized route density guideline: ≤19% of each subunit with > 2.0 mile/mi2; if <75% FS ownership, then no net increase in >2.0 mile/mi2 open route density class due to FS actions.

CORE - Core area (>2,500 contiguous acres, ≥0.3 mi. from motorized route, no roads or trails receive ”high intensity use” (USDA 1990) and no motorized routes open during non-denning period) guideline: ≥68% of the subunit considered core area; if <75% FS ownership, then no net decrease in potential security core areas due to FS actions.

1 Alice Creek subunit meets 19/19/68 with <75% NFS lands, no net decrease in OPEN &TOTAL route density and no net decrease in Security CORE

Grizzly bear access management applies within the NCDE recovery zone during the non-denning period from 4/1 through 11/30. Under the existing condition winter motorized use continues in the Copper bowls play area beyond 4/1 therefore, the values presented in table 47 include that motorized use. The same is true for the action alternatives since all alternatives in the Blackfoot-North Divide Winter Travel Project would allow over-snow vehicle use in the Copper Bowls after 4/1. For the Red Mountain subunit, including over-snow vehicle use in the Copper bowls reduces the amount security core habitat. The duration of over-snow vehicle use in the Copper bowls varies from year to year dependent upon snow conditions and once that use concludes the area does serve as core habitat for the remainder of the grizzly non-denning season. In essence the core values for the Red mountain subunit are compromised due to spring season over-snow vehicle use after 4/1.

Under alternative 1 the Arrastra Mountain subunit meets ORD and CORE but does not meet TRD. The Arrastra subunit would improve under both action alternatives. In both scenarios, ORD would remain unchanged, but TRD would decrease and CORE would increase. With the reduction in TRD both action alternatives would fully meet the 19/19/68 guidelines.

The Red Mountain subunit currently has a degraded baseline since it does not meet any of the 19/19/68 guidelines under the existing condition. Under both action alternatives the ORD and TRD improve due to road closures, placing roads in storage or decommissioning. In turn, the amount of security core increases under both action alternatives bringing the subunit closer to the 119/19/68 guidelines but still deficient. Alternative 3 provides the greatest margin of improvement for this subunit.

The Alice creek subunit meets the 19/19/68 guidelines under all three alternatives even though it has less than 75 percent NFS lands. The guideline for subunits with less than 75 percent NFS ownership is no net increase in ORD and TRD and no net decrease in Security CORE. Both action alternatives would increase ORD due to allowing motorized use on lands acquired from The Nature Conservancy that are currently closed. However, TRD would decrease under both alternatives through road storage and decommissioning. The amount of CORE would increase under both alternatives.

In summary, both action alternatives improve ORD, TRD, and CORE in all three subunits over the existing condition. The least change occurs in the Arrastra subunit while the greatest change occurs in the Red Mountain subunit. The Red Mountain subunit would still have a degraded baseline under both action alternatives even though both would improve ORD, TRD, and CORE. Under alternative 3, none of the three guidelines are met but they are not far from it and the level of improvement is greater from alternative 2 to alternative 3 than it is from alternative 1 to alternative 2. For the BMU as a whole both action alternatives would improve access management conditions for grizzlies. Both action alternatives meet the guidelines however alternative 3 reflects the lowest open and total road values and the highest core value. Alternative 3 does the most to improve conditions for each of the subunits individually as well as collectively.

Forest Plan Standard - Open road density in occupied habitat

The Forest Plan standard for open road density within “occupied” grizzly habitat is 0.55 mile per square mile (HNF Forest Plan page II-19). Occupied grizzly habitat is identified in Appendix D of the Forest Plan and is not consistent with the Recovery zone boundary. Table 48 summarizes the open road density for occupied habitat for the three alternatives. As displayed in table 48, the Forest Plan standard is met for all three alternatives.

Table 48. Forest Plan occupied habitat road densities* by alternative

Alternative	Miles of Open Road	Change in Open Road Miles from Existing	Open Road Density (mi/mi^2)
Alternative 1	128.3	N/A	.43
Alternative 2	116.9	-11.4	.39
Alternative 3	102.4	-25.9	.35

FP Standard = 0.55 mi/sq. mi

The existing condition has the highest open road densities even though it is below the FP standard of no more than 0.55 mi/mi2. Both action alternatives would further reduce open road densities well below the standard. Similar to the moving windows analysis, Alternative 3 results in the greatest reduction of open road densities, providing greater benefit to those species sensitive to road densities.

Subunit Open Road Densities

The Forest Plan standard for open road density is specific to “occupied” grizzly habitat as identified in Appendix D of the FP. That boundary is different from the BMU/subunit boundaries. While FP direction does not require application of the standard (not to exceed 0.55 mi/mi2) for the BMU subunits, that analysis was completed and is shown in table 49 that follows. The open road density analysis by subunit uses the same methodology as used for occupied habitat.

Table 49. Road densities by subunit - alternative comparison

Subunit	Square Miles	Miles Open Road			Open Road Density		
		Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
Red Mtn	119.9	62.7	56.2	45.8	.52	.47	.38
Arrastra Mtn	109.7	57.2	55.0	50.7	.52	.50	.46
Alice Creek	108.3	50.4	65.3	51.9	.47	.60	.48
Total for BMU	**337.9**	**170.3**	**176.5**	**148.4**	**.50**	**.52**	**.44**

Distribution Zone Open Road Densities

All project area lands outside the recovery zone and south of Hwy 200 are within the grizzly bear distribution zone. Access management direction applied to lands within the recovery zone and the FP standard for occupied habitat do not apply to the remaining distribution zone lands in the project area. Road densities outside the recovery zone are typically higher due to their proximity to human population centers, varied ownerships, and a long history of various human uses. The analysis provides a comparison between alternatives for grizzly bears, elk, and other species influenced by access management. The miles of open road and open road densities for the grizzly distribution zone within the project area are shown in table 50.

Table 50. Distribution zone open road miles and densities by alternative

Alternative	Miles of Open Road	Change in Open Road Miles from Existing	Open Road Density (mi/mi2)
Alternative 1	394	N/A	1.6
Alternative 2	312	-82	1.3
Alternative 3	253	-141	1.0

Compared to the open road density values for the grizzly bear subunits and FP occupied habitat, road densities in the distribution zone are considerably higher. However, both occupied habitat and BMU subunits include lands in the Scapegoat Wilderness. In the elk section of this report, habitat effectives (HE) is an analysis tool that was used to evaluate potential elk summer use of an area based upon open road densities. The methodology was developed by Lyons (1983) as an outcome of the Montana Elk Logging Study summarized in Appendix C of the FP. The relationship is reflected as a curve with increasing potential use by elk as open road densities decline. On an elk herd unit basis, the recommended minimum habitat effectiveness for elk is 50 percent which represents a road density of approximately 1.75 mile/square mile. Based on the HE values generated for the elk analysis, the respective HE values for alternatives 1, 2, & 3 are 51 percent, 56 percent, and 60 percent respectively.

Since studies have shown a very similar relationship to open road densities by grizzly bears, it can be assumed that while the road densities under the existing condition are not excluding grizzly bear use, the higher HE values in alternatives 2 and 3 would be less exclusive to grizzly bear use.

Special Habitats

Denning Habitat

It is not anticipated that there would be any direct or indirect effects to grizzly bear denning habitat associated with summer access management since they do not overlap in time or space. The NCDE adopted grizzly bear denning period is from 12/1 through 3/31 when the remote, high elevation, snow covered landscapes selected by bears for denning are inaccessible to wheel-motorized use. As discussed for winter travel, the majority of modeled denning habitat north of Hwy 200 is within the Scapegoat Wilderness or along the ridgeline defining the wilderness boundary. South of Hwy supports considerably less modeled denning habitat which is predominantly scattered along the continental divide.

Foraging and Travel

Various landscape features in the project area are import to grizzly bears for foraging, seasonal movement, or dispersal. The head of the Copper creek drainage for instance has high value to grizzly bears in part due the long reach of the drainage and the numerous other drainages sharing its outer perimeter that facilitate movement between various habitats. The steep head of Copper creek provides late spring early and summer foraging in avalanche chutes and along the extensive network of connecting ridgelines. Numerous parts of the continental divide also provide important foraging areas for roots and tubers as well as insect feeding sites. The general flow of the continental divide on the landscape also serves facilitates travel for bears.

This project would not have significant effects on grizzly bears under any alternatives because: no structural changes to habitat would result, ungulate densities would remain unchanged, overall road densities would decrease and habitat security would increase. The decreases in road densities under the action alternatives would likely be beneficial to grizzlies. None of the alternatives poses significant risk to the population.

Cumulative Effects Common to the Grizzly Bear, for All Alternatives

Cumulative effects are those that have the potential to affect grizzly bears in the same time or place. There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or will have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

One of the most important past and future management activities influencing grizzly bear habitat use has been road construction. Roads have facilitated human access into grizzly bear habitat, during denning and non-denning seasons, which can be directly associated with bear mortality (Mattson et al. 1987, Kasworm and Wakkinen 2003). Within the Monture – Landers Fork BMU

road densities are managed in accordance with the *Northern Continental Divide Ecosystem Grizzly Bear Access Management Protocol and Flathead National Forest Amendment 19* (USDA 2002a) which considers open route density, total route density, and security core habitat to conserve grizzly bears. Both action alternatives serve to reduce the existing open and total route densities and increase security core habitat. Route densities outside of the recovery zone are managed to provide secure areas for big game, which tend to benefit grizzly bears.

Vegetation management projects that remove forest cover can make bears more susceptible to displacement for motorized use. Roads built to access timber may later be used as travel routes. Timber harvest activities have the potential to displace bears to less suitable habitats.

Land adjustments, such as the recent FS acquisition of previously owned Plum Creek lands from TNC as discussed under direct and indirect effects, can contribute to cumulative effects upon grizzlies through modifications to access management and authorized recreational uses. Under the proposed action these lands would allow motorized use which is a change from the current management direction and may serve to displace bear use.

Recent and ongoing travel planning efforts on adjacent Forests, as well as the Lincoln Ranger District, could be beneficial to bears by providing secure habitats free from motorized access. Because grizzlies are capable of traveling long distances, improved habitat conditions on other Forests could improve grizzly populations and subsequent dispersal opportunities.

Other ongoing and foreseeable management actions (e.g. tree planting, timber harvest, thinning, gathering forest products, road maintenance and developed recreation activities, etc.) in the cumulative effects analysis area are not expected to adversely affect grizzlies.

At present, development in the project area is limited and there are no significant developments within the project that would contribute appreciably to summer motorized use. The potential for future development of private land adjacent to or within the project area is unknown but there is limited potential for future developments within the project area to significantly contribute to effects upon bears.

Attractants

The entire NCDE grizzly bear recovery zone has a food storage order in effect. Additionally, in April, 2005, a special order was signed applying the food storage order across the entire Blackfoot landscape area.

The potential for bears to become habituated and conditioned to human-related foods would be similar under the three alternative but providing more secure habitat for bears and reducing access routes into bear habitat may help to reduce potential food related conflicts.

Linkage Habitat

The 1993 recovery plan includes an objective to identify management measures that will remove limiting factors so that populations will meet recovery. One of the factors targeted for examination is habitat linkage zones that may facilitate movement between existing grizzly bear recovery zones (USDI 1993, pg. 24). In recent years the importance of linkage zones has gained recognition and acceptance and greater attention has been focused on identifying and analyzing wildlife linkage zones.

It is recognized that the southern portion of the project area outside the recovery zone, may function as linkage habitat due to relatively low human use of the area and the presence of

contiguous forested habitat. This entire portion of the project area is within the mapped Grizzly Bear distribution zone (USDA 2002) which was developed based upon known occurrences of grizzly bears. This potential linkage habitat for grizzly bears may allow for connectivity with core habitat areas in the Scapegoat and Bob Marshall Wilderness areas. Under both action alternatives motorized use would decrease.

Determination of Effects

Alternative 1

Implementation of the Existing Condition (alternative 1) may affect, but is not likely to adversely affect the grizzly bear.

Alternatives 2 and 3

Implementation of the proposed activities in alternatives 2 and 3 of the Blackfoot Travel Project may affect, but are not likely to adversely affect the grizzly bear or its habitat.

Canada Lynx

Direct, Indirect, and Cumulative Effects Analysis

Potential direct and indirect effects of summer recreational uses are primarily associated with potential effects upon lynx productivity, mortality risks, and effects upon lynx movement.

Effects Common to All Alternatives

Among motorized routes, highways present the greatest risk of direct mortality to lynx and serve as the biggest barrier to lynx movements. The project area encompasses two 2-lane highways. Both are Montana State owned and managed highways. State Highway 200 bisects the project area paralleling the Blackfoot river in an east/west orientation and Highway 279 extends south along the eastern portion of the project area from its junction with Hwy 200. The nearest known lynx highway mortality occurred in 2003 within the four-lane segment of Highway 12 near the McDonald Pass area (Gayle Joslin, MTFWP, personal communication, August 2005), approximately 15 miles beyond the southern boundary of the project area. While Highways 200 and 279 may pose mortality risks to lynx or impede lynx movements, the management of these highways does not fall under FS authority and would remain unchanged under all alternatives.

Limited information is available on the magnitude of lynx mortality on forest roads. Forest roads within the project area are generally low-speed (<45 mph), single or double-lane gravel roads. Although many species of wildlife are disturbed when forest roads are used (Ruediger 1996), preliminary information suggests that lynx do not avoid roads (McKelvey et al. 2000*c*), except at high highway traffic volumes (Apps 2000, Squires et al. 2010). The best information suggests that the types of roads managed by the Forest Service do not adversely affect lynx as vehicle strikes on forest roads are unlikely, given the relatively slow speeds at which vehicles travel on these roads (due to topography and road conditions) and generally low traffic volumes (USDI FWS 2007).

A recent analysis on the Okanogan NF in Washington showed lynx neither preferred nor avoided forest roads, and the existing road density did not appear to affect lynx habitat selection (McKelvey et al. 2000). In Minnesota, Moen et al. (2010) found that lynx selected for roads during long-distance movements and although roads may not have been essential to these movements, lynx appeared to beneft energetically from the use of these linear features.

In denning habitat, when roads are used during summer, lynx may be affected if they move their kittens to avoid the disturbance (Ruggiero et al. 2000). Squires et al. (2008) reported that lynx denned farther from all roads compared to random expectation. Lynx occupy dens in early May when many forest roads are still impassable by wheeled vehicles due to persistent snowdrifts and wet, muddy roads; over-snow vehicles no longer used the roads because of intermittent and unpredictable availability of sufficient snow (Squires et al. 2008). They concluded that lynx did not avoid the subset of roads that were open to wheeled vehicle travel. Rather, the observed avoidance of roads was more a function of the correlation of roads and landscape pattern; fewer roads were located in denning habitat and higher road density occurred along forest edges and in managed stands which lynx avoided (Squires et al. 2010).

Trails in the project area are generally narrow corridors, single-tack or two-track with native surface. Currently there is no information to suggest that trails have negative impacts on lynx other than disturbance associated with motorized use. The minimal loss of habitat would not preclude lynx use of adjacent habitat and trail use would not preclude lynx from crossing the trail. Non-motorized trails are anticipated to have less potential for disturbance than motorized trails.

The susceptibility of lynx to incidental trapping would remain similar under all three alternatives. Regulated lynx trapping is currently prohibited in the contiguous United States, however incidental captures of lynx can occur in areas where regulated trapping for other species overlaps with lynx habitats (Squires and Laurion 2000, Vashon et al. 2012). Under all three alternatives the accessibility of routes to wheeled motorized use during the winter trapping season would remain very limited due to snow accumulations. The trapping season is regulated by MT FWP and the susceptibility of lynx to trapping would remain unchanged under any of the alternatives.

Direct and Indirect Effects, Alternative 1

Under this alternative no new route construction would occur and the current level and distribution of non-winter motorized access within the project area would be retained. Total miles of open motorized routes would remain higher than both action alternatives at 506 miles including 446 miles of motorized roads and 60 miles of motorized trails. In addition, user created trails would continue to receive motorized use contributing to continued unauthorized use of various yearlong or seasonally closed roads. Although the best information suggests Forest roads do not adversely affect lynx (USDI Fish and Wildlife Service 2007), motorized use associated with higher open motorized route densities would provide less habitat security and may potentially reduce habitat connectivity by deterring lynx movements.

Alternative 1 would have no direct or indirect effect upon the vegetative structure or condition of the boreal forest landscape, the primary constituent element of lynx critical habitat. No new trails, parking areas, other improvements or developments would occur under this alternative. Boreal forest habitat would retain its current abundance, distribution, and availability to lynx. The total miles of roads and trails in boreal forest habitat would remain unchanged both temporally and spatially. The effects to winter snow conditions would remain unchanged and current abundance and distribution of snowshoe hares, denning habitat, and matrix habitat would remain unchanged at current levels of availability.

Direct and Indirect Effects, Alternative 2

Under this alternative the total miles of open motorized routes would be reduced by 66 miles providing 440 miles of motorized open routes compared to 506 miles under the existing

condition. This includes a 98 mile decrease in open road density but a 32 mile increase in motorized trails. No new roads would be constructed but 2 miles of new trail would be constructed. In total, this alternative would provide 348 miles of open road and 92 miles of open trail. The total miles of routes with no seasonal restrictions would be reduced only slightly from the existing condition.

The potential effects of this alternative would be similar to the existing condition although the reduced miles of open routes would serve to further minimize effects to lynx and their habitat. As addressed above, available information does not suggest that forest roads adversely affect lynx. The construction of 2 miles of scattered trail segments would result in minimal vegetation loss that would not reduce the lynx prey base or impede lynx movements.

Direct and Indirect Effects, Alternative 3

Under this alternative the total miles of open motorized routes would be reduced by 152 miles providing 354 miles of motorized open routes compared to 506 and 440 miles under Alts 1 and 2 respectively. This includes a 139 mile decrease in open road density and 13 mile decrease in motorized trails. New construction includes 3 miles of trail and 0.5 miles of road. In total, this alternative would provide 307 miles of open road and 47 miles of open trail. This alternative also has 229 miles of routes open to highway legal vehicles with no seasonal restrictions whereas, Alt 2 has 248 miles and Alt 1 has 344 miles. Overall the fewer miles of open routes and routes with no seasonal restriction would have the least potential to disturb lynx throughout the non-winter period including the denning period and would provide the greatest connectivity.

In addition to having the fewest miles of open roads, Alternative 3 would decommission 197 miles of road whereas alt 2 would only decommission 8 miles. Road decommissioning would result in some short term disturbance but over the longer term would serve to improve lynx habitat and habitat connectivity.

Direct and Indirect Effects Common to Alternative 2 and 3

Both action alternatives would serve to further reduce the the already low risk of mortality associated with vehicle strikes on National Forest System roads. With alternative 2, open motorized roads would decrease by 98 miles from the exsitng condition and by 139 miles in alternative 3. While this may serve to concentrate more vehcle use on the remaining open roads, lynx would be exposed to fewer roads with motorized use reducing the potetial for vehicle related mortality and illegal shooting.

Both action alternatives reduce the total miles of exisitng motorized routes but would also allow motorized use on roads and trails that are currently closed to motorized use. While at a local scale the reintroduction of motorized use may result in some degeree of habitat fragmentaion, forest roads generally result in minmal fragmenation to lynx which are known to readily cross and even travel on forest roads with low to moderate levels of motorized use.

Both action alternatives propose 89 miles of mountain bike trails including 31 miles of new construction. The alternatives differ only in the miles of identified mountain bike trail that would also be open to motorized use. In alternative 2, 50 miles of mountain bike trail would also be open to motorized use while in alternative 3 only 19 miles overlap with motorized use. New trail construction that would exclude motorized use is common to both alternatives. In general, constructed mountain bike trails would be a narrow corridor with a native surface and there is no information to suggest that non-motorized trails have negative impacts on lynx. Mountain biking and other non-motorized uses have very limited potential to disturb lynx due to the minimal

noise level, low traffic levels, and limited season of use. Construction activies are not anticipated to significantly impact lynx or their habitat due to the minimal amount of vegetation that will be disturbed along the narrow trail corridor. Noise and activity associated with trail and road construction may result in some minor disturbacne to lynx although lynx are generally tolerant of human activities including motorized use.

Although forest roads provide access into lynx habitat where incidental trapping or illegal shooting can occur, alternatives 2 and 3 are not expected to increase the risk of incidental trapping to lynx. Roads that remain available to wheeled motorized travel during the trapping season would not change under the action alternatives. The majority of trapping in the project area is done by over-snow vehicle travel. Indirectly, new road and trail construction, 2 miles in alternative 2 and 3.5 miles in alternative 3, would have minimal influence upon over-snow vehicle access to the surrounding area due existing roads or trails and the ability to travel cross country.

Northern Rockies Lynx Management Direction

The applicable Northern Rockies Lynx Management Direction (NRLMD) objectives, standards, and guidelines for the Blackfoot travel planning area are identified below. This project does not propose vegetation management activities and practices or changes to livestock management therefore objectives, standards, and guidelines for these activities are not applicable.

The following objectives, standards, and guidelines apply to all management practices in lynx habitat in lynx analysis units (LAUs) and in linkage areas, subject to valid existing rights.

Table 51. Objectives, standards and guidelines for all Management practices and activities in lynx habitat in lynx analysis units and linkage areas (ALL)

Number	Objective, Standard, or Guideline	Alternative 1	Alternative 2	Alternative 3
Objective ALL O1	Maintain or restore lynx habitat connectivity in and between LAUs and in linkage areas.	Habitat connectivity in and between LAUs and linkage areas would be retained at its current level. The alternative is in compliance with Objective ALL O1.	Lynx habitat connectivity would be maintained in and between LAUs and in linkage areas due to the net decrease in open motorized routes. Roads open to wheeled motorized use would decrease by 98 miles although motorized trials (including 2 miles of new construction) increase by 32 miles yielding a net decrease of 66 miles of motorized routes. The construction of 31 miles of non-motorized trails would not serve to reduce connectivity. The alternative is in compliance with *Objective ALL O1.*	Similar to Alt 2 although a greater reduction in open motorized routes and more seasonal restrictions on motorized trails in particular. In total, motorized routes decrease by 152 miles. Open roads would decrease by 139 miles and motorized trails would decrease by 13 miles. New construction includes 3 miles of new motorized trail and 0.5 miles of new road. Non-motorized trails are the same as Alt 2. The alternative is in compliance with *Objective ALL O1.*

Number	Objective, Standard, or Guideline	Alternative 1	Alternative 2	Alternative 3
Standard ALL S1	New or expanded permanent developments and vegetation management projects must maintain habitat connectivity in a LAU and/or linkage area.	No new or expanded developments or vegetation management actions would occur and connectivity would be maintained at its current level. The alternative is in compliance with Standard ALL S1.	This project does not propose new or expanded permanent developments and is not a vegetation management project. Motorized use is largely restricted to existing roads and trails and vegetation loss due to new route development would be minimal maintaining connectivity in LAUs and linkage areas. Total motorized routes would decrease by 66 miles and vegetation disturbance due to 2 miles of motorized trail construction would be insignificant. This alternative is maintaining connectivity in LAUs and linkage areas, in compliance with *Standard ALL S1*.	Same as Alt 2 although the reduction in motorized routes is more than double. Vegetative disturbance associated with the construction of 0.5 miles of new road and 3 miles of new trail would have insignificant effects upon connectivity. The alternative is in compliance with *Standard ALL S1.*
Guideline ALL G1	Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forest highways across federal land. Methods could include fencing, underpasses, or overpasses.	This project does not include construction or reconstruction of highways or forest highways. The alternative is in compliance with Guideline ALL G.	Same as Alt 1.	Same as Alt 1.
Guideline ALL G2	Changes in LAU boundaries shall be based on site-specific habitat information and after review by the Forest Service Regional Office.	There would be no change to existing LAU boundaries. The alternative is in compliance with	Same as Alt 1.	Same as Alt 1.

The following objectives, standards, and guidelines apply to human use projects, such as special uses (other than grazing), recreation management, roads, highways, and mineral and energy development, in lynx habitat in lynx analysis units (LAUs) in occupied habitat, subject to valid existing rights. They do not apply to vegetation management projects or grazing projects directly. They do not apply to linkage areas.

Table 52. Objectives, standards and guidelines that apply to human use (HU) projects in lynx occupied habitat in lynx analysis units

Number	Objective or Guideline	Alternative 1	Alternative 2	Alternative 3
Objective HU O1	Maintain the lynx's natural competitive advantage over other predators in deep snow, by discouraging the expansion of snow-compacting activities in lynx habitat.	This project addresses summer travel only. Winter motorized use would not change under this project. Winter recreation is being addressed in a separate project. The alternative is in compliance with Objective HU O1.	Same as Alt 1.	Same as Alt 1.
Objective HU O2	Manage recreational activities to maintain lynx habitat and connectivity.	No changes to motorized routes or other recreational uses are proposed. Lynx habitat and connectivity would be maintained. The alternative is in compliance with Objective HU O2.	Lynx habitat and connectivity would be maintained or improved. In total, motorized routes would decrease by 66 miles. Roads open to public wheeled motorized use would decrease by 98 miles while motorized trails increase by 32 miles including 2 miles of new trail construction. Designated non-motorized trails would increase by 62 miles including 31 miles of new construction. The project does concentrate activities on already developed roads and eleiminates 62 miles of road. The alternative is in compliance with Objective HU O2.	Lynx habitat and connectivity would be maintained or improved. In total, motorized routes decrease by 152 miles. Roads open to public wheeled motorized use would decrease by 139 miles and motorized trails would decrease by 13 miles. New construction includes 3 miles of new motorized trail and 0.5 miles of new road. Designated non-motorized trails would increase by 41 miles with new construction the same as Alt 2. The project does concentrate activities on already developed roads and eleiminates 67 miles of road. The alternative is in compliance with Objective HU O2.
Objective HU O3	Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.	Activity would be maintained on existing routes only. No new route development would occur. The alternative is in compliance with Objective HU O3.	Motorized use is largely limited to existing road or trail system. New construction is limited to 2 miles of motorized trail. Motorized use would be allowed on recently acquired lands from TNC with 62 miles identified for closure or decommissioning. The alternative is in	Motorized use is largely limited to existing road or trail system. New construction is limited to 3 miles of motorized trail and 0.5 miles road. Motorized use would be allowed on recently acquired lands from TNC with 67 miles identified for

Number	Objective or Guideline	Alternative 1	Alternative 2	Alternative 3
			compliance with Objective HU O3.	closure or decommissioning. The alternative is in compliance with Objective HU O3.
Objective HU O4	Provide for lynx habitat needs and connectivity when developing new or expanding existing developed recreation sites or ski areas.	No new developed sites or ski areas are proposed and connectivity would be maintained at its current level. The alternative is in compliance with Objective HU O4.	No developed recreation sites or ski area are proposed. Motorized use is largely limited to existing routes where no vegetation removal would occur. Overall open route density would decrease. See HU 03 and 04. The alternative is in compliance with Objective HU O4.	Same as Alt 2.
Guideline HU G3	Recreation developments and operations should be planned in ways that both provide for lynx movement and maintain the effectiveness of lynx habitat.	No new recreational developments or operations would occur and lynx movement and effectiveness of habitat would be maintained. The alternative is in compliance with Guideline HU G3.	The 2 miles of scattered trail construction would not reduce the effectiveness of lynx habitat or impede movement. Road closures would reduce motorized disturbances. The alternative is in compliance with Guideline HU G3.	The 3 miles of scattered trail and 0.5 miles of road construction would not reduce the effectiveness of lynx habitat or impede movement. Road closures would reduce motorized disturbances. The alternative is in compliance with Guideline HU G3.
Guideline HU G11	Designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on an LAU basis, or on a combination of immediately adjacent LAUs. Use the same analysis boundaries for all actions subject to this guideline.	No changes to winter motorized use are proposed in this project. Winter recreation is being addressed in a separate project. The alternative is in compliance with Guideline HU G11.	Same as Alt 1.	Same as Alt 1.

The following objective, standard, and guidelines apply to all projects within linkage areas in occupied habitat, subject to valid existing rights

Table 53. Objectives, standards and guidelines for all projects in NRLMD Linkage Areas (LINK)

Number	Objective, Standard, or Guideline	Alternative 1	Alternative 2	Alternative 3
Objective LINK O1	In areas of intermingled land ownership, work with landowners to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.	Ongoing. In recent years 8,000 acres from TNC (previously Plum Creek lands) were acquired. The alternative is in compliance with Objective Link O1.	Same as Alt 1.	Same as Alt 1.
Standard LINK S1	When highway or forest highway construction or reconstruction is proposed in linkage areas, identify potential highway crossings.	No highway or forest highway construction is associated with this project. The alternative is in compliance with Standard LINK S1.	Same as Alt 1.	Same as Alt 1.
Guideline LINK G1	NFS lands should be retained in public ownership.	There are no recent or future proposals to decrease NFS ownership within the project area. The alternative is in compliance with Guideline LINK G1.	Same as Alt 1.	Same as Alt 1.
Guideline LINK G2	Livestock grazing in shrub-steppe habitats should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.	There would be no change to existing livestock grazing levels or allotments resulting from the proposed action. The alternative is in compliance with Guideline LINK G2.	Same as Alt 1.	Same as Alt 1.

Lynx Critical habitat

Direct, Indirect, and Cumulative Effects Analysis

Effects to Canada lynx critical habitat were evaluated by assessing potential project impacts to the primary constituent element (PCE) and its four attributes for lynx critical habitat to conserve the physical and biological features necessary to the conservation of lynx (USDI 2009, p. 8638).

The effects analysis area and the cumulative effects area is the Blackfoot travel planning area which represents the action area. This area is sufficiently large that it supports home ranges of several individual lynx and the PCE and its attributes of lynx critical habitat. The project area is bordered by the Scapegoat Wilderness to the north and contiguous forest cover extending south predominantly on FS lands. The east and west sides of the project area are bordered by private lands that do not support suitable lynx habitat.

Alternative 1

The no-action alternative would have no direct or indirect effect upon the vegetative structure or condition of the boreal forest landscape, the primary constituent element of lynx critical habitat. No new trails, parking areas, other improvements or developments would occur under this alternative. Boreal forest habitat would retain its current abundance, distribution, and availability to lynx. The total miles of roads and trails in boreal forest habitat would remain unchanged both temporally and spatially. The effects to winter snow conditions would remain unchanged and current abundance and distribution of snowshoe hares, denning habitat, and matrix habitat would remain unchanged at current levels of availability. Critical habitat would remain functional and maintain current lynx use.

Alternative 2

Boreal Forests **–** Alternative 2 would have no substantive direct or indirect effect upon vegetative structure or condition of the boreal forest landscape. The effect of 2 miles of new trail construction, and trailhead development would result in very little vegetation removal. Other than the new trail development motorized use would be confined to existing roads and trails that would not result in additional vegetation loss. Available information does not suggest that motorized trails have adverse effects to lynx or preclude lynx movement. Boreal forest habitat would retain its current abundance, distribution, and remain functional.

Presence of snowshoe hares – The 98 mile reduction in open routes would reduce motorized use in snowshoe hare habitat. Low levels of traffic on forest roads and low speeds minimize the potential for hare mortality due to motorized use. Hares are also most active at dusk and dawn when motorized use is at its lowest level. The construction of narrow motorized and non-motorized trails would remove minimal vegetation and trails would preclude hare movements or distribution. The effects of non-winter motorized use and other recreational activities on snowshoe hares and hare habitat would not be significant and are discountable.

Winter Snow Conditions – A decision on non-winter travel would have no effect upon winter snow conditions.

Denning habitat – Denning habitat is abundant throughout the project area and is not considered a limiting factor in Montana (Squires 2006). Lynx occupy dens in early May when many forest roads are still impassible by wheeled vehicles due to persistent snow or wet muddy conditions. The minimal reduction in structural components that lynx may use to den due to trail construction would be discountable.

Matrix habitat – Open forest roads would be reduced by 98 miles improving habitat connectivity and the ability of lynx to move upon the landscape. Forest roads and trails do not create barriers to lynx. Matrix habitat would not be reduced and would remain functional.

Alternative 3

Potential effects of alternative 3 to critical habitat would be similar to those described under Alternative 2. Alternative 3 would have the lowest miles of open routes allowing the PCE and its attributes to remain functional. The additional mile of trail and 0.5 miles of new road construction would be offset by the reduction of 159 miles of motorized routes. Road decommissioning would not affect denning habitat and would improve the ability to serve as matrix habitat.

Summary of Direct and Indirect Effects to Lynx Critical Habitat

In summary, non-winter motorized use under any of the three alternatives would have minimal impact upon the physical and biological features as described by the PCE and it attributes defined above. The PCE and its attributes represent the essential physical and biological features of boreal forest that (1) provide adequate prey resources necessary for the persistence of local populations and metapopulations of lynx through reproduction; (2) act as a possible source of lynx for more peripheral boreal forested areas; (3) enable the maintenance of home ranges; (4) incorporate snow conditions for which lynx are highly specialized that give lynx a competitive advantage over potential competitors; (5) provide denning habitat; and (6) provide habitat connectivity for travel within home ranges, exploratory movements, and dispersal within critical habitat units.

The proposed activities would not result in significant vegetation changes or connectivity within the action area. Sufficient forest habitat is present to provide cover for lynx movements throughout the action area. All three alternatives, lynx critical habitat would remain functional (or retain the current ability for the PCE and its attributes to be functionally established) to serve its intended conservation role for lynx.

Cumulative Effects to Lynx, and Lynx Critical Habitat

Cumulative impacts include future State, tribal, local or private actions that impact lynx or result in a direct loss or modification of the PCE and its attributes within the action area. Various State or private activities have spatial overlap with the action area, however few of these activities overlap temporally with the winter use period minimizing the potential to cumulatively impact lynx or their habitat. There are several past and ongoing activities occurring on the National Forest that cumulatively affect lynx and lynx habitat. For a complete list see Appendix D of the DEIS. Some of these activities have or will have positive effects. Road decommissioning projects may serve to reduce habitat fragmentation increasing habitat security and connectivity and some vegetation treatments are expected to improve snowshoe hare habitat benefitting lynx over the longer term. Conversely, the reopening of previously closed roads, relocating roads, and some vegetation management may serve to increase fragmentation and reduce connectivity between suitable habitats.

Vegetation management projects in the project area include the HNF Roadside Hazard Tree Removal Project which is nearing completion, the proposed Stonewall and Dalton Vegetation Management projects, ongoing Hogum and Poorman prescribed burn projects, and proposed Helmville Face and Alice Creek prescribed burn projects. These projects have been or will be

analyzed to address project related direct, indirect and cumulative effects to lynx and lynx critical habitat and will undergo the appropriate section 7 consultation.

Vegetation management can have beneficial, neutral, or adverse effects on lynx and snowshoe hare prey populations, and the duration of effects varies. Some vegetation management practices mimic natural disturbance processes, while other practices, such as use of herbicides to suppress hardwood regeneration, do not. Past vegetation management activities that clear-cut forests temporarily removed both snowshoe hare and red squirrel habitat, thereby reducing lynx prey densities. Timber harvests also regenerate the forest and provide the early successional forests needed by snowshoe hares. Timber harvest may also remove denning and security habitat that require long time periods to regenerate. In association with timber harvest, some level of road construction typically occurs that can facilitate recreational use in lynx habitats that previously received little use.

Considerable timber harvest has also occurred on State and private lands within the action area and future harvest activities are anticipated due to extensive insect mortality. In general, state and private lands within the cumulative effects area occur at lower elevations and provide little suitable lynx habitat but may serve as lynx matrix habitat. In matrix habitats, activities that change vegetation structure or condition do not adversely affect lynx critical habitat unless they create a barrier or impede movement between patches of foraging habitat and between foraging and denning habitat within a potential home range (USDI Fish and Wildlife Service 2009, p. 8645). On state lands, less stringent oversight is mandated and these actions can cumulatively impact lynx populations on federal lands. State lands are generally scattered parcels throughout the action area and past and future harvest activities are not anticipated to create barriers or impede lynx movements. While future harvest activities will further reduce forest cover and the abundance of dead trees, the impact from these activities on state and private lands will be minimal due to the small proportion of the action area involved.

The extensive tree mortality, particularly in the lodgepole pine where the greatest insect mortality is occurring, is expected to reduce the short term habitat suitability for lynx and snowshoe hares. Over the longer term of 15-30 years, natural regeneration is expected to provide increased cover and forage for snowshoe hares. The accumulation of down wood will increase the availability of structural components lynx select for denning. The extensive mortality also serves to significantly increase the risk of large scale wildfires that could significantly reduce availability of suitable lynx habitat for 15-40 years.

Climate change is anticipated to influence lynx and lynx habitat with several possible effects of climate change anticipated. These include: (1) potential shifts along elevation or latitudinal gradients in the distribution of the lynx population itself, along with prey species and potential competitors and predators; (2) reductions in overall lynx population size; (3) changes in demographic rates, such as survival and reproduction; (4) changes in co-evolved interactions, such as prey-predator relationships; and (5) direct loss of habitat from changes in forest species composition and changes in the frequency and pattern of forest disturbances (fire, hurricanes, insect outbreaks; McKenzie et al. 2004). The proposed project would not contribute cumulatively to the effects of climate change since it would not remove any substantive levels of forest cover and wheeled motorized use is limited to the non-winter period almost entirely on existing roads and trails.

The Blackfoot Travel Plan is currently being developed to address winter recreation in the project area. In general, snowmobiling primarily occurs on existing roads and trails or in open areas with limited forest cover or associated structural complexity at the ground level. Densely

stocked stands, dense regenerating young stands that provide good snowshoe hare habitat, or stands with a high level of dead and down that may provide denning habitat are generally not suitable for snowmobiling. None of the proposed new road or trail construction would occur it areas proposed as winter non-motorized. The Winter Travel Plan proposed action would designate approximately 88,000 acres as winter non-motorized and impose a winter season of 12/1 through 3/31 for lands north of Hwy 200, with the exception of the Copper Bowls play area that would allow use until 5/31. South of Hwy 200 the season ending date would be 4/15. Cumulatively, both travel plans would reduce recreational use in the project area minimizing recreational disturbances in lynx habitat.

Domestic grazing occurs on the much of the project area within several authorized livestock allotments but is not anticipated to cumulatively contribute to project related effects to lynx or lynx critical habitat. The project would not result in any changes to allotment management or stocking levels. Motorized use would remain largely unchanged within allotments and would not increase forage competition between hares and livestock. The presence of livestock during the summer grazing period in conjunction with the limited motorized access would not serve to create barriers or significantly impede the movement of lynx within the action area and habitat connectivity would be maintained. Low elevation allotment lands that do not provide suitable hare habitat would continue to function as matrix habitat.

The existing level of development within the action area is relatively low consisting primarily of developments in lower elevation habitats surrounding the town of Lincoln, as well as other scattered homes and/or ranches. Additional future development is anticipated to continue at a moderate level however, the degree of future development is difficult to predict and is limited by the availability of private land suitable for development. Most private lands are at lower elevations and support dry forest types that do not provide lynx habitat minimizing the potential to cumulatively affect lynx or critical habitat. These lands may however, function as matrix habitat for lynx and future developments may serve as impediments to lynx movements through matrix habitats. In general, the action area has a low degree of human development and the extensive forest cover provided by the large contiguous block of public lands provides a high degree of connectivity to allow lynx movements within the action area. The combined effects of summer and winter recreation and additional future development are not anticipated to appreciably contribute to the degradation of lynx matrix habitat or other PCE attributes.

Highways 200 and 279 currently provide the most significant impediment to wildlife movements within the action area and are responsible for multiple wildlife mortalities throughout the year, although there are no known lynx mortalities to date. It is anticipated that traffic volume on these highways will increase in future years as the human population in surrounding areas continues to grow. Correspondingly, since many of the project areas summer and winter recreationists come from the surrounding areas, it is reasonable to expect some future increase in highway traffic and an increased potential for lynx mortality.

Activities associated with exploration and development of leasable minerals could affect lynx habitat by changing or eliminating the native vegetation and contributing to habitat fragmentation. The development of associated roads, powerlines and pipelines to facilitate exploration and development could result in a loss of lynx habitat and contribute to fragmentation of habitat. Currently, there are no proposals for larger scale exploration or development of leasable minerals within the project area. There is however, a large reclamation proposal for the Mikehorse Mine at the head of the Blackfoot River. Reclamation activities are anticipated to last several years. Associated activities could increase the risk of highway

mortality due to increased traffic and impede lynx movements through the area. Sufficient habitat surrounds the reclamation site however that lynx would not be precluded from traveling between adjacent suitable habitats.

Based on the above discussion and the effects of any of the alternatives analyzed in this document, cumulatively, Alternative 1 (the No Action Alternative) or the proposed activities in Alternative 2 or Alternative 3 would have no significant adverse effects upon lynx, lynx critical habitat, or population viability. As addressed under direct and indirect effects, the proposed project is in compliance with the applicable objectives, standards, and guidelines of the NRLMD (USDA 2007) and no adverse effects to lynx are anticipated. Similarly, the effects of the proposed activities to lynx critical habitat are anticipated to be insignificant and would not appreciably contribute to cumulative impacts upon lynx or critical habitat.

Compliance with Management Direction

The proposed action is in compliance with applicable wildlife standards, guidelines and direction of the Forest Plan (USDA 1986) and is consistent with management guidance in the Northern Rockies Lynx Management Direction (USDA 2007), and Section 7 of the ESA (1973).

Determination of Effects

It is the determination of this analysis that the proposed project under all alternatives **May Affect- Not Likely to Adversely Affect** lynx or lynx critical habitat.

Alternative 1 (the no action alternative) represents the existing condition which is currently used by lynx however; this alternative has the greatest potential to impact lynx due to higher open route densities and greater number of motorized routes with no seasonal restrictions.

Alternative 2 would have intermediate impacts due to fewer miles of open routes and a slight decrease in routes with no seasonal restrictions.

Alternative 3 has the least potential to affect lynx or the functionality of lynx critical habitat due to the fewest miles of open routes and the most seasonally restricted routes.

For both action alternatives the determination for lynx and lynx critical habitat is based on the following rationale: (1) The proposed project is in compliance with standards and guidelines of the NRLMD; (2) human activity would largely be concentrated in an area already impacted by summer recreational use with the exception of recently acquired lands and the reopening of some currently closed roads or trails; (3) minimal new trail and road construction would occur (4) proposed activities would not result in any substantive changes to the existing vegetative condition, (5) road closures and decommissioning of roads would minimize motorized use in lynx habitat; (6) forest roads have little increased risk to lynx mortality, (7) lynx habitat connectivity would be maintained or enhanced under the proposed action and, (8) the affected critical habitat would remain functional (or retain the current ability for the PCE and its attributes to be functionally established) to serve its intended conservation role for the species.

Sensitive Species

Gray Wolf

General Effects of Roads to the Gray Wolf

Wolves may use the same den sites from one year to the next or maintain several dens in a local area through which they cycle over the years (USDI 1987). Packs are sensitive to human activity near den sites and they may move if disturbed (Ballard et al. 1987). Most dens are located well away from trails and backcountry campsites. Rendezvous sites are specific resting and gathering areas that wolves use in summer and early fall. Wolves move to several rendezvous sites in the course of a summer, the first one is usually located 1 – 6 miles from the natal den. Packs use rendezvous sites until pups are mature enough to travel with the adults. Wolves are most sensitive to disturbance at the first rendezvous site and become less so at later sites (USDI 1987).

The Wolf Recovery Plan (USDI Fish and Wildlife Service 1987) recognized den and rendezvous sites as key components of wolf habitat to be protected from human interference. Based on U.S. Fish and Wildlife Service recommendations, the HNF routinely proposes that known wolf dens on the Forest be buffered from any local project (or recreational activity) by at least at least ½ mile during the denning season. Rendezvous sites are more ephemeral and mobile, but any such sites that can be identified are also buffered from human presence as much as possible while they are active.

Wolves prey primarily on ungulates (ibid). During May and June, wolves focus on newborn deer, moose, elk, and bison in calving/fawning areas. In summer and fall, ungulates constitute the highest percentage of biomass; in winter wolves prey almost exclusively on deer, elk, and moose (although livestock may figure into the mix in ranchland areas). Because ungulates represent the bulk of the wolf's food supply, factors that affect ungulate distribution and abundance (habitat and access management, winter range productivity) also affect wolves.

Roads have not been identified as a component directly affecting the recovery and viability of wolf populations in the northern Rockies. The presence of roads on the landscape, however, is associated with indirect effects that can put pressure on wolves. These include the effect that roads have on the local abundance and distribution of ungulate populations upon which wolves depend for food; greater potential for human interference at key sites, such as dens; and the loss of space free from regular human presence in general. Other indirect effects are the potential for mortality associated with vehicle accidents and illegal shooting that roads facilitate (Theil 1985; Mech 1989; Mech et al. 1988; Boyd and Pletscher 1999).

Direct and Indirect Effects, Alternative 1 – No Action

There is one known denning site within the project area, located in a remote area with no access. Denning sites of known packs are located and monitored by MFWP each year and the information passed on to the HNF so that adjustments to activities on the Forest, including travel management, can be made to protect denning sites while they are active. As a result, retention of the status quo in alternative 1 would have no effect on these key sites.

Alternative 1 would have no effect on wolf prey base in the Blackfoot landscape. Retention of the existing condition would not imperil the ungulate prey base for current and future wolf packs.

The current open road density in the Blackfoot travel planning area is 1.4 mi/mi². Wolf packs have run into trouble confronting human enterprises (notably livestock operations) almost entirely on private lands away from the National Forest. But on the National Forest, wolves have seldom, if ever, been involved in negative encounters with humans.

Direct and Indirect Effects, Alternatives 2 and 3

Wolves are not impeded or repelled by most Forest roads, and, in fact, they often use primitive roads with low traffic volume as travel ways any time of year. Wolves are also attracted to road corridors that focus prey activity—as when deer graze roadside green-up or rabbits concentrate in roadside brush. On the other hand, some studies have worked out road density thresholds above which wolf pack activity is suppressed. In Minnesota and Wisconsin, average threshold road density was determined to be 0.72 mi/mi² (Mladenoff et al. 1995 cited in Forman et al. 2003). Whether or not this density applies to montane National Forest System roads in the West has not been determined. But given the facility with which wolf packs have made use of ranchlands and well-roaded portions of the HNF in the last 15 years (open road density in the Blackfoot travel planning area is 1.4 mi/mi²), it seems likely that, at least in parts of their territories, wolves are able to deal with road densities higher than the Wisconsin thresholds. Open road density under alternative 2 is 1.2 mi/mi²; and under alternative 3 it is 1.0 mi/mi², so the density decreases slightly from alternative 1(current condition) and alternative 2 to alternative 3.

Few roads on the HNF allow vehicle speeds high enough to threaten wolves. Roads may also be indirectly lethal in that they funnel hunters and other Forest users with rifles into areas occupied by wolves, leading to inadvertent or deliberate shooting. So far, however, neither strikes on the highway nor illegal/accidental shooting have been significant road-related factors in wolf mortality on the HNF since wolves began arriving in this area in the late 1980s.

Alternative 2 or alternative 3 is highly unlikely to have an effect on established denning or rendezvous sites. There is one known denning site within the project area, no new access under either alternative is proposed within a mile of the site. The changes in the availability of habitat in which wolves might establish dens and carry on with other activities on the Forest away from regular human presence would be relatively small under alternative 2 or 3 and would have no measurable effect on wolf population viability.

The primary factor determining the size of local elk populations is not due to variations in Travel Plan alternatives, but rather, on the number and variety of elk hunting permits allowed by Montana Fish, Wildlife, and Parks. The roads certainly facilitate hunting opportunity, but overall population numbers are a direct result of hunter success. In this regard, the degree to which hunters are able to access off-Forest lands where elk often seek refuge during the hunting season would also affect elk numbers. Block management agreements and State land purchases will drive this access. Alternatives 2 and 3 would allow elk to continue inhabiting the Plan Area at least at current population levels, thereby assuring a prey base for resident and transient wolves.

Both alternatives would increase the total acreage of large non-motorized habitat patches expanding the areas in which wolves can establish new dens and carry on with other activities away from regular human interference. But, the effects, in terms of their contribution to wolf population viability, are unlikely to be measurable.

Population increases could result, however, from a combination of improved elk habitat effectiveness and security on the Forest, and lower harvest rates resulting from more restrictive

hunting regulations via MFWP. Most likely, under alternatives 2 and 3, elk would continue inhabiting the Blackfoot travel planning area at something close to present population levels, maintaining an adequate prey base for resident and transient wolves.

Cumulative Effects Common to the Gray Wolf, for All Alternatives

Recent and ongoing activities on the National Forest that have improved prospects for wolves include: Establishment of the Statewide OHV Plan, which prohibits riding off established motor routes, thus reducing potential for negative wolf-human encounters; grazing allotment revisions that have generally reduced cattle numbers and grazing seasons, thus improving habitat conditions for big game species while at the same time reducing potential for wolf-livestock interaction on the Forest; road and motor trail closures associated with timber harvest projects that have expanded blocks of non-motorized habitat and potentially reduced opportunity for negative wolf-human encounters; trail relocation projects that have removed trails from riparian areas to upslope locations away from sites more likely to attract wolves and their prey.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or will have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

Activities that have locally increased the likelihood of wolf-human encounters include: numerous road permits allowing access across HNF land to private holdings; retention of private recreational residences on HNF land; small mining operations (under the 1872 Mining Act) in areas where wolves have been observed; construction and maintenance of communications sites and power lines; efforts to spread livestock distribution across allotments, which may bring cattle into areas where they are more vulnerable to wolf predation; retention of grazing allotments on the Forest in general providing ongoing potential for wolf predation; retention of numerous dispersed camping sites; unrestricted back-country recreational use (backpackers, day-hikers, horseback riders, hunters).

Private land development (primarily rural home building) is continuing to create more sites that prove troublesome for wolves moving through the landscape (bringing them into contact with human habitation, domestic animals, and residents with guns). Ranching operations on private lands near the Forest have proven to have high potential for wolf-human conflict. Wolves inevitably descend to private ranch and agricultural lands in the valleys as winter comes on, and, sometimes, they remain there yearlong. A circumstance that may, in part, be related to elk coming down off the Forest in early-mid fall to avoid hunters on the National Forest and remaining in the valley lands for up to 8 months.

Summary and Determination of Effects

Alternatives 1, 2, and 3

Effects are described in terms of parameters that threaten wolves through (1) human contact and conflict (primarily, livestock grazing, human settlement in the wildland-urban interface, and (2)

activities that compromise denning or rendezvous sites, and (3) activities that affect the prey base. These follow the three key components of wolf habitat identified in the Wolf Recovery Plan (USDI 1987): Viable denning and rendezvous sites, adequate prey, freedom from human interference. Under all alternatives, this project may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or loss of viability to the population or species.

Fisher

General Effects of Roads to the Fisher

Like wolverines, fishers are not averse to crossing roads and motor trails or using them as travel routes in winter as long as they are associated with mature forest cover. Overall, research has revealed no consistent relationship, positive or negative, between fisher habitat use and open road density. High-traffic roads that run along forested stream bottoms probably reduce the attractiveness of otherwise suitable sites for birthing and raising young but they do not seem to prohibit use of the areas for hunting and resting. Several authors recommend against construction of loop routes in riparian areas, since these tend to encourage human traffic in general and trappers in particular (see Heinmeyer and Jones 1994; Claar et al. 1999).

Fishers do not necessarily avoid roads and areas of human settlement, but the loss of suitable forest habitat that often accompanies these developments has been a primary reason for population decline (Heinemeyer and Jones 1994). Habitat loss and lessened habitat effectiveness in riparian areas is especially detrimental. Even in areas unaffected by timber harvest or clearing for building, firewood cutters typically remove most large snags from open road corridors, eliminating a key habitat component of potential use to fishers. Another problem has been trapping—often abetted by roads and other access channels for trappers on over-snow vehicles. Fishers are wide-ranging, curious, and opportunistic, and thus highly susceptible to trapping. Even in areas where quotas are minimal or where fishers are off-limits to trapping, they are caught incidentally in sets for other species (Jones 1991).

As is the case with lynx and wolverines, one of the primary threats that open roads pose to fishers comes from their role as over-snow vehicle routes for trappers in winter. Fishers are curious and opportunistic, and they are prone to being caught in traps set for marten and other furbearers, as well as for themselves (Douglas and Strickland 1987). In some areas, this is a significant source of mortality, especially where over-snow vehicle routes pass through forested riparian bottoms, old-growth stands, and forested saddles (Heinmeyer and Jones 1994). Removal of large snags from the road corridor by firewood cutters is another indirect effect—although its import is related to the availability of such components elsewhere in the landscape. Fishers use cavities in dead trees for resting, concealment, and protection of young.

Paved roads generally have higher speed limits than non-paved roads and are thus a higher potential source of vehicle-caused mortality to fishers (Naney et al. 2012). Forest roads and trails may be frequently used as travel and hunting corridors by potential fisher predators (e.g. mountain lions, black bears), which may increase vulnerability of fishers to predation (Naney et al. 2012).

Evidence from radio telemetry studies of fishers suggests that fishers are not displaced from suitable habitat by the presence of roads or road use (USDI Fish and Wildlife Service 2011). However, highways and other roads do increase the potential for vehicle-wildlife collisions and hence fisher mortality. Additionally, higher road/over-snow vehicle track densities in fisher

habitat may lead to increased accessibility for trappers, making fishers in these areas more susceptible to trapping.

Direct and Indirect Effects, Alternative 1 – No Action

Alternative 1 would retain the current configuration of motor routes including 446 miles of roads open to wheeled vehicles on public land (and thus, open to firewood cutters). Trapping access to potential fisher habitat (primarily, patches of riparian forest) would remain at its current level. Trapping activity in the Blackfoot landscape is variable from year to year, but generally low. This, combined with the rarity of fishers in the landscape, has resulted in no fishers being caught in recent decades. The potential for fisher mortality via trapping, as facilitated by the road/trail network, would remain slight.

Direct and Indirect Effects, Alternatives 2 and 3

With alternative 2, open road miles on public land would decrease by 98 miles from 446 to 348 miles, and under alternative 3 open road miles would decrease by 139 miles from 446 to 307 miles. The area from which firewood cutters would be able to remove large snags and logs that might be useful to fishers would thus be decreased substantially under alternative 3 and somewhat less under alternative 2. This would decrease trapper access to a variety of habitats, including a limited amount of potential fisher habitat.

Under both alternatives new motorized trail construction of 0.13 miles would occur within fisher habitat, 0.91 miles of road would be decommissioned. The new construction would be of minimal disturbance and the decommissioning would be beneficial.

Cumulative Effects Common to the Fisher, for All Alternatives

Past, present and reasonable foreseeable activities in and adjacent to the project area which may impact fisher habitat are and include: timber harvest, recreational use, general development, prescribed fire, and road building. These activities likely reduced fisher habitat quality within the project area and also subjected the species to increased trapping pressure.

Past timber harvest in the Blackfoot landscape, has removed mature and old-growth forest capable of providing fisher habitat (in particular, mid/low-elevation riparian forest). Primary actions have locally reduced the effectiveness of potential fisher habitat by providing access for trappers and firewood cutters include retention of groomed over-snow vehicle trails roads passing through forested riparian habitat.

Actions that have improved prospects for fishers include: closure of Roadless Areas to over-snow vehicle use; trail relocation projects that have removed trails from productive riparian areas to upslope locations; establishment of the Statewide OHV Plan, which prohibits riding off established motor routes; road and motor trail closures associated with timber harvest that have expanded blocks of non-motorized habitat.

Recent and ongoing private land development (building construction, clearing, thinning, commercial timber harvest, dead tree salvage) would continue to impact potential fisher habitat, particularly where it occurs in forested riparian areas. Actions that reduce key habitat components (large snags and logs, overhead cover) could have an effect.

Trapping, increased road access, and extensive clearcutting (especially in riparian areas) all likely contributed to fisher population declines across the western U.S. Fishers were released in some areas of western Montana around 1959 and 1988 through 1991 to augment nearly extinct

populations (Powell and Zielinski 1994). Montana Fish Wildlife and Parks regulates trapping, but fishers remain vulnerable to trapping pressure. The decreasing use of clearcutting and riparian harvest may have stabilized the amount of fisher habitat in Montana.

Recent and ongoing travel planning efforts on adjacent Forests, as well as the Lincoln Ranger District, could be beneficial to fishers if they provide local safe havens free from motorized access. Because fishers are capable of traveling some distance, improved habitat conditions on other Forests could improve fisher populations and subsequent dispersal opportunities to the Helena National Forest. Conversely, travel management decisions elsewhere could reduce fisher populations in those areas and reduce the potential for emigration/immigration.

Reasonably foreseeable activities on HNF land that could affect fishers to one degree or another include salvage projects designed to deal with the ongoing bark beetle epidemic which would remove substantial numbers of large dead trees, some of which could be of use to fishers.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or will have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

The proposed Dalton and Stonewall vegetation management projects would result in reductions of forest canopy (small-to medium-sized trees) and down woody material, adding to the impacts from past activities. However, these alternatives would retain down woody material as directed by the Forest Plan and mitigation measures for soils and watershed. In addition, the action alternatives would only include regeneration harvest using small patches of group tree selection within larger improvement cut units so the forested nature of treated stands would be maintained.

Finally, the overall reduction in road density following project completion would be beneficial to fisher and other species that are subject to trapping pressure.

Summary and Determination of Effects

Alternative 1

Because this alternative would not change the existing vegetative condition on the project area or change existing road densities it would have no impact on fisher.

Alternatives 2 and 3

It is the determination of this analysis that the proposed activities under alternative 2 and alternative 3 may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or loss of viability to the population or species. This determination is based on the following rationale: fisher are extremely rare in the project area, and the action alternatives would result in a decrease of open road density across the project area, which would be less opportunities for woodcutters and trappers to access areas.

Wolverine

Direct and Indirect Effects, Alternative 1 – No Action

There would be no direct loss of wolverine habitat since no vegetative modifications would occur. No additional actions such as opening additional roads or trails to motorized use, new road or trail construction or use of historic roads is proposed with this alternative so there would be no direct or indirect effects on wolverines or their habitat.

Modeled wolverine denning habitat occurs in high elevation areas primarily within the Scapegoat Wilderness, lands along the southern boundary of the wilderness, and along the continental divide. The majority occurs in the northern half of the project area with the greatest concentration within the Scapegoat Wilderness.

The most far-reaching effect of past management activities has been the development of road systems, recreational trails, and sites that improved access and promoted human use in remote areas. Motorized wheeled vehicles have reduced the remoteness of the pre-managed landscape. Management activities such as clearcuts and extensive thinning and the associated roads have provided additional opportunities for use over time. Natural disturbances such as the 34,000 acre 2003 Snow Talon fire may also serve to increase access in some areas by reducing overstory snow interception and removing down wood and understory vegetation.

Road and rail kill is another important source of human-caused mortality. Human land-use activities have affected wolverine populations, mostly those activities that fragment or supplant habitat (for example, human settlement, extensive logging, and recreational developments) (Banci 1994)). In British Columbia, a study of the effects of transportation corridors showed wolverine to avoid areas within 100 m of the TransCanada Highway (Austin 1998). In the same study wolverines frequently used sparsely-used ski trails for travel; but levels of human activity that may discourage use by wolverines are unknown (Austin 1998).

Direct and Indirect Effects, Alternatives 2 and 3

This project would not have significant effects on wolverine under any alternative because: no structural changes to habitat would result, ungulate densities would remain unchanged, additional acres potential denning habitat would be or increase motorized access (including over-snow vehicles). The decreases in road densities under the action alternatives would likely be beneficial to this species and to trapped and hunted species in general. None of the alternatives poses significant risk to wolverine population viability on the Helena NF. Table 54 shows 10.5 miles of already existing roads and trails within wolverine habitat. Under alternative 2, 7.2 miles of the existing mileage and 7.4 miles under alternative 3 would be designated as non-motorized trails; also under alternative 3, an additional 0.1 miles would be designated as non-motorized trail, and another 0.1 miles would be decommissioned.

Table 54. Road or trail mileage and designation per alternative within wolverine habitat in project area

Road or trail number	Road or trail mileage within wolverine habitat	Alt 1 road or trail designation	Alt 2 road or trail designation	Alt 3 road or trail designation
U-447, 771-A3, 485	4.3	Motorized	Non-motorized	Non-motorized
4106-H3	0.3	Closed to motorized use	Non-motorized	Non-motorized
330-B1	0.6	Road closed to motorized use yearlong	Road closed to motorized use yearlong	Road closed to motorized use yearlong
330-B1	0.1	Open Hwy legal	Open Hwy legal	Open Hwy legal
771-A1	0.1	Open Hwy legal	Open Hwy legal	Non-motorized
771-A1	2.4	Closed to wheeled motorized use 9/1 - 6/30	Closed to wheeled motorized use 9/1 - 6/30	Closed to wheeled motorized use 9/1 - 6/30
482	1.3	Non-motorized	Non-motorized	Non-motorized
483	1.3	Non-motorized	Non-motorized	Non-motorized
771-A2	0.1	Closed to wheeled motorized use 9/1 - 6/30	Closed to wheeled motorized use 9/1 - 6/30	Decom
Total	**10.5**			

As studies of wolverine are few and inconclusive, it is difficult to determine the exact effects past management actions have had on wolverine within the project area. In general, it is recognized that remote unroaded areas provide better wolverine habitat than roaded areas receiving consistent human use.

Although wolverines are not widely reported to be a habitat specialist, habitat loss and alienation are commonly thought to be a major contributing factor to population declines (Banci 1994).

Cumulative Effects Common to the Wolverine, for All Alternatives

Wilderness and roadless lands would continue to provide abundant, high quality habitat for wolverines in the short term. Climate change would continue to be a threat to wolverine populations in the long-term and is likely to shrink the size of their high quality habitat islands, but the northern Rocky Mountains would continue to provide some of the largest, most contiguous areas of wolverine habitat in the lower 48 states, serving as a population source area.

The project area is bisected by two single lane highways that may deter some wolverine movements but do not present barriers to wolverine movement. Past road management actions that have improved security habitat for grizzly bears and big game species also provide secure habitat for wolverines. There are no road improvement projects scheduled that would significantly change the ability of wolverines to move upon the landscape.

In the past, wolverines were subject to overharvest, but more restrictive trapping seasons combined the increase in secure habitat within the analysis area as proposed under the action alternatives, provides increased protection for wolverine populations.

Other ongoing and foreseeable management actions (e.g. tree planting, timber harvest, thinning, gathering forest products, road maintenance and developed recreation activities, etc.) in the cumulative effects analysis area are not expected to adversely affect wolverines because they do not overlap in space with areas of persistent spring snowpack. Dispersed recreation activities occur throughout the cumulative effects analysis area and are located in areas of persistent spring snowpack, but there is no evidence that dispersed recreation activities such as hiking, camping, and hunting affect wolverines. According to the 12-month review, “It is clear that wolverines can coexist with some level of human disturbance and habitat modification. How much is too much is not known. The proximity of wolverine habitats to areas heavily or moderately used for dispersed recreation needs more study, especially where there is overlap during the denning season. What little information exists suggests that wolverines can adjust to moderate habitat modification, infrastructure development, and human disturbance” (FR pg. 78049).

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or will have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

Summary and Determination of Effects

All Alternatives

It is the determination of this analysis that the proposed activities under alternative 2 and alternative 3 may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or loss of viability to the population or species. This determination is based on the following rationale: the action alternatives would result in a decrease of open road density across the project area; also both action alternatives would result in a decrease of motorized roads and trails within wolverine habitat; and roadless areas, RNAs and wilderness occur within the project area and provide for suitable displacement and security habitat.

Flammulated Owl

General Effects of Roads to the Flammulated Owl

Flammulated owls are small raptors, active primarily from dusk to dawn. McCallum (1994) observes that they appear quite tolerant of humans. In the northern Rockies, they will nest, roost, and forage close to houses and to open roads and well-used trails if habitat structure is suitable. The mature and old-growth ponderosa pine stands that traditionally provided that habitat structure in the Blackfoot landscape have been logged particularly heavily since the late 1860s—and their relatively low abundance and fragmented dispersion on the landscape are limiting factors for flammulated owls.

Open roads appear to exert little direct influence on the owls and on their selection and use of habitat. As with most cavity dependent species, effects are indirect: Removal of large cavity-prone snags by firewood cutters and of roadside hazard trees by the HNF may reduce potential nesting opportunities. For flammulated owls, this is a concern in stands of certain composition and structure—namely, more open-grown forest environments with large trees at lower and mid elevations.

The impact of roads is indirect in that firewood cutters working the open road corridors are likely to remove large dead trees that the owls most often use for nesting. Flammulated owls will nest in live conifers where pileated woodpeckers have excavated cavities, but large snags are the primary source of nest holes—and in the road corridor, they are ephemeral.

The ongoing pine beetle epidemic is of particular relevance to flammulated owl habitat, since mature ponderosa pine forests—particularly the more open-grown stands with large trees at lower and mid elevations—represent a primary environment for these birds. The increase in large cavity-prone trees in stands of this structure represents new habitat opportunities for flammulated owls wherever sufficient live canopy remains. In the road corridors, however, the loss of these components is virtually inevitable.

Direct and Indirect Effects, Alternative 1 – No Action

Alternative 1 would have no direct effect on flammulated owls since no new road or trail construction is part of this alternative, and no habitat components would be lost as a result. Alternative 1 would maintain the status quo and would not increase the potential for indirect effects resulting from removal of large dead trees that might serve as nesting substrate.

Direct and Indirect Effects, Alternatives 2 and 3

Snag removal by firewood cutters working the road corridors represents a loss of habitat components important to flammulated owls. The abundance of standing and downed dead trees is one of the key factors allowing flammulated owls to occupy a forest stand.

Modeled habitat identifies approximately 27,209 acres of potential flammulated owl habitat and is composed of an infinite number of small polygons creating a virtually contiguous habitat across the Blackfoot landscape.

Table 55 shows new road or trail construction within flammulated owl habitat. Under alternative 2, 0.6 miles of new construction would occur, compared to alternative 3 where 0.8 miles of new construction would occur. Since such minimal new construction would occur under either alternative the effects would be insignificant. Project mitigations dictate that no key habitat components would be removed as a consequence (i.e., large, mature trees).

Table 55. New road or trail construction mileage and designation per alternative within flammulated owl habitat in project area

Road or Trail Number	Road or Trail Mileage within Flammulated Owl Habitat	Alt 2 Road or Trail Designation	Alt 3 Road or Trail Designation
1841-D1-New2	0.2	NA	Motorized
U-New-4043	0.3	Motorized	Motorized
U-New-4	0.2	Motorized	Motorized
U-427	0.1	Motorized	Motorized
Total	**0.8**		

Table 56 shows the miles and affected acres of new road/trail construction and road decommissioning within flammulated owl habitat. Approximately 1.2 miles of road under alternative 2, affecting 84 acres within flammulated owl habitat would be decommissioned, compared to approximately 17 miles of road under alternative 3, affecting 1,240 acres. This would benefit the flammulated owl by decreasing access to woodcutters and decreasing disturbance.

Table 56. Miles and affected acres of new road/trail construction and road decommissioning within flammulated owl habitat by action alternative

Activity	Alternative 2	Alternative 3
New road/trail construction (miles/acres)	.6/44	.8/60
Decom (miles/acres)	1.2/84	17/1,240

Cumulative Effects Common to the Flammulated Owl, for All Alternatives

Past timber harvest throughout the Blackfoot landscape, has removed substantial acreages of mature and old-growth forest in which large-diameter conifer snags were prominent components.

A few recent timber harvest and thinning projects have emphasized retaining large trees in open-grown stands and allowing them to continue to grow in a forest configuration less likely to succumb to stand-replacing fire. Over the long term, these projects benefit flammulated owl habitat.

The ongoing HNF firewood policy that allows members of the public to take up to 10 cords of dead wood within reach of Forest roads continues to result in the removal of most large snags from the road corridors.

Recent and ongoing private land development (building construction, clearing, thinning, commercial timber harvest, dead tree salvage) has variable effects. Traditional clearcut logging and overstory removal eliminate potential habitat for flammulated owls; thinning projects—many of them aimed at reducing fuel loading for fire protection—are generally beneficial. Some recent timber harvest on state and private lands have opened up dense ponderosa pine stands, allowing them to develop in more open formations that would eventually be suitable for flammulated owls.

Foreseeable activities on HNF land that could affect flammulated owls to one degree or another include the salvage projects designed to deal with the ongoing bark beetle epidemic and that would remove numerous large dead trees, some of which could be of use to flammulated owls. On the other hand, those projects that retain mature trees in open-grown formations are likely to benefit the birds over the long term. Portions of the Forestwide roadside Hazard Tree Removal Project would be in mature ponderosa pine and may result in limited increase in potential flammulated owl habitat (although most surviving trees would not be ponderosa pine).

Future activity on non-Forest land within the cumulative effects area that could affect flammulated owl habitat includes settlement and associated development of private lands—often clearing that involves removal of large trees—and clearcut/overstory removal timber harvest and removal of large beetle-killed dead trees.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or would have positive effects. For a complete list

see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

Summary and Determination of Effects

Alternative 1

Because this alternative would not change the existing vegetative condition on the project area or change existing road densities it would have No impact on flammulated owl.

Alternatives 2 and 3

It is the determination of this analysis that the proposed activities under alternative 2 and alternative 3 may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or loss of viability to the population or species. This determination is based on the following rationale: minimal new construction to occur within habitat; removal of dead trees from the road corridor by firewood cutters is unlikely to have any measurable impact on flammulated owl occupancy of the landscape in either alternative.

Black-backed Woodpecker

General Effects of Roads to the Black-backed Woodpecker

The presence of open roads and motor trails has no direct effect on black-backed woodpecker habitat. Impacts come indirectly from the loss of dead trees to firewood cutting or to Forest operations designed to remove hazard trees from along the roads. Since black-backed woodpeckers are attracted first and foremost to snag arrays created by stand-replacing fire, roadside snag removal in these environments is the most telling. Woodpecker numbers are much lower in stands created by other agents, even where dead tree abundance is high.

The effects of ongoing bark beetle mortality put the status of black-backed woodpecker habitat in flux. The rapid replacement of healthy mature trees in closed forest formations by dead and dying trees in increasingly open-canopied arrays across the Blackfoot landscape may be creating new habitat opportunities for black-backed woodpeckers. On the other hand, the strong preference that these woodpeckers show for burned forest snags may mean that the beetle-killed forest will not be exploited by these particular woodpeckers. Even if blackbacks do move into the beetle-kill, it represents a short-term opportunity, likely to last no more than 10 years as the bark beetles run their course and the woodpeckers' food supply fades away.

But during that time period, even with the likelihood that many snags would be removed by dead tree harvest operations, the loss of snags along roads to firewood cutting would not be a factor in determining whether or not black-backed woodpeckers are able to occupy the landscape. Because of the magnitude of the beetle kill, the fact that the open road corridors would not be available as habitat would be of no real consequence under any Travel Plan alternative—Concentrations of dead tree habitat would be abundant and widely distributed. And it may be a moot point if the black-backed woodpecker continues to spurn the beetle-killed forest.

Direct and Indirect Effects, Alternative 1 – No Action

Alternative 1 maintains the status quo. The abundance of dead trees available as potential black back-woodpecker habitat is affected by current road patterns only to the extent that firewood cutters can remove snags from the open road corridors—and thus diminish habitat components in those areas. The degree to which black-backed woodpeckers are actually present depends upon the character of the environment created by the ongoing bark-beetle infestation of pine forests. This environment is currently a work in progress, and the effect of leaving the existing road system in place is speculative with regard to a species that appears to develop robust populations only in areas hit by stand-replacing fire.

Direct and Indirect Effects, Alternatives 2 and 3

Alternative 2 would reduce open roads by 98 miles and alternative 3 would reduce open roads by 146 miles. This is the extent of the road corridor that would no longer be available to firewood cutting and to removal of roadside hazard trees. The degree to which this would affect black-backed woodpeckers, which at this point have not put in an appearance in the beetle-killed forest, is highly speculative. It is likely that the removal of 98 miles and 139 miles of road corridor from the firewood cutting base would in a measurable way improve prospects for black-backed woodpeckers. Given the acreage of beetle-killed pine outside the road corridors, the impact on black-backed woodpecker occupancy by woodcutters would be insubstantial, since woodpeckers need extensive concentrations of dead trees to inhabit an area and have a strong preference for burned forest rather than beetle-killed trees.

The primary impact of open roads is that dead trees are lost to firewood cutting or to Forest operations that remove hazard trees along the roads. Since most of this activity occurs soon after the death of the trees, when bark insects are present in large enough numbers to attract woodpeckers, it amounts to a reduction of local habitat—at least for some species. In the case of black-backed woodpeckers, such snag removal could have an effect on potential habitat opportunity in stands where most trees have been killed (and less so in stands with variable mixtures of dead and dying trees). In the end, however, black-backed woodpeckers seem interested almost entirely in stands killed by fire and not those succumbing to bark beetles.

Cumulative Effects Common to the Black-backed Woodpecker, for All Alternatives

Fire management policy aimed at preventing stand replacing fires over several decades has, in the Blackfoot landscape, resulted in a paucity of black-backed woodpecker habitat. No other Forest Service policies or actions have had meaningful implications for these woodpeckers. Timber harvest on private lands has reduced the potential for a scenario where stand replacing fire would create abundant black-backed woodpecker habitat in those areas.

Reasonably foreseeable activities on HNF land that could affect black-backed woodpecker habitat revolve around projected salvage projects designed to deal with the ongoing bark beetle epidemic which would remove substantial numbers of dead trees. Future activity on non-Forest land that could affect black-backed woodpeckers is tied to salvage of dead trees and thinning projects designed to reduce the probability of stand replacing fire.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or would have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some

vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

Summary and Determination of Effects

Alternative 1

Because this alternative would not change the existing vegetative condition on the project area or change existing road densities it would have no impact on black-backed woodpecker.

Alternatives 2 and 3

It is the determination of this analysis that the proposed activities under alternative 2 and alternative 3 may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or loss of viability to the population or species. This determination is based on the following rationale: removal of dead trees from the road corridor by firewood cutters is unlikely to have any measurable impact on black-backed woodpecker occupancy of the landscape in either alternative.

Western Toad

General Effects of Roads to the Western Toad

Toads are small, relatively slow-moving animals that are often enough on the move (between breeding, foraging, and hibernating areas) that they are more at risk from roads and motor trails as barriers and agents of fragmentation than virtually any other species of interest on the HNF (Maxell and Hokit 1999). Forest roads that seldom deter mammalian and bird species from moving about can be lethal barriers to toads. The roadways are exposed environments that are difficult to cross. While the loss is not significant in terms of total population numbers, it is high compared to other species, particularly where traffic volume is steady (Fahrig et al. 1995), and it amounts to another cumulative impact on a population under stress.

Primary local risk factors for western toads are those that affect breeding habitat through reductions in size and quality of riparian areas. Activities that result in the elimination of key vegetation and increase water turbidity in turn reduce the quality of riparian areas as breeding habitat. Road construction, and the presence of dirt/gravel roads in riparian areas, would increase sedimentation in adjacent aquatic habitats if not contained. Off-route motorized use in riparian areas can also reduce habitat availability by degrading vegetation and increasing sedimentation (Maxell and Hokit 1999).

While toad populations are highest near riparian areas, adult toads travel some distance away from breeding sites, moving through a variety of upland habitats. Because they are small, move slowly and deliberately, and are highly dependent on cover, toads find Forest roads to be more of a barrier than almost any other local wildlife species. In addition to being a deterrent to efficient movement through the landscape, well-traveled roads are often a source of mortality for toads and for amphibians and reptiles in general.

Western toads often seek shelter in logs and under other coarse woody debris, and removal of these components from the road corridor—typically by firewood gatherers or by Forest Service burning operations designed to reduce fuel loading—can reduce local habitat opportunity (see additional discussion in the section Snag and Downed Logs).

Direct and Indirect Effects, Alternative 1 – No Action

Alternative 1 retains the current configuration of roads and motor trails. This leaves 446 miles of open roads and trails in the Travel Plan Area, 115 miles of which are in riparian habitat conservation areas (RHCAs). Off-route riding would continue to be restricted by the State-wide OHV Decision (USDA, USDI 2001), which limits off-road vehicle use to a 300-foot corridor on either side of the road for reaching dispersed camping sites and prohibits riding in sensitive habitats (particularly wet sites). A Forest road system of this magnitude, while a contributing factor to depressing local western toad populations, represents a relatively minor impact compared to other decimating factors and sources of habitat degradation (chytrid fungus, draining and diversion of ponds and streams, water pollution, predatory fish introduction, cattle at aquatic sites).

Direct and Indirect Effects, Alternatives 2 and 3

Alternative 2 would reduce open route mileage, 98 miles overall and 15 miles in riparian habitat conservation areas. Alternative 3 would reduce open route mileage, 139 miles overall and would decrease by 39 miles in riparian habitat conservation areas. Alternative 2 would incrementally reduce mortality risk for western toads, reduce the area from which coarse woody debris is likely to be removed by firewood gatherers, and reduce the miles of roadside riparian habitats likely to be disrupted by motorized use. Alternative 3 would further reduce mortality risk for western toads in the upland areas by reducing the area from which coarse woody debris is likely to be removed by firewood gatherers. The result would not be measurable in terms of shifts in local western toad population viability.

Cumulative Effects Common to the Western Toad, for All Alternatives

Recent and ongoing activities on the Forest that have negative implications for western toads include: Timber sales that have created large openings with minimal coarse woody debris; retention of grazing allotments on National Forest System land, most of which allow cattle some degree of access to riparian and aquatic habitats; small mining operations across the landscape; large mining operations on and adjacent to the Forest.

Actions that have improved prospects for western toads include: Revision of allotment management plans that have resulted in lower cattle numbers and range improvements aimed at protecting riparian sites; trail relocation projects that have removed trails from productive riparian areas to upslope locations; establishment of the Statewide OHV Plan, which prohibits riding off established motor routes except for dispersed camping access; road and motor trail closures associated with timber harvest projects; mine site reclamation projects that have reduced sedimentation and pollution at a number of aquatic sites.

Development of private lands adjacent to the Forest and on inholdings within Forest boundaries has modified riparian and aquatic habitats (by water diversion, sedimentation, degradation of vegetation) and subtracted potential breeding habitat for western toads. Timber harvest on private land has removed forest cover useful to toads, but has often increased the amount of coarse woody debris at ground level—a benefit to toads. Cattle grazing on private ranchlands have led to degradation of riparian/aquatic habitat at many of sites. ATV, trail bike, and 4wd riding in riparian areas disrupts habitat where toad densities are likely to be highest.

Reasonably foreseeable activities on the HNF that may affect toads to one degree or another include: road improvement, closures or decommissions; implementation of grazing allotment revision; and salvage projects designed to deal with the ongoing bark beetle epidemic that may remove or thin out understory vegetation and woody debris in some areas. Future activity on

lands of other ownerships within the cumulative effects area that may affect western toads includes: settlement and associated development of private lands (including road building); timber harvest and removal of beetle-killed trees; continued ATV and other motorized activity; continued heavy grazing on private ranchlands, including riparian sites.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or would have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

Summary and Determination of Effects

All Alternatives

It is the determination of this analysis that the proposed activities under alternative 2 and alternative 3 may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or loss of viability to the population or species. This determination is based on the following rationale: given the relatively minor contribution of Forest roads to mortality factors impacting western toads, it would be highly unlikely to show measurable differences in local toad populations.

Management Indicator Species

Elk

Direct and Indirect Effects, All Alternatives

The following measures are evaluated to analyze effects to elk:

- Summer range Forest Plan Standard 3 for hiding cover (p. II/17) and habitat effectiveness by Elk Herd Unit (EHU)
- Hiding cover/open road densities Forest Plan Standard 4(a) by EHU (p. II/17)
- Hunting season elk security by Elk EHU
- Winter Range Forest Plan Standard 3 for thermal cover by EHU (p. II/17) and Forest Plan Standard 4(c) (p.II/18)

Disturbance processes including climate change, insect and disease and fire will continue to influence elk use of the project area. Predation by wolves, grizzlies, black bears, and lions along with hunter harvest will continue to influence elk and other big game population levels.

Hiding Cover

The effects to hiding cover would be similar among the three alternatives. The existing condition does not meet FP Standard 3 for summer range hiding cover or for winter range thermal cover.

The Standard requires 50 percent hiding cover and 25 percent thermal be maintained per herd unit. Standard 4a is intended to address elk vulnerability during the hunting season. Since hiding cover is a component of this standard and only three of eight herd units meet the hiding cover requirement, the action alternatives would not meet Standard 4a either.

Winter Range

The effects to winter range and winter range thermal cover, would be similar among the three alternatives. Under the existing condition motorized use is only permitted on 'designated' open routes through winter range areas. The designated open status of these routes would not change under either action alternative. These designated open routes are consistent with FP direction (FP p. II/18) that directs that "all winter range areas will be closed to vehicles between December 1 and May 15. Exceptions (i.e., access through the winter range to facilitate land management or public use activities on other lands) may be granted." Since travel would be limited to existing designated routes under all alternatives, the availability of winter range and winter range thermal would remain unchanged.

In addition, the accessibility of these routes to wheeled use varies from year to year dependent upon snow conditions. The winter grooming season runs from 12/1 through 3/31, initiating once sufficient snowpack is present. Under the 2001 Tri-State Off-Highway Vehicle (OHV) Decision that amended nine Forest Plans including the HNF Plan, once a route is groomed, it is then closed to wheeled use until the grooming season ends.

Thermal Cover

No new road or trail construction would occur in winter range thermal cover under either action alternative and thermal cover availability would remain unchanged. Construction of mountain bike trails would not remove enough forest cover to effect thermal capability of the stand and no bike use would occur during the winter to preclude use by elk. Within winter range, alternative 2 would construct 0.8 miles of new trail and alternative 3 would construct 1.6 miles of new trail and 0.5 miles of new road.

Effects Common to Alternatives 2 and 3

Summer Range and Calving Areas

Forest Plan management direction for summer range (pgs. II/17, II/18) includes maintaining adequate summer range to support the habitat potential; maintaining 50 percent or greater summer range hiding cover (under the FWP definition of hiding cover) per elk herd unit and; excluding motorized use in calving grounds and nursery areas during peak use by elk.

Under both action alternatives known elk calving and nursery areas would be protected by road closures or seasonal motorized restrictions.

Alternatives 2 and 3 would retain the existing level of FP hiding cover although motorized use through hiding cover varies among alternative. As shown in table 57 below, only the Beaver Creek, Nevada Creek, and Poorman Creek EHUs meet the 50 percent requirement for summer range hiding cover (55%, 64%, and 63% respectively) under the existing condition. Five of the eight herd units currently do not meet the minimum 50 percent hiding cover requirement. Therefore, these five herd units would not meet FP standard 3 under any of the three alternatives. However, neither action alternative would reduce hiding cover as defined by the FP. New connector road construction would not occur in elk hiding cover. New connector trail

development both motorized and no-motorized would not remove sufficient canopy to alter stand structure.

While management options for motorized summer access would not increase the level of FP hiding cover, motorized access can influence the effectiveness of available summer hiding cover. Summer range habitat effectiveness is used to measure how much of a given area elk are likely to use during the non-hunting season. It is a function of suitable habitat components (cover, forage, wet sites, travel routes) and reduced human disturbance (generally measured in terms of open roads and motorized trails) (Christensen et al. 1993). As reflected in the habitat objectives and management strategies for the Granite Butte EMU (FWP 2004 p. 198) habitat effectiveness is an important consideration of access management. The Elk Plan does not however, identify thresholds or target levels for habitat effectiveness. For the Bob Marshall Wilderness Complex BMU habitat management strategies include maintaining elk habitat security and retention/recruitment of effective cover blocks (MTFWP 2004 p. 117).

Comparison of Elk Herd Units by Key Habitat

Table 57. Consistency with key habitat analysis parameters - existing condition

Elk Herd Unit	Percent Summer Hiding Cover (FP Standard 3) Required 50%	Percent Summer Habitat Effectiveness[1] Recommended >50%	Meets Hunting Season Elk Vulnerability (FP Standard 4a - open road density to hiding cover ratio)	Percent Hunting Season Security Habitat[1] (> .5 mile from open road, > 250 acres) Recommended > 30%
Arrastra Creek	42	**60**	No	**32**
Beaver Creek	**55**	**51**	No	26
Flesher Pass	44	**58**	No	29
Keep Cool	36	**52**	No	26
Landers Fork	44	**73**	No	**70**
Nevada Creek	**64**	**60**	**Yes**	**35**
Ogden Mountain	43	48	No	17
Poorman Creek	**63**	49	**Yes**	18

*Note: Bold indicates meeting FP standard or recommended level

[1] Summer habitat effectiveness and hunting season elk security are not FP standards but rather additional analysis tools.

Hunting Season Elk Vulnerability

Maintaining hiding cover in the project area can be important to maintain big game habitat capability and hunting opportunity and to provide for a first week bull elk harvest that does not exceed 40 percent of the total bull harvest (Forest Plan Standard 4(a) p. II/17).

Hiding cover is a component of Forest Plan Standard 4a that addresses elk vulnerability based upon the relationship between hiding cover and open road densities during the hunting season. Five of the eight herd units do not meet the 50 percent hiding cover requirement which is half of the equation for FP standard 4a. Since this project would not increase hiding cover, there is no feasible way to bring these five herd units into compliance with the FP standard. Even closing all roads in herd units that do not meet the minimum hiding cover requirement would not bring them into compliance. As a result, a FP amendment is necessary for project implementation.

The intent of Standard 4a is to provide for a first week bull harvest that does not exceed 40 percent of the total general season bull harvest. This element of the standard represents a FWP objective that is not practical to apply at the herd unit scale due to the manner in which harvest information is collected and reported by MT FWP. Hunter survey information is collected at the Hunting District or EMU level not the herd unit level. As shown in the 2004 MT Elk Management Plan – Granite Butte EMU the first week bull harvest from 1999-2001 was at 36 percent thereby meeting the objective of less than 40 percent of the bull harvest occurring during the first week of the general season (MT FWP 2004 p. 197). For the Bob Marshall Wilderness Complex BMU there is no information pertaining to the first week bull harvest and it is not identified as a management concern.

Hiding Cover/Open Road Densities

Access management options between alternatives can only serve to influence open road densities and or the effectiveness of summer habitat. Forest Plan standard 4a, which conceptually, is intended to address elk vulnerability during the hunting season, is a numerical relationship between road densities and hiding cover availability. Table 58 below reflects the changes between alternatives based on access management differences on how that would move either move the herd unit closer or further from meeting the FP Standard 4a. No level of road closure however, would bring the five herd units that do not meet the minimum hiding cover requirement into compliance with the Standard.

Table 58. Elk Vulnerability Alternative Comparison - Hiding Cover to Open Road Density[5]

Elk Herd Unit	FP Hiding Cover %	Miles Open Road during Hunting Season			Open Road Density During Hunting Season			Alts Meeting FP Standard #4a
		Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	
Arrastra Creek	42	42.2	45.2	42.5	1.0	1.0	1.0	None
Beaver Creek	55	72.3	72.0	64.6	1.4	1.4	1.3	None
Flesher Pass	44	139.6	130.9	108.8	1.0	0.9	0.8	None
Keep Cool	36	90.7	85.5	74.1	1.3	1.2	1.1	None
Landers Fork	44	95.1	85.4	83.6	0.4	0.4	0.4	None
Nevada Creek	64	57.0	49.9	42.1	0.9	0.8	0.7	1, 2, 3
Ogden Mountain	43	103.6	100.2	95.6	1.2	1.1	1.1	None
Poorman Creek	63	150.4	143.1	115.2	1.4	1.4	1.1	1, 2, 3
Total	**N/A**	**750.9**	**712.1**	**626.5**	**N/A**	**N/A**	**N/A**	**N/A**

As shown in table 58, only two herd units meet Forest Plan Standard 4a. Both the Poorman Creek and Nevada Creek EHUs meet the FP standard under the existing condition and continue to meet the standard in alternatives 2 and 3 due to the reduction in miles of open road in both alternatives. While there are differences in road densities among alternatives, the change in open miles of road provides a more meaningful unit of measure to evaluate differences. For example, under alternative 3 the Poorman creek EHU would have the greatest reduction in open roads, 35.2 miles or 23 percent, but only results in a 0.3 mile reduction in open road density due to the

[5] Our open road density calculations are more conservative than the Forest Plan intended since we are weighting local roads by a factor of one rather than by a factor of 0.25 which is the factor upon which the Plan was crafted.

large size of the herd unit. While that satisfies the Forest Plan standard it only reflects a small numeric change that is not representative of the benefits to the herd unit or differences among alternatives.

The Beaver Creek EHU does meet the 50 percent hiding cover requirement. To get the EHU in compliance with Standard 4a at the current 55 percent hiding cover, would require reducing open roads to approximately 36 miles based upon the Forest Plan Hiding Cover/Open Road Density chart (table 48). However, approximately 31 miles of roads counted as open during the hunting season in the Beaver creek herd unit are represented by Highway, County, State, and private roads. The end result of trying to comply with FP Standard 4a for the Beaver Creek herd unit is that approximately 1 mile of road under FS jurisdiction could remain open during the big game hunting season.

Hunting Season Habitat Security

Security habitat for elk is important during the hunting season relative to elk vulnerability, population structure, and hunter success. The Habitat Security analysis is used to provide a more meaningful approach to addressing elk security during the hunting season than FP Standard 4a. Under alternative 1, elk security would remain at its present level with only three of the eight herd units meeting the recommendation for security habitat. Hillis et al. (1991) recommend that at least 30 percent of a herd unit provide security.

Table 59. Elk security habitat by alternative

Herd Unit	Total Herd Unit Acres	Habitat Security (acres)			Habitat Security (percent)			Alts With 30% Security
		Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	
Arrastra Creek	27738	8796	8528	8525	31.7	30.7	30.7	1, 2, 3
Beaver Creek	32406	8493	9459	10154	26.2	29.2	31.3	3
Flesher Pass	91093	26486	28035	33427	29.1	30.8	36.7	2, 3
Keep Cool	44325	11828	14222	18186	26.7	32.1	41.0	2, 3
Landers Fork	136516	95930	95505	95561	70.3	70.0	70.0	1, 2, 3
Nevada Creek	38824	13569	13897	16811	35.0	35.8	43.3	1, 2, 3
Ogden Mountain	56310	9809	10770	11912	17.4	19.1	21.1	None
Poorman Creek	67425	12250	12586	18759	18.2	18.7	27.8	None
Total	**494637**	**186621**	**193001**	**213336**	**37.7**	**39.0**	**43.1**	**N/A**

Some stands that currently provide security may become more open due to mountain pine beetle mortality. However, most stands would continue to provide security since most dead ponderosa and lodgepole pine would fall within 10 years resulting in a jackstraw layer of down woody debris. This may actually improve security simply because these stands would be extremely cumbersome to walk through by hunters, although no research exists to model or test that hypothesis.

Habitat Effectiveness

As shown in table 60 below, alternative 1 would maintain the status quo with regard to summer range habitat effectiveness with 6 of 8 herd units meeting the 50 percent recommendation (Lyon

1983). Under alternatives 2, all the herd units meet the recommended 50 percent with five of the eight increasing slightly over the existing condition. Alternative 3 provides the greatest increase in habitat effectiveness with increases in six herd units over the existing condition and the highest average among the three alternatives.

Table 60. Habitat effectiveness by alternative - summer open road density (miles/square mile)

Herd Unit	Square miles in EHU	Miles open road in EHU			Miles open road per square mile			Percent Habitat Effectiveness		
		Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
Arrastra Creek	43	42	45	43	1.0	1.0	1.0	60	60	60
Beaver Creek	51	82	77	75	1.6	1.5	1.5	51	52	52
Flesher Pass	142	167	148	136	1.2	1.0	1.0	58	60	60
Keep Cool	69	103	96	86	1.5	1.4	1.2	52	54	58
Landers Fork	213	100	114	101	0.5	0.5	0.5	73	73	73
Nevada Creek	61	64	58	50	1.0	1.0	.8	60	60	62
Ogden Mountain	88	164	140	135	1.9	1.6	1.5	48	51	52
Poorman Creek	105	185	170	135	1.8	1.6	1.3	49	51	56
Total	**772**	**884**	**848**	**805**	**1.1**	**1.1**	**1.0**	**59**	**59**	**60**

Cumulative Effects Common to Elk, for All Alternatives

Cumulative effects are the incremental impacts that the direct and indirect effects associated with the action alternatives on elk habitat in the context of the myriad of other past, present, and future effects on elk habitat from unrelated activities. The cumulative effects analysis considers spatial and temporal boundaries, how past activities have contributed to the existing condition, and whether the ecosystem can accommodate additional effects.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or would have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and increase habitat security. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocating roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, and proposed Stonewall and Dalton vegetation management projects, Poorman, Hogan, Helmville Face, and Alice Creek burning project. Vegetation management projects are designed to improve or maintain elk habitat. Project specific analysis addresses direct, indirect and cumulative effects.

Cumulative effects on elk have been varied. Timber harvest, road building, encroachment on habitat by human development, recreation, and hunting are activities that impact elk populations. All of these activities may occur within or immediately adjacent to, the project area during some time of the year. On federal lands, these activities are regulated, the effects analyzed, documented, reviewed by the public and other federal agencies, and mitigated accordingly. On state and private lands, less stringent oversight is mandated and these actions can cumulatively impact lynx populations on federal lands. In general, state and private lands within the cumulative effects area occur at lower elevations and provide little suitable lynx habitat.

Past timber harvest activities that clear-cut forests temporarily remove forest cover but also regenerate the forest and provide the early successional forests needed by snowshoe hares. Timber harvest may also remove security habitat that requires long time periods to regenerate. In association with timber harvest, some level of road construction typically occurs that can facilitate access into big game habitats including winter range.

Winter snowmobiling occurs on existing roads and trails or in open areas with limited forest cover or associated structural complexity at the ground level. Densely stocked stands, dense regenerating young stands that provide good hiding cover, thermal cover, and security habitat are generally not suitable for snowmobiling.

Regulatory Framework and Forest Plan Consistency

Elk are a management indicator for commonly hunted species; as such they are intended to be a bellwether of the effects of management activities on representative wildlife habitats with the objective of ensuring that viable populations of existing native and desirable non-native animal species are maintained.

Federal laws and direction applicable to management indicator species include the National Forest Management Act (NFMA), the Forest Service Manual, and the Helena National Forest Plan. The NFMA requires the Forest Service to “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives” [16 USC 1604(g)(3)(B)]. All alternatives are consistent with this requirement. Elk habitat would continue to be abundant and well-distributed and species’ viability would be maintained across the Forest. For more information on Forest Plan consistency see appendix A.

Summary and Determination of Effects

This project would have no significant effect on elk, under any alternative. Both alternatives 2 and 3 would benefit elk by reducing open road densities and improving security habitat. Furthermore, elk are within MFWP objectives for most of the hunting districts associated with the Blackfoot travel planning area. Since implementation of Alternative 2 or 3 would result in increases in security habitat in all but one EHU, it’s fair to assume that this trend will continue and potentially improve.

Mule Deer

Direct and Indirect and Cumulative Effects, All Alternatives

Direct, indirect, and cumulative effects for mule are similar to those described for elk. See *Elk* section above.

Summary and Determination of Effects

This project would have no significant effect on mule deer or other hunted species under any alternative. Both alternatives 2 and 3 would benefit mule deer by reducing open road densities and improving security habitat.

Marten

General Effects of Roads to the Marten

Indirectly, roads negatively impact marten habitat by providing access routes for firewood cutters, who remove snags and logs. Snags and coarse woody debris (stumps, logs, and large woody fragments) provide critical habitat components for marten foraging, resting, and denning (Spencer 1987; Buskirk et al. 1989; Coffin 1994).

Roads also facilitate trapping. Trapping affects marten populations by altering the sex and age structure, disproportionately capturing juveniles and males, as well as lowering local population density (Hodgman et al. 1994). In some drainages marten can be completely eliminated (at least in the short term) by persistent trapping. Roads in forested areas increase trapping pressure on marten and result in higher capture rates in roaded versus unroaded areas. Thompson (1994) found that the increased impacts of trapping in logged sites as opposed to unlogged areas were a direct result of the higher road densities generated by logging operations (and the access provided primarily to trappers on over-snow vehicles).

Direct and Indirect Effects, Alternative 1 – No Action

Maintaining the status quo under alternative 1 would have no direct effect on marten habitat since there would be no mandate to construct new road. Likewise, there would be no increase in the potential for indirect effects resulting from removal of large snags. Snag removal in the road corridors by firewood cutters and under the proposed HNF hazard tree removal program would increase in the near future because of the proliferation of dead trees generated by ongoing bark beetle infestations. This increase, however, is not a function of this alternative.

Direct and Indirect Effects, Alternatives 2 and 3

Effects on marten stem from removal of snags and woody debris from the road corridor by firewood cutters and from routes available to trappers on over-snow vehicles. Given the acreage of snags being created by bark beetles across the landscape, losses in the road corridor would be relatively minor.

Marten do not like to cross broad open areas; however, they show little reluctance to cross Forest roads, groomed over-snow vehicle trails, or paved highways (Coffin et al. 2002). As with wolverines and fishers, marten are not averse to crossing roads and motor trails or using them as travel routes in winter as long as they are associated with a reasonable degree of mature forest cover. Overall, research has revealed no obvious relationship, positive or negative, between marten habitat use and open road density. High-traffic roads that run through mature forests with abundant deadfall may reduce the attractiveness of otherwise suitable sites for birthing and raising young but probably do not prohibit their use as hunting and resting areas.

As is the case with lynx, wolverines, and fishers, one of the primary threats that open roads pose to marten comes from their role as over-snow vehicle routes used by trappers in winter. Marten are the most common target of trappers (Buskirk and Ruggiero 1994). Trapping intensity waxes and wanes with the trajectory of fur prices, and trapping mortality is periodically a more important determinant of marten population density than is habitat availability. Trapping can be a significant source of mortality where over-snow vehicle routes pass through riparian bottoms, old-growth stands, and other complex forested habitats (Buskirk and Ruggiero 1994).

Snag removal by firewood cutters working the road corridors represents a loss of habitat components important to marten. The abundance of standing and downed dead trees is one of the key factors allowing marten to occupy a forest stand.

Modeled habitat identifies approximately 63,104 acres of virtually contiguous potential marten habitat across the Blackfoot landscape, enabling martens to roam between these linkage habitats across the landscape.

Table 61 shows new road or trail construction within marten habitat. Under alternative 2, 0.6 miles of new construction would occur, affecting 44 acres of habitat, compared to alternative 3 where 1.0 miles of new construction would occur, affecting 72 acres of habitat. Since such minimal new construction would occur under either alternative the effects would be insignificant.

Table 61. New road or trail construction mileage and designation per alternative within marten habitat in project area

Road or Trail Number	Road or Trail Mileage within Marten Habitat	Alternative 2 Road or Trail Designation	Alternative 3 Road or Trail Designation
1841-D1-New2	0.2	NA	Motorized
U-New-4090	0.2	NA	Motorized
U-New-4043	0.3	Motorized	Motorized
U-New-4	0.2	Motorized	Motorized
U-427	0.1	Motorized	Motorized
Total	**1.0**		

Table 62 shows the miles and affected acres of new road/trail construction and road decommissioning within marten habitat. Under both alternatives, decommissioning would occur over 43 miles, affecting 3,112 acres of marten habitat. This would benefit marten by decreasing access to woodcutters and decreasing disturbance.

Table 62. Miles and affected acres of new road/trail construction and road decommissioning within marten habitat

Activity	Alternative 2	Alternative 3
New road/trail construction (miles/acres)	.6/44	1/72
Decommissioning (miles/acres)	43/3,112	43/3,112

Cumulative Effects Common to the Marten, for All Alternatives

Past timber harvest throughout the Blackfoot landscape, has removed substantial acreages of mature and old-growth forest capable of providing primary marten habitat—particularly projects that have intruded into riparian forest. Primary actions that have locally reduced the effectiveness of potential marten habitat by providing access for trappers and firewood cutters include retention of groomed over-snow vehicle trails and roads passing through forested riparian habitat.

Actions that have improved prospects for marten include: trail relocation projects that have removed trails from productive riparian areas to upslope locations; establishment of the Statewide OHV Plan, which prohibits riding off established motor routes.

Recent and ongoing private land development (building construction, clearing, thinning, commercial timber harvest, dead tree salvage) would continue to impact potential marten habitat, particularly where it occurs in forested riparian areas. Actions that reduce key habitat components—large snags and logs, and overhead cover—could have an effect.

Reasonably foreseeable activities on HNF land that could affect marten to one degree or another include salvage projects designed to deal with the ongoing bark beetle epidemic which, if implemented, would remove substantial numbers of large dead trees that could be of use to marten. In addition, travel planning efforts underway on adjacent Forests, as well as the Lincoln Ranger District on the HNF, could be beneficial to marten if they provide local sanctuaries free from motorized access. Because marten are capable of traveling some distance, better habitat conditions on other Forests could improve marten populations and subsequent dispersal opportunities to the Helena National Forest. Conversely, travel management decisions elsewhere could reduce marten populations in those areas and reduce the potential for emigration/immigration. Future activity on non-Forest land within the cumulative effects area that could affect marten includes: Settlement and associated development of private lands and timber harvest and removal of large beetle-killed dead trees.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or would have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

Determination of Effects, for All Alternatives

This project would have no significant effect on mature habitat or population viability for this management indicator species under any alternative.

Northern Goshawk

General Effects of Roads to the Northern Goshawk

Construction of a new Forest road into nest stands and post-fledging areas can negatively impact resident goshawks by introducing regular human activity into sites causing the birds to defend these areas. As well, it can eliminate key habitat components (nest trees, perch sites, snags and logs used by prey species). Regular human activity in the vicinity of a nest may cause goshawks to abandon the site (Reynolds et al. 1992). But most often, while not abandoning the nest, goshawks will exert much more energy defending it and fledglings, than they would under normal circumstances. This diversion of time and energy can negatively impact their ability to successfully raise and fledge young (Morrison et al. 2011). The presence of a road may also eliminate the stand as suitable nesting habitat in the future. Since high-quality nesting habitat is often a primary limiting factor for goshawks, new road systems that push into these areas can

erode the overall habitat quality of a goshawk home range. Reopening closed roads or trails to motorized use can have a similar impact.

A recent analysis in the Lake Tahoe Basin of California suggests that goshawks avoid placing nests near roads, based on the intensity of traffic that they experience in a previous year (Morrison et al. 2011). Fieldwork on the HNF, however, has shown that goshawks will establish nests relatively close (within a few hundred feet) to existing roads (Sweeney Creek, Jimtown, Kelly Gulch, Cottonwood Gulch, Spring Gulch, South Fork Quartz Creek, Elliston Creek, Minnehaha Creek) as long as most human activity predictably remains in the road or trail corridor.

Direct effects on goshawk habitat include removal of mature forest cover useful as goshawk nesting habitat during road construction. While habitat loss is inevitably a threat to goshawks, significant impacts derive from large-scale phenomena such as logging and fire, not road construction. Human activity associated with road construction has the potential to displace goshawks from active nests that they had considered adequately buffered from human intrusion.

Other indirect effects associated with roads are removal of large snags in the road corridor by firewood cutters and, as is now occurring, by the HNF roadside hazard tree crews. Dead trees provide habitat for cavity nesters, a number of which serve as prey for goshawks. Reynolds et al. (1992) considered snags to be a primary component of goshawk nesting and foraging habitat and included them in guidelines for optimal goshawk home ranges.

Direct and Indirect Effects, Alternative 1 – No Action

Alternative 1 would retain the existing condition. There would be no direct effects on goshawks since there would be no new road construction tied to implementation of the alternative. As a result, there would be no increased potential for indirect effects resulting from removal of large snags. Snag loss to firewood cutting and the proposed HNF hazard tree program would increase in the near future because of the proliferation of dead trees generated by ongoing bark beetle infestations. This increase, however, would not result from implementation of alternative 1.

Direct and Indirect Effects, Alternatives 2 and 3

Table 63 shows the current nest locations and activity distance from them and what activity under each alternative would occur. While foraging goshawks spend most of their time in mature forest environments, they frequently cross open roads and may use a road corridor as a convenient flyway when the forest presses in closely on either side or traffic is infrequent.

Table 63. Distance of activity to established goshawk nest sites by alternative

Goshawk Nest	Distance from activity (miles)	Alternative 2	Alternative 3
Ward Creek	0.20	Closed to motorized use yearlong	Decom
SWNOGONest	0.45	Closed to motorized use yearlong	Decom
Stonewall East	1.80	New MT construction	New MT construction
Wasson Creek	0.12	Open hwy legal	Decom
Dalton 2009	1.10	Open hwy legal	Decom

Indirectly, roads negatively impact goshawk habitat through disturbance associated with the human activity that comes with them. Goshawks are sensitive to human presence near nest sites and can be very aggressive in defending both the nest and the larger area within which newly fledged young are operating (post-fledging family area—the PFA). Goshawks nesting in areas near established roads show a tolerance of existing conditions (table 63). Closing the roads to motorized use and decommissioning under both alternatives would only result in beneficial effects to goshawk and habitat.

Table 64 shows the miles and affected acres of new road/trail construction and road decommissioning within goshawk nesting and foraging habitat: Approximately 1.4 miles of road under alternative 2, affecting 100 acres and approximately 2.7 miles of road under alternative 3, affecting 197 acres. Table 63 shows the distance to the Stonewall East nest site from new construction is almost 2 miles, there would be minimal disturbance. Table 64 also shows that under alternative 2, 6.5 miles of road w would be decommissioned, affecting 470 acres, compared to alternative 3, where 125 miles of road would be decommissioned, affecting 9,110 acres. This would benefit goshawk by decreasing disturbance, and reducing the roadside area susceptible to snag depletion by firewood cutters.

Table 64. Miles and affected acres of new road/trail construction and road decommissioning within goshawk habitat

Activity	Alternative 2	Alternative 3
New road/trail construction (miles/acres)	1.4/100	2.7/197
Decom (miles/acres)	6.5/470	125/9,110

Cumulative Effects Common to the Northern Goshawk, for All Alternatives

Past timber harvest in the Blackfoot landscape, has removed thousands of acres of mature and old-growth forest over the last 30 years, much of which provided nesting and foraging habitat for goshawks. For the short- and mid-term, these projects have depleted suitable goshawk habitat.

A few recent timber harvest and thinning projects have emphasized retaining large trees in open-grown stands and allowing them to continue to grow in forest configurations less likely to succumb to stand-replacing fire. The ongoing HNF firewood policy that allows members of the public to take up to 10 cords of dead wood within reach of Forest roads continues to result in the removal of most large snags and intact logs from the road corridors.

Recent and ongoing private land development (building construction, clearing, thinning, timber harvest, dead tree salvage) has variable effects. Traditional clearcut logging and overstory removal eliminate potential goshawk habitat; thinning projects—many of them aimed at reducing fuel loading for fire protection—may retain foraging habitat over the long term.

Reasonably foreseeable activities on HNF land that could affect goshawks to one degree or another include salvage projects designed to deal with the ongoing bark beetle epidemic, which would remove substantial numbers of large dead trees that could continue as components of goshawk foraging habitat. The effect, as related to the salvage cutting, would be of short duration, since the dead trees would fall of their own accord within a few years, reducing the suitability of the habitat for goshawks. Any of these projects that are able to retain mature trees in open-grown formations are likely to retain long-term foraging habitat.

Future activity on non-Forest land within the cumulative effects area that could affect goshawks includes continuing timber harvest on private, State, and BLM lands—dominated by thinning for fire protection and salvage of beetle-killed dead trees.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or would have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

Summary and Determination of Effects, for All Alternatives

This project would have no significant effect upon old growth habitat, potential nesting, foraging habitat or population viability for the northern goshawk under any alternative. Effects under all alternatives would be indirect and rather insubstantial—arising from loss of snags and woody debris in the road corridor to firewood gatherers. This would represent a loss of habitat structure for potential prey species. Differences between alternatives are insufficient to be reflected in different levels of local goshawk occupancy.

Pileated Woodpecker

General Effects of Roads to the Pileated Woodpecker

A potential direct effect of road construction is habitat fragmentation. Rosenberg and Raphael (2000) found that pileated woodpeckers are associated with forest edges but are moderately intolerant of small forest islands. The association of pileated woodpeckers with edge, however, is based on studies of the juxtaposition of mature forest and clearcuts, not the narrow strip-edges created by Forest roads. These strips do not really create isolated “islands” of forest habitat, and as a result, the “fragmentation” effect of Forest roads should have little or no influence on pileated woodpecker habitat use patterns; nor are the road edges likely to be substantial enough to attract woodpeckers.

Research has not demonstrated that pileated woodpeckers avoid otherwise suitable nesting habitat because of the presence of Forest roads, but intuitively, it seems a real possibility—at least in areas immediately adjacent to regularly-used roads. In general, foraging woodpeckers do not appear averse to making use of habitat near open roads if large dead trees are present there [personal observation]. But none of this has been studied in enough detail to be quantified. Vehicle traffic, with its associated noise, vibration, and visual disruption, is the primary problem (Forman et al. 2003), and the degree to which pileated woodpeckers may avoid nesting near roadside habitat is undoubtedly a function of the volume and regularity of vehicle use.

Direct and Indirect Effects, Alternative 1 – No Action

Road proposals in this alternative would create no new opportunities for removal of large snags from the road corridor. Snag loss to firewood cutting and under the HNF hazard tree removal program would increase in the near future because of the proliferation of dead trees generated by

ongoing bark beetle infestations. No increase, however, would result from implementation of this alternative.

Direct and Indirect Effects, Alternatives 2 and 3

Modeled habitat identifies approximately 65,728 acres of potential pileated woodpecker habitat and is composed of an infinite number of small polygons creating a virtually continuous habitat across the Blackfoot landscape. Edge effects from open and closed roads would be identical to those under alternative 1, and they would be negligible.

Few snags in the corridor are large enough (in the 30-inch d.b.h. range) to provide nesting or roosting sites for pileated woodpeckers; and as a result, only a minimal amount of this component would the lost. Many smaller trees on which woodpeckers might feed, however, are likely to be removed.

Table 65 shows the miles and affected acres of new road/trail construction and road decommissioning within pileated woodpecker habitat. Approximately 0.6 miles of new road and trail construction, affecting 44 acres of pileated woodpecker habitat, would occur under alternative 2; approximately 1.1 miles of new road and trail would be constructed under alternative 3, affecting 77 acres within pileated woodpecker habitat. Table 65 also shows that under alternative 2, 2.6 miles of road would be decommissioned, affecting 188 acres, compared to alternative 3, where 50 miles of road would be decommissioned, affecting 3,603 acres. This would benefit pileated woodpecker by decreasing disturbance, and reducing the roadside area susceptible to snag depletion by firewood cutters.

Table 65. Miles and affected acres of new road/trail construction and road decommissioning within pileated woodpecker habitat

Activity	Alternative 2	Alternative 3
New road/trail construction (miles/acres)	.6/44	1.1/77
Decom (miles/acres)	2.6/188	50/3,603

Table 66 shows new road or trail construction within pileated woodpecker habitat. Under alternative 2, 0.6 miles of new construction would occur, compared to alternative 3 where 1.0 miles of new construction would occur. Since such minimal new construction would occur under either alternative the effects would be insignificant. Also, approximately 3 miles of road under alternative 2, and approximately 60 miles of road under alternative 3 within pileated woodpecker habitat would be decommissioned. This would benefit pileated woodpeckers by decreasing access to woodcutters.

Table 66. New road or trail construction mileage and designation per alternative within pileated woodpecker habitat in project area

Road or Trail Number	Road or Trail Mileage within Pileated Habitat	Alternative 2 Road or Trail Designation	Alternative 3 Road or Trail Designation
1841-D1-New2	0.2	NA	Motorized
U-New-4090	0.2	NA	Motorized
U-New-4043	0.3	Motorized	Motorized
U-New-4	0.2	Motorized	Motorized
U-427	0.1	Motorized	Motorized
Total	1.0		

Virtually all potential effects emerging from the proposed alternatives would be indirect—a result of human use of the road system: displacement of woodpeckers from roadside habitat, and loss of roadside snags to firewood cutting.

The primary indirect effect generated by all alternatives would result from the loss of large dead trees in the road corridor to firewood cutting or to Forest Service roadside hazard tree removal projects. Large diameter dead and dying trees are key habitat components for pileated woodpeckers in whatever forest configuration they occur. Mountain pine beetles are in the process of producing numerous large snags within reach of Forest roads throughout pine forests. The larger snags preferred by pileated woodpeckers for nesting and roosting (preferably > 30 inches d.b.h.) occur almost entirely in ponderosa pine stands; they are highly unlikely in lodgepole pine forests. Some may be found in whitebark pine forests, but few, if any of these stands provide pileated woodpecker habitat or are traversed by open Forest roads.

Cumulative Effects Common to the Pileated Woodpecker, for All Alternatives

Past timber harvest in the Blackfoot landscape, has removed a substantial acreage of mature and old-growth forest in which large-diameter conifers were prominent components. Overall, these projects have depleted suitable pileated woodpecker habitat.

A few recent timber harvest and thinning projects have emphasized retaining large trees in open-grown stands and allowing them to continue to grow in forest configurations less likely to succumb to stand-replacing fire. Over the long term, these projects benefit pileated woodpecker habitat. The ongoing HNF firewood policy that allows members of the public to take up to 10 cords of dead wood within reach of Forest roads continues to result in the removal of most large snags and intact logs from the road corridors.

Recent and ongoing private land development (building construction, clearing, thinning, commercial timber harvest, dead tree salvage) has variable effects. Traditional clearcut logging and overstory removal eliminate habitat for pileated woodpeckers; thinning projects—many of them aimed at reducing fuel loading for fire protection—are generally beneficial.

Reasonably foreseeable activities on HNF land that could affect pileated woodpeckers to one degree or another include salvage projects designed to deal with the ongoing bark beetle epidemic by removing substantial numbers of large dead trees that could be of use to pileated

woodpeckers. On the other hand, those projects that retain mature trees in open-grown formations are likely to benefit the birds over the long term.

Future activity on non-Forest land within the cumulative effects area that could affect pileated woodpeckers includes settlement and associated development of private lands—often clearing that involves removal of large trees—and clearcut/overstory removal timber harvest and removal of large beetle-killed dead trees.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or would have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

Summary and Determination of Effects, for All Alternatives

This project would have no significant effect upon old growth habitat, snag habitat or population viability for the pileated woodpecker under any alternative. Differences between alternatives, in terms of road corridor available to firewood cutting, would not be large enough to show up as differences in the ability of pileated woodpeckers to occupy the landscape. Potential nesting trees (ponderosa pine snags greater than 25 inches d.b.h.) that might be removed are rare in the road corridor, and given the proliferation of beetle-killed trees in pine forests across the landscape, nesting habitat would be less limiting than in the past regardless of the alternative selected here.

Hairy Woodpecker

General Effects of Roads to the Hairy Woodpecker

Hairy woodpeckers are directly impacted by the road/trail system when new road construction eliminates key habitat components—namely, dead, dying, and other insect-prone trees. Dead trees in the open road corridors would be lost to firewood cutting and to roadside hazard tree removal by Forest Service crews. Bark beetle infestations are in the process of producing an abundance of snags within reach of Forest roads throughout Blackfoot pine forests. For hairy woodpeckers, already relatively common in the landscape, this is an expansive habitat opportunity throughout all pine forests at all elevations, and these birds are likely to proliferate over the next 15-20 years.

The Region-1 model presents a narrow construct of hairy woodpecker habitat—focusing on mature forest stands (with overstory trees greater than10 inches d.b.h.) of sparse/intermediate density (less than 50 percent canopy closure) with numerous dead trees (at pre-beetle outbreak levels). Stands of this sort provide ideal nesting and foraging habitat for hairy woodpeckers. However, this model appreciably underestimates the reach of suitable hairy woodpecker habitat in the Blackfoot landscape. In fact, hairy woodpeckers appear in virtually all forested habitats on the HNF other than seedling/sapling stands devoid of residual snags. Although they are most common in environments with a plethora of dead and dying trees, they are often seen in stands that appear relatively healthy, as long as enough insect-supporting trees are present. They also forage in stands dominated by pole-sized trees, although they may be unable to nest there.

As with the other woodpeckers reviewed in this report, hairy woodpeckers appear to suffer no meaningful effects from the presence of open roads and motor trails in their home ranges. Human presence, motorized or otherwise, does little to alter the birds' normal habitat use patterns (Hamann et al. 1999).

Other indirect effects are more substantive: Virtually any accessible solid dead tree (pole-sized and up) in the road corridor (estimate. at 300 ft. on either side of the road) would be removed by firewood cutters or, less often, by HNF personnel as roadside hazard trees. This represents an inevitable loss of key habitat components within open road corridors for hairy woodpeckers and other dead tree dependent species for which they serve as an indicator. Because hairy woodpeckers are mobile and range widely, loss of key components within road corridors may amount to little. The relative significance of the loss depends on the availability of snags in areas outside the road corridor. In current circumstances, the proliferation of beetle-killed pine trees across the landscape renders snag loss in the road corridor inconsequential.

Direct and Indirect Effects, Alternative 1 – No Action

Road and trail proposals in this alternative (which maintain the status quo) would generate no new potential for removal of large snags. Snag removal by firewood cutters and under the proposed HNF hazard tree removal program would increase along existing open roads in the near future because of the proliferation of dead trees generated by the ongoing bark beetle infestation. This increase, however, would not result from implementation of this alternative.

Direct and Indirect Effects, Alternatives 2 and 3

Modeled habitat identifies approximately 65,797 acres of potential hairy woodpecker habitat and is composed of an infinite number of small polygons creating a virtually contiguous habitat across the Blackfoot landscape. Edge effects from open and closed roads would be identical to those under alternative 1, and they would be negligible.

Table 67 shows new road or trail construction within hairy woodpecker habitat. Under alternative 2, 0.6 miles of new construction would occur, compared to alternative 3 where 1.0 miles of new construction would occur. Since such minimal new construction would occur under either alternative the effects would be insignificant.

Table 67. New road or trail construction mileage and designation per alternative within hairy woodpecker habitat in project area

Road or Trail Number	Road or Trail Mileage within Hairy Woodpecker Habitat	Alternative 2 Road or Trail Designation	Alternative 3 Road or Trail Designation
1841-D1-New2	0.2	NA	Motorized
U-New-4090	0.2	NA	Motorized
U-New-4043	0.3	Motorized	Motorized
U-New-4	0.2	Motorized	Motorized
U-427	0.1	Motorized	Motorized
Total	**1.0**		

Table 68 shows the miles and affected acres of new road/trail construction and road decommissioning within hairy woodpecker habitat: Approximately 0.6 miles of road under alternative 2, affecting 44 acres and approximately 1.1 miles of road under alternative 3,

affecting 77 acres within hairy woodpecker habitat. Table 68 also shows that under alternative 2, 2.6 miles of road would be decommissioned, affecting 188 acres, compared to alternative 3, where 50 miles of road would be decommissioned, affecting 3,603 acres. This would benefit hairy woodpecker by decreasing disturbance, and reducing the roadside area susceptible to snag depletion by firewood cutters.

Table 68. Miles and affected acres of new road/trail construction and road decommissioning within hairy woodpecker habitat

Activity	Alternative 2	Alternative 3
New road/trail construction (miles/acres)	.6/44	1.0/77
Decom (miles/acres)	2.6/188	50/3,603

Cumulative Effects Common to the Hairy Woodpecker, for All Alternatives

Timber harvest over the past 30 years, primarily via clearcutting and other regeneration harvest methods, has removed substantial acreages of hairy woodpecker habitat. Residual snags in some of these areas have continued to support woodpeckers, but, overall, the habitat quality has declined. A few recent timber harvest and thinning projects have emphasized retaining large trees, as well as snags, in open-grown stands and allowing them to continue to grow in forest formations less likely to succumb to stand-replacing fire. Over the long term, these projects benefit hairy woodpeckers.

Recent and ongoing activities on the National Forest that have improved prospects for snags and consequent habitat opportunity for hairy woodpeckers are the road closures associated with a number of timber harvest projects which limit roadside firewood cutting. These projects have all adhered to Forest Plan standards for retaining snags and replacement snags. In some cases, decisions not to pursue potential salvage opportunities have resulted in retention of large blocks of snags.

The ongoing policy of allowing public firewood cutting on the National Forest is the primary factor driving the removal of most large snags from Forest road corridors. Ongoing efforts by the HNF to limit the potential safety hazard posed by large numbers of dead trees in areas frequented by the public have accelerated the process of snag loss in road corridors and other accessible sites. These actions have also reduced the number of snags available to firewood cutters. Hazard tree removal projects have recently been completed or are going forward at a number of campgrounds, administrative sites, as well as along open Forest roads.

Recent and ongoing private land development—particularly clearing, thinning, commercial timber harvest, and dead tree salvage has had variable effects. Traditional clearcut logging and overstory removal, eliminate most habitat components for hairy woodpeckers; thinning projects—many aimed at reducing fuel loading for fire protection—preserve some habitat, but generally lower suitability because of the elimination of dead and dying trees.

The most prominent foreseeable activities on HNF land that could affect hairy woodpeckers to one degree or another are salvage projects designed to deal with the ongoing bark beetle epidemic—removing substantial numbers of dead trees that could be of useful habitat components. On the other hand, those projects that retain mature trees in open-grown formations are likely to benefit the woodpeckers over the long term.

Future activity on non-Forest land within the cumulative effects area that could affect hairy woodpeckers includes settlement and associated development of private lands that involves timber harvest and removal of beetle-killed dead trees.

There are several past and ongoing activities occurring on the National Forest that affect general forested habitat. Some of these activities have or would have positive effects. For a complete list see appendix D. These include road decommissioning projects and some vegetation treatments that reduce fragmentation and edge effects. Overall reforestation projects are expected to be beneficial. Other activities may exacerbate fragmentation and edge effects as well as direct habitat loss. These include reopening previously closed roads, relocated roads, and some vegetation management. Vegetation management projects include HNF hazard tree removal, Poorman burn, and proposed Stonewall and Dalton vegetation management, Helmville Face, and Alice Creek burning project. Project specific analysis addresses direct, indirect and cumulative effects.

Summary and Determination of Effects, for All Alternatives

No significant effect upon snag habitat or population viability for the hairy woodpecker would occur under any of the alternatives. The only effects on hairy woodpeckers would be indirect—resulting from removal of dead trees from the road corridors by firewood cutters. Given the vast acreage of snags being created by bark beetles across the landscape, losses in the road corridor would be insignificant, and differences between alternatives, in terms of woodpecker numbers, would be undetectable.

Species of Concern

Mountain Goat

Direct and Indirect Effects, Alternatives 1Through 3

Potential project related effects are predominantly associated with disturbance and/or displacement of goats due to OHV use. The greatest concern for potential impacts to mountain goats includes the Stonewall and Red mountain areas and the connecting ridgeline. From late fall through early spring the population is largely confined to the Stonewall and Red Mountain areas due to snowpack. Although individuals from this population have been known to occur in the head of Arrastra creek and different parts of the wilderness during the summer months these areas are not addressed in detail in this analysis due to the lack of motorized access and the lack of consistent or concentrated use by goats. None of the alternatives would change motorized access in these secondary habitats so future use by goats would not be affected. The Stonewall and Red mountain areas receive the greatest concentrated use by the goat population due to the presence of steep cliff faces that provide both cover and forage. The connecting ridgeline between these primary use areas serves as a movement corridor between the Stonewall and Red Mountain subpopulations. While the connecting ridgeline supports suitable forage for mountain goats much of it lacks the steep rugged cliff faces goats prefer as security cover from predators and other disturbances, thereby limiting persistent use.

All three alternatives allow OHV access to the Stonewall mountain lookout via trail #417. Under alternative 1 and 2 there are no seasonal restrictions for trail #417 allowing motorized use as long as snow conditions allow; alternative 3 restricts OHV use from 9/1 to 6/30. From Stonewall peak, trail U-330-B1 which exists as a poorly defined single track trail extending north into Cotter basin, is closed under all alternatives. Some limited, infrequent single track use is

however known to occur on this trail. Alternative 1 and 2 would maintain this trail as closed while alternative 3 would decommission the trail having the greatest potential to preclude unauthorized use. The greatest potential of unauthorized use of this trail to impact goats is primarily associated with that portion of the trail descending off Stonewall Mountain where goats are known to occur. Some occasional goat use may occur along the lower reaches of the trail however there are no known observations of goats in the area.

OHV access to the Stonewall peak area is known to temporarily displace mountain goats as observed by the Stonewall summer fire lookout. Observed responses suggest the goats are able to hear approaching OHVs well in advance and casually recede over the steep cliff face before the OHVs reach the top. Based upon observed responses to approaching OHVs by the Stonewall lookout; reproductive success and growth of the overall population; forage abundance and availability during the summer months and; the fact that energy expenditure relative to thermal regulation is much less important than during the winter, summer OHV use of the Stonewall peak area does not appear to have a substantive negative affect upon individuals, the population or overall use of the area.

As proposed under alternative 3, restricting OHV use during the fall period would likely benefit goats in the Stonewall area during the time when accumulating and maintaining fat reserves prior to the harsh winter months is more critical. The lack of disturbance during the fall months would help reduce energy expended in response to disturbance and allow unimpeded utilization of available forage in the area.

Currently there is no established hunting season for the mountain goat population in the project area. There is a risk of illegal harvest however which was believed to be contributing factor to the loss of the original population of goats in the area. That risk is likely lowest during the summer months when OHV and other recreational use is highest increasing the potential for detection of illegal activities. The pelage of mountain goats is also at its least desirable trophy value during the summer months when the previous winters coat is shed for a shorter summer coat. In the Stonewall area where the risk of illegal harvest may be greatest due to OHV accessibility and habituation of the subpopulation to OHVs, the presence of summer lookout personnel would help minimize the risk for fear of detection. By the fall big game season however, the pelage of goats is in prime condition, OHV traffic to Stonewall lookout declines, the lookout tower is generally unoccupied, and carrying a weapon is commonplace. Therefore, it is reasonable to expect that restricting OHV use of trail #417 after 9/1 as proposed in alternative 3 would serve to substantially reduce the risk of illegal harvest. The existing condition and both alternatives 2 and 3 limit OHV access to the head Copper creek from 9/1 to 6/30 minimizing the risk of illegal harvest in that area.

Another access change proposed in both alternatives 2 and 3, involves trail #485 that extends from Stonewall creek across the head of the Copper creek drainage to its junction with route #771 at Copper Camp Mine. Under alternatives 2 and 3 this trail would become a non-motorized trail. Currently this trail is open to motorized use with no seasonal restrictions. Route 771-A3 above its junction with trail 485 at the Copper Camp mine would also become a non-motorized trail under both alternatives 2 and 3. Motorized use would still be allowed to the Copper Camp mine area from 7/1 through 8/31 but restricting motorized use beyond this point would preclude motorized access to the ridgeline. The ridgeline represents the wilderness boundary and provides a travel route for goats between the Stonewall and Red Mountain subpopulations.

Restricting motorized use of trail #485 across the head of Copper creek would benefit goats by minimizing displacement from key summer foraging habitat. The head of Copper creek is a

series of steep avalanche chutes that provide important summer forage for mountain goats as well as grizzly bears. Due to the lush vegetation in these chutes during the summer months these habitats are particularly important for nursing nannies. However, this area lacks the steep rugged cliffs that goats prefer to remain close to when foraging for quick escape from perceived threats. Therefore, motorized disturbance may serve to disrupt foraging activity in the area for longer time periods than in habitats where secure escape cover is nearby.

The effects of restricting motorized use on route #771-A3 would be similar to those discussed for trail #485 although the area supports lower foraging values for goats and is closer to escape cover. The section of ridgeline accessed by this route is narrow however which can serve to disrupt movements by goats as well as grizzly bears. There is currently no evidence to support that the current level of summer motorized access this route provides from 7/12 through 8/31 has been detrimental to either goats or grizzly bears. However, it is reasonable to expect that future OHV use will continue to increase and correspondingly, increase the potential to negatively impact use by goats. The head of the Copper creek drainage and the Red Mountain area are also recognized as important grizzly bear habitat and the potential for OHV use to impact grizzly bears is similar to that described for mountain goats.

Cumulative Effects Common to the Mountain Goat, for All Alternatives

The potential of this project to cumulatively impact mountain goats is minimal due to limited access into mountain goat habitat and minimal overlap between the range of the mountain population with other activities in time and space. Spatially, other than winter recreational use there are no other future activities planned in the preferred habitats of mountain goats within the project area. Similarly, there are no activities that overlap temporally with the summer recreation period in mountain goat habitats. Cumulatively, both the summer and the winter travel plans incorporate changes in access through route or area restrictions and through season of use restriction. The proposed changes under both travel management plans serve to benefit mountain goats not only by minimizing or preventing disturbance in key habitats during the spring and fall seasons but would also reduce potential disturbance and displacement effects during the summer and winter months. The existing condition under both the summer and winter travel management projects has the greatest potential to negatively affect the mountain goat population both spatially and temporally.

Summary and Determination of Effects, for All Alternatives

In summary, both alternative 2 and 3 would reduce the potential for summer motorized use to negatively impact mountain goats or their habitat. The no action alternative does the least to minimize potential impacts to mountain goats while alternative 3 does the most to minimize potential impacts. Alternatives 2 and 3 area similar with the exception of trail U-330-B1 (single track trail from Stonewall Mountain. to Cotter Basin) which is closed in alternative 2 versus decommissioned in alternative 3 and; trail #417 (accessing Stonewall Mountain.) which would be closed to OHV use seasonally (9/1-6/30) in alternative 3 versus no seasonal restriction in alternative 2. For both trail U-330-B1 and #417, alternative 2 is consistent with the no action alternative. Considering differences among the three alternatives for OHV access options that may affect mountain goats, U-330-B1 likely provides the least benefit because of the limited unauthorized OHV use that occurs and the lack of known goat use along the lower segment of the trail. Conversely, the seasonal closure of trail #417 under Alt 3is anticipated to have the greatest benefit to the mountain goat population as discussed previously.

Determination of Effects Summary

Table 69 provides a summary of the effects determinations of the proposed Blackfoot Travel Project upon relevant terrestrial species as addressed in the Wildlife Specialist Report/Biological Evaluation (2012). The BA will be completed analyzing the effects of the proposed action and will be provided to the USFWS. The Wildlife Specialist Report/Biological Evaluation also incorporated the effects analysis and determinations from the Biological Assessment (BA) for threatened, endangered, proposed species, and designated critical habitat.

Table 69. Species determination of effects

Species	Scientific Name	Status	Determination		
			Alt 1	Alt 2	Alt 3
Mammals					
Grizzly bear	*Ursus arctos horribilis*	Threatened	NLAA	NLAA	NLAA
Canada lynx	*Lynx canadensis*	Threatened	NLAA	NLAA	NLAA
Critical habitat for Canada lynx			NLAA	NLAA	NLAA
Gray wolf	*Canis lupus*	Sensitive	MIIH	MIIH	MIIH
Fisher	*Martes pennanti*	Sensitive	MIIH	MIIH	MIIH
Wolverine	*Gulo gulo*	Sensitive/ Candidate	MIIH	MIIH	MIIH
Marten	*Martes americana*	MIS	No effect upon mature conifer habitat or population viability.	No effect upon mature conifer habitat or population viability.	No effect upon mature conifer habitat or population viability.
Elk	*Cervus elaphus*	MIS	No effect upon habitat or population viability.	No effect upon habitat or population viability.	No effect upon habitat or population viability.
Mule deer	*Odocoileus hemionus*	MIS	No effect upon habitat or population viability.	No effect upon habitat or population viability.	No effect upon habitat or population viability.
Mountain goat	*Oreamnos americanus*	SOC	No significant effect upon population or habitat	No significant effect upon population or habitat	No significant effect upon population or habitat
Birds					
Flammulated owl	*Otus flammeolus*	Sensitive	NI	MIIH	MIIH
Black-backed woodpecker	*Plecotus arcticus*	Sensitive	NI	MIIH	MIIH
Northern goshawk	*Accipiter gentilis*	MIS	No significant effect upon old growth habitat, potential nesting, foraging habitat or population	No significant effect upon old growth habitat, potential nesting, foraging habitat or population	No significant effect upon old growth habitat, potential nesting, foraging habitat or population

Species	Scientific Name	Status	Determination		
			Alt 1	Alt 2	Alt 3
Mammals					
			viability.	viability.	viability.
Pileated woodpecker	*Dryocpus pileatus*	MIS	No significant effect upon old growth habitat, snag habitat or population viability.	No significant effect upon old growth habitat, snag habitat or population viability.	No significant effect upon old growth habitat, snag habitat or population viability.
Hairy woodpecker	*Picoides villosus*	MIS	No significant effect upon snag habitat or population viability.	No significant effect upon snag habitat or population viability.	No significant effect upon snag habitat or population viability.
Amphibians					
Western toad	*Bufo boreas*	Sensitive	MIIH	MIIH	MIIH

Migratory Birds

Direct and Indirect Effects, Alternative 1 – No Action

Alternative 1 would maintain habitat over the short-term.

Direct and Indirect Effects, Alternatives 2 and 3

Alternatives 2 and 3 would minimize disturbance by road closures and decommissions, outweighing the negative effects of new trail/road construction. As a result, habitat for migratory birds would be maintained or improved. Snag reduction is expected to occur along new open/constructed roads by firewood cutters.

Summary and Determination of Effects, for All Alternatives

Local populations of all migratory bird species that currently utilize the project area are expected to be maintained. All alternatives are in compliance with the Migratory Bird Treaty Act.

Invasive Plants

Affected Environment

Approximately 25,514 acres of mapped noxious weed infestations occur within the Blackfoot travel planning area. Approximately 12,435 acres of weed infestations (49 percent occur within 100 feet of open or closed roads and trails. Within the 100-foot buffer of open roads and trails, 4,755 acres of weed infestations occur along motorized routes and 47 acres occur along non-motorized routes.

Noxious weeds are invasive by definition and are able to spread when there are no natural enemies, pathogens, or ungulate grazing to keep them in check. The spread of weeds is promoted by wildfire and ground disturbance of any kind. More use by the public has occurred across the HNF in the past few years due in part to increased OHV use, recreation displacement from wildfire areas, and travel plan closure areas, which place more pressure on the remaining open areas (Olsen 2011).

Various methods of weed control are used on the HNF. Herbicide application is the most common form of control used in the project area. This analysis tiers to the *HNF Weed Treatment Project FEIS* and associated *Record of Decision* (USDA Forest Service 2006, 2007) which provide environmental requirements and guidelines regarding noxious weed treatment and herbicide effects. Most roadside areas on the Lincoln Ranger District receive herbicide treatment annually. Effectiveness monitoring is used to prioritize the roads and polygons that need re-treatment. Results of spray effectiveness monitoring are located in records kept by the Forest Weed Specialist. There is an ongoing effort to accurately map the extent of weeds as new infestations start every year, and old infestations expand or are reduced in response to treatment.

Roadsides are commonly infested with noxious weeds. Roads have high weed infestations for several reasons: vehicles carry weed seeds, which are dispersed along travelways; roads are disturbed by maintenance activities on a regular basis, which provides a ready seedbed for weed seeds, both the seeds dispersed by vehicles and those that are carried on the wind or by animals and birds; human use is concentrated along roadsides which increases the exposure of these areas to noxious weed seed dispersal and ground disturbance (Lonsdale 1999, Ouren 2007, Pauchard et al. 2003).

Although herbicide application has been the primary noxious weed treatment method, numerous biological control insectaries have been established across the Forest. The Forest generally treats approximately 3,900 acres of weeds annually (averaging 2007 through 2009 as typical years). Table 70 shows insect releases made Forestwide from 2005–2008.

Table 70. Biological controls release on the Helena National Forest

Weed Species Treated	Insect Agent Used
Canada thistle	*Urophora cardui* gall flies (400 adult stage insects) (4,000 pupae)
	Ceutorhynchus litura (now *C. hadroplantus*) basal root weevil (1,000 adults)
Musk thistle	*Trichosirocalus horridus* (1,000 adults)
Dalmatian toadflax	*Mecinus janthnus stem mining weevils* *(1,100 insects)*
Leafy spurge	*Aphthona mixed speciesflea beetles* *(16,000 insects)*
Spotted knapweed	*Cyphlocleonus achates* *root boring weevil* *(6,400 insects)*

Numerous partners and volunteers such as the Rocky Mountain Elk Foundation, Backcountry Horsemen, OHV groups, over-snow vehicle clubs and counties participate as partners with the Forest in weed treatment annually. The budget allocated for noxious weed treatment in 2012 is projected at $165,000 with a target to treat approximately 3000 acres. In addition, numerous grants and volunteer contributions are used to treat weeds.

Current Condition of the Project Area and Buffered Roads

The BNWTP project area includes approximately 238,000 acres. Within the BNWTP area approximately 25,514 acres are currently infested with noxious weeds. These areas are infested from light (less than 5 percent) to high coverage (50 percent canopy cover of weeds). The areas affected by this project are all along travelways and, as described above, these areas are susceptible to noxious weed infestation. Approximately half the weeds known in the project area occur along open or closed travelways.

Species in table 71 have been identified in the Blackfoot travel planning area. Table 71 also lists the status of each species as a noxious weed on the Montana State weed list or on county lists.

Table 71. Mapped noxious weed infestations within the project area

Primary Noxious Weed Species	Infested Acres	Status
Black henbane (*Hyoscymus niger*)	778	County lists
Butter and eggs (*Linaria vulgare*)	2,035	2B
Canada thistle (*Cirsium arvense*)	2,301	2B
Common mullein (*Verbascum Thapsus*)	1,842	County lists
Common tansy (*Tanacetum vulgare*)	0.3	2B
Dalmatian toadflax *(Linaria dalmatica)*	1,319	2B
Houndstongue/Gypsyflower (*Cynoglossum officinale*)	2,198	2B
Leafy spurge (*Euphorbia esula*)	121	2B
Musk thistle (*Carduus nutans*)	3,022	County lists
Oxeye daisy (*Leucanthemum vulgare*)	590	2B
St. Johnswort (*Hypericum perforatum*)	11	2B
Spotted knapweed (*Centaurea maculosa*)	11,295	2B
Total Acres	**25,512**	

The following table shows the acres infested with noxious weeds within the 100-foot buffer of all travel routes in the project area.

Table 72. Mapped noxious weed infestations within 100 feet of travelways

Noxious Weed Species	Infested Acres
Black henbane (*Hyoscymus niger*)	392
Butter and eggs (Linaria vulgare)	1,004
Canada thistle (*Cirsium arvense*)	1,221
Common mullein (*Verbascum Thapsus*)	1,266
Common tansy (*Tanacetum vulgare*)	0.09
Dalmatian toadflax *(Linaria dalmatica)*	314
Houndstongue/Gypsyflower (*Cynoglossum officinale*)	1,356
Leafy spurge (*Euphorbia esula*)	127
Musk thistle (*Carduus nutans*)	1,525
Oxeye daisy (*Leucanthemum vulgare*)	104
St. Johnswort (*Hypericum perforatum*)	11
Spotted knapweed (*Centaurea maculosa*)	5,120
Total Acres	12,435

Nine State of Montana noxious weed species occur in the project area: spotted knapweed, Canada thistle, leafy spurge, oxeye daisy, Dalmatian toadflax, butter and eggs, houndstongue, common tansy, and St. Johnswort. These species have a 2B priority, meaning that they are widespread and abundant in Montana; management criteria require that they are eradicated or contained where less abundant. Three species (black henbane, common mullein and musk thistle) are not on the Montana State Weed List, but are on the lists of several counties in the project area. Cheatgrass (*Bromus tectorum*), although not listed as a noxious weed in the state of Montana, is considered a "regulated plant" by the State; it is not mapped in the project area but does occur and is a species of concern on the Helena National Forest.

The invasive species report (Carsey 2012) in the project record provides more detailed descriptions of each of these species.

Environmental Consequences

Indicators used to disclose environmental effects of the alternatives are:

- Predicted acres of noxious weed infestation within a 100-foot buffer of motorized routes
- Qualitative comparison of risk of noxious weed infestation between alternatives

Methodology

The methodology used in this analysis includes the best available data from the Helena National Forest Weeds database, Geographic Information System datasets and personal ground reconnaissance of the project area. A literature review has been completed of available information on noxious weed species, habitat and the effects of disturbance on flora. Geographic Information Systems were used to combine various datasets and understand relationships and the effects of travel routes on weeds and other flora as well as influences from landform and landtypes.

A geodatabase (BlkftNonwinTMP.gdb) contains numerous geospatial layers that provide the data that was used in this analysis. This geodatabase is available in the project file. Those layers include the known locations of weed infestations, watershed and stream information; habitat types for risk assessment.

Assumptions

The following assumptions were used for this analysis:

- The analyses and decisions made in the FEIS and Record of Decision for the HNF Weed Treatment Project guide noxious weed management on the HNF.
- Any soil disturbing activity with mechanized equipment has the potential to increase noxious weed invasion or spread.
- The rate of spread of noxious weeds on the Lincoln Ranger District is mitigated by an aggressive weed treatment program. The District has begun efforts to measure weed infestations, treatments and changes in infestation levels on the District over time. The expected rate of weed spread is assumed to be less than 10 percent per year, but may be less than that estimate.
- Herbicide use in accordance with the requirements specified in the *HNF Weed Treatment Project FEIS* and *Record of Decision* (USDA Forest Service 2006, 2007) is appropriate for noxious weed management on infested lands.

- The Forest noxious weed treatment program would continue to treat approximately 30 percent of the weeds within the project area annually, regardless of whether the project occurs or not.
- Any roads proposed for storage would be at a 3S level (table 4).
- Any roads proposed for decommissioning would be at a 4 level (table 4).
- All mitigation measures/project design features would be implemented.
- All changes proposed for each alternative would be fully implemented.
- As discussed in chapter 2, motorized use within 300 feet of roads and parking along the side of the road would occur as long as:
    - No new permanent routes are created by this activity
    - No damage to existing vegetation, soil, or water resource occurs
    - Travel off-route does not cross streams
    - Travel off-route does not traverse riparian or wet areas
- The resulting motorized route system would be managed as described in the DEIS and motorized use would occur where it is proposed. The effects analysis describes the effects resulting from the change between where people are driving (alternative 1) and where people would drive (alternative 2 and alternative 3).
- Motorized use results in more ground disturbance and therefore, greater potential risk of new weed introductions and weed spread. See discussion in the Effects Common to All Alternative section.

The paragraphs below define mapped weed acres and weed treatment acres as used in this analysis.

Mapped Weed Acres: Mapped acres are reflected by polygons within which there is at least 1 percent noxious weed cover. There are weeds outside those polygons that are too scattered to map, or are infestations that have not been discovered yet. The mapped acres are taken from the Weeds layer in the HNF Geographical Information Systems (GIS) database.

Weed Treatment Acres: Weed treatment acres for the purposes of this analysis are assumed to be the total polygon acres described above. This is a worst-case scenario analysis to identify any thresholds that are being approached. Actual chemical application is reported to the state of Montana annually, as a requirement of a chemical applicator/operator license. Pesticide application is also recorded in the National Forest System FACTS database.

Spatial and Temporal Context for Effects Analysis

The Blackfoot Non-winter Travel Plan (BNWTP) project area was used as the indirect and cumulative effects analysis area for this project. A 100-foot wide buffer was applied to all routes within the project area and was used as the analysis area for direct effects.

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Cumulative effects result from the incremental impact of an action when added to the effects of past, present, and reasonably foreseeable future actions. Past activities are considered part of the existing condition and are discussed within the affected environment section above. This is because the existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed to those effects. A

list of project considered for cumulative effects is found in appendix D of the Draft Environmental Impact Statement (DEIS) and the alternative 1 section contains a list of activity types considered for cumulative effects.

Effects Common to All Alternatives

Noxious weed infestations adversely affect native fauna and flora and present a large-scale threat to native ecosystems (D'Antonio et al. 2004, Lodge and Shrader-Frechette 2003, Lonsdale 1999, Mack et al. 2001, Pauchard et al. 2003). Noxious weeds can create monocultures if uncontrolled with herbicides or effective biocontrol. At high infestation levels (canopy cover greater than or equal to 25%), noxious weeds cause a loss of native plant diversity, reduction of wildlife habitat and forage, increase in erosion, and depletion of soil moisture and nutrient levels. These effects are common to all alternatives and would vary depending on the level of infestation.

Spotted knapweed, cheatgrass, houndstongue, musk thistle, common mullein, St. Johnswort, black henbane, common tansy, oxeye daisy, and Canada thistle may spread rapidly with ground disturbance and will spread at a slower rate without disturbance (Young et al. 1987, Zouhar 2001a, 2001b, 2003b). Dalmatian toadflax, butter and eggs, and leafy spurge spread readily without ground disturbance and spread very rapidly with disturbance (Zouhar 2003b, 2003c, Gucker 2010). Dalmatian toadflax is of primary concern across the project area due to the amount of infestation and difficulty of control whether or not additional ground disturbance occurs. The leafy spurge is also a concern due to difficulty of control (USDA Forest Service 2006). Common tansy is a species of particular concern because it covers a very small portion of the project area and could likely be eradicated in the project area if treated as a priority.

New weed infestations would occur under all alternatives, particularly along roadsides and areas of disturbance (Lonsdale 1999, Trombulak and Frissell 2000). The *HNF Weed Treatment Project FEIS* and *Record of Decision* (USDA Forest Service 2006, 2007) provide guidance and environmental requirements for weed control activities that would be applied to this area under any alternative. The forest currently uses herbicides to treat approximately 30 percent of infestations annually. Roadsides would be treated on a scheduled basis, as they are a major vector for weed invasion. The Forest also has a bio-control program that has been successful in establishing insectaries. Bio-control would be used in areas where the biological agents had optimal conditions for survival and expansion. In riparian areas, biological control would be emphasized where conditions for insect establishment are met.

Effects to Native Plant Diversity and Ecosystem Processes

Native plant diversity could be adversely affected by infestations of nonnative plants, especially noxious weeds. Noxious weed competition to individual plants and plant communities can result in loss of species diversity and sensitive native plants (Mack 2000, Olson 1999).

Some studies have investigated effects on nutrient cycling on invaders that are nitrogen fixers for example, as available nitrogen in that case might be predictable (Vitousek and Walker 1989). Evans et al. (2001) found that cheatgrass invasion can significantly alter nutrient cycling through differences in litter quality and quantity. However, the consequences of altered nitrogen availability for community structure are poorly demonstrated and highly variable (Levine et al. 2003).

Studies of impacts to natural fire processes strongly support the expectation that invader impacts on disturbance regimes (ecosystem process) can strongly and possibly irreversibly affect community structure (Levine et al. 2003). Dramatic alterations of fire frequency in historic

shrublands that are now dominated by cheatgrass have been demonstrated (Ehrenfeld et al. 2001). Other cases of exotic grass and shrub impacts include increasing fuel resulting in greater flame lengths, higher temperatures and greater heat release. In each case the mechanism through which impact develops depends on whether the invader can outcompete the natives for resources. In most cases the specific ecophysiological reasons for greater biomass production have not been identified. The effects of cheatgrass strongly support the prediction that invaders affecting disturbance processes have the greatest potential to create large impacts on ecosystems (Vitousek 1990).

Allelopathy is a biological phenomenon by which one organism produces biochemicals that influence the growth, survival and reproduction of other plants. Ridenour and Calloway (2001) showed that spotted knapweed reduced the root growth of Idaho fescue by 50 percent, showing an adverse allelopathic effect. Additional studies on the effect of arbuscular mycorrhizae on interactions of spotted knapweed-Idaho fescue roots showed an enhancement of the competitive ability of spotted knapweed but direct effects of mycorrhizae were weak (Marler et al. 1999). Unanswered questions in the ecosystem-impacts literature include the degree to which the documented impacts result simply from the addition of new functional traits brought in by the invader, or alternatively the reduction or elimination of native species (e.g. Mack et al. 2001).

Herbicide Use

Current weed management activities would continue under all alternatives. Chemical weed treatments would be used in areas accessible to ground spraying equipment. Roadside infestations would be treated on a scheduled basis. Bio-control would be used in areas where the biological agents have optimal conditions for survival and expansion. In riparian areas, biological control would be emphasized where conditions for insect establishment are met.

The use of herbicides may have positive or negative impacts on native plant diversity. Rice et al. (1997) found in a detailed comparison of plant community composition over an eight year period that plots treated with Tordon®, Transline®, and Curtail® were more similar to the potential natural communities than the no-spray controls (Mueggler and Stewart 1980). Side effects of weed management can vary as a function of local site conditions and the herbicide formula used. Potential effects include reducing vigor or abundance of native or desirable species, inhibiting overall productivity or diversity, shifting community structure and function, and altering physical conditions (D'Antonio et al. 2004, Hulme 2006, Louda et al. 1997; Shea et al. 2005). Therefore, effective weed management requires weighing the success of control measures (e.g., impacts on target weeds and recovery of native species) against the side effects of management actions. This necessitates a thorough understanding of how management tools interact with non-target system components as well as the target weed (Ortega and Pearson, in review).

The *HNF Weed Treatment Project FEIS* and *Record of Decision* (USDA Forest Service 2006, 2007) provide guidance and environmental requirements for weed control and treatment activities, which would be applied to this area in any alternative. All personnel using herbicides are appropriately certified by the State of Montana and knowledgeable as to the environmental guidelines and requirements of the Noxious Weed EIS (USDA 2006).

The *HNF Weed Treatment Project FEIS* and *Record of Decision* (USDA Forest Service 2006, 2007) identified several 6th code HUCs in which herbicide application would be limited based on the amount of herbicide applied, the location of the application, the stream flow, and HUC area. The estimates of the amount to be applied if all acres were treated are shown by HUC in HNF Weed Treatment Project FEIS-A*ppendix B*. The rationale for that determination is from the

Coarse Filter calculation to estimate possible concentrations of herbicide in stream waters, shown in *HNF Weed Treatment Project FEIS-Appendix C*. No HUCs would exceed the limit identified through modeling.

Recreational Use

Comparing the effects of different types of use on ground disturbance and the potential for introduction and spread of noxious weeds is complex and must involve consideration of numerous factors. Where use is light or where management programs provide adequate protection, impacts may not be unacceptably severe. However, where use is heavy and protective actions are inadequate, impacts may be severe and widespread (Cole 1994). Location and design of roads and trails may add to or reduce the potential for impacts from recreational use. The types of recreational activities and modes of travel continue to diversify within protected areas resulting in a wider range of effects on ecological conditions. Impacts associated with motorized travel differ greatly from those associated with equestrian, foot traffic, and mountain bike use (Cole and Spildie1998, Torn and others 2009). Motorized uses are generally considered to have greater potential to adversely affect the landscape and contribute to the introduction and spread of noxious weed species than non-motorized uses, primarily due to (1) the ability of vehicles to travel great distances, allowing visitors to access more terrain in a shorter time, including remote locations, and (2) the higher ground pressures and greater torque applied to soil and vegetation surfaces (Olive and Marion 2009). Non-motorized uses, however, may also cause serious damage to soil and native vegetation, but effects generally tend to be more localized (Cole 1989, Potito and Beatty 2005, White et al. 2006). Among non-motorized uses, horse use has been shown to have significantly greater effects (for trampling and erosion indicators) than hiking, llama use, and mountain biking (Cole and Spildie 1998, Olive and Marion 2009). White and others (2006) found that certain impacts to mountain bike trails, especially width, are comparable or less than hiking or multiple-use trails, and significantly less than impacts to equestrian or off-highway vehicle trails.

For the purposes of analysis, we assume that motorized uses usually create more ground disturbance than non-motorized uses and therefore, motorized uses are more likely to promote weed establishment and spread.

Public access for recreation, firewood collection, and private property access would continue along roadsides. Also, forest users would be free to use all existing dispersed recreation sites and other open areas, except during spring break-up when the road surfaces are over saturated with moisture. The ground disturbance associated with these activities would likely increase weed infestations where bare soil is exposed. The area immediately adjacent to the roads would continue to be the most vulnerable to weed infestation due to several factors: weed seed from vehicles would be likely to detach along the roadsides; these areas are disturbed when roadsides are bladed with heavy machinery; weed seed can be on the machinery or in the soil that is spread along the maintained area. The exposure to road and trail routes is high due to constant delivery of weed seed from vehicles, humans and animals. The greater the frequency of use for trails and roads, the higher the exposure becomes to weed species.

Climate Change

The data on response of weeds and changes in weed ecology because of climate change are limited. Weeds are genetically diverse and if resources such as light, water, nutrients, or carbon dioxide change within the environment, it is more likely there may be an expansion of weeds. Drought can increase the susceptibility of ecosystems to invasion of nonnative species,

especially under elevated CO_2 conditions (Chambers et al. 2008, Davis et al. 1999, Davis et al. 2001). However, prolonged drought or drought that occurs at the margin of a species range can result in mortality of nonnative invaders such as *Bromus tectorum* (Loeser et al. 2007), at least temporarily. Drought also can alter fire regimes but effects differ among ecoregions (Westerling et al 2006, Ford et al. 2012, Littel et al. 2009):

- In most mountainous ecoregions, drought conditions in seasons prior to and including the fire season are associated with larger burn areas.
- In southwestern and arid ecoregions, precipitation in seasons prior to the fire season is more highly associated with burn area than warmer temperatures or drought the year of fire due to the importance of fine fuel production. However, prolonged drought can decrease production of fine fuels and may decrease the probability of fire.

Effects Common to All Action Alternatives (Alternatives 2 and 3)

While the spread of noxious weeds would continue under all alternatives, the rate of spread would potentially be faster in areas with motorized use. Weed management would continue as in the past with the addition of management in areas that have ground disturbance through this project. Areas of ground disturbance would be monitored for weed infestations and treated as appropriate, in accordance with the *HNF Weed Treatment Project FEIS* and *Record of Decision* (USDA Forest Service 2006, 2007) and Best Management Practices (BMPs) as specified in *FSM 2080* (USDA Forest Service 2001), and the Helena National Forest Plan (USDA Forest Service 1986). The effect of all treatment methods would be to control and contain existing and new infestations related to open roads and trails.

Alternatives 2 and 3 propose fewer miles of motorized use, more miles of non-motorized use, and more miles of road storage and decommissioning than alternative 1. While non-motorized use may have serious effects, generally effects are less intense and widespread than effects of motorized use. Due to the more limited number of miles of motorized use available under the action alternatives, those alternatives would be expected to have fewer adverse effects than the no action alternative (alternative 1).

Both alternatives 2 and 3 include new route construction which would create more disturbance than use of existing trails. Alternative 3 proposes new road construction (0.5 miles) and both alternatives 2 and 3 propose new motorized trail construction, 2 miles for alternative 2 and 3miles for alternative 3. Both alternatives propose approximately 30 miles of new non-motorized trail construction over the next 10 to 20 years. New construction would disturb native vegetation on the road or trail and adjacent to it; construction and use of new trails could increase erosion, sedimentation, and soil compaction which could impact native plants and plant communities and create ground disturbance that would be conducive to the establishment or spread of noxious weeds. Over half of the proposed non-motorized trails occur in areas that currently do not have any mapped weed infestations; however, they join other trails that do pass through infested areas. Over time, use of the new trails would likely spread weeds into the currently uninfested areas. Under both alternatives, some trails designated as mountain bike trails would also allow foot, horse travel, motorized use, and mixed use along existing roads or trails. Guidance from the *HNF Weed Treatment Project FEIS* and *Record of Decision* (USDA Forest Service 2006, 2007) and Best Management Practices (BMPs) as specified in *FSM 2080* (USDA Forest Service 2001), and the Helena National Forest Plan (USDA Forest Service 1986) would limit the effects and any weeds resulting from the construction would be treated as part of the Forest's regular weed treatment program.

Alternatives 2 and 3 propose roads for storage and decommissioning. Both storage and decommissioning would include re-contouring intersections (obliterating the road entrance) or adding rock or earth barriers as needed. Storage could include placement of waterbars or outsloping, removal of metal pipes or culverts, restoration of watercourses, light scarification, seeding and treating noxious weeds.

Decommissioning would include construction of waterbars, outsloping, or selectively re-contouring, removal of CMPs, restoration of watercourses, ripping 12-18 inches, seeding, fertilizing, treating noxious weeds, and scattering slash on slopes.

Both storage and decommissioning would involve localized ground disturbance, erosion and sedimentation in the short term. Over time, these former roads would be less likely to promote the spread of weeds.

Alternative 1 – No Action

Direct and Indirect Effects

Alternative 1 does not propose any changes to the existing condition. No new construction would take place and no additional closures or road decommissioning would take place. No additional ground disturbance would occur specifically as a result of implementing this alternative. Weeds would continue to spread at a rate less than 10 percent per year (HNF 2012).

Under this alternative there are approximately 4,755 acres of noxious weeds associated with motorized routes, and 47 acres of noxious weeds associated with non-motorized routes. A spreadsheet showing the weeds on a given route as well as a map can be found in the project file.

The following table shows a qualitative comparison of risk for weed infestation and expansion due to various factors.

Table 73. Qualitative comparison of risk by type of route

Type of Risk	Motorized Routes	Non–motorized Routes
Amount of area exposed	Approximately 6.25 times as many miles of motorized routes (446 miles) as non-motorized routes (71 miles)	
Frequent exposure to weed seed	Very high	Low
Likelihood of treatment	High	Low
Long term impact on native flora	High due to herbicide effects and introduced species	High due to infestation level without treatment
Risk of new infestations	High	Low to moderate

Cumulative Effects

The existing condition reflects the effect of past disturbances as well as the effect of noxious weed control efforts. Please refer to the Blackfoot Travel cumulative effects table in appendix D for a specific description of past, present and foreseeable activities.

Implementing alternative 1 in combination with the effects of past, present and reasonably foreseeable future actions (appendix D) would result in the continuation of effects currently taking place. Noxious weeds would continue to spread at current rates. All projects on National

Forest System lands are subject to direction to minimize the spread of noxious weeds, and weed infestations on the HNF are treated as part of an integrated weed program. Any disturbance, however, may create conditions conducive to the spread of weeds, so weeds may be expected to continue to expand under all alternatives.

Ongoing activities: Weed expansion would continue to occur with implementation of alternative 1 in association with ongoing activities at a rate lower than 10 percent per year. Annual weed treatments and project design features under the Helena National Forest and Lincoln Ranger District weed programs would mitigate effects of ground disturbing activities. Ground disturbance associated with the following projects would likely cause some noxious weed expansion in the cumulative effects area:

- Grazing Allotments – in areas where cattle congregate such as salt grounds. Disturbed soil in these areas would be susceptible to weed infestation. Grazing allotments are monitored annually and noxious weed infestations are treated as part of the forest-wide noxious weed treatment program.
- Roadside Hazard Tree Removal – this project includes approximately 491 miles of harvest along existing roads in the project area in the short-term. Noxious weed treatment (herbicide) is required on all harvest units before and after harvest.
- Private Land Tree Activities – Tree removal would be expected to continue as trees continue to die due to the mountain pine beetle. Ground disturbance associated with road construction and logging operations would likely cause noxious weed population expansion in the cumulative effects area. Private land operations are governed by Montana state law to control noxious weed populations.
- Mining operations – there are numerous small mining operations ongoing. All plans of operations require weed treatment of all ground disturbances.
- Recreational use of campgrounds, roads, trails and other areas of the Forest.
- Fuel reduction projects that involve tree removal and prescribed burning.
- Wildlife habitat improvement projects that may involve prescribed fire, tree thinning, and other ground disturbance.
- Forest Noxious Weed Treatment Program – the Herbicide treatment is primarily along roads and in patches that are accessible to mechanized equipment (spraying with ATVs) and/or by hand, biological (insects), goats/sheep, and aerial spraying. Areas for treatment are as identified in the EIS/ROD and continually being updated and treated as new infestations are located. The program would continue to treat approximately 30 percent of the weeds within the project area.

Summary of Effects

The acreage of noxious weed infestations within the 100-foot road and trail buffer is similar for all alternatives (less than 1 percent difference between alternatives). Estimated treatment costs would also be similar, with 1 percent or less difference between the alternatives.

Alternative 1 permits the most motorized use and has the largest amount of weed infestation near roads and trails. Alternative 1 would be expected to contribute most to the introduction and spread of noxious weeds in the project area.

Alternative 2 – Proposed Action

Project Design Features

Project design features specific to invasive plants are listed in chapter 2 starting on page 28. These design features apply to alternatives 2 and 3.

Direct and Indirect Effects

Implementing alternative 2 would reduce the mileage of open motorized routes (compared to alternative 1), increase road storage (compared to both other alternatives), and add 2 miles of new motorized and 30 miles of new non-motorized trail. Alternative 2 would have the same amount of mountain bike trails as alternative 3 and approximately the same amount available for horse use, but would have over four times as many miles of mountain bike trails available for motorized use. Under this alternative there are approximately 4,741 acres of noxious weed infestations associated with motorized routes and 61 acres of noxious weeds associated with non-motorized routes. A spreadsheet showing the weeds on a given route as well as a map can be found in the project file.

Alternative 2 proposes 2 miles of new motorized trail construction and 30 miles of non-motorized trail construction. While only one of the proposed new motorized segments and fewer than half of the proposed non-motorized segments intersect weed occurrences, almost all the proposed segments join roads or trails that intersect occurrences of weeds. Weeds from the roads and trails that join the proposed new segments are likely to be carried to the new segments and with the ground disturbance from building the new trail, would likely find suitable conditions for establishment. Therefore, the new construction is likely to result in a localized expansion of weeds into areas currently uninfested. New infestations would likely remain along the roadside unless there is disturbance away from the new trail segment (e.g., dispersed camping).

Alternative 2 proposes the largest amount of road storage (133 miles). Restoration of roads would involve construction that would initially increase the level of disturbance. However, the site restoration, noxious weed treatment, and removal of these roads from use would be likely to reduce the risk of weed establishment or spread in these sites.

The following table shows a qualitative risk rating of various factors for motorized and non-motorized routes.

Table 74. Qualitative comparison of risk by type of route

Type of Risk	Motorized Routes	Non–motorized Routes
Amount of area exposed	Approximately 4 times more miles of motorized routes (348) than non-motorized routes (89)	
Frequent exposure to weed seed	Very high	Low
Likelihood of treatment	High	Low
Long-term impact on native flora	High due to herbicide effects and introduced species	High due to infestation level without treatment
Risk of new infestations	High	Low

Cumulative Effects

Cumulative effects under alternative 2 would be similar to those identified under alternative 1. There would be fewer infested acres along motorized routes and fewer motorized routes associated with alternative 2, so some effects would be expected to be less with this alternative as compared to alternative 1.

Implementing alternative 2 in combination with the effects of past, present and reasonably foreseeable future actions (appendix D) would continue to allow activities that promote the introduction and spread of noxious weeds and would result a contribution to cumulative effects on the Forest. However, implementing alternative 2 would result in a reduction of noxious weed infestation in some areas or a slower increase over time compared to the existing condition (alternative 1) because it would reduce the number of miles of open motorized routes through storage, decommissioning, or conversion to trails.

Summary of Effects

The acreage of noxious weed infestations within the 100-foot road and trail buffer is similar for all alternatives (less than 1 percent difference between alternatives). Estimated treatment costs would also be similar, with 1 percent or less difference between the alternatives.

With the lowest mileage proposed for motorized use and the lowest acreage of weed infestation near travelways, alternative 3 would be less likely than the other alternatives to promote the introduction, establishment and spread of noxious weeds. Effects of alternative 2 would be intermediate between alternatives 1 and 3.

Alternative 3

Direct and Indirect Effects

Alternative 3 would reduce the mileage of motorized routes (compared to other alternatives), increase the mileage of non-motorized routes (compared to other alternatives), decommission more miles of road than either of the other alternatives, designate mountain bike and horse routes similar to alternative 2 but with fewer miles of motorized routes. Implementing alternative 3 would result in the construction of one-half mile of new road and 3 miles of new motorized trail.

Under this alternative there are approximately 4,716 acres of noxious weed associated with motorized routes, 90 acres of noxious weeds associated with non-motorized routes. A spreadsheet showing the weeds on a given route as well as a map can be found in the project file.

Alternative 3 proposes one-half mile of new road construction, 3 miles of motorized trail construction, and 30 miles of non-motorized trail construction. Three of the proposed motorized segments intersect a weed occurrence (spotted knapweed and houndstongue), but all the proposed segments join roads or trails that intersect occurrences of weeds. Weeds from the roads and trails that join the proposed new segments are likely to be carried to the new segments and with the ground disturbance from building and using the new trails, would likely find suitable conditions for establishment. Therefore, the new construction is likely to result in a localized expansion of weeds into areas currently uninfested. New infestations would likely remain along the roadside unless there is disturbance away from the new trail segment (e.g., dispersed camping).

Alternative 3 proposes the largest amount of road decommissioning (197 miles). Restoration of roads would involve construction that would initially increase the level of disturbance. However,

the site restoration, noxious weed treatment, and removal of these roads from use would be likely to reduce the risk of weed establishment or spread in these sites over time.

The following table shows a qualitative risk rating of various factors for motorized and non-motorized routes.

Table 75. Qualitative Comparison of risk by type of route

Type of Risk	Motorized Routes	Non–motorized Routes
Amount of area exposed	Approximately 4-5 times more motorized routes than non-motorized routes	
Frequent exposure to weed seed	Very high	Low
Likelihood of treatment	High	Low
Long-term impact on native flora	High due to herbicide effects and introduced species	High due to infestation level
Risk of new infestations	High	Low

Cumulative Effects

Cumulative effects under alternative 3 would be similar to those identified under alternative 1. There would be fewer infested acres along motorized routes and fewer motorized routes associated with alternative 3, so some effects would be expected to be reduced with this alternative as compared to alternative 1

Implementing alternative 3 in combination with the effects of past, present and reasonably foreseeable future actions (appendix D) would continue to allow activities that promote the introduction and spread of noxious weeds and would result in a contribution to cumulative effects on the Forest. However, implementing alternative 3 would result in a reduction of noxious weed infestation in some areas or a slower increase over time compared to the existing condition (alternative 1) because it would reduce the number of miles of open motorized routes through storage, decommissioning, or conversion of motorized routes to trails.

Summary of Effects

The acreage of noxious weed infestations within the 100-foot road and trail buffer is similar for all alternatives (less than 1 percent difference). Estimated treatment costs would also be similar, with 1 percent or less difference between the alternatives.

With the lowest mileage proposed for motorized use and the lowest acreage of weed infestation near travelways, alternative 3 would be less likely than the other alternatives to promote the introduction, establishment and spread of noxious weeds.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The **Plant Protection Act** defines a noxious weed as “any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment” (7 *USC* 104 § 7702, 2000). Montana also has a Weed Control Act (7 *Montana Code* 22 §§ 2101 et seq., 2003), and while Montana laws do not apply to federal lands, section 2814 of the Federal Noxious Weed Act of 1974, as

amended (7 *USC* 61 § 2814, 1990)[6] requires that federal land management agencies "complete and implement cooperative agreements with state agencies regarding the management of undesirable plant species on federal lands under the agency's jurisdiction and establish integrated management systems to control or contain undesirable plant species targeted under cooperative agreements."

The **HNF Forest Plan (USDA 1986)** outlines noxious weed management objectives and control measures. Page II/22 states,

> "Implement an integrated weed control program in cooperation with state of Montana and County Weed Boards to confine present infestations, and prevent establishing new areas of noxious weeds. Noxious weeds are listed in the Montana Weed Law and designated by County Weed Boards.
>
> Integrated Pest Management, which uses chemical, biological, and mechanical methods, would be the principal control method. Spot herbicide treatment of identified weeds would be emphasized. Biological control methods would be considered as they become available.
>
> Funding for weed control on disturbed sites would be provided by the resource that causes the disturbance."

Threatened, Endangered and Sensitive (TES) Plants

Affected Environment

Sensitive species in the Northern Region of the Forest Service are those plant and animal species identified by the Regional Forester for which population viability is a concern. Viability concern is evidenced by (1) substantial current or predicted downward trends in population numbers or density and/or (2) substantial current or predicted downward trends in habitat capability that would reduce a species' existing distribution (Reel et al. 1989).

There are no known populations of federally listed threatened or endangered species in the Blackfoot travel planning area. The focus of this analysis is on Forest Service sensitive species.

The Helena National Forest has known or suspected occurrences of 21 species of sensitive plants. A complete list of these species and a description of associated habitat can be found in table 76 and (*Appendix A of the Botany Specialist Report in the project files*). The likelihood of occurrence of a given species within the project area and status is listed in table 76.

Species known to occur in the project area are considered with site-specific analysis in this section. Other species may have habitat in the project area. Since that habitat is not mapped, site-specific effects to potential habitat or undiscovered occurrences cannot be analyzed. Effects to species with potential habitat in the project area are considered in a general way. The species that are specifically addressed in this assessment are those identified as known or possible in the project area (indicated in bold in table 76). Other species listed in table 76 do not have habitat in the project area, would not be affected by the project and are not considered further in this analysis.

[6] The Plant Protection Act repealed all sections, except section 2814, of the Federal Noxious Weed Act of 1974.

Table 76. Region 1 sensitive plant species that occur or may occur on the Helena National Forest

Species (Family) Common Name	Known to occur on Helena National Forest	Known to occur in BNWTP Project Area	Likelihood of Occurrence in BNWTP Project Area
Amerorchis rotundifolia (Orchidaceae) Roundleaf orchid	No	No	Unlikely – Known from the Rocky Mtn. Front and the northwest corner of Montana in spruce forests along seeps and streams
Aquilegia brevistyla (Ranunculaceae) Smallflower columbine	No	No	Unlikely – In Montana, it is known only from the Little Belt Mountains in open woods and streambanks at mid-elevations in the montane zone.
Astragalus lackschewitzii (Fabaceae) Lackschewitz's milkvetch	No	No	Unlikely – Restricted to high elevation gravelly and rocky slopes and ridges, this species' habitat is not generally subject to human disturbance
Botrychium crenulatum (Ophioglossaceae) Scalloped moonwort	No	No	**Possible** – Known from the Beaverhead-Deerlodge National Forest and in western Montana, it generally occurs in wet habitats with high cover. The project would occur in mostly dry Douglas-fir habitat but includes a few moist areas.
Botrychium paradoxum (Ophioglossaceae) Peculiar moonwort	Yes	No	**Possible** – This diminutive species is known from the Occidental Plateau, and near Irish Mine Hill. On the Helena NF, populations are in sagebrush/rough fescue and rough fescue, however other populations have been documented from mesic meadows associated with spruce and lodgepole pine forests in montane and subalpine (MNHP 2007)
Cypripedium parviflorum (Orchidaceae) Lesser yellow lady's slipper	Yes	No	**Possible** – Known from Divide landscape in fens, damp mossy woods, seepage area, and moist forest-meadow ecotone, in valleys & lower montane.
Cypripedium passerinum (Orchidaceae) Sparrow egg lady's slipper	No	No	**Possible** – This species is found in mossy, moist, or seepy places in coniferous forest; in northwestern Montana including Glacier National Park.
Drosera anglica (Droseraceae) English sundew	Yes	No	**Known** – Known from Indian Meadows, this species occurs with sphagnum moss in wet, organic soils of fens. Habitat is specialized.
Drosera linearis (Droseraceae) Slenderleaf sundew	Yes	No	**Known** – Known from Indian Meadows, in wet, organic soil of nutrient-poor fens
Epipactis gigantea (Orchidaceae) Stream orchid	No	No	Unlikely – This species is associated with seeps and springs, often thermal.

Species (Family) Common Name	Known to occur on Helena National Forest	Known to occur in BNWTP Project Area	Likelihood of Occurrence in BNWTP Project Area
Goodyera repens (Orchidaceae) Lesser rattlesnake plantain	No	No	Unlikely – In Montana, it is known from the Little Belt and Big Snowy Mts. in moist, montane forests with mossy understory.
Grindelia howellii (Asteraceae) Howell's gumweed	No	No	**Possible** –This species is an endemic known only from a cluster of sites northeast of Missoula, and a single county in Idaho.
Juncus hallii (Juncaceae) Hall's rush	Yes	No	**Possible**—Several populations occur on the Forest in the Big Belts and the Divide area. Moist to wet meadows.
Oxytropis podocarpa (Fabaceae) Stalkpod locoweed	No	No	Unlikely – Habitat for this species is in the alpine zone.
Phlox kelseyi var. missoulensis (Phlox missoulensis) (Polemoniaceae) Missoula phlox	Yes	No	**Known**– It is known from east of the analysis area; habitat is rough fescue meadow, exposed, limestone-derived slopes in foothills and montane.
Pinus albicaulis Pinaceae Whitebark pine	Yes	Yes	**Known** – This species occurs in the project area, and habitat is minimally suitable and limited in extent.
Polygonum douglasii ssp. austinae (Polygonaceae) Austin knotweed	Yes	No	Unlikely – This taxon is known from the Big Belts in open gravelly shale-derived soil of eroding slopes/banks or usually moist, barren shale slopes.
Saxifraga tempestiva (Saxifragaceae) Storm saxifrage	No	No	Unlikely – This species is a Montana endemic known only from vernally moist open sites and rock ledges at high elevations, west of Continental Divide.
Schoenoplectus subterminalis (Cyperaceae) Swaying bulrush	Yes	No	**Known** – This species is known from Indian Meadows, and sites in the Northwest primarily west of Continental Divide in open water and boggy margins of ponds, lakes, and sloughs.
Thalictrum alpinum (Ranunculaceae) Alpine meadow-rue	No	No	Unlikely – In Montana, this species is known from sites in the southwest corner, in moist alkaline meadows.
Veratrum californicum (Liliaceae) California false hellebore	No	No	Unlikely – In Montana it is known from four sites in Bitterroot Valley

Sensitive Plant Occurrences

This analysis addresses the potential for sensitive plant populations to occur in the project area, within the rights of way of travelways or near motorized and non-motorized trails and the effects of the alternatives on those populations.

Species Known or Possibly Present

Five sensitive plant species are known to occur in the project area: English sundew, slenderleaf sundew, Missoula phlox, swaying bulrush, whitebark pine. Additionally the following six species may have habitat in the project area: scalloped moonwort, peculiar moonwort, lesser yellow lady's slipper, sparrow egg lady's slipper, Howell's gumweed and Hall's rush.

Species Known in the Project Area

English sundew is a circumboreal species with scattered distribution over a large area. It is ranked as G5 (globally secure) by NatureServe and as S3 (vulnerable) in Montana (NatureServe 2012). This species occurs in two sites in the Indian Meadows RNA in the project area. The occurrence is not in a road right of way or within 100 feet of a motorized or non-motorized or mountain bike trail.

Slenderleaf sundew is similar to English sundew and occurs in the same two sites in the project area. The species is known from only four populations in Montana. It is ranked by NatureServe as G4 (apparently secure globally) and as S2 (imperiled) in Montana (NatureServe 2012). The occurrence is not in a road right of way or within 100 feet of a motorized or non-motorized or mountain bike trail.

Missoula phlox occurs in four known sites within the project area, three occurrences in the northeast section of the project area and one at the southeastern edge of the Granite Butte proposed RNA. Occurrences range in size from 0.2 acres to 24.5 acres. One occurrence, in the Granite Butte proposed RNA, is adjacent to Road 1884 and motorized trail 440 (designated under alternatives 2 and 3 as a mountain bike trail). One occurrence is intersected by non-motorized trail 440 and another is intersected by non-motorized trails 440 and 493. The species is ranked G2G3 (globally critically imperiled to vulnerable) and S2S3 in Montana where it is endemic to portions of the state. Although not widespread, occurrences may be large. The species typically occurs in open areas. Two occurrences in the project area overlap occurrences of whitebark pine in open stands with low canopy cover. Potential threats to the species include competition from nonnative invasive plants, recreation use, and development. Risk of disturbance is rated low but the population trend is not known (NatureServe 2012). This species could occur in other areas in the project area, but has not been found in surveys. Negative survey information is available in the project file.

Whitebark pine is scattered throughout the project area. Approximately 23 stands are within 100 feet of motorized or non-motorized roads or trails or mountain bike trails. Whitebark pine occurs between 4,300-12,100 feet rangewide; in Montana it is typically found between 5,900 and 9,300 feet on cold, snowy and generally moist sites (Arno and Hoff 1989). It is often found on ridges and near the timberline where trees are exposed to strong desiccating winds. Whitebark pine has been proposed for federal listing under the Endangered Species Act. It is ranked by NatureServe as G3G4 (globally imperiled to apparently secure) and S2 (critically imperiled) in Montana. Threats to the species include white pine blister rust, mountain pine bark beetle, succession resulting from fire suppression, climate change resulting in decreases of suitable habitat and combinations of these threats (NatureServe 2012). White pine blister rust infestations have

resulted in over 50 percent mortality in some stands. A small percentage of trees appear to be resistant to the rust (Keane et al. 2012). This is a keystone species whose decline is expected to affect ecosystem functioning and biodiversity (NatureServe 2012). Whitebark pine is relatively rare on the Helena National Forest and most stands are dead or dying (Milburn 2012) from beetles, blister rust or competition from shade tolerant trees.

Swaying bulrush is known from the Indian Meadows RNA on the Helena National Forest. This species occurs in very wet sites on the edges of ponds, bogs and open water. It does not occur in a road right of way or within 100 feet of a motorized or non-motorized or mountain bike trail.

Species Possibly Occurring in the Project Area

Scalloped moonwort has not been found to date on the Helena Forest. This species has been found on the Beaverhead-Deerlodge Forest, immediately adjacent to the Helena National Forest in the Occidental Plateau area. The habitat for this species is moist to wet areas, similar habitat to that of Hall's rush. This species is searched for in all wetland and riparian surveys.

Peculiar moonwort is known from two occurrences on the Helena National Forest. The species has been found in sagebrush/rough fescue shrublands and rough fescue grasslands on the Helena.

Lesser yellow lady's slipper has not been found to date on the Forest. An unverified record of this species from the Mount Helena area has been determined to be unfounded. Habitat for this species includes fens, moist woods and seepage areas in the lower mountain areas. Limited habitat exists in the project area due to the low elevation that this species occupies, along with the moist habitat requirements.

Sparrow egg lady's slipper occupies peaty soils in ecotones between wet mossy coniferous forests and wetlands or streams and in mossy, moist, or seepy places in coniferous forests, often on calcareous substrates. Searches have been conducted for this species in the project area, but no occurrences have been found.

Howell's gumweed has not been found on the Helena Forest but is known from an area west of the Blackfoot landscape. It may have habitat in the project area in natural and human-created vernally moist, lightly disturbed soil such as roadsides.

Hall's rush has thirteen known occurrences on the Forest. The Montana Heritage database identifies eight populations on the Helena National Forest (three of the Heritage Program populations were again located by HNF personnel in 2009). Twelve populations were found by Helena National Forest personnel in 2009. This species typically occurs in moist grasslands and sedge meadows (NatureServe 2012, Poole and Heidel 1993). The Helena populations are on the edge of more moist riparian or wetland areas, similar to the habitat for scalloped moonwort. Many negative surveys were found during wetland identifications (Olsen 2011). The populations tend to be small and isolated; it is likely that many populations could exist, particularly in the area where other known populations are concentrated.

All species on the sensitive list are searched for in any sensitive plant surveys. Numerous past vegetation data collection efforts by Forest personnel and MTNHP staff have failed to discover sensitive plant populations in the project area (negative surveys in the GIS data).

Forest Plan and Other Relevant Laws, Regulations, Policies and Plans relevant to the TES Plant Resource

The *Endangered Species Act* (1973) as amended, the *National Forest Management Act* (1976) and the *National Environmental Policy Act* (1969) require protection and consideration of threatened, endangered, and other rare species.

Helena National Forest Plan direction for sensitive plants (page II-20) is as follows:

> 8. Species of Special Concern
>
> There are habitats on the Forest where the following species of special concern may be found (Plant Species of Special Concern, USDA Forest Service 1986)
>
> Lemhi penstemon (*Penstemon lemhiensis*)
> Howell's gumweed (*Grindelia howellii*)
> Missoula phlox (now called *Phlox kelseyi* var. *missoulensis* instead of *P. missoulensis*)
> Cliff toothwort (*Cardamine rupicola*)
>
> Missoula phlox and cliff toothwort have been located on the Helena Forest. Other plants that are termed rare have also been located on the Helena Forest. They are Klaus' bladderpod (*Lesquerella klausii*) and long-styled thistle (*Cirsium longistylum*). Two additional rare plants, moschatel (*Adoxa moschatellina*) and lesser rushy milkvetch (*Astragalus convallarius*) are believed to occur on the Helena Forest but currently have no occurrence records.
>
> If any of these species are verified on the Helena Forest, appropriate measures, pursuant to Section 7 of the Endanger(ed) Species Act, will be taken.

Subsequent to the completion of the forest plan, the regional forester designated sensitive plant species for the region per Forest Service Manual direction (USDA Forest Service 2005). This list was recently reviewed and updated. Table 76 lists the species that are known or suspected to occur on the Helena National Forest (also appendix A in the Plants Report available in the project record).

Environmental Consequences

Methodology

The methodology used in this analysis includes best available data from several geospatial layers using known sensitive plant populations to predict sensitive plant habitat.

Scalloped moonwort, Hall’s rush, English sundew, slenderleaf sundew, and swaying bulrush are associated with wetlands and moist areas. Potential wetlands were modeled using sensitive land types—areas identified as having wet or moist areas in them with slopes less than 10 percent. These areas were intersected with potential habitat and surveyed in 2009 across various project areas within the Blackfoot travel planning area. Numerous populations of Hall’s rush were found during field surveys in 2009 across the Helena Forest. Negative surveys for this species occurred in other riparian study plots across the Forest. English sundew, slenderleaf sundew, and swaying bulrush are known from the Indian Meadows RNA on the Lincoln Ranger District. The species were not found during riparian surveys using Pacific INFISH Biological Opinion (PIBO) protocols in sample sites across the Forest. Plot locations for negative survey locations for these species are maintained in the NRIS database.

Peculiar moonwort, Howell's gumweed and Missoula phlox are associated with non-forest habitats. The R1-VMAP product (USDA Forest Service 2009) was used to identify non-forested areas within major grazing allotments. Plot data were collected throughout allotments by field crews trained to identify sensitive plant species. FIA and FIA grid intensification data points have not discovered any populations of these species to date. Numerous negative survey data (other than FIA data) are maintained in the NRIS database. The Montana Natural Heritage Program database identifies seven areas of Missoula phlox on the Helena National Forest. Four occurrences are in the Blackfoot Travel Plan area.

Lesser yellow lady's slipper is found in fens, damp mossy woods, seepage areas, and moist forest-meadow ecotones in valleys and lower elevations in the mountains. This species had been identified in the MTNHP database as being present in the Mount Helena area, but has never been relocated. Habitat for this species is limited in the project area. Numerous negative survey data are maintained in the NRIS database. The species has not been located on the Forest to date.

Sparrow egg lady's slipper occurs in peaty soils, in ecotones between wet mossy coniferous forests and wetlands or streams and in mossy, moist, or seepy places in coniferous forests, often on calcareous substrates. Numerous negative survey data are maintained in the NRIS database. It has not been found on the Helena National Forest.

Numerous surveys and inventories have been conducted in the Blackfoot Travel Plan area over the past 20 years or more: FIA grid intensification plots, a systematic placement of intensive inventory plots where data collectors are instructed to search for and identify sensitive plant species; roadside surveys associated with noxious weed infestations (Barton and Crispin 2002); project level reconnaissance by Forest Service field crews; riparian study plots; and field survey crew inventories (Bricker 2009). Negative survey information is used in identifying potential habitat, and as well as to help identify areas that do not support sensitive plant habitat.

A literature review has been completed of available information on sensitive plant species, habitat and disturbance process effects on flora. See the References Cited section for a complete list.

Assumptions

The following assumptions were used in this analysis:

- The analyses and decisions made in the record of decision for the *HNF Weed Treatment Project FEIS* are incorporated in noxious weed analysis and management on the HNF.
- Any soil disturbing activity with mechanized equipment has the potential to increase noxious weed invasion or spread.
- The rate of spread of noxious weeds on the Lincoln Ranger District is mitigated by an aggressive weed treatment program. The District has begun efforts to measure weed infestations, treatments and changes in infestation levels on the District over time. The expected rate of weed spread is assumed to be less than 10 percent per year, but may be less than that estimate.
- Herbicide use in accordance with the requirements specified in the *HNF Weed Treatment Project FEIS* and *Record of Decision* (USDA Forest Service 2006, 2007) is appropriate for noxious weed management on infested lands.
- The Forest noxious weed treatment program would continue to treat approximately 30 percent of the weeds within the project area annually, regardless of whether the project occurs or not.

- All mitigation measures/project design features would be implemented.
- Any roads proposed for storage would be at a 3S level.
- Any roads proposed for decommissioning would be at a 4 level
- All changes proposed for each alternative would be fully implemented.
- Motorized use within 300 feet of roads and parking along the side of the road would occur as long as:
    - No new permanent routes are created by this activity
    - No damage to existing vegetation, soil, or water resource occurs
    - Travel off-route does not cross streams
    - Travel off-route does not traverse riparian or wet areas
- The resulting motorized route system would be managed as described in the DEIS and motorized use would occur where it is proposed. The effects analysis describe the effects resulting from the change between where people are driving (alternative 1) and where people would drive (alternative 2 and alternative 3).

The paragraphs below define mapped weed acres and weed treatment acres as used in this analysis.

Mapped Weed Acres: Mapped acres are reflected by polygons within which there is at least 1 percent noxious weed cover. There are weeds outside those polygons that are too scattered to map, or are infestations that have not been discovered yet. The mapped acres are taken from the Weeds layer in the HNF Geographical Information Systems (GIS) database.

Weed Treatment Acres: Weed treatment acres for the purposes of this analysis are assumed to be the total polygon acres described above. This is a worst-case scenario analysis to identify any thresholds that are being approached. Actual chemical application is reported to the state of Montana annually, as a requirement of a chemical applicator/operator license. Pesticide application is also recorded in the National Forest System FACTS database.

Information Used

A geodatabase (BlkftNonwinTMP.gdb) contains numerous geospatial layers that provide the data that was used in this analysis. This geodatabase is available in the project file. Those layers include the known locations of weed infestations, watershed and stream information; habitat types for risk assessment.

Experience, GIS analysis and information from plant surveys in adjacent areas and specific plant surveys in high potential habitat were used to determine areas that would be more likely to support sensitive plant populations.

The Montana Natural Heritage Program (MTNHP) maintains a statewide database for sensitive species. Data from the MTNHP were used for known sensitive plant populations.

Past surveys by the MTNHP (Barton and Crispin 2002, Poole and Heidel 1993) as well as past surveys by the HNF ecologist were used to focus the survey work.

Both negative and positive survey information was used from all surveys in preparing this analysis.

Spatial and Temporal Context for Effects Analysis

The rights of way of travelways within the Blackfoot Non-Winter Travel Plan project area and areas within 100 feet of motorized or nonmotorized trails were used as the analysis area for direct effects; the Blackfoot Non-Winter Travel Plan project area was used for indirect and effects on individual populations. The Helena National Forest was used as the area for consideration of cumulative effects.

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Cumulative effects result from the incremental impact of an action when added to the effects of past, present, and reasonably foreseeable future actions. Past activities are considered part of the existing condition and are discussed within the affected environment section above. This is because the existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed to those effects.

Cumulative effects from the list of projects noted in the cumulative effects table in Appendix D of the DEIS would be minimal. The projects that have occurred since 1993 have all had ground reconnaissance to determine whether sensitive plant populations would be impacted by those actions. Where sensitive plant populations were found, such as the Cave Gulch Fire Salvage project, populations were buffered from treatment. The actions associated with the projects listed in the cumulative effects section of this analysis may have impacted individuals or habitat but would not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species.

Effects Common to All Alternatives

Use of established routes has the potential to affect sensitive plant occurrences, either directly by damage or mortality to individual plants or indirectly by altering the habitat through soil disturbance, changes in hydrologic functioning, or by the introduction of nonnative invasive plant species that can out-compete sensitive species for water, sunlight, and nutrients.

Comparing the effects of different types of use on ground disturbance and habitat degradation is complex and must involve consideration of numerous factors. Where use is light or where management programs provide adequate protection, impacts may not be unacceptably severe. However, where use is heavy and protective actions are inadequate, impacts may be severe and widespread (Cole 1994). Location and design of roads and trails may add to or reduce the potential for impacts from recreational use. The types of recreational activities and modes of travel continue to diversify within protected areas resulting in a wider range of effects on ecological conditions. Impacts associated with motorized travel differ greatly from those associated with equestrian, foot traffic and mountain bike use (Cole and Spildie1998, Torn et al. 2009). In general, motorized uses are considered to have greater potential effects on the landscape and on the introduction and spread of noxious weed species than non-motorized uses, primarily due to (1) the ability of vehicles to travel great distances, allowing visitors to access more terrain in a shorter time, including remote locations, and (2) the higher ground pressures and greater torque applied to soil and vegetation surfaces (Olive and Marion 2009). Non-motorized uses, however, may also cause serious damage to soil and native vegetation, but effects generally tend to be more localized (Cole 1989, Potito and Beatty 2005, White et al. 2006). Among non-motorized uses, horse use has been shown to have significantly greater effects (for trampling and erosion indicators) than hiking, llama use, and mountain biking (Cole

and Spildie 1998, Olive and Marion 2009). White and others (2006) found that certain impacts to mountain bike trails, especially width, are comparable or less than hiking or multiple-use trails, and significantly less than impacts to equestrian or off-highway vehicle trails.

For the purposes of analysis, it is assumed that motorized uses usually create more ground disturbance than non-motorized uses; therefore, motorized uses are more likely to degrade habitat and promote nonnative invasive plant establishment and spread.

Direct and Indirect Effects

Direct effects occur when individual plants are broken, crushed, or trampled by vehicles traveling or parking off road surfaces, or their habitat is physically impacted, such as disturbing or compacting the soil. Vehicles traveling on or parking off the route surface can result in plant mortality, altered growth, or reduced seed set through physically breaking, crushing, or uprooting plants (Wilshire et al. 1978, Cole and Bayfield 1993). Root exposure or direct root damage may occur due to vehicle passes over vegetation, particularly in loose soils, or in wet soils susceptible to rutting; these impacts can affect plant vigor and survival success.

Dust from motor vehicle use has also been shown to decrease native plant cover and vigor by reducing rates of photosynthesis, respiration, transpiration (Spellerberg and Morrison 1998 in Ouren et al. 2007) and water-use efficiency. Dust can block photosynthesis, respiration and transpiration, and may even be sufficient in some cases to alter community structure (Trombulak and Frissell 2000).

Herbicide application (an indirect result of the spread of weeds) would have variable effects on sensitive plant populations. Broadleaf herbicides (e.g. 2,4D or Tordon) could adversely impact scalloped and peculiar moonworts. Both lady's slippers would be adversely affected by broadleaf herbicides with the exception of herbicides that are specifically designed to harm certain plant families, such Asteraceae, the aster family. Grasslike species, Hall's rush and swaying bulrush, would not be harmed by herbicides designed to kill broadleaf plants. These species would, however, be harmed by herbicides that are "non-specific" and kill both broadleaf and grasslike species. An example of this type of herbicide is Round-up. The Helena National Forest Weed Treatment Project Final Environmental Impact Statement and Record of Decision (USDA Forest Service 2006, 2007) provide guidance for proper weed treatment and for appropriate herbicides to be used. Herbicide application used to control noxious weeds would adversely affect sensitive plant populations as described above unless sensitive plant populations were protected from herbicide application.

Direct effects are dependent upon the intensity and timing of disturbance. Effects are also dependent upon the number of plants at a specific location and the proportion of the occurrence impacted. Repeated damage weakens the compensatory capabilities of rare plants, which can lead to degradation of habitat and eventually to the replacement of native plants species with nonnative species more adapted to frequent disturbances, such as invasive weeds.

Indirect effects are caused by the action but occur later in time; or are further removed in distance but are still reasonably foreseeable. Indirect effects to rare plants can occur from soil erosion or compaction, dust, habitat fragmentation or from the potential displacement of rare and native species with nonnative or invasive species. Indirect impacts to soil from repeated off-road vehicle use can lead to the degradation of habitat for rare plants and other native plant communities. Soil compaction, erosion, and modification of soil properties can affect the distribution, abundance, growth rate, reproduction, and size of plants (Ouren et al. 2007). The

effects of soil erosion on plants can include undercutting of root systems as routes are enlarged by erosion, creation of new erosion channels in areas not used by vehicles, wind erosion of adjacent destabilized areas, burial of plants by debris eroded from areas of use, and reduction of the biological capability of the soil by physical modification and stripping of fertile layers (Wilshire et al. 1978).

Soil compaction and the subsequent decrease in infiltration and distribution of water through the soil profile can lead to decreased moisture available for plant growth. Compaction caused from repeated off-highway vehicle use, can result in reduced seed germination (Williams 1967 in Davidson and Fox 1974), seedling survival, soil water infiltration (Wilshire et al. 1978), plant and root growth (Phillips and Kirkham in Davidson and Fox 1974). In rare plant habitat, soils subjected to vehicular traffic that become compacted and eroded due to wheel ruts may become unsuitable for seedling development and the sustainability or expansion of that rare plant population could be affected. Compaction by vehicles also contributes to roadside invasions of exotic plant species by reducing native plant vigor and creating areas of competition-free space that are open to invasion (Ouren et al. 2007, Trombulak and Frissell 2000, Wilshire et al. 1978). Trombulak and Frissell (2000) report the spread of exotics by vehicles through habitat alteration, stress on native species, and creation or maintenance of movement corridors. Off-highway vehicles have been shown to accelerate weed invasions (Von der Lippe and Kowarik 2007) by reducing native plant vigor and cover, creating a competition-free habitat open to invasion, and acting as a vector for seed dispersal. See the invasive plants analysis for this project for more details.

Habitat fragmentation resulting from increased density of roads may create “islands” of otherwise suitable habitat that are too small to allow for maintenance of populations of certain plants. Fragmentation also results in a greater amount of edge area relative to the amount of interior habitat area. Newly created edges experience changes in microclimate conditions which may alter plant communities (Collinge 1996). Numerous studies have addressed the results of habitat fragmentation to plant populations and the pollinators upon which they depend (Young et al. 1996, Jules 1998, Harrison and Bruna 1999). Research findings vary depending on the type of plants, pollinators, and location. Donaldson et al. (2002) found no variation in species diversity of pollinators in habitat fragments of different sizes, but found that fragment size and distance to large fragments had a significant effect on fruit and seed set for four of the seven perennial plant species studied. Jennersten (1988) in Murren (2002) found a lower diversity and abundance of both flowering plants and insect pollinators in fragmented habitats. In her studies, seed set was much lower in fragmented habitats. These studies are not conclusive, but suggest the possibility that habitat fragmentation by road creation and use, and associated activities may affect plant populations.

Wetlands and associated plants may be indirectly affected. Sediments and chemicals washing into wetlands from road travel may compromise water quality. Vehicle travel in or adjacent to wetlands may create ruts that do not heal by themselves, and allow water to flow out of the wetland; over time the wetland may dry to the extent that it no longer supports wetland vegetation or provides wetland functions.

The Helena National Forest requires weed-seed-free feed for stock users; this limits the exposure of noxious weeds seeds in non-motorized areas. Bicycles can carry weed seeds, but are much less likely to carry weed seed or plant parts any distance. Animals (both domestic and wild) can carry noxious weed seeds in their coats (Campbell and Gibson 2001, Myers et al. 2004). An indirect effect of weed infestations in the rights-of-way would be that the entire project area

would be exposed to weed introduction and transfer by motorized vehicles and to a lesser extent, bicycles and other non-motorized travel. The increased weed presence would pose a threat to sensitive plants and their habitat throughout the travel plan area. In the project area one Missoula phlox occurrence is currently overlapping and adjacent to weed infestations. There is little information available concerning the effects of weeds on whitebark pine. Since it is a tree, it would seem less vulnerable to effects by herbaceous weedy plants. However, in the project area, 10 whitebark pine stands overlap or are immediately adjacent to weed infestations. Weeds could affect the understory or plant communities of the stands if they do not affect the whitebark pines directly. The risk of nonnative invasive plant establishment and spread would be greater in areas with more roads and trails, particularly those designated for motorized use. Table 77 shows the miles of travelways proposed for each alternative.

The presence of humans in the forest increases the risk of human-caused wildfire, which could indirectly impact sensitive plants. Wildfire could have short-term detrimental effects on sensitive plant habitats, but no long-term effects in most cases since most native plants will resprout after all but the most severe wildfires. However there has been a dramatic increase of severe wildfires in the ponderosa pine type in recent decades where fuels have built up due to fire suppression (Agee and Skinner 2005). In these habitats there is potential for long-term damage to sensitive plant habitats (Menges and Dolan 1998, Pendergrass et al. 1999). Plant response to fire is a result of the interaction between severity of the fire and the individual plant species' inherent resistance to injury and ability to recover (Brown et al. 2000). Mortality of herbaceous species is more dependent on the length of time plants are exposed to high heat, determined by the amount of duff and woody fuel consumed by the fire, than flame length and fire line intensity (Armour et al. 1984). The effect of wildfire on sensitive plant habitats, therefore, would depend on the surface fuel conditions. The longer fuels build up on the forest floor, the greater the potential damage to sensitive plant habitats. In many cases, wildfire would be beneficial to whitebark pine by opening overgrown areas to reduce competition with other tree species and to allow Clark's nutcrackers to plant seeds for regeneration.

Wildland fires also risk enhancing nonnative plant invasions if severe fires damage the native vegetation. Wildland fires can also exacerbate nonnative plant invasions if native vegetation is damaged by severe fire. Canada thistle, bull thistle, knapweeds, Dalmatian toadflax and cheatgrass have been shown to increase following wildfire (Jacobs and Sheley 2003, Keeley 2006).

While whitebark pine is more resistant to damage than herbaceous species, the trees are still subject to disturbance. Whitebark pine forests may be popular places for recreation since they are open, high-elevation forests often with attractive views. A study in Oregon found that while about one-third of the landscape consisted of whitebark pine forests, associated subalpine meadows, and spruce-fir forests in which whitebark pine was a component, 46 percent of the trail miles and 78 percent of the campsites were located in these ecosystem types (Cole 1989). Four attributes of these ecosystems that likely attract large numbers of dispersed recreationists are esthetics, diversity, ease of hiking and camping, and good fishing. The most common problems resulting from recreation in whitebark pine ecosystems are resource degradation as a result of intensive recreational use, trail and campsite degradation, packstock impacts, development of unauthorized trails and litter (Cole 1989). A study in the Eagle Cap Wilderness found campsite impacts in whitebark pine forests were pronounced. The mean vegetation loss on the central part of campsites was 94 percent. This compares, for example, with neighboring sedge *(Carex nigricans)* meadows where the mean vegetation loss on campsites was only 40 percent (Cole 1981).

Other impacts may be associated with the collection of fuelwood for campfires and widespread proliferation of unauthorized trails and campsites. Whitebark pine is a slow growing tree that occurs in open forests and does not produce an abundance of wood. Without assistance, trails and campsites in whitebark pine ecosystems require decades, if not centuries, to recover. For example, campsites in a lodgepole pine/whitebark pine forest around heavily impacted Bullfrog Lake in Rings Canyon National Park were closed to overnight use in 1961. After 17 years of closure, soil compaction levels had returned to near-natural levels. Litter depth and volume, however, remained substantially below those found in undisturbed forest. Tree damage, vegetation loss, and unauthorized trails remained pronounced, although recovery had begun. Tree mutilations were often covered over with new growth and some of the trails were being recolonized (Parsons and DeBenedetti 1979, Cole 1989).

Generally, the suitability of whitebark pine forests for trails appears to be good to moderate, while suitability for campsites is moderate to poor (Cole 1989). The intensity of impacts to whitebark pine forests is directly related to the amount of use the forest receives. The amount of use is likely directly related to accessibility or miles of motorized access to or through whitebark pine stands.

While recreational use is a potential threat on the Helena National Forest, white pine blister rust is the main threat to whitebark pine and most stands are already dead or dying (Milburn 2012).

Cumulative Effects

Present and future activities that are associated with the proposed route system could impact rare species that are growing along or in the vicinity of designated routes. These activities may include routine maintenance, such as clearing brush, posting signs, cleaning, or clearing of debris, or increased levels of dispersed camping or recreation along and near routes. Future projects in timber harvest and vegetation treatments, range management, fuel treatments, recreation, reforestation, road decommissioning, and special uses may also contribute impacts to rare plant species. A complete list of current and known future projects is in the Draft Environmental Impact Statement (DEIS).

The effects of other types of future projects (e.g., vegetation management) would likely be minimal or similar to those described in this analysis if existing management guidelines (such as field surveys, protection of known rare species locations, and noxious weed mitigations) remain in place.

Effects Common to All Action Alternatives

The effects common to all alternatives would apply to all action alternatives. In addition, both alternatives 2 and 3 would include new construction of motorized and non-motorized trails. Alternative 3 would include 0.5 miles of new road construction. New construction would remove native vegetation and create short and long-term increases in erosion, sedimentation, and compaction of the soil. New construction would increase the potential for the spread of nonnative invasive plants into areas currently uninfested areas. Project design features require botany surveys before construction and mitigations if plants are found, so sensitive plants would not be affected by the construction. Motorized, non-motorized roads and trails and mountain bike trails occur within or adjacent to approximately 23 whitebark pine stands in the project area. Effects of new road and trail construction are considered further under each alternative.

Table 77. Miles of motorized and non-motorized roads and trails within 100 feet of whitebark pine stands

Alternative	Motorized miles	Non-Motorized miles
Alternative 1	28	15
Alternative 2	24	16
Alternative 3	12	21

Alternative 1 – No Action

Direct and Indirect Effects

Whitebark pine and Missoula phlox are the two known sensitive plant species in the project area within road rights-of-way or within 100 feet of motorized or non-motorized roads or trails. Missoula phlox is known from one location within 100 feet of a road and from sites within 100 feet of one motorized and two non-motorized system trails (table 77).

Alternative 1 has the highest total number of motorized miles and the highest number of motorized miles possibly affecting sensitive plant occurrences. Motorized, non-motorized roads and trails and mountain bike trails occur within 100 feet of approximately 23 whitebark pine stands in the project area. Table 78 and table 79 show roads and trails that intersect or are adjacent to sensitive plant occurrences. Roads proposed for changes from the current status are shown in bold.

Table 78. Roads or trails with known occurrences of *Phlox kelseyi var. missoulensis*

Road/Trail Number	Alternative 1	Alternative 2	Alternative 3
440	NOMTR	No change	No change
493	NOMTR	No change	No change
440[1]	**M-07**	No change	**NM**
1884[1]	Open, highway legal	No change	No change

[1]Also a mountain bike route for Alts 2 &3, Alt 2 = Mountain bike, foot–horse, motorized trail; Alt 3 = Mountain bike, foot-horse

M – 07 = motorized trail – vehicles less than 50” – no seasonal restrictions

NM = non-motorized trail, over-snow vehicles allowed

NOMTR = NOMTR = non-motorized trail, no over-snow vehicles allowed

Table 79. Roads and trails intersecting or adjacent to known populations of whitebark pine

Road/Trail Number[1]	Alternative 1	Alternative 2	Alternative 3
330 – B1	01 - Res	No change	No change
330 – B1	**UC closed**	**01 – Res**	**Decommission**
417	**M-07**	No change	**M-08**
418	**M-10**	**NM**	**NM**
440	**NOMTR**	No change	**NOMTR-FS**
440	NM	No change	No change
440[2]	**M – 10**	No change	**NM**
440[2]	**M – 07**	No change	**NM**
465	Decommission	No change	No change
466	NOMTR	No change	No change
483	**NM**	No change	**NOMTR-FS**
485	**UC – M-07**	**NM**	**NM**
485	Open, highway legal	No change	No change
485 – I1	Open, highway legal	No change	No change
488	**NM**	No change	**NOMTR-FS**
490	**NOMTR**	No change	**NOMTR-FS**
493	**NOMTR**	No change	**NOMTR-FS**
601	**Open, highway legal**	**01 – STO**	**01 - STO**
626	15	No change	No change
1825 – B1	**Open, highway legal**	No change	**Decommission**
1825 – D1	**01 – Res**	**01 – Res – STO**	**01 – Res - STO**
1827	**09 – Res**	No change	**Decommission**
1827	**09 – Res**	No change	**11 - Res**
1827 – F1	**09 – Res**	No change	**Decommission**
1827 – G1	**09 – Res**	**01 – STO**	**Decommission**
1827 – H2	**09 – Res**	**01 – STO**	**Decommission**
1884[2]	Open, highway legal	No change	No change
1884	15	No change	No change
1884 – D1[2]	**CNDST**	**MB/ FH/MT trail**	**MB/FH**
4080	Decommission	No change	No change
4080 – A1	**01 – Res**	**Decommission**	**Decommission**
4080 – B1	**01 – Res**	**Decommission**	**Decommission**
4133[2]	**Open, highway legal**	No change	**01 - Res**
U - 112	**UC – open**	**Open, highway legal**	**Decommission**
U - 113	**UC – open**	**Open, highway legal**	**Decommission**
U - 114	**UC – open**	**Open, highway legal**	**Decommission**
U - 115	**UC – open**	**Open, highway legal**	**Open, highway legal**
U - 446	Open, highway legal	No change	No change
U - 446	Open, highway legal	No change	No change
U - 447	**UC - M-07**	**NM**	**NM**

[1]Roads and trails are listed more than once if different segments have different prescriptions. Different segments are

not re-listed if they have the same prescriptions even though they may intersect different whitebark pine stands.
[2]Also a mountain bike route: Alt 2 = Mountain bike, foot–horse, MT trail; Alt 3 = Mountain bike, foot-horse
Continental Divide Scenic Trail
01 – Res = closed to motorized use yearlong
01 – Res – STO = closed roads change to storage
09 – Res = closed to wheeled motorized use 10/15-6/30, closed to over-snow vehicle use 10/15-12/1
11 – Res = closed to wheeled motorized use 9/1-6/30, closed to over-snow vehicle use 10/15-12/1
M – 07 = motorized trail – vehicles less than 50" – no seasonal restrictions
M – 08 = motorized trail – vehicles less than 50" – closed 9/1-6/30
M – 10 = motorized trail – single track – no seasonal restrictions
MB/FH/MT trail = mountain bike/foot-horse/motorized trail
NM = non-motorized trail, over-snow vehicles allowed
NOMTR = non-motorized trail, no over-snow vehicles allowed
NOMTR-FS = non-motorized trail – foot and stock only
U = Unclassified route

Alternative 1 includes 15 percent more miles available for motorized use than alternative 2, and 43 percent more than alternative 3. Motorized wheeled vehicles would have the potential to introduce noxious weed seed and spread noxious weeds at a higher rate than non-motorized means of travel. There would be no new road construction under alternative 1, but users would be able to continue current uses and no roads would be closed or decommissioned. With more miles open to motorized use under this alternative, the likelihood of potential effects to habitat suitable for sensitive species is greater.

The current road and trail system (alternative 1) has the potential to affect 4 occurrences of Missoula phlox and 23 occurrences of whitebark pine. Effects to the phlox would be the same as for alternative 2 and possibly slightly greater than for alternative 3. Under alternative 3, one currently motorized route would be changed to non-motorized (440), but Road 1884, which travels the same route adjacent to the phlox site, would remain open to motorized use and mountain bike use would be added to 440.

Assuming that motorized use is more likely to adversely impact sensitive plants, alternative 1 is more likely than the other two alternatives to affect whitebark pine stands. Compared to alternative 2, alternative 1 would have approximately 17 percent more miles of motorized use and 6 percent fewer miles of non-motorized use within 100 feet of whitebark pine stands. Compared to alternative 3, alternative 1 would have approximately 233 percent more miles of motorized use. Although mountain bike use currently occurs on the Forest, alternative 1 does not have specifically designated mountain bike routes. The number of miles currently being used by mountain bikers is not known.

Alternative 1 has the greatest potential to affect both of the sensitive species known to occur in the project area. One Missoula phlox occurrence is within 100 feet of motorized vehicle routes. Motorized vehicle use and associated recreational use could result in damage or destruction of that site if it is not protected from use. Helena National Forest management direction would protect the occurrence from herbicide use, road maintenance and new road or trail construction, but would not protect it from recreational use or other motorized vehicle use. Implementation of alternative 1 would not likely result in the destruction of whitebark pine stands, but it has greater potential than the other alternatives to adversely affect those stands. Since whitebark pine in the project area is already stressed, damage associated with vehicle use could result in further deterioration of whitebark pine condition on the Forest.

Cumulative Effects

As described in appendix D, present and ongoing projects that have been considered in this analysis include:

- **Several livestock grazing allotments** have whitebark pine stands within the allotment boundary. It is likely that grazing has some effects on the whitebark pine or the plant community. Whitebark pine stands, however, typically have minimal understories, so grazing pressure is probably limited in these areas.
- **Alice Creek Wildlife Habitat Project:** This decision would include using prescribed fire to enhance wildlife habitat on 1,500 acres on the Lincoln Ranger District. There are no known sensitive plant populations in the area. Plant surveys are planned in the summer of 2011. Design criteria and continuing monitoring would protect any sensitive plant populations found.
- **Clancy-Unionville Vegetation Management Project:** Implementation is ongoing. This project includes temporary road construction and timber harvest. A sensitive plant population (*Botrichium paradoxum*) is known from the project area but was not affected by treatment units.
- **Roadside Hazard Vegetation Treatment:** This project would treat approximately 9,614 acres with mechanical tree removal. Field surveys were completed on the treatment areas in 2009. Three populations of *Juncus hallii* were found in proposed units. Those populations would be protected from ground disturbing activities and herbicide application.

For the reasonably foreseeable future, the following projects have been reviewed.

- **Blackfoot Winter Travel Plan:** This decision would be to determine what roads would be open to motorized traffic in the winter season. The decision would have minimal ground disturbance; no new routes would be established and no existing routes would be closed. There are known sensitive plant populations within the project area of *Phlox kelseyi* var. *missoulensis*. Design criteria and continuing monitoring would protect any sensitive plant populations found.
- **Cabin Gulch Vegetation Project:** This project would treat approximately 3,315 acres with a combination of timber harvest and prescribed fire. Up to 9.1 miles of new temporary road would be built. There are no known populations of any sensitive plant species in the project area. If any populations should be discovered, those populations would be protected from ground disturbing activities and buffered from herbicide application as appropriate.
- **Dalton Mountain Forest Restoration and Fuels Reduction Project:** This project proposes commercial and precommercial harvest, hand thinning and prescribed burning. Whitebark pine is the only sensitive plant species in the project area. Design features would protect whitebark pine during implementation and removal of competing shade-tolerant trees would benefit whitebark pine.
- **Helmville Face Wildlife Habitat Improvement Project:** The project proposes hand thinning and prescribed burning to enhance wildlife habitat. No new roads would be constructed. No R1 sensitive plant species occur in the project area and none would be affected by the project. If any populations are found at any time they would be protected from ground disturbance or herbicide application.
- **Granite Butte Whitebark Pine Restoration Project:** This project involves planting whitebark pine seedlings in a burned area. The project would benefit whitebark pine. Any

other sensitive plants found within the project area would be protected during implementation.

- **Grassy Mountain Vegetation Project:** This project would treat approximately 3900 acres with a combination of prescribed fire and timber harvest. Up to 0.5 miles of new temporary road would be built. Intensive vegetation data collection in the project area was completed in 2006. No sensitive plant populations were found during those surveys or previous surveys. If any populations are found at any time they will be protected from ground disturbance or herbicide application.
- **Stonewall Vegetation Management Project:** This project would treat approximately 8,500 acres with a combination of pre-commercial thinning, timber harvest and prescribed fire. Up to 5 miles of new roads would be built and then obliterated at the end of the project. Field surveys of the proposed units and temporary roads were completed in 2009. No sensitive plant populations were found during those surveys or previous surveys. If any populations are found at any time they would be protected from ground disturbance or herbicide application.
- T**elegraph Vegetation Project:** This project would treat approximately 6,300 acres with a combination of precommercial thinning, timber harvest and prescribed fire. Up to 6 miles of new temporary road would be built. There are known populations of *Juncus hallii* in this project area. Those populations have been identified and would be protected from ground disturbing activities and herbicide application.
- **Hogum Wildlife Habitat Project:** This decision would include using prescribed fire to enhance wildlife habitat on 1,500 acres on the Lincoln Ranger District. There are no known sensitive plant populations in the area. Design criteria and continuing monitoring would protect any sensitive plant populations found.

Surveys are currently occurring or have been completed for future foreseeable actions. If sensitive plant occurrences have been or are found, they will be protected from ground disturbance or herbicide application.

Summary of Effects

Alternative 1 - no action would have the highest potential impact on sensitive plants by having the fewest restrictions on motorized wheeled vehicles.

Alternative 2 – Proposed Action

Project Design Features

Project design features specific to TES plants are listed in chapter 2 starting on page 28. These design features apply to alternatives 2 and 3.

Direct and Indirect Effects

The routes affecting known sensitive plant populations are shown in table 78 and table 79. Compared to alternative 1, for routes within 100 feet of whitebark pine stands, alternative 2 would authorize wheeled motorized use on approximately 13 percent fewer miles of travelways. Alternative 2 would have 14 percent fewer miles of motorized routes and 7 percent more non-motorized routes within 100 feet of whitebark pine stands.

Compared to alternative 3, for routes within 100 feet of whitebark pine stands, alternative 2 would have 100 percent more miles of motorized routes and 31 percent fewer miles of non-motorized trails. The mileage of mountain bike trails (89) and the mileage of mountain bike trails

within 100 feet of whitebark pine stands (11) is the same for both alternatives 2 and 3. Under alternative 2, four times the miles of mountain bike trails would be available for motorized use. Alternatives 2 and 3 would have similar numbers of miles of mountain bike trails available for horse use.

Alternative 2 proposes slightly less motorized trail and road construction than alternative 3 and the same amount of non-motorized trail construction. The amount of new construction is considerably more than under alternative 1. Most of the construction proposed under alternative 2 would take place over the next 10 to 20 years, so impacts would be spread over a long time period. Most of the construction would be of non-motorized trails, which would be expected to have fewer adverse impacts than motorized use to sensitive plants and their habitat. New construction would affect native plants and plant communities, but would not affect sensitive plant occurrences since construction is not proposed in known sensitive plant habitat and project design features would protect any newly discovered sensitive plant occurrences.

There would be no change (from alternative 1) to roads or trails possibly affecting known occurrences of Missoula phlox.

For roads and trails within 100 feet of whitebark pine stands, implementation of alternative 2 would be less likely than alternative 1and more likely than alternative 3 to adversely affect the stands.

New trail construction would disrupt localized areas of native plant communities; however, new trail construction is not proposed in known sensitive plant habitat and project design features would protect newly discovered occurrences. Increased recreational use resulting from improved access in whitebark pine stands and other sensitive plant habitat could have adverse effects. Over time, the increase in non-motorized use and the decrease in motorized use with this alternative would result in fewer long -term impacts than alternative 1.

One Missoula phlox occurrence is threatened by motorized vehicle use under this alternative. Motorized vehicle use could result in damage or destruction of that site if it is not protected from use. Project design features would protect the occurrence from herbicide use, road maintenance and new road or trail construction, but would not protect it from recreational use or other motorized vehicle use. Implementation of alternative 2 would not likely result in the destruction of whitebark pine stands; it has less potential than alternative 1 and more than alternative 3 to adversely affect whitebark pine stands. Since whitebark pine in the project area is already stressed, damage associated with vehicle use or the indirect effects of increased recreation use could result in further deterioration of whitebark pine conditions on the Forest.

Cumulative Effects

See the alternative 1cumulative effects section for a description of projects. The cumulative effects of implementing alternative 2 in combination with other past, present, and foreseeable future actions (appendix D) would be minimal, but known plant populations could potentially be affected.

Surveys are currently occurring or have been completed for future foreseeable actions. If populations have been or are found, they would be protected from ground disturbance or herbicide application.

Summary of Effects

Alternative 2 would have more effects intermediate between alternatives 1 and 3.

With project design features, the action alternatives may impact individuals, but would not contribute toward a trend for federal listing or loss of viability for sensitive species.

Alternative 3

Direct and Indirect Effects

The routes affecting known sensitive plant occurrences are shown in tables 4 and 5. Alternative 3 proposes fewer miles of motorized routes than either of the other alternatives. Compared to alternative 1, alternative 3 would have 57 percent fewer miles of motorized routes. Compared to alternative 2, alternative 3 would have 50 percent fewer miles of motorized routes. As a result, implementation of alternative 3 would be less likely to have adverse effects and more likely to provide the most long-term protection to sensitive plants by limiting potential exposure to noxious weed infestations and physical damage from motorized vehicle use. Under alternative 3, plants would still be susceptible to damage from foot, horse and mountain bike use.

Alternative 3 proposes slightly more new motorized trail and road construction than alternative 2 and the same amount of non-motorized trail construction. The amount of new construction is considerably more than under alternative 1. Most of the construction proposed under alternative 3 would take place over the next 10 to 20 years, so impacts would be spread over a long time period. Most of the construction would be for non-motorized use, which would be expected to have fewer adverse impacts than motorized use to sensitive plants and their habitat. New trail construction is not proposed in known sensitive plant habitat and project design features would protect any new sensitive plant occurrences discovered.

Alternative 3 would provide slightly more protection for one known Missoula phlox occurrence by closing route 440 to motorized vehicles. However, Road 1884 follows the same route and would remain open under all alternatives. This route would also be designated as a mountain bike route under alternative 3.

Alternative 3 would have at least 50 percent fewer miles of motorized routes through whitebark pine stands than either of the other alternatives.

While new trail construction would disrupt localized areas of native plant communities, sensitive plants would be protected from adverse effects of construction since construction is not proposed in known sensitive plant habitat and since project design features would protect any newly discovered occurrences. Road and trail construction could result in the spread of noxious weeds into currently uninfested areas. Increased recreational use in whitebark pine stands and other sensitive plant habitat as a result of improved access could have adverse effects. This alternative would have a substantially lower potential for the spread of noxious weed seed since it proposes fewer miles of motorized vehicle use than alternatives 1 and 2. Noxious weed infestations would be treated according to the regular Forest integrated weed treatment program. Over time, the increase in non-motorized use and the decrease in motorized use with this alternative would result in fewer long-term impacts than either alternative 1or 2.

Project design features would be applied to this alternative to protect sensitive plant occurrences from herbicide use, road maintenance and road and trail construction.

One Missoula phlox occurrence is threatened by motorized vehicle use under this alternative. Motorized vehicle use could result in damage or destruction of that site if it is not protected from use. Known populations would be protected from ground disturbance associated with road maintenance, herbicide use and road and trail construction, but would not be protected from recreational use or other motorized vehicle use.

Implementation of alternative 3 would not likely result in the destruction of whitebark pine stands. Since whitebark pine in the project area is already stressed, damage associated with vehicle use or increased recreational use could result in further deterioration of whitebark pine conditions on the Forest. Alternative 3 has less potential than alternatives 1 or 2 to adversely affect whitebark pine stands.

Cumulative Effects

See the cumulative effects section under alternative 1 for a description of projects. The cumulative effects of implementing alternative 3 in combination with other past, present and foreseeable future actions (appendix D) would be minimal, but known plant populations could potentially be affected.

Surveys are currently occurring or have been completed for future foreseeable actions. If populations have been or are found, they would be protected from ground disturbance or herbicide application.

Summary of Effects

Alternative 3 would have the fewest effects to sensitive plant occurrences by restricting motorized wheeled vehicle use, with slight benefits to Missoula phlox and more benefits to whitebark pine.

With project design features, the action alternatives may impact individuals, but would not contribute toward a trend for federal listing or loss of viability for sensitive species.

Summary of Determinations for TES Plant Species

The following determinations apply to alternatives 2 and 3 and assume compliance with project design features.

Scalloped Moonwort

Direct, Indirect, and Cumulative Effects of Proposed Actions

This species is known from the Beaverhead-Deerlodge Forest, immediately adjacent to the Helena National Forest. This species is associated with wetland habitats. This species has not been found to-date in field surveys of the project area. Wetlands, seeps and springs would be protected from ground disturbance in the design features for this project. Should any occurrences be found, a buffer would be established around each plant occurrence as a no-entry zone for equipment associated with road maintenance. This species would be impacted by broadleaf herbicides. Should any occurrences be found, a 100-foot buffer would be established around any occurrences as a no herbicide zone. See cumulative effects section of this analysis for cumulative effects.

Determination

The decision may impact individuals but would not contribute toward a trend for federal listing or loss of viability.

Peculiar Moonwort

Direct, Indirect, and Cumulative Effects of Proposed Actions

Peculiar moonwort is not known from the project area. The habitat for this species on the Helena National Forest is open grassland and open grassland/sagebrush.

If peculiar moonwort is found in the future, a buffer would be established around each plant occurrence as a no-entry zone for equipment associated with road maintenance. This species would be impacted by broadleaf herbicides. A 100-foot buffer around the known populations would be a no herbicide zone. See cumulative effects section of this analysis for cumulative effects.

Determination

The decision may impact individuals but would not contribute toward a trend for federal listing or loss of viability.

Lesser Yellow Lady's Slipper

Direct, Indirect, and Cumulative Effects of Proposed Actions

This species has not been found on the Helena National Forest to date. The species occurs in fens, which are limited in extent on the forest. The habitat also includes damp mossy woods, seepage areas, and moist forest-meadow ecotones in valleys and lower elevations in the mountains. These habitats would be protected by design features that limit ground disturbance in wet habitats.

If lesser yellow lady's slipper is found in the future, a buffer would be established around each plant occurrence as a no-entry zone for equipment associated with road maintenance. This species would be impacted by broadleaf herbicides. A 100-foot buffer around the known occurrences would be a no herbicide zone. See cumulative effects section of this analysis for cumulative effects.

Determination

The decision may impact individuals but would not contribute toward a trend for federal listing or loss of viability.

English sundew

Direct, Indirect, and Cumulative Effects of Proposed Actions

This species occurs in the Indian Meadows Research Natural Area. Known occurrences do not occur within 100 feet of roads or trails and would not be affected by this project. Suitable habitat in wetlands, seeps and springs would be protected from ground disturbance in the design features for this project. It is possible that undiscovered occurrences could be nearer to roads or trails, but project design features would protect new occurrences. See cumulative effects section of this analysis for cumulative effects.

Determination

The decision may impact individuals but would not contribute toward a trend for federal listing or loss of viability.

Slenderleaf Sundew

Direct, Indirect, and Cumulative Effects of Proposed Actions

This species occurs in the Indian Meadows Research Natural Area. Known occurrences do not occur within 100 feet of roads or trails and would not be affected by this project. Suitable habitat in wetlands, seeps and springs would be protected from ground disturbance in the design features for this project. It is possible that undiscovered occurrences could be nearer to roads or trails but project design features would protect new occurrences. See cumulative effects section of this analysis for cumulative effects.

Determination

The decision may impact individuals but would not contribute toward a trend for federal listing or loss of viability.

Howell's Gumweed

Direct, Indirect, and Cumulative Effects of Proposed Actions

This species is not known to occur in the project area. If any occurrences are found in the future, a buffer would be established around each plant occurrence as a no-entry zone for equipment associated with road maintenance. This species would be impacted by broadleaf herbicides. A 100-foot buffer around any discovered occurrences would be a no herbicide zone. See the cumulative effects section of this analysis for cumulative effects.

Determination

The decision may impact individuals but would not contribute toward a trend for federal listing or loss of viability.

Hall's Rush

Direct, Indirect, and Cumulative Effects of Proposed Actions

This species is not known to occur in the project area. Its habitat, wetlands, seeps and springs, would be protected from ground disturbance in the design features for this project. If any occurrences are found in the future, a buffer would be established around each occurrence as a no-entry zone for equipment associated with road maintenance. This species would not be impacted by broadleaf herbicides but may be affected by non-specific herbicides such as Roundup®. A 100-foot buffer around newly discovered occurrences would be a no herbicide zone. See the cumulative effects section of this analysis for cumulative effects.

Determination

The decision may impact individuals but would not contribute toward a trend for federal listing or loss of viability**.**

Missoula Phlox

Direct, Indirect, and Cumulative Effects of Proposed Actions

This species is known from four locations within rights-of-way in the Blackfoot travel planning area shown in table 78.

Alternative 3 would provide the best protection for known occurrences by changing one motorized route to a non-motorized route, however, the route would still allow mountain bike, foot and horse use. Alternatives 1 and 2 would have essentially the same (and the most) potential impact to this species by leaving open the motorized trail immediately adjacent to a Missoula phlox site. Alternative 2 would also allow mountain bike, foot and horse use.

The greatest danger to this species would be from noxious weed infestations, herbicide application or ground disturbance. A buffer would be established around each plant occurrence as a no-entry zone for equipment associated with road maintenance. This species would be impacted by broadleaf herbicides. A 100-foot buffer around the known populations would be a no herbicide zone, unless site specific exceptions were made by the Forest Ecologist. See the cumulative effects section of this analysis for cumulative effects.

Determination

The decision may impact individuals but would not contribute toward a trend for federal listing or loss of viability.

Swaying Bulrush

Direct, Indirect, and Cumulative Effects of Proposed Actions

This species is known from the Indian Meadows RNA in the northern portion of the Forest in true fens. This species is associated with wetland habitats and fens which are limited on the Forest. This species was not found to-date in field surveys of potential wetlands in the area. Wetlands, seeps and springs would be protected from ground disturbance in the design features for this project. Should any populations be found, a buffer would be established around each plant occurrence as a no-entry zone for equipment associated with road maintenance. This species would not be impacted by broadleaf herbicides. Non-specific herbicides such as Roundup would damage the plant. A 100-foot buffer around known occurrences would be a no herbicide zone if non-specific herbicides were applied. See the cumulative effects section of this analysis for cumulative effects.

Determination

The decision may impact individuals but would not contribute toward a trend for federal listing or loss of viability.

Whitebark pine

Direct, Indirect, and Cumulative Effects of Proposed Actions

Whitebark pine is usually found at the alpine timberline or with other high-mountain conifers just below the timberline. A number of whitebark pine stands are intersected by or adjacent to roads or trails under all alternatives. Alternative 3 proposes the fewest roads and trails associated with whitebark pine stands.

Determination

The decision may impact individuals but would not contribute toward a trend for federal listing or loss of viability.

For more details on compliance with the Forest Plan, see appendix A, and for more details on compliance with other regulations and policy, see the TES Plants report (Carsey 2012) in the project record.

Soils

Affected Environment

Analysis Area

The project area is the northern portion Continental Divide area, known as the Blackfoot travel planning area, located north of Helena, Montana on the Lincoln District of the Helena National Forest.

Blackfoot Planning Area

The Blackfoot travel planning area surrounds the area around Lincoln, Montana. It is underlain by metasedimentary rocks and intruded granitic rocks. The Continental Divide is the most prominent feature in the planning area, trending northeast to southwest at elevations ranging from 6,300 to 7,581 feet. The local relief is between 1,000 and 2,000 feet. The area is mountainous except for the Lincoln valley, which is a relatively flat, gravel-covered surface at an elevation of 4,600 feet. The principal streams in the Lincoln area include the Blackfoot River and tributaries.

Geology

The mountain ranges in the analysis area were formed by folded and faulted metasedimentary rocks and limestone. There are exposures of Boulder Batholith granitic, basaltic, and rhyolitic rocks in the western part of the project area. The granitic rocks were intruded into pre-existing limestone and metasedimentary rocks. The basaltic and rhyolitic rocks were extruded and covered granitic or metasedimentary rocks. There are moderately extensive deposits of glacial till, colluvium, and alluvium in the larger valleys. There are minor surface deposits of loess that have been influenced by volcanic ash in the northern part of the survey area. These deposits originated with the eruption of Mt. Mazama in Oregon approximately 6,700 years ago.

The landforms in the survey area have been formed by erosion and by deposition of both water and ice. Glaciers have affected parts of the area, giving a unique character to the landforms. U-shaped valleys, cirques, steep-sided mountain peaks, and rolling glacial moraines are common. In other areas, stream erosion has produced V-shaped mountain valleys, terraces, and flood plains. The shapes of some landforms are influenced by the structure of the bedrock. The bedding and hardness of the bedrock and the orientation of the beds affect the location of stream channels and the gradient and shape of slopes. Landslides are found in areas where some of the layers of bedrock are soft. They can produce large areas of landslide deposits that are irregular in shape. Stream bottoms are along major perennial streams. They include flood plains, low terraces, and alluvial fans. They are gently sloping. Soils on stream bottoms can have a water table and are usually subject to flooding. Terraces are relatively flat surfaces bordering a valley floor. They represent the former position of an alluvial plain or lake bottom and can include steep

risers between terrace surfaces and valley floors. They are formed by alluvial, glacial outwash, and lacustrine deposits. Alluvial fans are formed by stream deposition in areas where channel gradients rapidly decrease. They are in areas where a stream emerges from a narrow mountain valley onto a broader valley bottom or plain. They are smooth, convex, fan-shaped deposits. Their apex is at the mouth of the stream. Alluvial fans are dissected by poorly defined, intermittent streams 1,000 to 5,000 feet apart. The drainage system has braided channels with moderate gradients. Alluvial fans have no major changes in slope aspect.

Soils

There are many relationships between parent geology and the properties of soils. Relationships between soil properties and geologic origin of parent material have been observed and used to map the distribution of soils in the project area. Relationships between geologic origin of parent material and the performance of materials on road cutbanks, in roadfills, and as native road surfaces have been used to identify limitations to these uses and listed in the 2001 Helena National Forest Soil Survey. Metasedimentary rocks are argillites, quartzites,siltites, and siliceous limestones of the Precambrian age Belt Supergroup. Soils formed in these materials are subject to a slight hazard of erosion. Included in this group are small areas of sandstone and shale. Parent material derived from shale has higher clay content than parent materials derived from other rocks.

Granitic rocks are granite, granodiorites, and diorites. This bedrock group weathers to produce moderately coarse-textured and coarse-textured parent materials. Soils formed in these parent materials are generally subject to a severe hazard of erosion and are scattered throughout the project area. Volcanic ash-cap and loess soils are common in the project area, and these are sensitive to compaction and have a moderate to high erosion hazard depending on landform. Soils in the Blackfoot Project Area are commonly also found associated with glacial moraines, landslide deposits, or deposits of alluvial material. Soils and sub-soils generally have high rock fragment content, with sandy or loamy surface soils, sometimes with minor amounts of clay. Soils are grouped into landtypes with soils derived from similar parent material, topography, soil patterns, and climate. Typically, a landtype map unit consists of three or four major soils and some minor soils. Landtypes can be used to compare the soil suitability of large areas for common land uses. Within the Blackfoot Travel Planning Project area, there are 49 landtypes affected by roads and trails (table 80).

Table 80. Blackfoot travel planning area soil landtypes

Soil Landtypes found in the Blackfoot Travel Planning Project Area				
100	36-	46-	54-	790
101	360	47-	56-	791
120	36B	470	58-	80-
12A	380	48-	59-	87-
13A	381	480	59A	90-
14B	39-	49-	59B	91-
14C	390	490	76-	94-
15-	392	49A	76A	94A
15C	39A	49B	77A	94A
29B	44-	51-	79-	

Sensitive soils within landtypes are selected as indicators because they represent the areas most vulnerable to watershed impacts from roads or trails. Detrimental watershed impacts would include:

- Soil compaction with increased surface water runoff and accelerated erosion
- Routing of sediment and surface water runoff from road or trail prisms to streams
- Direct connection between roads or trails and streams at crossings, including culverts, fill material, etc.

Sensitive soils are found on 24 landtypes that are prone to landslides, slumps, wet soils and flooding, and soils that are vulnerable to compaction and erosion as a result of moisture content, parent material, and slope on the Helena National Forest. These determinations are based upon the "Soil Survey of Helena National Forest Area, Montana," USDA Forest Service and Natural Resource Conservation Service 2001. Table 81 displays the sensitive landtypes on the Helena National Forest. The following 24 landtypes are designated as sensitive soils within the Blackfoot Project Area:, 120, 12A, 13A, 14B, 14C, 15, 15C, 30, 36B, 49B, 56, 58, 59, 59A, 59B, 76, 76A, 75, 90, 100, 101, 360, 790, 791,.

Landslide and Slump-prone Landtypes

Soils prone to landslides and slumping are typically derived from loose or incoherent material.

Wet Soil and Flood-prone Landtypes

Wet soils and flood prone landtypes are typically described to occur on areas with surface water (either seasonal or year-long), poor drainage, or riparian areas near streams, springs or seeps. These sites are usually found in geographical depressions, concave shaped areas or along fault zones.

Loess with Volcanic Ash Landtypes

These soil's textures range from silt to sand sized particles that have been deposited by wind events. Loess and ash derived soils are vulnerable to compaction and susceptible to erosion when not vegetated.

Granitic Landtypes

Granitic parent materials weather relatively quickly into coarse textured soils which are also susceptible to erosion when not vegetated.

Table 81. Sensitive soil landtypes broken out by geological hazard

Soil Geologic Hazards (from HNF SRI)	"Sensitive" Landtypes
Landslide Map Units: Landslide-prone and wet soils	100, 101, 12A, 13A, 14B, 14C, 15, 15C, 790, 791
Colluvial Map Units: Slump-prone and wet soils	14B, 14C
Wet Soil Map Units	12A, 13A, 14, 14B, 14C, 15, 15C, 36B, 100, 101,
Loess w/ Volcanic Ash Map Units: Vulnerable to compaction & Highly erodible soils	49B, 56, 58, 59, 59A, 59B, 76, 76A, 77, 77B, 79, 790, 791, 90
Granitic Map Units: Highly erodible soils	36, 36D, 36B, 56, 76, 76A, 120, 260, 360
Flood Plains & Terrace Map Units: Flood-prone areas and wet soils	100, 101
Alluvial Fan MU: Flood-prone areas	110

Environmental Consequences

Methodology

Assumptions

All roads occurring on private land or road that are not under Forest Service management were not considered in this analysis.

Project activities involve management of existing roads, and involve very little new ground disturbance. Action alternatives propose less than a half an acre of ground disturbing activities for this project. This project is a key first step to implementing other watershed improvement activities such as; road decommissioning and recontouring, culvert removal, and replanting of disturbed areas.

The magnitude and extent of soil impacts are generally greatest on roads compared to non-motorized trails, because cut and fill road construction frequently results in soil disturbance on areas adjacent to the road tread. The magnitude and extent of soil impacts resulting from both construction and use of roads, motorized trails and non-motorized trails decrease in that order. Motorized trails typically require cut and fill construction on steeper slopes which results in a trail prism more narrow than a road but wider than a non-motorized trail.

Other than roads and trails over sensitive soils (typically riparian areas), areas most prone to extensive soil degradation would include routes that run parallel to the slope and complex networks or "spaghetti" road patterns.

Information Used

Information used consists of professional interpretations of landtypes based upon the "Soil Survey of Helena National Forest Area, Montana" USDA Forest Service and Natural Resource Conservation Service 2001 and queries from the attribute table of the Excel database file "RoadTrailLandtype102312.xlsx" as well as products derived from this file.

Travel restriction determinations are based upon the document labeled; "RestrictionDescriptionCodes.doc".

Helena NF Roads Analysis: 2002-2004.

Data Analysis

The data used for the analysis is the best available data with regards to accuracy of route location, soil type and associated soil properties. Open roads proposed on sensitive soils was the main metric for estimating effects from roads on soils in the Blackfoot travel planning area. The road and trail layer was overlain with the soil landtypes designated as “sensitive” for a GIS product displaying the miles of roads and trails occurring on specific designated sensitive landtypes. Sensitive landtypes were grouped into four categories of geologic hazard as identified in the Soil Survey of the Helena National Forest Area, 2001. These hazards address soils that occur in positions identified as; Landslide/Slump prone, Wet/Flood prone areas, Granitic soils and soils with Volcanic Ash surfaces. From this information, all routes were stratified based on these geologic hazards and then further divided by Open or Closed travel restriction.

For the Soil Resource analysis, all routes on Forest Service managed lands from each soil hazard were grouped into open or closed travel restriction. For those travel restrictions that allow **any** wheeled motorized travel at any time of year, they were placed into the Open category. The closed category was applied to those routes that are closed to **all** wheeled motorized travel yearlong and includes year-long motorized closures, decommissioned roads and naturally reclaimed roads. For open roads open to wheeled, motorized use open yearlong or for part of the year, it is assumed the potential to perform decommissioning or soil reclamation would not be possible.

Spatial and Temporal Context for Effects Analysis

The project area is the northern portion Continental Divide area, known as the Blackfoot Travel Planning Area, located north of Helena, Montana on the Lincoln District of the Helena National Forest.

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

The list of past, present and foreseeable actions noted in appendix D of this document was used for this analysis.

Effects Common to All Alternatives

Soil effects on roads and trails include: removal of vegetative cover, loss of soil productivity, compaction, and degradation of soil structure, decreased infiltration and water holding capacity, reduction in organic material, accelerated surface erosion, and exacerbation of mass failure risks, such as the risks of landslides or slumps. These types of soil impacts can occur on the prism of all roads and trails, whether those routes are used for motorized or non-motorized access. These effects are more likely and common on open routes rather than closed routes, but can happen on either open or closed routes.

The magnitude and extent of soil impacts are generally greatest on roads compared to trails, because cut and fill road construction often causes soil disturbance on areas adjacent to the road tread. On forest roads, the road tread is typically about 12-15 feet wide. For roads on steep slopes, the total area of soil disturbance, including cut and fill slopes, can be twice the width of the road tread itself. The width of total soil disturbance associated with each road in the project area is estimated to have an average width of soil disturbance associated with roads of approximately 30 feet. This is likely an overestimate for roads on flat ground, but more accurately reflects width of disturbance for roads on steep ground.

The magnitude and extent of soil impacts are generally the least on trails designed for non-motorized uses such as foot, horseback, and mountain bike travel compared to roads and motorized-use trails, because construction of non-motorized trails does not require large cut and fill slopes. The trail tread for non-motorized trails is usually designed to be 2 feet wide. Non-motorized trails affect a relatively narrow corridor, typically no more than 6 feet wide for the total area of soil disturbance. Trails designed for motorized uses are typically intermediate in magnitude and extent of soil impacts, compared to roads and non-motorized-use trails. The trail tread is usually designed to be 5 feet wide. Motorized trail design generally requires moderate cut and fill construction.

The exact width of total soil disturbance associated with each motorized trail in the project area has not been measured in the field. However for the purposes of this travel planning environmental analysis, the average width of soil disturbance associated with motorized trails is approximated as 15 feet, including ground disturbance on cut and fill slopes. This is likely an overestimate for trails on flat ground, but more accurately reflects the actual width of motorized trails on steep ground.

Impact on Soils from Off-Route Activity

Transportation uses can indirectly impact soil productivity on lands outside the road or trail prism when travelers establish new routes, especially to avoid trail obstructions and crossing difficult terrain or wet areas. Under alternatives 1 and 2 – proposed action and alternative 3 – non-motorized emphasis, wheeled motorized vehicle travel would be allowed for camping (and parking associated with camping) within 300 feet of designated system routes, including roads and trails, as long as damage to soils is not observed. Soil displacement or compaction and subsequent loss of soil productivity could result from this activity. The potential for misuse of these areas and development of new routes connecting areas, particularly in valley bottoms, is a concern for soils. However, it is important to identify that the agency currently has several authorities to temporarily or permanently remove a site or area from use should resource concerns be identified. It is expected that the effects of this activity would be mitigated by closure of specific areas if adverse soil effects are observed.

Over 60 miles of unauthorized routes have been identified in the Blackfoot travel planning area for the existing condition. Soil impacts associated with these routes can occur on all types of roads and trails, whether those routes are used for motorized or non-motorized access. Lands affected by unauthorized routes have not been officially dedicated to transportation uses. This activity results in soil quality degradation on areas that are identified for other types of uses in the Forest Plan, such as timber or forage production, and provisions for wildlife or fisheries habitat. Unauthorized routes have been identified for all alternatives

Alternative Comparisons

Table 82 shows the major differences between alternatives for sensitive soil areas, and for proposed new travel routes and decommissioned roads.

Table 82. Comparisons of miles of open and closed roads on sensitive soils, and new and decommissioned travel routes by alternative

Description of Action	Alternative 1	Alternative 2	Alternative 3
Miles of motorized-use travel route open on sensitive soils	224	222	165
Miles of motorized-use travel route closed on sensitive soils	126	125	177
Miles of new travel route construction	0	2	3.5
Miles of new non-motorized trail construction	0	31	31
Acres of ground disturbance	0	5	8
Miles of travel route decommissioned*	0	8	197
Acres of road decommissioning	0	12	284

*- effectiveness of soil rehabilitation of decommissioned roads is dependent on type of rehabilitation implemented.

Effects Common to All Action Alternatives

The effects common to alternatives 2 and 3 include a net reduction in the number of miles of routes open to wheeled motorized use on sensitive soils. Open motorized routes in sensitive landtypes have a higher risk of causing loss of soil productivity, compaction, and degradation of soil structure, decreased infiltration and water holding capacity, reduction in organic material, accelerated surface erosion, and exacerbation of mass failure risks, such as the risks of landslides or slumps.

Effects of non-motorized trails proposed in the action alternatives, compared to motorized trails, would result in a much lower risk of extensive losses of soil productivity due to narrower tread widths and less surface disturbance. They would create less area with soil compaction that could lead to surface erosion. Further, BMPs and design features would be applied to non-motorized trails to reduce erosion potential. Overall, the effects of non-motorized trails would be much smaller compared to the same mileage of motorized trails.

Alternative 2 and alternative 3 would consist of closing approximately 39 miles of unauthorized routes, which would in turn be considered a benefit from a soils perspective. These routes are assumed to be the most detrimental to soil conditions because they were not constructed with any erosion prevention measures. The effects of closing these routes would lead to natural revegetation of these sites and the reduction of erosion risk and eventual recovery of soil productivity through natural site recovery.

The action alternatives call for road decommissioning. The forest has adopted a multi-level approach to decommissioning roads, which range from closing the entrance of a road to signing the entrance, to fully re-contouring the land surface. Simply placing a sign or gate at the entrance to the route, changing the maintenance level or changing the designated use, but not making any physical improvements to the road or trail prism would be evaluated as having low effectiveness for improving soil and watershed conditions. These methods would not be considered effective in reclaiming soil productivity. Soil impacts such as compaction and decreased infiltration capacity on road or trail prisms can persist for several decades without implementation of physical reclamation measures, even though transportation or access use is discontinued. At this time for alternatives 2 and 3, the preferred treatment for road decommissioning for this project is

to waterbar, outlsope, or selectively re-contour, and subsoil the road surface 12-18 inches, seed and fertilize (if needed) and scatter slash on slopes. This effort would encourage infiltration and re-vegetation of the road surface, prevent erosion, and encourage eventual recovery of soil productivity through natural site recovery. Decommissioning roads would be moderately effective at restoring soil productivity over the short term (less than 10 years) on about 12 acres for alternative 2 and 284 acres for alternative 3. Eventually over the long term (greater than 10 years) full soil productivity would restored on decommissioned roads. In the short term, by disturbing the road surface, decommissioning can compound soil impacts from roads or trails, such as accelerated erosion. A number of citizen groups consider these short-term impacts acceptable when working towards long-term watershed improvement (Della Sala et al. 2003). There are no reclamation treatments that can immediately restore soil productivity to pre-disturbance conditions. Reclamation of site productivity is considered a long-term effect (over 10 years) since recovery of vegetation, soil and watershed conditions requires time.

Both action alternatives would store roads for future use. 133 miles of roads would be stored under alternative 2, and 75 miles in alternative 3. Roads would be water-barred and outlsoped, the road surface would be lightly scarified, and slash would be spread on steeper slopes. Simply by excluding certain forms of motorized use erosion risks can be reduced on roads. Once vegetation begins to establish on areas of the road that is unused, although compaction would still persist, surface runoff and sediment transport would decrease. The effects of closing and storing these routes would lead to natural revegetation of these sites and the reduction of erosion risk and eventual recovery of soil productivity through natural site recovery, until the road is re-used.

New roads or motorized trails are proposed for both action alternatives. The extent of new ground disturbance outside of existing roads is very low for all action alternatives. New roads and trails for the action alternatives occupy approximately five acres under alternative 2 and eight acres under alternative 3. Route construction best management practices (BMPs) would be used during construction to avoid soil erosion and provide mitigation consistent with the Forest Plan (page II/26). New roads or trails and sensitive soils by alternative are shown in table 83. Figure 3 and figure 4 show the locations of roads and trails relative to sensitive soil areas.

Table 83. New roads and motorized trails proposed for action alternatives on sensitive soils

	Alternative 2	Sensitive Soils	Alternative 3	Sensitive Soils
Road	U-New-005	No	U-New-005	No
			4081-New-A	Floodprone, wet, rutting/compaction risk
			4081-New-C	No
Motorized Trails	U-New-4	No	U-New-4	No
	U-New-4043	Ashcap	U-New-4043	Ashcap
	U-New-3	No	1821-B1-New	Ashcap, floodprone, rutting/compaction risk
	U-New-2	No	1841-D1-New2	Slump-prone, Ashcap, floodprone
	U-New-1005	No	U-New-1006	Ashcap, rutting/compaction risk
	-	-	U-427	No
	-	-	U-New-4090	No

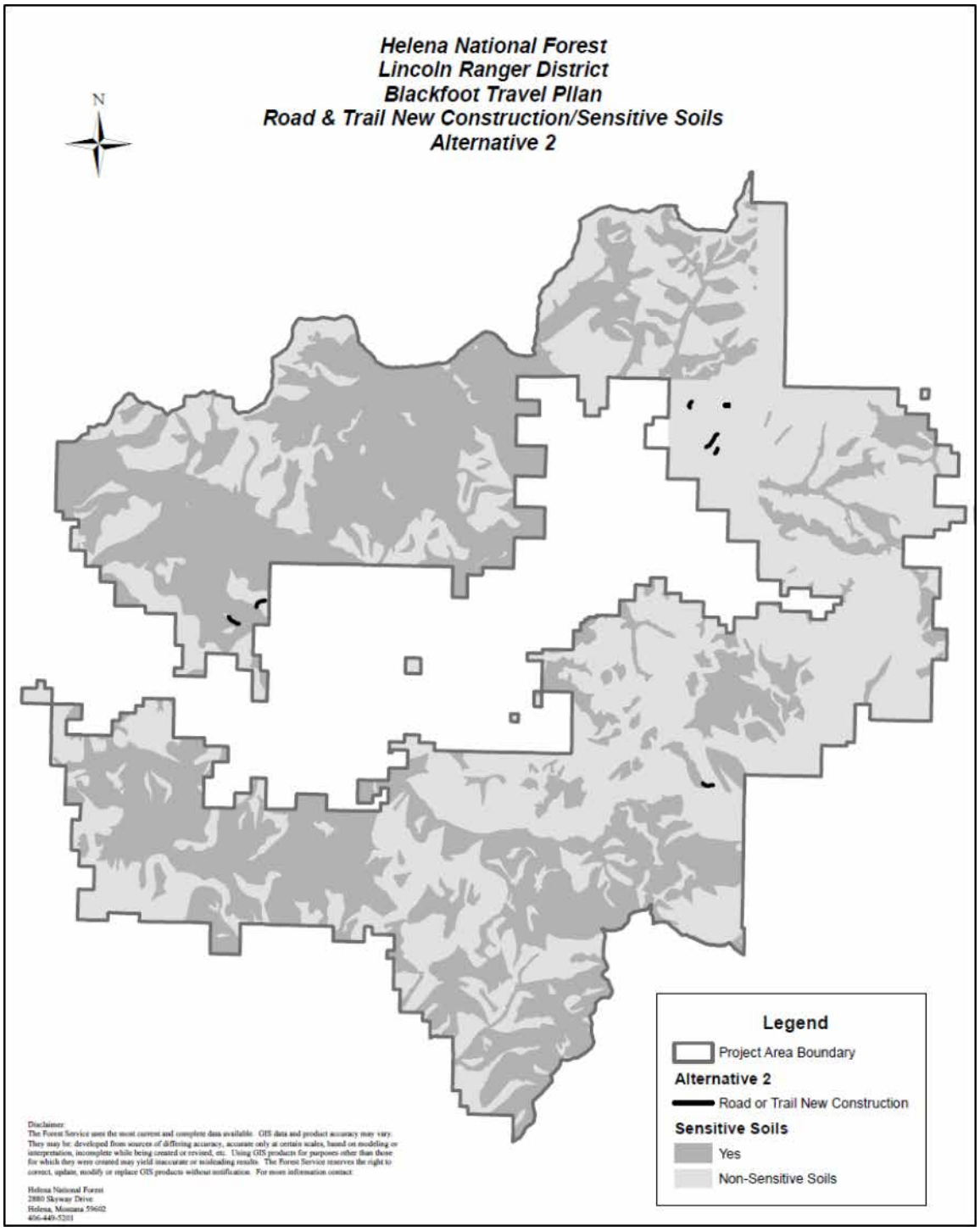

Figure 3. Alternative 2 proposed new roads and motorized trails with sensitive soil locations

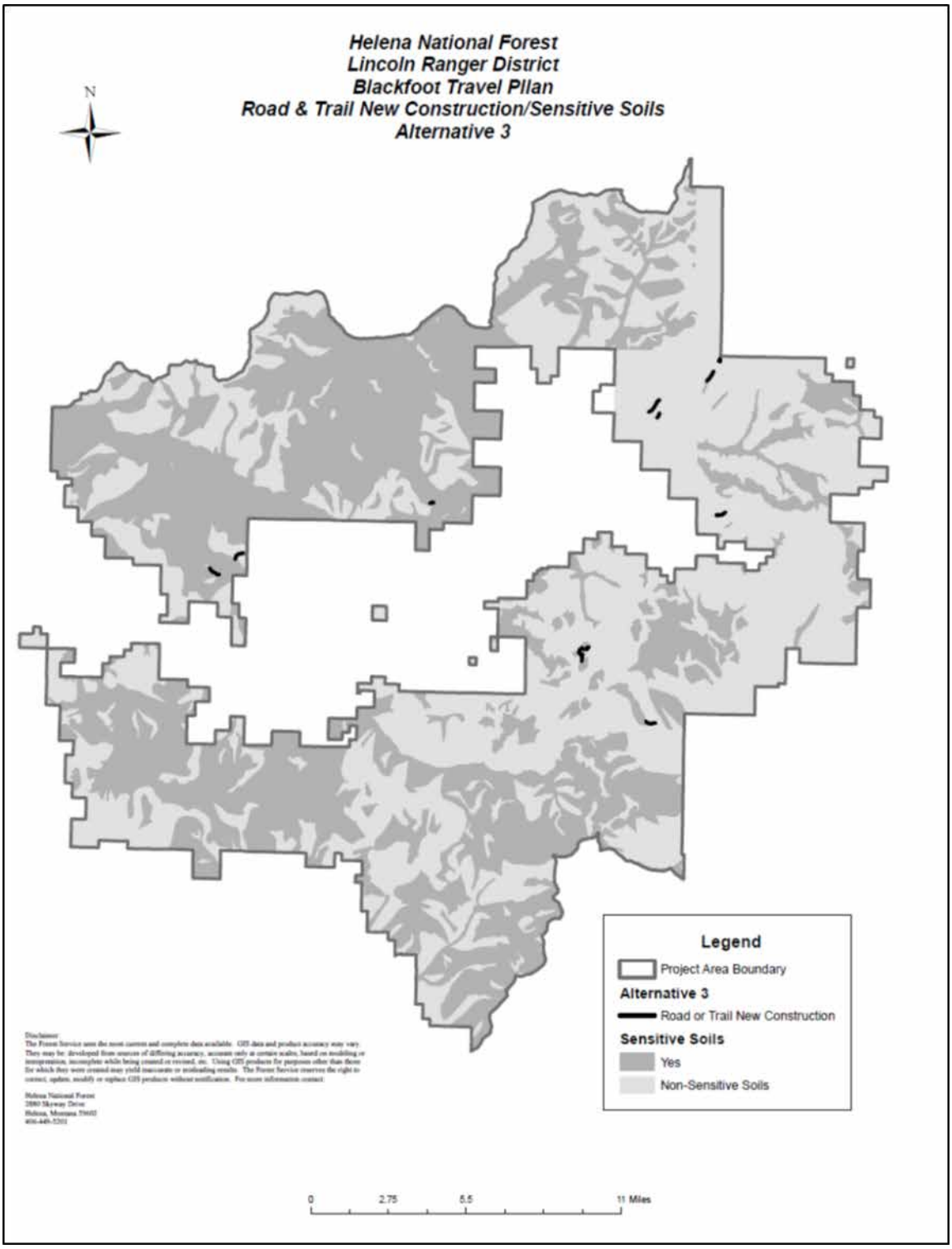

Figure 4. Alternative 3 proposed new roads and motorized trails with sensitive soil locations

Alternative 1 – No Action

Direct and Indirect Effects

Table 84 shows a description of the miles of road on each identified sensitive landtype feature for alternative 1. The quantities described do not take into account state highways, county roads or routes on private land occurring on sensitive landtypes.

Table 84. Alternative 1 open and closed road miles on sensitive soils

Alternative 1 Open	Miles	Alternative 1 Closed	Miles
Landslide/Slump prone	30	Landslide/Slump prone	15
Wet/Flood prone	22	Wet/Flood prone	5
Granitic	18	Granitic	5
Volcanic Ash	154	Volcanic Ash	101
Total Miles	224	Total Miles	126

There are approximately 60 miles of unauthorized roads or trails occurring on sensitive landtypes. These routes are assumed to be the most detrimental to soil conditions because they were not constructed with any erosion prevention measures. Therefore, no action would leave these routes open to use and would potentially further degrade soil conditions. There are no roads proposed for decommissioning or storage, and no new road or trail construction

Essentially the no-action alternative would only perpetuate further degradation of areas which contain sensitive soils. Degradation may include compaction and loss of soil productivity, and increased runoff from non-vegetated areas which would transport sediment off the native site. There would be no additional road decommissioning, closure, storage, or new road and trail construction.

No ground disturbing activity is proposed as part of this alternative, therefore no soil related irreversible and/or irretrievable commitments exist.

Cumulative Effects

The no-action alternative, when combined with other past, present, and reasonably foreseeable activities in the project area (appendix D), has the potential to perpetuate soil degradation including erosion risks and soil productivity loss especially in areas which contain sensitive soils with open roads. The primary sediment sources for these drainages include roads, and may include livestock grazing in riparian areas, and timber harvest. By far, the major sediment producer from anthropogenic sources on the forest is roads.

Other projects such as the Stonewall and other vegetation management projects, livestock grazing, mining and dispersed recreational uses are ongoing and would continue in the project area. Roads would continue to be used in the project area and would contribute to sediment yield in the project area. Degradation may include compaction, mass wasting, and increased runoff from non-vegetated areas which could transport sediment from roads to adjacent areas.

Regional Standards and Forest Plan Consistency

Generally, roads and trails are a dedicated use for the lands that comprise the road prism. Impacts to soil productivity resulting directly from the presence of roads and trails would not be evaluated for compliance with Region 1 soil quality standards for this analysis, because the affected land is managed for transportation uses not for vegetation production.

The National Forest Roads and Trails Act of 1964 authorize the Forest Service to establish and maintain a network of roads and trails on National Forest System Lands. Implicit in this legal direction is Forest Service authority to withdraw lands from vegetation production and related soil productivity on National Forest for dedication to road and trail corridors for transportation and access uses. Thus, Helena National Forest Plan guidance to sustain soil productivity when planning management activities (page II/26) would not be applicable to this decision to open, close or create new travel routes.

Alternative 1 does not move in the direction outlined in the Helena National Forest's Plan when managing for preservation of granitic soils. The criteria are described on page II/26 (Standard 3) under Soil Guidance states:

> "To reduce sedimentation associated with management activities, the highly sensitive granitic soils, which cover about 20 percent of the Forest, will have first priority for soil erosion control."

Areas with granitic soils have not received emphasis for road closure and decommissioning and erosion control efforts. However, alternative 1 would not result in an increase of routes open to wheeled motorized use occurring on granitic soils. Completely eliminating routes on all granitic landtypes would be most beneficial, however, it would be simply impractical to accomplish this and at the same time effectively manage the Forest. Overall, designated Forest routes are designed to minimize sediment production and erosion potential.

Summary of Effects

Within the project area open routes in sensitive landtypes have a higher risk of causing loss of soil productivity, compaction, degradation of soil structure, decreased infiltration and water holding capacity, reduction in organic material, accelerated surface erosion, and exacerbation of mass failure risks, such as the risks of landslides or slumps.

Combining Landslide/Slump prone, Wet/Flood prone, Granitic and Volcanic Ash soil landtypes, there are currently about 224 total miles of routes open to wheeled motorized use on sensitive soils within the Blackfoot travel planning area (table 85).

Table 85. Comparisons of miles of open and closed roads for different landtype sensitivity

Alternative 1 Open	Miles	Alternative 1 Closed	Miles
Landslide/Slump prone	30	Landslide/Slump prone	15
Wet/Flood prone	22	Wet/Flood prone	5
Granitic	18	Granitic	5
Volcanic Ash	154	Volcanic Ash	101
Total Miles	**224**	**Total Miles**	**126**

Alternative 2 – Proposed Action

Project Design Features

Project design features specific to soils are listed in chapter 2 starting on page 28, and appendix H. These design features apply to alternative 2 and 3.

Direct and Indirect Effects

Effects of road closure, storage, and decommissioning described in the "Effects Common to all Action Alternatives" section of this analysis. This alternative proposes a modest reduction in roads open on sensitive soils, and road decommissioning that would lead to a modest increase in soil productivity in the project area.

Table 86 shows a description of the miles of road proposed on each identified sensitive landtype feature. The quantities described do not take into account state highways, county roads or routes on private land occurring on sensitive landtypes.

Table 86. Alternative 2 open and closed road miles on sensitive soils

Alternative 2 Open	Miles	Alternative 2 Closed	Miles
Landslide/Slump prone	29	Landslide/Slump prone	15
Wet/Flood prone	24	Wet/Flood prone	2.3
Granitic	18	Granitic	4
Volcanic Ash	151	Volcanic Ash	104
Total Miles	222	Total Miles	125.3

When comparing alternative 2 to alternative 1 the miles of routes opened for wheeled motorized use overall decreases by 98 miles. For alternative comparison on sensitive soils and landtypes (table 87), mileages increase for routes occurring on wet and flood-prone soils by 2 miles. Mileages for roads on landslide/slump prone, granitic or ash-cap soils either remain the same, or go down slightly. The routes occurring on landslide/slump prone areas decrease from 30 miles to 29 miles, routes on granitic soils remain the same at 18 miles, and open routes on volcanic ash soils decrease by three miles, dropping from 154 to 151 miles.

Table 87. Miles of open route on sensitive soils for alternative 1 and alternative 2

Open Route Miles	Alternative 1 Miles	Alternative 2 Miles
Landslide/Slump prone	30	29
Wet/Flood prone	22	24
Granitic	18	18
Volcanic Ash	154	151
Total Miles	**224**	**222**

For alternative 2, 62 miles of unauthorized roads would be closed, 8 miles of roads would be decommissioned, 133 miles of road would be stored, and 2 miles of roads and motorized trails

would be created. Effects of each of these activities are described in the “Effects Common to all Action Alternatives” section of this analysis.

New roads and trails are proposed for construction for alternative 2. New roads and trails would be areas where land would be withdrawn from soil productive use, and dedicated to transportation use. Minor amounts of ground disturbing activity would occur as part of this travel planning effort, with about 5 acres of new road or motorized trail construction.

Cumulative Effects

Alternative 2, when combined with other past, present, and reasonably foreseeable activities in the project area (appendix D), has the potential to perpetuate existing soil degradation including erosion risks and soil productivity loss especially in areas which contain sensitive soils with open roads. The primary existing loss of soil productivity for the project area would result from roads. Ongoing and future soil productivity loss may result from soil disturbance from livestock grazing, and activities associated with timber harvest such as the creation of log landings and use of skid trails. By far, the major source of erosion from anthropogenic sources on the forest is from roads.

Other projects such as the Stonewall and other vegetation management projects, livestock grazing, mining and dispersed recreational uses are ongoing and would continue in the project area. The specific list of past, ongoing, and proposed projects considered for soil cumulative effects is listed in the DEIS (reference needed). Roads would continue to be used in the project area and would contribute to sediment yield in the project area. Degradation of soils may include soil disturbance leading to soil compaction, mass wasting, and increased runoff and erosion from non-vegetated areas which could transport sediment from roads to adjacent areas.

Regional Standards and Forest Plan Consistency

Generally, roads and trails are a dedicated use for the lands that comprise the road prism. Impacts to soil productivity resulting directly from the presence of roads and trails would not be evaluated for compliance with Region 1 soil quality standards for this analysis, because the affected land is managed for transportation uses not for vegetation production.

The National Forest Roads and Trails Act of 1964 authorize the Forest Service to establish and maintain a network of roads and trails on National Forest System Lands. Implicit in this legal direction is Forest Service authority to withdraw lands from vegetation production and related soil productivity on National Forest for dedication to road and trail corridors for transportation and access uses. Thus, Helena National Forest Plan guidance to sustain soil productivity when planning management activities (page II/26) would not be applicable to this decision to open, close or create new travel routes.

Alternative 2 does not move in the direction outlined in the Helena National Forest’s Plan when managing for preservation of Granitic soils. The criteria are described on page II/26 (Standard 3) under Soil Guidance states:

> “To reduce sedimentation associated with management activities, the highly sensitive granitic soils, which cover about 20 percent of the Forest, will have first priority for soil erosion control.”

Areas with Granitic soils have not received emphasis for road closure and decommissioning and erosion control efforts. However, alternative 2 would not result in an increase of routes open to

wheeled motorized use occurring on Granitic soils. Completely eliminating routes on all Granitic landtypes would be most beneficial, however, it would be simply impractical to accomplish this and at the same time effectively manage the Forest. Overall, designated Forest routes are designed to minimize sediment production and erosion potential.

Summary of Effects

Implementing alternative 2 would provide 222 road miles accessible to wheeled, motorized use on sensitive soils, 2 miles less than alternative 1(table 88).

Table 88. Comparisons of open and closed roads for different landtype sensitivity

Alternative 2 Open	Miles	Alternative 2 Closed	Miles
Landslide/Slump prone	29	Landslide/Slump prone	15
Wet/Flood prone	24	Wet/Flood prone	2.3
Granitic	18	Granitic	4
Volcanic Ash	151	Volcanic Ash	104
Total Miles	**222**	**Total Miles**	**125.3**

Alternative 3

Direct and Indirect Effects

Below is a description of the miles of road on each identified sensitive landtype feature. The quantities described do not take into account state highways, county roads or routes on private land occurring on sensitive landtypes.

Effects of road closure, storage, and decommissioning described in the “Effects Common to all Action Alternatives” section of this analysis. Alternative 3 proposes the lowest amount of open roads on sensitive soils of the two action alternatives, and the highest amount of road decommissioning overall (67 miles). Road decommissioning would lead to increased soil productivity on former forest roads.

Table 89 shows a description of the miles of road proposed on each identified sensitive landtype feature. The quantities described do not take into account state highways, county roads or routes on private land occurring on sensitive landtypes.

Table 89. Miles of open and closed road proposed on sensitive landtypes

Alternative 3 Open	Miles	Alternative 3 Closed	Miles
Landslide/Slump prone	26	Landslide/Slump prone	11
Wet/Flood prone	20	Wet/Flood prone	6.3
Granitic	12	Granitic	11
Volcanic Ash	107	Volcanic Ash	149
Total Miles	**165**	**Total Miles**	**177**

When comparing alternative 3 to alternative 1 the miles of routes opened for wheeled motorized use decreases overall by 139 miles and approximately 59 miles for sensitive soils including

Landslide/Slump prone areas, Wet soils/Flood prone areas, routes on Granitic soils and for routes occurring on Volcanic Ash soils (table 90). For sensitive soils and landtypes, route mileages decrease for routes occurring on wet and flood-prone soils by 2 miles. Mileages for roads on landslide/slump prone landtypes lower from 30 to 26 miles, granitic soils decrease from 18 to 12 miles, and ash-cap soils decrease 47 miles.

Table 90. Open route sensitive soil comparisons between Alt. 1 and Alt. 3.

Open Route Miles	Alternative 1 miles	Alternative 3 miles
Landslide/Slump prone	30	26
Wet/Flood prone	22	20
Granitic	18	12
Volcanic Ash	154	107
Total Miles	**224**	**165**

New roads and trails are proposed for construction for alternative 3. About 8 acres of new road or motorized trail construction would take place. New roads and trails would be areas where land would be withdrawn from soil productive use, and dedicated to transportation use.

Cumulative Effects

Alternative 3, when combined with other past, present, and reasonably foreseeable activities in the project area (appendix D), has the potential to perpetuate existing soil degradation including erosion risks and soil productivity loss especially in areas which contain sensitive soils with open roads. The primary existing loss of soil productivity for the project area would result from roads. Ongoing and future soil productivity loss may result from soil disturbance from livestock grazing, and activities associated with timber harvest such as the creation of log landings and use of skid trails. By far, the major source of erosion from anthropogenic sources on the forest is from roads. Road decommissioning proposed in this alternative and the reduction of wheeled vehicle uses would lead to a beneficial effect.

Other projects such as the Stonewall and other vegetation management projects, livestock grazing, mining and dispersed recreational uses are ongoing and would continue in the project area. The specific list of past, ongoing, and proposed projects considered for soil cumulative effects is listed in the DEIS (reference needed). Roads would continue to be used in the project area and would contribute to sediment yield in the project area. Degradation of soils may include soil disturbance leading to soil compaction, mass wasting, and increased runoff and erosion from non-vegetated areas which could transport sediment from roads to adjacent areas.

Regional Standards and Forest Plan Consistency

Regional soil standards and Forest Plan consistency for alternative 3 is the same as alternative 2 and described in more detail in the Soils Report (McNamara 2012) in the project record.

For more details on compliance with the Forest Plan, see appendix A, and for more details on compliance with other regulations and policy, see the Soils Report (McNamara 2012) in the project record.

Summary of Effects

Alternative 3 would result in an approximate reduction of 59 miles of routes open to wheeled motorized use on sensitive soils with a total of 165 miles of road open.

Table 91. Comparisons of open and closed roads for different landtype sensitivity

Alternative 3 Open	Miles	Alternative 3 Closed	Miles
Landslide/Slump prone	26	Landslide/Slump prone	11
Wet/Flood prone	20	Wet/Flood prone	6.3
Granitic	12	Granitic	11
Volcanic Ash	107	Volcanic Ash	149
Total Miles	**165**	**Total Miles**	**177.3**

Socioeconomics

Affected Environment

Existing Condition

The combination of small towns and rural settings, along with people from a wide variety of backgrounds, provides a diverse social environment for the geographical region around the Lincoln Ranger District of the Helena National Forest. Local residents pursue a wide variety of life-styles, but many share a common theme, an orientation to the outdoors and natural resources. This is reflected in both vocational and recreational pursuits including employment in agricultural, logging and milling, and mining operations, outfitter and guide businesses, hiking, hunting, fishing, camping and many other recreational activities.

Timber harvest and processing, recreation, mining, tourism, and agricultural industries are important to the economy of local areas. Despite the common concern for, and some dependence on natural resources within the local communities, social attitudes vary widely with respect to public land management. Local residents hold a broad spectrum of perspectives and preferences ranging from complete preservation to maximum development and recreational utilization of natural resources.

Population

The Blackfoot travel planning area includes portions of both Lewis & Clark and Powell Counties. Lewis & Clark, Cascade and Missoula Counties contain the closest major population centers where many forest users reside. In order to fully understand an economy and the potential impacts a Forest Service decision may have upon it, it is important to understand the communities that make up the area. Three of the four counties contain the urban areas of Helena, Great Falls and Missoula. All four counties contain vast expanses of rural communities as well as federal and state public lands. Lewis & Clark and Missoula Counties saw population growth from 1970-2010 exceed that of the national average while Cascade and Powell County witnessed their populations stagnate in the same time period.

Lewis & Clark County

The Lewis & Clark County population in 2010 was 63,604 up from 33,455 in 1970, a 90 percent increase. During that period population growth was steady with very few ebbs and flows. The

median age of Lewis and Clark County has increased by 2.7 years since 2000, from 38 to 40.7, a 7 percent increase. The portion of the population with the greatest percentage of the total population is the 45-64 age-bracket, which contains 26.2 percent of the population. The majority of the population of Lewis and Clark County is in the Helena area and surrounding communities. Other population centers include Wolf Creek, Lincoln and Augusta.

Cascade County

The Cascade County population in 2010 was 81,509, down slightly from 82,258 in 1970; a -1 percent decrease. During that period population trends have been erratic, reaching a peak of slightly more than 86,000 in the late 1970s to a low of slightly under 78,000 in 1990 before rising again through the 1990s and leveling off during the 2000 decade. The median age of Cascade County in 2010 is 39.2 up 2.5 years from 36.7 in 2000, a 7 percent increase. The portion of the population that makes up the greatest share is 18 and under, which is 26 percent of the total. The major population center of Cascade County is Great Falls. Other population centers include Cascade, Neihart and Belt.

Powell County

The Powell County population in 2010 was 7,031 up slightly from 6,666 in 1970, a 5 percent increase. During that period population trends have been erratic from a high of approximately 7,300 in 1975 to a low of approximately 6,600 in 1989. The 1990s showed positive growth for the County, and then population began to decline in the 2000s before rebounding in the middle part of the decade. Powell County is definitely getting older with a median age of 44.5, which is 12 percent older than the median age of 39.7 in 2000. The major population center of Powell County is Deerlodge. Other smaller towns in the County include Elliston, Avon, and Helmville.

Missoula County

The Missoula County population in 2010 was 109,443 up from 58,472 in 1970, an 87 percent increase. Unlike Powell and Cascade County population growth has been steady and consistent since 1970, similar to the growth seen in Lewis and Clark County. Compared to the other Counties in the economic impact area Missoula County is young with a 2010 median age of 33.9, up slightly from 33.2 in 2000, a 2 percent increase. This younger demographic can largely be attributed to the presence of the University of Montana in Missoula, Missoula County’s largest population center. Other communities in Missoula County include Seeley Lake, Clinton and Frenchtown.

Employment

The rate of unemployment is an important indicator of economic well-being. This figure can go up during national recessions or when more localized economies are affected by area downturns. There can also be significant seasonal variations in unemployment.

It is important to know how the unemployment rate has changed over time, whether there are periods of the year where the rate is higher or lower, and if this seasonality of unemployment has changed over time. Geographies that are heavily dependent on the tourism industry, for example, may show higher rates of unemployment during spring and fall "shoulder seasons." Places that rely heavily on the construction industry, for example, may have lower unemployment rates during the non-winter months.

As the economy of a place diversifies, it can become more resilient and less affected by downturns and rising unemployment rates. This is particularly true of places that are able to attract in-migration, retain manufacturing, and support a high-tech economy.

Public land agencies sometimes provide seasonal employment and may have an effect on the local rate of unemployment.

Lewis & Clark County

Annual unemployment rates have varied in the last 20 years from a high of 5.3 percent in 2011 to a low of 2.9 percent in 2007. From 1970 to 2010, wage and salary jobs (people who work for someone else) grew from 14,878 to 36,575, a 146 percent increase. During that same time period proprietors grew from 2,439 to 9,396, a 285 percent increase. Increased proprietorship can be a positive sign of entrepreneurial activity and economic strength; however it must be viewed in conjunction with proprietors' income trends. In areas of stressed economic growth people may work as a proprietor because there are no wage and salary positions available, or those available pay less.

During the period of 2001-2010 the sector of the economy that grew the most at 302 percent was mining (including fossil fuels); however it remained a small portion of the total employment picture at only 0.7 percent. The sector of the economy that grew the least was information which had a negative growth rate of -14.1 percent. As of 2010, government (federal, state and local) remained the largest employer at 24.5 percent of total employment by industry. This amount of government employment can largely be attributed to the presence of Montana's capital city, Helena, which also serves as the county seat of Lewis & Clark County.

Cascade County

Annual unemployment rates have varied in the last 20 years from a high of 6.2 percent in 1993 to a low of 3.1 percent in 2006. From 1970 to 2010 wage and salary employment grew from 32,198 to 40,765, a 27 percent increase. During the same time period proprietors grew from 5,099 to 9,833, a 93 percent increase.

During the period of 2001 to 2010 the sector of the economy that grew the most at 53.7 percent was mining (including fossil fuels), however like Lewis & Clark County this accounts for a very small percentage of the total employment by industry at only 0.3 percent. The sector of the economy that grew the least was forestry, fishing and related activities with a negative growth rate of -23 percent. Similar to Lewis and Clark County, government is the largest employer in Cascade County at 19.1 percent. This is mainly attributable to an air force base located in Great Falls, which has been a major employer in the area for many decades and traces its roots back to the World War II era.

Powell County

Annual unemployment rates have varied in the last 20 years from a high of 8.9 percent in 1993 to a low of 4.7 percent in 2006. From 1970 to 2010 wage and salary employment grew from 2,019 to 2,473, a 22 percent increase. During the same time period proprietors grew from 557 to 1,244, a 123 percent increase.

During the period of 2001 to 2010 the sector of the economy that grew the most at 103 percent was arts, entertainment and recreation, although it remains a minor player in the overall economy. The sector of the economy with the lowest growth rate was information with a-35.5

percent growth rate. Government is the largest employer in the county with 32.5 percent of the total employment by industry.

Missoula County

Annual unemployment rates have varied in the last 20 years from a high of 6.9 percent in 2010 to a low of 3 percent in 2006. From 1970 to 2010, wage and salary employment grew from 21,640 to 58,657, a 171 percent increase. During the same period proprietors grew from 3,499 to 16,928, a 384 percent increase.

During the period of 2001 to 2010 the sector of the economy that grew the most at 219 percent, was mining (including fossil fuels), although like Lewis & Clark and Cascade Counties, it is a minor component of total economic picture. The sector that grew the least was manufacturing with a -28.2 percent growth rate. Like all the counties in the impact area, Government is the largest employer in Missoula County, although it is the lowest of the analysis counties at 14.5 percent.

Income

Personal income is an important measure of economic development. Personal income indicators can show whether an economy is growing or slowing. Income can measured using different methods and it is important to understand the advantages and disadvantages of these methods. Changes in income, source of income and income distribution can show how the economy has developed over time.

Per capita income is considered one of the most important measures of economic well-being. However, this measure can be misleading. Per capita income is total personal income divided by population. Because total personal income includes non-labor income sources (dividends, interest, rent and transfer payments), it is possible for per capita income to be relatively high due to the presence of retirees and people with investment income. And because per capita income is calculated using total population and not the labor force as in average earnings per job, it is possible for per capita income to be relatively low when there are a disproportionate number of children and/or elderly people in the population. Unlike per capita income, which is affected by non-labor income, average earnings per job are an indicator of the quality of local employment. Higher average earnings per job indicate that there are relatively more high-wage occupations.

An important aspect to understanding an economy is to determine in which industries income is derived. There are three broad categories of employment. The first is non-services related, which includes farming, mining and manufacturing. The second is services related which includes industries such as retail trade, finance, insurance and real estate. The third is Government which consists of federal, state, local and military. In the last thirty years most growth in employment has been in the services related field. The services related field includes a wide variety of wages. Often the types of services related employment is different in rural versus urban areas and can affect the wages earned in those different environments.

Lewis & Clark County

From 1970 to 2010 average earnings per job (in 2011$s) adjusted for inflation increased from $40,049 to $44,198 a 10.4 percent increase. During the same time period, per capita income grew from $24,695 to $39,445 a 59.7 percent increase. In 2010, the three industry sectors with the largest personal income were government, at $765.1 million, health care and social assistance at $196.2 million and professional, scientific and technology at $172.8 million.

Employment and wages vary by industrial sector. Services related fields vary widely from financial fields to leisure and hospitality. In 2011 services related jobs employed the greatest percentage of workers at 62.3 percent; however average annual wages within the services related field remained lower than that of government and non-services related. The average annual wage in Lewis & Clark County for non-services in 2011 was $42,731, while government paid on average $64,977 and services paid $33,895.

Cascade County

From 1970 to 2010 average earnings per job (in 2011$s) adjusted for inflation increased from $43,389 to $45,576 a 5 percent increase. During the same time period, per capita income grew from $23,118 to $40,015, a 73.1 percent increase. In 2010, the three industry sectors with the largest personal income were government, at $647.2 million, health care and social assistance at $361.2 million and retail trade at $185.9 million.

Employment and wages vary by industrial sector. Services related fields vary widely from financial fields to leisure and hospitality. In 2011 services related jobs employed the greatest percentage of workers at 74.1 percent; however average annual wages within the services related field remained lower than that of government and non-services related. The average annual wage in Cascade County for non-services in 2011 was $43,580, while government paid on average $43,528 and services paid $31,736.

Powell County

From 1970 to 2010 average earnings per job (in 2011$s) adjusted for inflation increased slightly from $32,496 to $32,923, a 1 percent increase. During the same time period, per capita income grew from $17,277 to $26,835, a 55.3 percent increase. From 2001 to 2010, the three industry sectors that added the most personal income were government, at $15.5 million, Mining (including fossil fuels) at $10.4 million and arts, entertainment and recreation at $3.7 million.

Employment and wages vary by industrial sector. Services related fields vary widely from financial fields to leisure and hospitality. In 2011 services related jobs employed the greatest percentage of workers at 37.7 percent; however average annual wages within the services related field remained lower than Government and slightly higher than non-services related. The average annual wage in Powell County for non-services in 2011 was $24,515, while government paid on average $57,269 and services paid $26,187.

Missoula County

From 1970 to 2010 average earnings per job (in 2011$s) adjusted for inflation decreased slightly from $39,891 to $39,372, a 1.3 percent decrease. During the same time period, per capita income grew from $20,054 to $35,864, a 78.9 percent increase. In 2010, the three industry sectors with the largest personal income were government, at $583.3 million, health care and social assistance at $510.6 million and retail trade at $279.4 million.

Employment and wages vary by industrial sector. Services related fields vary widely from financial fields to leisure and hospitality. In 2011 services related jobs employed the greatest percentage of workers at 74.5 percent; however average annual wages within the services related field remained lower than that of Government and non-services related. The average annual wage in Missoula County for non-services in 2011 was $40,552, while Government paid on average $42,847 and services paid $32,015.

Timber Management

In recent years timber management on the Lincoln Ranger District has focused primarily on hazard tree removal as a result of insect outbreaks. Hazard tree removal is designed to protect infrastructure and the health and safety of forest users and forest employees. There are two (Stonewall and Dalton) vegetation projects currently in analysis on the Lincoln Ranger District. Table 92 displays the timber volume output in CCF (hundred cubic feet) on the Lincoln Ranger District for the past five years. Approximately 2000 CCF is equal to 1 million board feet.

Table 92. Lincoln Ranger District timber sale volume sold

Fiscal Year	Volume Sold (CCF)
2008	0
2009	70
2010	12,159
2011	20,470
2012	1,614

Fuelwood Gathering

Firewood gathering is an important service that the Helena National Forest provides. According to census data conducted in 2000, 7.5 percent of Montana households use wood as a source of heat. Firewood cutters can purchase up to 12 cords of firewood annually for a fee of $60.00. In recent years the mountain pine beetle epidemic has produced a vast supply of firewood across the District. Most firewood cutters make use of roads close to town to fill their firewood permits. Under the no-action alternative firewood cutting is expected to continue at the level of volume sold in recent years. With the abundant supply of readily available firewood in the communities that surround the Blackfoot Travel Planning area, fuelwood will be an important and viable source of heat for homes in the area. Table 93 displays the volume of fuelwood sold on the Lincoln Ranger District in the last 5 years.

Table 93. Lincoln Ranger District fuelwood volume sold.

Fiscal Year	Volume Sold (Cords)
2008	931
2009	1,181
2010	965
2011	160
2012	688

Environmental Consequences

Methodology

Economic information used to describe the affected environment is compiled from various primary government sources. There is no new data collected specifically for this analysis. Existing county-level and national forest-level data is used to describe trends in the regional economy. County economic profiles are available from the Economic Profile System (EPS), which compiles and digests primary population and economic data from a variety of government sources into a report. Recent EPS reports, which include data up to 2010, provide a recent description of the population, employment, and income composition of the counties comprising

the economic impact area for the Blackfoot travel planning area. The recent economic conditions vary for the four counties that have land in the project area. Highlights of the EPS reports are presented to describe the economies that may be impacted by the Blackfoot Travel Plan decision. As a result of the small number of firms in surrounding communities, employment and income figures were not available for some sectors of the economy due to disclosure restrictions. The key economic factors displayed for the affected environment include population, employment and income.

Measurement indicators were developed to quantify the impacts of the alternatives. The measurement indicators are changes in access to timber management and change in public access for fuelwood gathering. Measurement indicators are helpful in determining what if any impacts the alternatives may have on important natural resource considerations.

Access to suitable timber management areas is critical to successfully plan and implement feasible timber sales. Changes in existing access to timber management areas can negatively impact the ability to treat lands whose primary objective under the Forest Plan is to maintain active timber management. Without road access, timber management would likely only be able to be achieved via logging systems (helicopter) that are not economically viable in current market conditions or through the construction of new temporary or permanent roads which can considerably increase the cost of future projects.

All financial expenditures related to implementation of the action alternatives and the no action alternative will be displayed. Financial expenditures may be items such but not limited to road decommissioning, trail construction or road construction.

Incomplete and Unavailable Information

Modeling of economic impacts using input/output analysis is often conducted to estimate the expected changes in the contribution of jobs and labor income to local economies following management decisions. In order to model changes to jobs and income, expectations for changes in forest visitation are needed. Due to a lack of district-level recreation impact monitoring data, no recreation visitation impacts are provided for the Blackfoot travel planning area. In lieu of this information, measurement indicators were developed to analyze this travel management area Decision.

Spatial and Temporal Context for Effects Analysis

The analysis area includes Missoula, Powell, Lewis & Clark and Cascade counties in Montana. Access management activities within the project area have the potential to mainly impact the economic conditions of the communities adjacent to the project area in these counties. These counties are visible in figure 5 that follows.

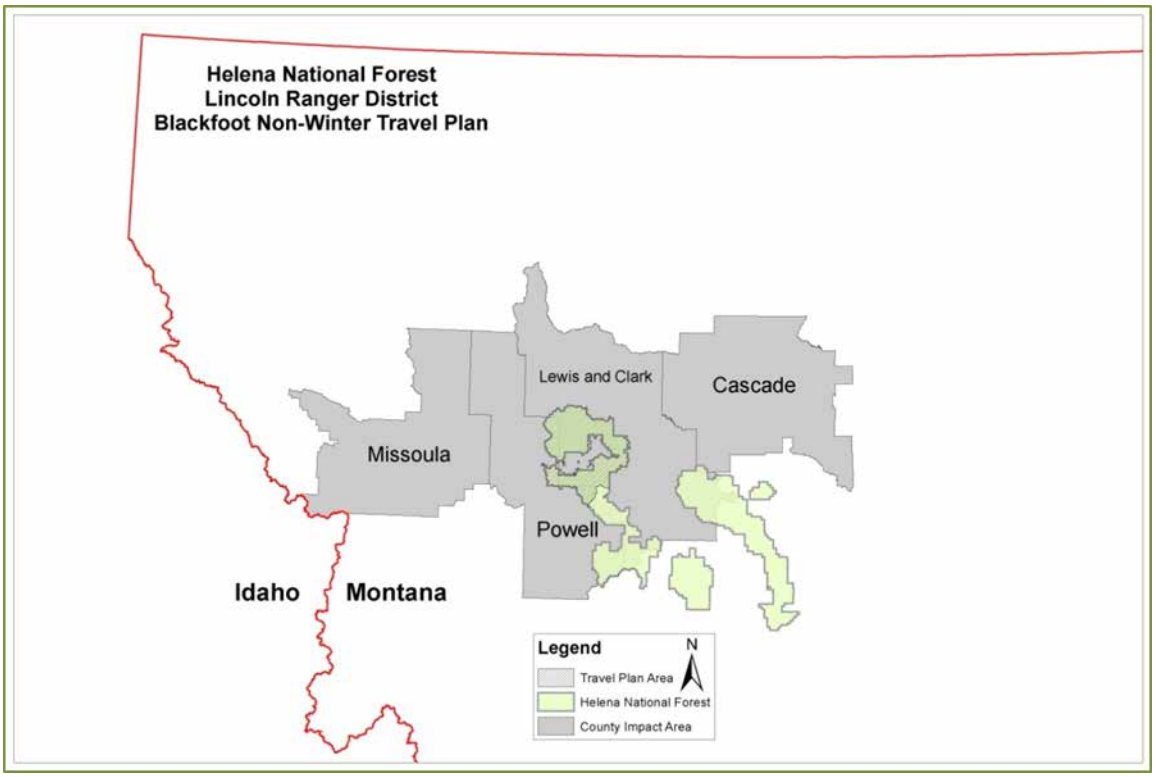

Figure 5. Economic impact area

Alternative 1 – No Action

Direct and Indirect Effects

Changes in Access to Suitable Timber Lands for Forest Management

The suitable timber management areas in the Blackfoot Travel Planning area are, for the most part, accessible for forest management under the no action alternative and would stay accessible for the planning horizon.

Change in Public Access for Fuelwood

With the abundance of available firewood in the Blackfoot Travel Planning area, no measurable change in public access for firewood would occur. It is anticipated that the public would continue to purchase firewood permits at or near current levels.

Financial Expenditures

Financial expenditures related to the project area transportation system are listed in table 94. The effects of these expenditures may be felt at the local level; however they would have little to no impact on the economic picture at the county level or over the larger economic impact area.

Table 94. Alternative 1 financial expenditures

Activity	Cost/Mile(Acre)	Miles(Acre)	Alternative 1
Road Maintenance- Level 1*	$700	182	$127,400
Road Maintenance- Level 2*	$2,000	297	$594,000
Road Maintenance- Level 3*	$3,500	106	$371,000
Road Maintenance- Level 4*	$6,500	9	$58,500
Road Maintenance- Level 5*	$7,000	2	$14,000
Trail Maintenance	$150	N/A	$0
Trail construction	$12,000	N/A	$0
Road Construction	$3,750	N/A	$0
Road Decommission- Level 4	$5,250	N/A	$0
Road Storage- Level 3S	$3,000	N/A	$0
Weed Spraying Motorized (annual)**	($30)	(1585)	$47,550
Weed Spraying Non-Motorized(annual)**	($70)	(15.6)	$1,092
Weed Monitoring (annual)**	($3)	(1600.6)	$4,802

*This is the level of 100 percent road maintenance; the Forest spends $20,000 to $40,000 annually on road maintenance.

** Assumed that 1/3 of infested acres are treated annually

Alternative 2 – Proposed Action

Project Design Features

There is no specific project design feature tied to the socioeconomic resource. For a full list of project design features see chapter 2, page 28.

Direct Effects and Indirect Effects

Changes in access to suitable timber lands for forest management

Alternative 2 decommissions 8 miles of National Forest System road. Many of these roads do not provide access to suitable timber grounds or provide redundant access to timber management areas and are appropriate to remove as system roads. Appropriate levels of road access would remain following implementation of this alternative. This alternative would not create a perceptible change in accessibility to suitable timber management lands and therefore would not reduce volume output or hinder future timber management in any measurable way.

Change in public access for fuelwood

With the abundance of available firewood in the Blackfoot Travel Planning area, no measurable change in public access for firewood would occur given the proposed changes in the transportation system. It is anticipated that the public would continue to purchase firewood permits at or near current levels.

Financial Expenditures

Financial expenditures related to the alternative 2 transportation system are listed in table 95. The effects of these expenditures may be felt at the local level; however they would have little to no impact on the economic picture at the county level or over the larger economic impact area.

Table 95. Alternative 2 financial expenditures

Activity	Cost/Mile(Acre)	Miles(Acre)	Alternative 1
Road Maintenance- Level 1*	$700	182	$127,400
Road Maintenance- Level 2*	$2,000	297	$594,000
Road Maintenance- Level 3*	$3,500	106	$371,000
Road Maintenance- Level 4*	$6,500	9	$58,500
Road Maintenance- Level 5*	$7,000	2	$14,000
Trail Maintenance	$150	181	$27,150
Mountain Bike Trail construction	$12,000	33	$396,000
Road Construction	$3,750	2	$7,500
Road Decommission- Level 4	$5,250	8	$42,000
Road Storage- Level 3S	$3,000	133	$399,000
Weed Spraying Motorized (annual)**	($30)	(1580)	$47,400
Weed Spraying Non-Motorized(annual)**	($70)	(20.3)	$1,421
Weed Monitoring (annual)**	($3)	(1600.3)	$4,801

*This is the level of 100% road maintenance; the Forest spends $20,000 to $40,000 annually on road maintenance. Maintenance levels are described in the glossary

** Assumed that 1/3 of infested acres are treated annually

Cumulative Effects

There would be no cumulative effects for alternative 2 that would result from the implementation of alternative 2 when combined with the effects of other past, present and foreseeable future actions (appendix D). Opportunities for timber harvest would remain unchanged. Planned timber management projects would not be affected by proposed road decommissioning. Current trends in timber harvest and firewood sales would continue.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

This alternative would comply with all Forest Plan standards and other laws, rules and regulations because there would be no measureable impact to the economic measurement indicators developed for this project.

Summary of Effects

Changes in recreation use and travel management have the potential to impact individual users or vendors in the local communities. Some users may transition to other recreational activities while others may venture into other areas for their pursuits. These changes, although important to some, would have little to no impact on the individual counties or the larger economic impact area. The Lincoln Ranger District would continue to provide a diverse array of non-winter recreational opportunities, which would economically benefit the adjacent communities as well as the larger communities of Helena, Great Falls and Missoula.

Change in access to timber management and change in public access for fuelwood gathering would be very minor and have no measureable impact on the overall economic impact area.

Implementation of alternative 2 would have little effect on the overall economy of the economic impact area. A few vendors or service providers may be impacted, with some seeing negative impacts, while others experience impacts of a positive nature.

Alternative 3

Direct Effects and Indirect Effects

Changes in access to suitable timber lands for forest management

Alternative 3 would decommission 197 miles of National Forest System road. Many of these roads do not provide access to suitable timber grounds or provide redundant access to timber management areas, so are appropriate to remove as System roads. Although a greater number of miles of road would be removed from the National Forest System, in comparison with alternatives 1 and 2, appropriate levels of road access would remain following implementation of this alternative. This alternative would not create a perceptible change in accessibility to suitable timber management lands and therefore would not reduce harvest volume output or hinder future timber management in any measurable way.

Change in public access for fuelwood

With the abundance of available firewood in the Blackfoot Travel Planning area, no measurable change in public access for firewood would occur given the proposed changes in the transportation system. It is anticipated that the public would continue to purchase firewood permits at or near current levels.

Financial Expenditures

Financial expenditures related to the alternative 2 transportation system are listed in table 96. The effects of these expenditures may be felt at the local level; however they would have little to no impact on the economic picture at the County level or over the larger economic impact area.

Table 96. Alternative 1 financial expenditures

Activity	Cost/Mile(Acre)	Miles(Acre)	Alternative 1
Road Maintenance- Level 1*	$700	182	$193,036
Road Maintenance- Level 2*	$2,000	297	$64,345
Road Maintenance- Level 3*	$3,500	106	$18,000
Road Maintenance- Level 4*	$6,500	9	$31,600
Road Maintenance- Level 5*	$7,000	2	$3,333
Trail Maintenance	$150	173	$25,950
Trail construction	$12,000	33	$396,000
Road Construction	$3,750	3.5	$13,125
Road Decommission- Level 4	$5,250	197	$1,034,250
Road Storage- Level 3S	$3,000	75	$225,000
Weed Spraying Motorized (annual)**	($30)	(1572)	$47,160
Weed Spraying Non-Motorized(annual)**	($70)	(30)	$2,100
Weed Monitoring (annual)**	($3)	(1602)	$4,806

*This is the level of 100% road maintenance; the Forest spends $20,000 to $40,000 annually on road maintenance. Maintenance levels are described in the glossary

** Assumed that 1/3 of infested acres are treated annually

Cumulative Effects

There would be no cumulative effects f that would result from the implementation of alternative 3 when combined with the effects of other past, present and foreseeable future actions (appendix D). Opportunities for timber harvest would remain unchanged. Planned timber management projects would not be affected by proposed road decommissioning. Current trends in timber harvest and firewood sales would continue.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

This alternative would comply with all Forest Plan standards and other laws, rules and regulations because there would be no measureable impact to the economic measurement indicators developed for this project.

For more details on compliance with the Forest Plan, see appendix A and for more details on compliance with other regulations and policy, see the socioeconomics report (Lahey 2012) in the project record.

Summary of Effects

Changes in recreation use and travel management have the potential to impact individual users or vendors in the local communities. Some users may transition to other recreational activities while others may venture into other areas for their pursuits. These changes, although important to some, would have little to no impact on the individual counties or the larger economic impact area. The Lincoln Ranger District would continue to provide a diverse array of non-winter recreational opportunities, which would economically benefit the adjacent communities as well as the larger communities of Helena, Great Falls and Missoula.

Change in access to timber management and change in public access for fuelwood gathering would be very minor and have no measureable impact on the overall economic impact area.

Implementation of alternative 3 would have little effect on the overall economy of the economic impact area. A few vendors or service providers may be impacted, with some seeing negative impacts, while others experience impacts of a positive nature.

Scenery

Affected Environment

Existing Condition

Introduction

Scenery, just as any other resource, is an important component of the forest environment and must be cared for and managed for future generations. Visual resources vary by location and existing natural features including vegetation, water features, landform, geology, and human-made elements. All activities experienced by forest visitors occur in a scenic environment which is defined by the arrangement of the natural character of the landscape along with components of the built environment.

Landscape Character

The project area is located in the Broad Valley Rockies landscape character type subregion. The Broad Valley Rockies character type is an area characterized by widely spaced round-topped mountains and ridges separated by broad U-shaped valleys that allow for sweeping panoramic views from the valley floor (USDA Forest Service 1980). Inherently, the forest patterns of the project area are characterized by mostly continuous vegetation composed of medium to dense stands of Douglas-fir and subalpine forests; these include lodgepole pine, Douglas-fir, and subalpine fir, with mixed coniferous forests of ponderosa pine and Douglas-fir. Small, open meadows break up the forest canopy on lower foothills and wetlands and streams break up the forest canopy throughout the project area.

The project area provides access to a variety of recreation opportunities that include: hunting snowmobiling, camping, fishing, driving for pleasure, off-highway vehicle travel and horseback riding, hiking, firewood gathering, berry picking, cross-country skiing and wildlife viewing.

The variety class, or scenic attractiveness, of the project area is common to the landscape with its rounded mountain features and coniferous forests. The vibrant, golden fall colors of aspen trees in small inclusions provide seasonal distinctive variety on a small scale throughout project area, and water features, such as Willow Creek, Sauerkraut Creek, and wet meadow openings, add some variety in this landscape.

State Highways 200 and 279 are main highways used by people traveling to Lincoln and other places on the district. Some past timber harvests and fire activity within the project area has varied the appearance of the forest. Areas of past treatments and burns can be appear as breaks in the forest canopy when viewed from the transportation system within and outside the project area. Although noticeable, the visible roads in these affected areas do not dominate the landscape settings, and remain subordinate to the surrounding characteristic landscape.

Environmental Consequences

Methodology

This section describes the considerations, assumptions, methodologies, and indicators used to determine the effects of the proposed alternatives on the visual component of the project area. The analysis was completed using the framework outlined in USDA Forest Service Handbook, The Visual Management System (VMS) (USDA Forest Service 1974). The proposed alternatives have the potential to affect both the visual resource itself, as well as the forest visitor’s opportunity to view the resource. Roads and trails are most often the platform for viewing the Forest’s scenery. On the other hand, the road or trail itself can affect visual quality if seen from another vantage point. Non-characteristic line quality created by road or trail segments is the greatest impact to the visual resource from the proposed alternatives. Roads and trails can create changes to a naturally appearing landscape by introducing noticeable deviations to the characteristic form, line, color, or texture of a landscape. The location and design of these segments can significantly reduce their visual impact.

Visual experiences in outdoor recreation settings vary and depend on whether a scene is viewed from a motorized or non-motorized mode of travel, the speed at which the traveler is moving, the distance from the viewing area, and topography. For instance, alterations seen in the landscape on steep topography are more visually apparent than on flat topography due to the viewing angle. The ability to identify and discern individual objects, patterns, and their relationship to the whole landscape, becomes more difficult the faster one travels because the duration of the view is

decreased. However, the chances for a hiker to notice deviations on a trail increase, because the viewing period increases dramatically.

For the classification, analysis, and inventory of the visual resource, viewing is identified by the following distance zones (USDA Forest Service, 1974):

- Foreground (0 to 0.5 mile)
- Middleground (0.5 to 5 miles)
- Background (5 miles and greater)

For this analysis, retention and partial retention visual quality objectives (VQOs) that exist in the foreground distance zone of 0 to 0.5 mile were considered. Routes beyond this foreground distance zone are expected to be unseen due to vegetation, distance, and topography, rendering no effect. This determination was made through field review and GIS analysis of the proposed route additions, sensitive travel corridors, topographic and vegetation data layers, and aerial imagery.

Representative proposed route additions were field reviewed to determine effects of this type of activity on the visual resource. Additionally, Arc Map GIS was used to analyze the alternatives in regards to key viewshed locations, vegetative and topographic screening from the sensitive travel corridors, and visual quality objectives assigned to the area.

Visual quality objectives provide direction for visual resources to determine the level of acceptable change for the landscape and are established in the Forest Plan. The analysis uses VQOs to determine if the alternatives meet Forest Plan standards and guidelines by comparing the degree of alterations from an otherwise natural-appearing forest landscape. The Helena National Forest Land and Resource Management Plan and Agriculture Handbook Number 462 provide definitions for the VQOs used for the visual management of lands administered by the Lincoln Ranger District.

Preservation VQO – This VQO provides for ecological changes only (USDA Forest Service 1995). Management activities, except for very low visual impact recreation facilities, are prohibited (USDA Forest Service 1974).

Retention VQO – Activities are not evident to the casual forest visitor (USDA Forest Service 1995). This VQO provides for management activities that are not visually evident. Under retention, activities may only repeat form, line, color, and texture, which are frequently found in the characteristic landscape (USDA Forest Service 1974).

Partial Retention VQO – Activities may be evident, but must remain subordinate to the characteristic landscape (USDA Forest Service, 1974). Activities may also introduce form, line, color, or texture which are found infrequently or not at all in the characteristic landscape, but they should remain subordinate to the visual strength of the characteristic landscape (USDA Forest Service 1974).

Modification VQO – Human activity may dominate the characteristic landscape, but must, at the same time, follow naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground (USDA Forest Service 1974).

Maximum Modification VQO – Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background (USDA Forest Service 1974).

The effects analysis will consider how each alternative meets these visual quality objectives from the transportation system within the project area under each alternative. When reviewing the proposed project activities, a determination will be made as to whether the proposed activity would be evident to the casual forest visitor, evident but subordinate to the characteristic landscape, or dominate the characteristic landscape. In order to meet an identified visual quality objective, potential alterations in the landscape would have to meet the definition for the visual quality objective assigned to the area. The terms visual resources, scenic resources, and scenery are used interchangeably in this analysis.

Assumptions

The following assumptions were used in the scenery effects analysis:

- The continued prohibition of cross-country travel under any of the alternatives would continue to have a beneficial effect on scenery.
- Proposals for season of use, vehicle class restrictions, and parking and camping off of designated routes do not cause physical impositions that are permanent on the landscape, and therefore, do not effect scenic quality in terms of VQOs. If site-specific protection measures are implemented for heritage protection, such measures would propose using natural materials such as gravel, soil, rocks, and stumps to create barriers in order prevent vehicular access where needed. Since these physical measures borrow elements from the natural landscape, the visual scenes they create are expected to meet the definition of retention (i.e., activities will repeat the line, form, color, and texture frequently found in the characteristic landscape).

Spatial and Temporal Context for Effects Analysis

The “viewshed” is the unit of spatial analysis for determining cumulative effects. Viewsheds encompass lands generally seen from travel corridors. Retention and partial retention VQOs are generally assigned to key viewsheds. The temporal scope is 20 years, because it is the approximate length of time for natural rehabilitation of unauthorized routes.

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

The cumulative effects analysis for the visual resource considers the impact of the alternatives when combined with the following past, present, and foreseeable future actions and events: routes (both system and unauthorized), any projects with decisions or proposals to close, abandon, add, or decommission system or unauthorized roads, fuels and vegetation treatment, timber management and vegetation treatment, grazing management, minerals and geology, special uses and lands management, recreation, fish/wildlife/rare plant management and road/watershed management, etc.

Alternative 1 – No Action

Direct and Indirect Effects

Cross-country motor vehicle travel is currently prohibited in the project area, and would continue with implementation of alternative 1. While this use is prohibited, some existing unauthorized routes may be noticeable in the foreground distance zone, but generally, these activities remain subordinate to the characteristic landscape due to vegetative and topographic screening. If and when seen, these routes typically appear as any other forest road or trail. When an unauthorized route intersects existing system roads and trails, the unauthorized route would be seen briefly by the casual observer general driving at the posted speed limits. In most cases, the short duration

for observation, in addition to the low development level and quality of the unauthorized routes, would allow these roadside scenes to meet their prescribed VQO of retention or partial retention. Under alternative 1, these existing unauthorized routes would not be closed, stored or decommissioned.

Under alternative 1, approximately 0.20 mile of new road construction is proposed because of a prior decision. This proposed route would be designed to resemble the same class in terms of use, surface materials, and width as similar forest routes on the district, and would not change the existing landscape character with regards to visual quality objectives.

Cumulative Effects

Past activities have formed the current landscape aesthetics and recreation opportunities. Recreation activities, developments, and travel management activities, including the existing transportation system, most often form the viewing platform and opportunities for viewing scenery. Abandoning, closing or decommissioning roads generally results in a more naturally appearing landscape in the long term. These activities would not occur under alternative 1. Continuing the current road and trail system in the project area combined with other forest existing and planned management activities, such as vegetation management projects, have the potential for affecting the visual resource; however, are expected to comply with the visual resources direction in the Forest Plan. Cumulatively, the effects of continued the existing road and trail system, along with the past, present, and reasonably foreseeable future actions could result in more unnatural-appearing landscape characteristics, resulting in lower VQO ratings that do not meet the retention or partial retention VQO along the forest's key viewsheds. Although the majority of the forest would continue to have a natural appearance, it is anticipated that the no-action alternative along with the past, present, and reasonably foreseeable future actions would result in an increase in forest land that appears altered.

Summary of Effects

Existing roads and trails do not occur at the physical scale or frequency that when seen, change or dominate a particular landscape setting enough to exceed an areas Forest Plan prescribed visual quality objective. Cumulatively, the effects of the existing road and trail system, along with the past, present, and reasonably foreseeable future actions could result in more unnatural appearing landscape characteristics, resulting in lower VQO ratings that do not meet the retention or partial retention VQO along the forest's key viewsheds. Although the majority of the forest would continue to have a natural appearance, it is anticipated that the no-action alternative along with the past, present, and reasonably foreseeable future actions would result in an increase in forest land that appears altered.

Alternative 2 – Proposed Action

Project Design Features and Mitigation Measures

There is no specific project design feature tied to the scenery resource. For a full list of project design features see chapter 2, page 28.

Direct and Indirect Effects

Similar to alternative 1, alternative 2 would continue to prohibit cross country motorized travel, (except for camping within 300 feet of a road and parking within 30 feet of a road, as described in chapter 2); nevertheless, in the short term, visual effects of past cross-country travel may be noticeable in the retention and partial retention VQO areas because rehabilitation of

unauthorized routes would take longer than 1 year. Visual evidence of cross-country travel would be reduced in the long term, allowing the viewshed scenes where impacts occurred to revegetate and take on characteristics associated with higher scenic integrity.

Actions having the potential to affect visual quality objectives from the existing scenic condition are those that propose newly constructed routes to be potentially seen and those that are physically removed from the system. Under alternative 2, segments of new road construction are proposed, a segment of new motorized trail is proposed, and segments of previously decommissioned roads are converted to motorized trail. These proposed routes would be designed to resemble the same class in terms of use, surface materials, and width as similar forest routes on the district. These additions are not at a level, scale, or frequency that would alter the overall landscape character enough to affect visual quality objectives. Alternative 2 also proposes decommissioning road segments, which would have no physical effect on the landscape character in terms of visual quality objectives. The footprints of decommissioned roads typically remains evident, but are softened over time as a result of either natural or management-induced reclamation.

Changes to the existing transportation system, such as season of use restrictions and closure to motorized use, have no direct or indirect effects on the landscape character since the routes would remain visible.

Cumulative Effects

Past activities have formed the current landscape aesthetics and recreation opportunities. Recreation activities, developments, and travel management activities, including the existing transportation system, most often form the viewing platform and opportunities for viewing scenery. Abandoning, closing or decommissioning roads generally results in a more natural-appearing landscape in the long term. Other forest management activities that have the potential for affecting the visual resource, such as vegetation management projects, are expected to comply with the visual resources direction in the Forest Plan. The majority of the forest would continue to have a natural appearance, and visually impacted areas would continue to rehabilitate, resulting in a more natural-appearing landscape. It is anticipated that this alternative along with the past, present, and reasonably foreseeable future actions would result in no cumulative effects to visual resources. With continued prohibition of cross-country motorized travel, a more natural-appearing landscape along the forest’s key viewsheds would continue as unauthorized cross-country routes are naturally reclaimed and revegetate.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

Existing and proposed roads and trails do not occur at the physical scale or frequency that when seen, change or dominate a particular landscape setting enough to exceed the prescribed Forest Plan visual quality objective for an area. Prescribed Forest Plan visual quality objectives for the affected management areas would continue to be met.

Summary of Effects

Existing and proposed roads and trails do not occur at the physical scale or frequency that when seen, change or dominate a particular landscape setting enough to exceed the prescribed Forest Plan visual quality objective for an area. This applies to cumulative effects as well. Proposals for season of use, vehicle class restrictions, and parking and camping off of designated routes do not cause physical impositions that are permanent on the landscape, and therefore, do not affect

scenic quality in terms of VQOs. Therefore, implementing alternative 2 would not impose negative impacts upon the visual resources because the prescribed Forest Plan visual quality objectives for the affected management areas would continue to be met.

Alternative 3

Direct and Indirect Effects

Effects resulting from the continued prohibition of cross-country motorized travel would be the same as those discussed under alternative 2.

The direct and indirect effects of route additions proposed under alternative 3 are generally the same as those discussed under alternative 2 because segment route distances differ little. Alternative 3 proposes to decommission approximately 190 more miles of road than alternative 2. The effect on landscape character would be less visible evidence of roads over time, in comparison with alternative 2.

Cumulative Effects

The cumulative effects of alternative 3 would be similar to the effects discussed under alternative 2.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

Existing and proposed roads and trails do not occur at the physical scale or frequency that when seen, change or dominate a particular landscape setting enough to exceed the prescribed Forest Plan visual quality objective for an area. Prescribed Forest Plan visual quality objectives for the affected management areas would continue to be met.

For more details on compliance with the Forest Plan, see appendix A and for more details on compliance with other regulations and policy, see the Scenery Report (Boisseau 2012) in the project record.

Summary of Effects

Existing and proposed roads and trails do not occur at the physical scale or frequency that when seen, change or dominate a particular landscape setting enough to exceed the prescribed Forest Plan visual quality objective for an area. This applies to cumulative effects as well. Proposals for season of use, vehicle class restrictions, and parking and camping off of designated routes do not cause physical impositions that are permanent on the landscape, and therefore, do not effect scenic quality in terms of VQOs. Therefore, implementing alternative 3 would not impose negative impacts upon the visual resources because the prescribed Forest Plan visual quality objectives for the affected management areas would continue to be met.

Fire and Fuels

Affected Environment

Existing Condition

A transportation system can provide a number of beneficial fire/fuels needs such as access for ground-based fire suppression equipment; access to and from water sources, lookouts,

communication sites, and medevac staging areas; and under certain burning conditions, fire breaks for fire suppression, anchor points for pre-positioning firefighting resources and fire line construction. Ample miles of roads in a given area also provides for options while fighting fire and potential safer, easier escape routes if needed. Additionally, roads may provide control lines for fuels projects during low intensity burns.

While roads provide the above beneficial accommodations, the number of open road miles also can have a direct impact on risk of human caused fires. The more miles open equates to more areas available to recreational uses e.g. firewood cutting and potentially more dispersed camping e.g. campfire use. There are about 446 miles of roads in the Blackfoot Travel Plan area available to the public for motorized use and 729 miles of roads available for fire management activities.

Environmental Consequences

Methodology

The quantitative effect of travel management on fire suppression and human-caused fire starts is difficult, if not impossible, to measure. Intuitively it can be stated that the more routes that are open for fire vehicle access, the better the suppression opportunities would be. Those same routes, if open to the public, would also provide an increase in the risk of human-caused fire starts under the right fuel and weather conditions, while also providing more opportunities for detection of new fire starts by forest users.

Fuels management projects, however, rely to a great degree on readily available administrative access for accomplishing land and resource objectives, thereby allowing alternatives to be quantitatively analyzed for this activity.

Assumptions

The overall goal for fire management in the Blackfoot Travel Planning Area is to allow fire's natural ecological role in ecosystem restoration, maintenance, and functioning to occur, while minimizing the detrimental effects from unwanted wildland fires (wildfires). Fire management programs and activities would be economically viable, based on resource management objectives and values to be protected. They would be based on the best available science and responsive to public health and environmental quality considerations. Firefighter and public safety is the first priority in every fire management activity; property and resource values are always the second priority.

Wildfires would be suppressed with an appropriate suppression response that attempts to minimize costs while fully considering firefighter and public safety, values at risk, and resource objectives. The full range of possible suppression responses is available, from an aggressive control strategy to simply monitoring the incident, and may eventually include the management of wildland fires to meet resource objectives (Wildland Fire Use fires). The selected response for each wildland fire must consider safety of firefighters and the public as the highest priority.

Prescribed fires would be conducted in a manner consistent with land and resource management plans, public health considerations, and with an approved burn plan. The highest priority for application of prescribed fire would be in the short interval, fire-dependent ecosystems.

Mechanical treatments may be used to facilitate the beneficial effects of future wildland fire use or prescribed fires, or may be used as stand-alone treatments to meet land management objectives.

Spatial and Temporal Context for Effects Analysis

The scope of this analysis in regard to fire and fuels management is the delineated project area, the miles of forest transportation system within the project area, and the roads that access the project area. There may be opportunity for additional access through private or other agency lands but for the extent of this analysis, only those that are readily available are considered in this context e.g., Hwy 200, Hwy 279.

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

The baseline used for cumulative effects analysis is the current condition. The cumulative effects analysis includes some consideration of past human actions, does not fully quantify all effects of past human actions by adding up all prior actions on an action-by-action basis. By looking at current conditions, we are sure to capture residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects.

Alternative 1 – No Action

Direct and Indirect Effects

There are currently about 446 miles of roads in the Blackfoot Travel Plan area available to the public for motorized use and 729 miles of roads available for fire management activities. There would be no change to the current management of travel routes, therefore, the level of fire risk or fire management activities would not be affected by the selection and implementation of this alternative. Areas that are currently not readily accessible for resource management activities such as timber harvest, fuels treatment, and ground-based fire suppression vehicles, would continue to be at risk for change due to the effects of severe wildland fires.

Wildfires would continue to be suppressed with an appropriate suppression response that attempts to minimize costs while fully considering firefighter and public safety, values at risk, and resource objectives. Prescribed fires would continue to be used to achieve resource management objectives.

Cumulative Effects

Alternative 1 would have no direct or indirect effects on fire suppression or fuel management because no project activities are proposed. There are no direct or indirect effects, so there would be no cumulative effects.

Summary of Effects

Current fire management and public access issues would not be affected by selection of this alternative. Routes that are restricted to administrative-use only would continue to provide access for fire management personnel and vehicles as long as those routes are maintained to that degree. The risk of human-caused fire starts adjacent to routes open to the public would be determined by weather and fuel conditions, and the amount of public use along those routes.

Alternative 1 - no action, clearly allows more vehicle access to all areas for both public and administrative uses, in comparison with alternatives 2 and 3. In a wildfire situation, response time is a critical factor, especially when human lives and firefighter safety may be at stake. The more routes that are open for fire vehicle access, the better the suppression opportunities would be. Those same routes, if open to the public, would also provide an increase in the risk of human-caused fire starts under the right fuel and weather conditions, while also providing more opportunities for detection of new fire starts by forest users.

Alternative 2 – Proposed Action

Project Design Features

There is no specific project design feature tied to the fire and fuels resource. For a full list of project design features see chapter 2, page 28.

Direct and Indirect Effects

There would be about 348miles of roads in the Blackfoot Travel Plan area available for public motorized use and 579 miles of roads available for fire management activities. Road access for fire suppression and fuels management projects would be reduced by about 150 miles (20 percent), while public motorized access would be reduced by 98 miles (22 percent).

Opening new or currently closed roads and trails to motorized use would have the effect of increasing the risk of human-caused fire starts during the times when vegetation is susceptible to combustion. This would also allow vehicle access for fire suppression or prescribed burning activities. Closing any currently accessible motorized route may have an impact on the response time and delivery of ground resources to any fire starts, or affect vehicle access to some prescribed burn areas, unless a gate or other type of movable barrier is used as the method of closure permitting access for administrative use. Closure of any roads or trails would also tend to reduce the risk of human-caused fires by limiting or eliminating vehicle access into those areas.

Firefighting suppression costs may increase due to the need for more extensive use of aerial firefighting resources such as helicopters, helitack crews, and retardant aircraft in areas that are no longer readily accessible by ground resources. In times of high fire activity, these aerial resources may be scarce, being committed to other assignments locally, regionally, or nationally. In these cases, area burned and total suppression costs may escalate substantially based on the need for additional resources and extended incident duration required to reach containment and control objectives.

Travel management decisions do not directly affect fire characteristics; however, they can ultimately affect fire size, human-caused fire occurrence, and vegetation treatment options by allowing or prohibiting access to an area by motorized wheeled vehicles. Wildfires would continue to be suppressed with an appropriate suppression response that attempts to minimize costs while fully considering firefighter and public safety, values at risk, and resource objectives. Fire response time, fire fighter exposure to hazardous wildfire conditions, and the cost of the fire suppression would increase in comparison with alternative 1. Prescribed fires would continue to be used to achieve resource management objectives.

Cumulative Effects

This action when combined with past, present, or future actions to close roads would further reduce the ability to respond to fires by suppression resources utilizing full-sized vehicles and would also limit fire manager’s ability to easily access areas for vegetation treatment.

Summary of Effects

Alternative 2 provides the second most access to all areas for both public and administrative uses, in comparison with alternatives 1 and 3. In a wildfire situation, response time is a critical factor, especially when human lives and firefighter safety may be at stake. The more routes that are open for fire vehicle access, the better the suppression opportunities would be. Those same routes, if open to the public, would also provide an increase in the risk of human-caused fire

starts under the right fuel and weather conditions, while also providing more opportunities for detection of new fire starts by forest users.

Alternative 3

Direct and Indirect Effects

There would be about 507 miles of roads in the Blackfoot Travel Plan area available for fire management activities, with 307 miles of these roads available to the public. Road access for fire suppression and fuels management projects would decrease by about 222 miles (30 percent), while public access would decrease by 139 miles (31 percent). Since there would be decommissioning of existing roads there would be fewer opportunities for vehicle access for fire suppression or prescribed fire activities.

Opening new or currently closed roads and trails to motorized use would have the effect of increasing the risk of human-caused fire starts during the times when vegetation is susceptible to combustion. This would also allow vehicle access for fire suppression or prescribed burning activities being conducted by designated resources. Closing any currently accessible motorized route may have an impact on the response time and delivery of ground resources to any fire starts, or affect vehicle access to some prescribed burn areas, unless a gate or other type of movable barrier is used as the method of closure permitting access for administrative use. Closure of any roads or trails would also tend to reduce the risk of human-caused fires by limiting or eliminating vehicle access into the areas.

Firefighting suppression costs may increase due to the need for more extensive use of aerial firefighting resources such as helicopters, helitack crews, and retardant aircraft in areas that are no longer readily accessible by ground resources. In times of high fire activity, these aerial resources may be scarce, being committed to other assignments locally, regionally, or nationally. In these cases, area burned and total suppression costs may escalate substantially based on the need for additional resources and extended incident duration required to reach containment and control objectives.

Travel management decisions do not directly affect fire characteristics; however, they can ultimately affect fire size, human-caused fire occurrence, and vegetation treatment options by allowing or prohibiting access to an area by motorized wheeled vehicles. Wildfires would continue to be suppressed with an appropriate suppression response that attempts to minimize costs while fully considering firefighter and public safety, values at risk, and resource objectives. Fire response time, fire fighter exposure to hazardous wildfire conditions, and the cost of the fire suppression would increase in comparison with alternatives 1 and 2. Prescribed fires would continue to be used to achieve resource management objectives.

Cumulative Effects

When combined with any past, current, or future actions that decrease access to additional Forest areas, this action would further decrease the ability to suppress fires and implement vegetation treatment projects utilizing full-sized vehicles, as well as decrease the risk of human-caused fires in areas accessed by roads. This alternative potentially could affect the cost of suppression and the size of the wildfires.

Summary of Effects

Alternative 3 provides the least access to all areas for both public and administrative uses, in comparison with alternatives 1 and 2. In a wildfire situation, response time is a critical factor, especially when human lives and firefighter safety may be at stake. The more routes that are open for fire vehicle access, the better the suppression opportunities would be. Those same routes, if open to the public, would also provide an increase in the risk of human-caused fire starts under the right fuel and weather conditions, while also providing more opportunities for detection of new fire starts by forest users.

Short-term Uses and Long-term Productivity

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

The change in driving on National Forest System roads and trails created by any of the action alternatives does not jeopardize the long-term productivity of the Helena National Forest. As described throughout chapter 3, implementing any of the action alternatives would improve resources in the project area such as wildlife habitat, cultural resource sites, and others.

Unavoidable Adverse Effects

Heritage (Cultural Resources)

Since no actions associated with this project would occur for alternative 1-no action, there would not be a need to inventory the project area. Therefore, additional cultural resources data would not be realized.

Travel management may increase public access, and as a consequence, enhance opportunities for artifact collecting and vandalism. Travel management may inadvertently expose previously undiscovered prehistoric or historic sites. It is possible that exposed artifacts and/or ruins would be observed and not reports to the Forest Service, thus providing opportunities for artifact collecting and vandalism. However, the results of past cultural resources monitoring and inventories suggest that these kinds of indirect effects would be negligible.

Permanent road and trail closures that lead to decommissioning (ripping, seeding), as based on future site-specific NEPA and NHPA analyses, could adversely affect identified cultural resources unless mitigation treatments are imposed. Adequate planning and funding are necessary to insure that the necessary cultural resource work can be completed to comply with NHPA Section 106.

Minerals

Specific permitted projects are negatively affected by alternatives 2 and 3 as shown in table 30 in the minerals analysis section. Mitigating these impacts may be possible and would have to be done on a case by case basis with the claimant.

Recreation

Alternative 3 would result in a net decrease of 14 miles of motorized trail opportunity. No designated motorized single track opportunities would be available .All designated motorized trail use would be restricted to July 1 - August 31. Overall, the motorized trail system could be characterized as having fewer, and less challenging opportunities than under the other alternatives. An unknown number of both 4-wheel and 2-wheel motorized recreationists would probably be displaced to other parts of the Forest, neighboring Forests, or other public lands.

Invasive Plant Species

The effects of noxious weed infestations are adverse to native fauna and flora and present a great large-scale threat to native ecosystems in the Nation's wild lands (Lonsdale 1999, Mack et al. 2001, Lodge and Shrader-Frechette 2003, Pauchard et al. 2003). At high infestation levels these effects are adverse due to the loss of native plant diversity, reduction of wildlife habitat and forage, increase in erosion and depletion of soil moisture and nutrient levels. These effects are common to all alternatives due to the effects of noxious weeds whether ground disturbance occurs or not. If noxious weed populations are not controlled, these effects could be irreversible.

Alternative 1 permits the most motorized use and has the largest amount of weed infestation near roads and trails. Alternative 1 would be expected to contribute most to the introduction and spread of noxious weeds in the project area. With the lowest mileage proposed for motorized use and the lowest acreage of weed infestation near travelways, alternative 3 would be less likely than the other alternatives to promote the introduction, establishment and spread of noxious weeds. Effects of alternative 2 would be intermediate between alternatives 1 and 3.

TES Plants

Alternative 1, no action would have the highest potential impact on sensitive plants by having the largest number of miles of routes open to wheeled, motorized use. Alternative 3 would have the lowest level of potential to affect sensitive plant occurrences by restricting motorized wheeled vehicle use, with slight benefits to Missoula phlox and more benefits to whitebark pine. Alternative 2 would have more potential for adverse effects than alternative 3, but somewhat less impact than alternative 1.

Hydrology

Currently, full attainment of all beneficial uses in streams is not being met in several of the 6th-HUC watersheds within the Blackfoot travel planning area. In some of these impaired streams, beneficial uses are compromised due, at least in part, to land-use activities outside of HNF management. Under the no-action alternative, full attainment of all beneficial uses would still not be met in these watersheds. Although effects of forest roads and other management practices in place before April 1993 are exempt from this standard (MCA 75-5-317), in some cases, existing activities (e.g., forest roads) on the HNF managed portions of these watersheds might not meet the state requirement that "all reasonable land, soil and water conservation practices have been applied" (ARM 17.30.602) to minimize pollution. Exemption notwithstanding, many of these roads could be considered to "cause excessive water pollution" (HNF Forest Plan, II/25) and should thus be "corrected where feasible" (ibid.), or stand in violation of the Forest Plan. Finally, planning for road decommissioning in the Blackfoot travel planning area generally cannot move forward in the absence of a travel plan decision. With these matters considered, of the three alternatives, alternative 1 offers the fewest opportunities to reduce the impact of the

HNF road network on water quality and riparian conditions (*the action alternatives 2 and 3 would result in improved water quality and riparian conditions*).

Soils

New roads and trails are proposed for construction for alternative 2 and 3. New roads and trails would be areas where land would be withdrawn from soil productive use, and dedicated to transportation use. Minor amounts of ground disturbing activity would occur as part of this travel planning effort, with about 5 acres of new road or motorized trail construction for alternative 2 and about 8 acres of new road or motorized trail construction for alternative 3 would take place. New roads and trails would be areas where land would be withdrawn from soil productive use, and dedicated to transportation use.

Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of a resource is one that cannot be regained, such as the extinction of a species. An irretrievable commitment is one where the value of the resource is lost for a period of time, such as the loss of soil productivity from the existence of a road.

Transportation

The revision and combining of travel restriction seasons are completely reversible. These actions are also retrievable since changes in travel management decisions can be revised, changed or removed through the travel analysis process or by special order in the event of sudden, unforeseen or emergency situations.

Travel management proposes new motorized and non-motorized trail and road construction. The 31 miles of proposed non-motorized trail construction in alternatives 2 and 3, as well as the 2 and 3 miles of new motorized trail construction in alternatives 2 and 3, respectively, and the 0.5 miles of new road construction in alternative 3 would be considered irretrievable commitments of forest vegetation.

Heritage (Cultural Resources)

Since no actions associated with this project would occur for alternative 1-no action, there would not be a need to inventory the project area. Therefore, additional cultural resources data would not be realized.

Travel management may increase public access, and as a consequence, enhance opportunities for artifact collecting and vandalism. Travel management may inadvertently expose previously undiscovered prehistoric or historic sites. It is possible that exposed artifacts or ruins would be observed and not reported to the Forest Service, thus providing opportunities for artifact collecting and vandalism. However, the results of past cultural resources monitoring and inventories suggest that these kinds of indirect effects would be negligible.

Minerals

The amount of minerals that are removed from Forest Service public lands through Alternatives 1-3 on the road system, whether open or closed but drivable, is an irreversible and irretrievable commitment of mineral resources. The amount of material removed is currently minimal and is expected to largely remain that way in the near future due to the complexity and cost of large scale mineral extraction activities.

Aquatic Species and Habitat

An irretrievable commitment of the action alternatives would be continued sediment delivery to streams from the existing road network, and continued impact to riparian areas traversed by roads that remain open as a result of the decision. Another irretrievable commitment to either action alternative would be a greater difficulty in the future to decommission roads known to be water quality problems that are designated as open to wheeled traffic for at least part of the year by this decision. While future closing and decommissioning of any road is not precluded by an "open" classification in this travel plan, the hurdle to accomplish this would be higher. There are no irreversible commitments from this alternative.

Invasive Species

The effects of noxious weed infestations are adverse to native fauna and flora and present a great large-scale threat to native ecosystems in the Nation's wild lands (Lonsdale 1999, Mack et al. 2001, Lodge and Shrader-Frechette 2003, Pauchard et al. 2003). At high infestation levels these effects are adverse due to the loss of native plant diversity, reduction of wildlife habitat and forage, increase in erosion and depletion of soil moisture and nutrient levels. These effects are common to all alternatives due to the effects of noxious weeds whether ground disturbance occurs or not. If noxious weed populations are not controlled, these effects could be irreversible.

TES Plants

Alternative 1 has the greatest potential to affect both of the sensitive species known to occur in the project area. One Missoula phlox occurrence is within 100 feet of motorized vehicle routes. Motorized vehicle use and associated recreational use could result in damage or destruction of that site if it is not protected from use. Project design features would protect the occurrence from herbicide use, road maintenance and new road or trail construction, but would not protect it from recreational use or other motorized vehicle use. Implementation of alternative 1 would not likely result in the destruction of whitebark pine stands, but it has greater potential than the other alternatives to adversely affect those stands. Since whitebark pine in the project area is already stressed, damage associated with vehicle use could result in further deterioration of whitebark pine condition on the Forest.

One Missoula phlox occurrence is threatened by motorized vehicle use under alternative 2. Motorized vehicle use could result in damage or destruction of that site if it is not protected from use. Project design features would protect the occurrence from herbicide use, road maintenance and new road or trail construction, but would not protect it from recreational use or other motorized vehicle use. Implementation of alternative 2 would not likely result in the destruction of whitebark pine stands; it has less potential than alternative 1 and more than alternative 3 to adversely affect whitebark pine stands. Since whitebark pine in the project area is already stressed, damage associated with vehicle use or the indirect effects of increased recreation use could result in further deterioration of whitebark pine condition on the Forest.

One Missoula phlox occurrence is threatened by motorized vehicle use under alternative 3. Motorized vehicle use could result in damage or destruction of that site if it is not protected from use. Known populations would be protected from ground disturbance associated with road maintenance, herbicide use and road and trail construction, but would not be protected from recreational use or other motorized vehicle use.

Implementation of alternative 3 would not likely result in the destruction of whitebark pine stands. Since whitebark pine in the project area is already stressed, damage associated with

vehicle use or increased recreational use could result in further deterioration of whitebark pine conditions on the Forest. Alternative 3 has less potential than alternatives 1 or 2 to adversely affect whitebark pine stands.

Hydrology

An irretrievable commitment of alternative 1-no-action alternative, would be continued sediment delivery to streams from the existing road network, and continued impact to riparian areas traversed by roads. There are no irreversible commitments from this alternative.

An irretrievable commitment of the action alternatives 2 and 3 would be continued sediment delivery to streams from the existing road network, and continued impact to riparian areas traversed by roads that remain open as a result of the decision. Another irretrievable commitment to either action alternative would be a greater difficulty in the future to decommission roads known to be water quality problems that are designated as open to wheeled traffic for at least part of the year by this decision. While future closing and decommissioning of any road is not precluded by an “open” classification in this travel plan, the hurdle to accomplish this would be higher. There are no irreversible commitments from this alternative.

Soils

No ground disturbing activity is proposed as part of alternative 1, therefore no soil related irreversible and/or irretrievable commitments exist.

New roads and trails are proposed for construction for alternative 2. New roads and trails would be areas where land would be withdrawn from soil productive use, and dedicated to transportation use. Minor amounts of ground disturbing activity would occur as part of this travel planning effort, with about 5 acres of new road or motorized trail construction.

New roads and trails are proposed for construction for alternative 3. About 8 acres of new road or motorized trail construction would take place. New roads and trails would be areas where land would be withdrawn from soil productive use, and dedicated to transportation use.

Other Required Disclosures

NEPA at 40 CFR 1502.25(a) directs “to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders.”

Environmental Justice Act

Executive Order 12898 (Feb. 11, 1994) requires all federal agencies to make environmental justice part of each agencies mission, by identifying and addressing, as appropriate, disproportionately high, and negative human health or environmental effects on minority populations or low-income populations. The alternatives were assessed to determine whether they would disproportionately impact minority or low-income populations, in accordance with Executive Order 12898.

None of the alternatives would have a disproportionate health or environmental risk on any minority or low income communities as route closures primarily focus on restricting off-road travel and closure of high-clearance dirt roads and not those most important for vehicular access.

None of the alternatives would have a disproportionate economic effect on any community or minority or low-income population. The effects to jobs and income from all alternatives studied are a very small portion. There is no evidence that any loss of jobs or income would disproportionately affect minority populations in or adjacent to the project area.

We have consulted with potentially affected tribes and effects on their rights and concerns have been considered within the analysis of alternatives. American Indian populations would not be disproportionately impacted under any alternative with avoidance of heritage resources, consideration of traditional values, and reasonable access and forest product collection allowed through agreements, permits, and recognition of their sovereignty and legal rights.

American Indian Religious Freedom Act

This proposal would not conflict with any religious freedom rights of any Tribal group. See Cultural Resources section and the Cultural Resources Specialist Report in the project files.

American Indian Rights

This proposal would not conflict with any inherent rights or treaty provisions of any Tribal group. See Cultural Resources section and the Cultural Resources Specialist Report in the project files

Social Groups

The project would have no impacts on any social groups, including minorities, Native American Indians, women, or the civil liberties of any American citizen.

American Indian Religious Freedom Act

This proposal would not conflict with any inherent rights or treaty provisions of any Tribal group.

Congressionally Designated Areas

- Wilderness: There are no lands designated in the project area as wilderness
- Wilderness Study Areas; There are no lands designated in the project area as Wilderness Study Areas or recommended for wilderness classification
- National Recreation Areas: There are no lands designated in the project area as National Recreation Areas.

Energy Requirements and Conservation Potential

The potential energy consumption associated with the proposed action and alternatives as well as the differences between the alternatives is not measurable

Floodplains (Executive Order 11988)

There would be no measurable effect to floodplains (as defined in this executive order) in the project area from implementing this project.

Inventoried Roadless Areas (IRAs)

The quality of wilderness characteristics in IRAs would be enhanced with implementation of this project through reduced motorized use in these areas.

Undeveloped / Unroaded Character / Potential Wilderness

The quality of wilderness characteristics in IRAs would be enhanced with implementation of this project through reduced motorized use in these areas.

National Landmarks

There are no National Landmarks in the project area. Therefore, no impacts would occur for any National Landmark.

Municipal Watersheds

There are no municipal watersheds affected by the project; therefore, no impacts would occur on any municipal watersheds.

Parklands

There are no lands within the proposed project area that would be characterized as parklands.

Prime Farmlands, Rangelands, and Forestlands

The project area is not located in or adjacent to prime farmlands; therefore, there would be no impacts to prime farmlands. The project area does not contain prime rangeland because of soils and climate, and none of the proposed activities in the project would convert rangelands to other uses. Therefore, there would be no impacts on prime rangelands. The project would not convert forestlands to other uses. All lands designated as forested would be retained and managed as forested; therefore, there would be no negative impacts on Prime Forestland.

Research Natural Areas (RNA)

A Forest Plan amendment for the proposed Granite Butte RNA (Management Area N-1) may be necessary in order to existing motorized use on an existing trail.

Wetlands (Executive Order 11990)

There would be no measurable effect to wetlands meeting this definition in the project area from implementing this project.

Wild and Scenic Rivers

There are no wild and scenic rivers in the project area.

Incomplete or Unavailable Information

Roads

It is possible that there are existing unauthorized routes that were unknowingly not identified on-the-ground for this analysis.

Heritage

We did not complete an on-the-ground compliance survey of every road and trail closures and new construction proposed in the project alternatives. Closed roads and trails that are proposed for reclamation would require NHPA Section 106 compliance reviews since they may be: (1) historic in origin; (2) linked to a significant cultural resource; or (3) contain an exposed historic or prehistoric archaeological site within the roadbed or prism. Mitigation measures may need to be implemented to avoid causing harm to the roadbed itself or its associated cultural resources