Chapter 3: Affected Environment and Environmental Consequences

3.1 OVERVIEW OF CHANGES FROM DRAFT TO FINAL EIS

- The tables of past, present, and reasonably foreseeable activities were updated.
- Changes in resource analyses are noted at the beginning of each resource section.

3.2 INTRODUCTION

This chapter describes the affected environment, methodology for analysis, and the direct, indirect and cumulative effects of the alternatives. The resource summaries focus on those aspects of the physical, biological, and human environment most likely to be affected by the alternatives. More detailed information on certain resources can be found in the resource specialist's reports in the project record.

3.2.1 DIRECT AND INDIRECT EFFECTS

Direct effects are caused by an action and occur at the same time and place. Indirect effects are caused by an action and occur later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1500-1508). Direct and indirect effects analysis for each alternative and each resource area are based on the factors outlined in alternative descriptions of the alternatives provided in Chapter 2.

3.2.2 CUMULATIVE EFFECTS

Cumulative impacts on the environment result from the incremental impact of actions when added to other past, present, and reasonably foreseeable future actions. For each resource, an analysis area was identified and used to adequately measure cumulative effects of the proposed alternative. Unless otherwise stated, the cumulative effects area, or the geographic scope, is the District.

3.2.2.1 Past, Present, and Reasonably Foreseeable Activities

Past Actions are addressed by the Council on Environmental Quality[1] (CEQ) in the following manner, "Generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions."[2] Past actions include grazing, timber harvest, mining and exploration, recreational camping, prescribed burning, and small product removal (i.e., post and poles, and firewood).

Present Actions are typically ongoing activities and are treated similarly to past actions. Anticipated future changes in these activities are included under reasonably foreseeable actions.

Reasonably Foreseeable Actions are those which are formal proposals or decisions not yet implemented at the time of the analysis. Activities that add to the effects of designated travel routes

[1] CEQ is the agency responsible for promulgation of regulations and guidance for the National Environemental Policy Act.
[2] CEQ's June 24, 2005 Memo

include wildfires, timber harvesting, fuel reduction, livestock grazing, and recreational uses (hunting, hiking, motorized recreation, etc.). These activities will continue to influence the landscape.

Past, present, and reasonably foreseeable activities with the most potential to cumulatively impact resources are shown in the following two tables and are considered in various manners within each of the resource analyses in this chapter. An extensive catalog of past, present, and reasonably foreseeable activities for the Ashland Ranger District can be found in Appendix F.

Table 3-1. Reasonably Foreseeable Activities[3]

Project Name	Type of Project
Custer National Forest – Sioux Ranger District Travel Management Planning	Travel Management
Whitetail Hazardous Fuels Reduction Project	Fuels Management
Ten Mile Prescribed Fire	Fuels Management
Hanson Fuels Reduction	Fuels Management
Ashland Roads Pile Burning	Fuels Management
Whitetail Cabin Toilet Replacement, Fencing, and Entry Road Project	Recreation Management
Poker Jim Picnic Area Toilet Replacement	Recreation Management
Holiday Spring Campground Toilet Replacement	Recreation Management
Geothermal Leasing Analysis	Minerals Management

Table 3-2. Past and Present Activities Considered in Cumulative Effects

Project Name	Type of Project
Recreational Use – hunting, camping, viewing, etc.	Recreation Management
Weed Treatment – District-wide	Weed Management
Fuels Treatments	Fuels Management
Permitted Grazing (~367,200 suitable acres)	Grazing Management
Montana Fish, Wildlife, and Parks Block Management	Recreation Management
2001 Tri-State OHV Decision (FS)	Recreation Management
2003 Tri-State OHV Decision (BLM)	Recreation Management
Helena NF - Elkhorn Vegetation and Travel Management Planning	Fuels and Travel Mgmt
Helena NF - Clancy-Unionville Travel Planning	Travel Management
Lewis and Clark NF – Badger-Two Medicine Travel Planning	Travel Management
Upper Missouri River Breaks RMP (BLM)	Land Management Planning
Custer NF – Beartooth Ranger District	Travel Management
Lewis and Clark NF – Big Snowy Mountains Travel Planning	Travel Management
Bighorn NF– Hunt Mountain Travel Planning	Travel Management
Helena NF– North and South Belts Travel Planning	Travel Management
Gallatin NF– Forest-Wide Travel Planning	Travel Management
Lewis and Clark NF – Rocky Mountain District, Birch Creek South	Travel Management
Lewis and Clark NF – Little Belt, Castles, and North Half Crazy Mountains Travel Planning	Travel Management

[3] Source: July 2008 Quarterly Schedule of Proposed Actions (SOPA), Custer National Forest.

Use of travel routes will continue on privately-owned and public lands within and adjacent to the Custer National Forest. Government agencies and local municipalities of Montana all use travel routes, and to varying degrees, manage them to different standards and restrictions.

3.2.3 ENVIRONMENTAL JUSTICE

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low Income Populations" requires all Federal agencies to incorporate environmental justice into their mission. No effects to the well-being and the health of minorities and low income groups were identified during scoping and the proposed action would not disproportionately affect minority or low-income populations. Three Indian Reservations are located within the region. No issues of disproportionate distribution of project impacts were found regarding any racial minorities or impoverished populations within the project area that might be affected by implementation of this project. Minority and low income populations will be treated the same as all with respect to travel opportunities.

3.2.4 NATIVE AMERICAN TREATY RIGHTS

Many tribes have aboriginal ties and use area within the Custer National Forest, including Northern Cheyenne, Crow, Assiniboine, Shoshone, Arapahoe, Shoshone-Bannock, and Three Affiliated and the Great Sioux Nation. The Crow, the Sioux, and Gros Ventre have treaty rights under the Fort Laramie Treaties to use the National Forests for hunting and gathering. None of the alternatives would affect treaty rights.

3.2.5 UNAVOIDABLE ADVERSE EFFECTS (40 CFR 1502.16)

Chapter 3 of this EIS addresses the potential environmental consequences of the alternatives for Travel Management on the District. In general, any adverse "environmental" effects can be avoided through increased restrictions on human use. However, increased restrictions also limit recreation opportunities. The alternatives were created, in part, to address issues and provide a clear basis for comparison. Adoption of Ashland Ranger District Travel Management direction does not necessarily mean that adverse environmental effects cannot be avoided. However, some resource impacts may be determined to be acceptable in light of providing for a variety of recreation uses. No unavoidable adverse effects to the various resources that are located within or adjacent to the project area were found. Implementation of any of the alternatives is not expected to move any sensitive wildlife species toward federal listing or threatened/endangered species to be in jeopardy.

3.2.6 RELATIONSHIP BETWEEN SHORT TERM USE AND LONG TERM PRODUCTIVITY (40 CFR 1502.16)

Chapter 3 of this EIS discusses the potential resource impacts of each of the alternatives including the potential consequences to soil, vegetation, water quality and biological diversity. Otherwise human travel within the Ashland Ranger District would not be considered a short-term consumptive use such as timber harvest or mining. In general travel would not affect the ability of the land to produce continuous supplies of other Forest resources. Selection of any of the alternatives considered in this analysis is expected to affect the long term productivity of the soil and vegetation resources within system route prisms while they are in use. Soil and vegetation function and productivity on roads and trails can be recovered if at some future time it is deemed as a need.

3.2.7 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES (40 CFR 1502.16)

An "irreversible" commitment of resources results from a decision to use or modify resources that are renewable only over a long period of time. Non-renewable resources, such as minerals, are an irreversible commitment if used. An "irretrievable" commitment of resources refers to resources, resource production or the use of renewable resources that are lost because of land allocation or scheduling decisions. Proposed actions can result in certain effects to various resources which are described throughout Chapter 3 of this EIS. The decision for Ashland District Travel Management would not result in any irreversible commitment of resources. The decision for Ashland District Travel Management could result in irretrievable commitment of soil and vegetation resources for as long as the road or trail exists.

3.2.8 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL (40 CFR 1502.16)

The Forest determined that the action alternatives would not affect energy consumption. People will continue to recreate on the District and consume energy for that purpose. The alternatives are not anticipated to change the amount of motorized or non-motorized use of the District, and therefore there would be no change in the amount of energy consumption due to the alternatives. Use on the District is anticipated to increase based on other factors, such as increases in population, but these factors would not be influenced by the alternatives.

3.3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES – SIGNIFICANT ISSUES

The affected environment and environmental consequences (direct, indirect, and cumulative effects) for each alternative are organized by issue topic area and are addressed below.

3.3.1 RECREATION

Overview of Changes from Draft to Final EIS

- ROS acreages were updated based on refined mapping of the ROS settings.
- Cumulative effects portion was expanded to include additional present and reasonably foreseeable activities.
- A limited amount of minor edits were made in this section.

This topic addresses general recreation, which focuses on opportunities for recreational activities and potential for travel planning to impact these activities.

3.3.1.1 Affected Environment – Recreation

Introduction

Comments related to recreation on the Ashland Travel Management proposed action could generally be categorized as issues associated with the loss of recreation opportunities or activities. Losses of opportunities were typically portrayed as loss of opportunities for motorized recreation, hunting, OHV use opportunities, non-motorized recreation, and dispersed vehicle camping.

Regulatory Framework

The Custer Forest Plan identifies both Forest-wide and management area-specific direction for recreation management. The Forest-wide goal "is to provide a broad spectrum of recreation experience opportunities". The more specific guidance provided in the management area direction of the Plan reflects this goal and represents providing a broad range of differing recreation opportunities.

Effects Analysis Methodology

The analysis area for the recreation analysis direct and indirect effects contains all Forest Service administered lands within the Ashland Ranger District.

Motorized and non-motorized recreation opportunities were evaluated based on the acres available in each Recreation Opportunity Spectrum (ROS) setting by season of use, as well as the miles of motorized routes available by alternative.

The ROS under this analysis includes the following settings: roaded natural, semi-primitive motorized, and semi-primitive non-motorized. (Full definitions of each of the ROS settings are provided later in this section.) For this analysis, the Forest Service began by assigning ROS classifications using the National ROS Inventory Mapping Protocol (USDA, 2003). The protocol assigns a one half mile width along each side of motorized wheeled vehicle routes to include in the total acres as the area utilized by motorized activities primarily due to noise. Areas that are more than ½ mile from roads or motorized trails are suitable for a semi-primitive non-motorized ROS setting as long as an individual area is equal to or greater than 2,500 acres in size. Areas less than 2,500 acres in size are added in with adjacent semi-primitive motorized or roaded natural settings, as appropriate.

This ROS information was used to determine differences between the alternatives in terms of opportunities for motorized and non-motorized recreation.

The miles of designated motorized routes available by alternative were also used to evaluate relative differences in the motorized and non-motorized recreation opportunities provided by each alternative.

The Recreation Setting

The majority of recreation activities occur in conjunction with the motorized travel corridors on the District. The majority of the activity occurs during fall and spring hunting seasons. District staff field observations indicate that OHV use, and in particular ATV use, is relatively low outside of hunting seasons.

Public feedback and staff input during the Forest's Recreation Facilities Analysis, finalized in May 2008, indicated that local communities have a relatively strong connection to recreation opportunities provided by the District. This connection appears to include a general connection with the District as well as connections with site-specific locations such as Poker Jim Butte, Red Shale Campground, and Whitetail Cabin.

Approximately 40,000 acres, or slightly more than nine percent, of the District lies within three areas where public motorized use is prohibited – the Cook Mountain, King Mountain, and Tongue River Breaks hiking and riding areas. These areas provide opportunities for solitude and non-motorized activities, such as non-motorized hunting. There are no system trails within the three hiking and riding areas.

District staff experience and public input did not indicate any significant conflicts exist between types of recreational activities on the District. Those seeking non-motorized hunting experiences did indicate some difficulty in finding non-motorized opportunities. They indicated that escaping from motorized disturbances could be challenging on the District.

Motorized Recreation

Existing system road mileages by type of restriction are shown in Chapter 2, Tables 2-3 and 2-4. The tables show there are 676 miles of road open yearlong in the analysis area.

National Forest system roads are only open to highway legal vehicles. Currently, Forest staff have observed unlicensed off-highway vehicle use on forest system roads by recreation visitors and permittees. While riding on forest system roads with unlicensed vehicles is not uncommon, it is not consistent with state and federal regulations. Under specific circumstances, system roads can be designated as motorized mixed use to all use by both licensed and unlicensed vehicles. There are currently no motorized mixed use routes on the District. The motorized mixed use designation can only be authorized on individual roads following an analysis and evaluation of the risks involved. The opportunity to mix highway legal and unlicensed vehicles has not been evaluated on the District in the past. A preliminary assessment of the Preferred Alternative indicated that the routes proposed for motorized mixed use were suitable for mixing licensed and unlicensed vehicles. The required risk analysis would be completed if any mixed motorized use roads are selected in the final decision.

There are currently no motorized system trails on the District. Motorized system trails allow operation of all off-highway vehicles, licensed or unlicensed.

Implementation of the 2001 Tri-State OHV decision restricted motor vehicles to existing routes (USDA Forest Service 2001), whether system or non-system routes. Some OHV opportunities on the District are located on existing non-system routes. Non-system routes are those that were not designed, constructed, identified, or managed as a part of the forest transportation system. State motor vehicle laws do not address vehicle licensing requirements for non-system routes.

Off-Route Motorized Travel

There are no designated cross-country vehicle areas on the District.

Dispersed Vehicle Camping

The 2001 Tri-State OHV decision and subsequent regulations implemented in 2001 allow motorized travel up to 300 feet off existing motorized routes but only to access dispersed campsites. Dispersed vehicle camping occurs along routes throughout the District. Heaviest use occurs during the fall hunting seasons.

Hunting

Big-game hunting is the primary recreation activity on the District. Turkey hunting is also an important activity on the District, but because the use numbers are highest during big-game hunting, this season will be used as the indicator for determining if there are potentially significant effects.

The primary hunting seasons include archery deer (September to mid-October), and general deer/elk (late-October through November). The State of Montana Fish, Wildlife, and Parks (FWP) administer hunting within Montana. Hunting locations vary somewhat depending on the game species. Motorized routes provide hunters with access, with some hunters using this access to seek areas more

removed from motorized influences, while other hunters may choose to hunt along or near motorized routes.

The District lies within the FWP hunting district 704. The hunting district is generally bounded by the Tongue River on the west, the Powder River on the east, the Yellowstone River on the north, and Montana/Wyoming state line on the south. This area also includes private, state, and other Federal lands. The District represents roughly 10-15 percent of the hunting district.

Recreation Opportunity Spectrum

Forest Service recreation management is guided by the Recreation Opportunity Spectrum (ROS), which models outdoor recreation opportunities and activities by natural resource setting. The Forest Service published an ROS Users Guide in 1981 along with an updated Primer and Field Guide in 1990. A National ROS Inventory Mapping Protocol was implemented in 2003. ROS has been used by the Forest Service nationwide for recreation planning and management to provide opportunities and settings consistent with public expectations to realize a desired set of experiences.

Within the District, ROS settings vary from areas dominated by roads classified for highway vehicle use (Roaded Natural), to areas through which high clearance roads and motorized trails pass (Semi-primitive Motorized), to areas away from the sights and sounds of civilization (Semi-primitive Non-motorized). The following are definitions and examples of each setting on the District:

"Roaded Natural" settings extend about one-half mile on each side of a road used by standard highway-type vehicles. All roads used by the public or permittees, and all roads used by private landowners outside the Forest boundary were considered as affecting the recreation setting. Non-motorized recreation is available on within this setting. Quiet areas and opportunities for solitude would be hard to find during the summer and fall. Forest development roads and well-used private roads typically are examples of roaded-natural corridors.

"Semi-Primitive Motorized" settings extend about one-half mile on each side of a road or trail where high clearance vehicles or motorized vehicles are legal to be used. The lack of vegetative screening or the influence of intervening ridges may allow the zone to be wider or narrower than one-half mile. This ROS setting is available to both non-motorized and motorized recreation. By definition, quiet areas and the opportunity for solitude would not occur in this setting during the time of year the routes are open to motorized travel.

"Semi-Primitive Non-Motorized" settings denote areas where stock, hiking, and/or bicycling are the predominant modes of travel (motor vehicles would not be legal to operate in this setting and motorized travel corridors would be at least one half mile in distance). The lack of terrain screening or vegetative screening may occasionally allow the sights and sounds of humans within three miles to influence the setting. The area does not meet the size, distance, or lack of human disturbance criteria established for "primitive" settings. By definition, this would be a primary area for quiet areas and an appropriate setting to provide opportunities for solitude.

District ROS Settings

Added together, the data in the following table shows that 94% of the analysis area is influenced by motorized use based on ROS settings under the No Action Alternative. Six percent of the District is in non-motorized settings. (Although the hiking and riding areas on the District represent

approximately nine percent of District lands, the effects of motorized route corridors adjacent to the boundaries of these areas extend into these areas based on the 2001 ROS Mapping Protocol.)

Table 3-3. Current (No Action) ROS Classification by Acres and Percent[4]

ROS Classification	Acres	Percent
Roaded Natural	116,928	23%
Semi Primitive Motorized	337,798	67%
Semi Primitive Non-Motorized	47,533	10%

Recreational Use

Recreation Activities – National Visitor Use Monitoring

The Custer National Forest conducted a National Visitor Use Monitoring (NVUM) survey in 2001-2002 with the data resulting from the survey compiled and made available in 2003. The NVUM protocol is designed to be repeated every 5 years. Locations for surveys are established by the Forest based on field observation of potential sites to interview visitors about their activities as they exit the forest, a trail, or developed recreation site. The survey dates, times and places are assigned on a random basis and capture a range of use levels at different sites and areas across the Forest. The schedule is assigned to the Forest by the national NVUM working group.

The relatively high recreational use on the Beartooth Ranger District resulted in selection of only a handful of NVUM surveys on the District. The result is that the data generated from this effort is relatively reliable for the Beartooth District, but does not appear to be representative of recreational activities on either the Sioux or Ashland Ranger Districts. Consequently, NVUM data is not helpful in conducting site-specific analysis for the Ashland District, but can be useful in identifying national and regional trends.

Hunting

It is difficult to determine how many hunters use the District during big-game hunting season, or how many may be on the District at any one time. FWP issues unlimited permits for general and archery deer in the area. For elk, they issue unlimited archery permits (approx. 600 issued in 2008) and 300 general permits. Hunter surveys conducted by FWP indicate that in the past three years 3,000-5,000 deer hunters have used the 704 hunting unit (FWP 2008a). FWP staff suspect that the majority of these hunters use the District National Forest lands for deer hunting (FWP 2008b).

The opening weekend of big-game hunting season typically has the highest number of hunters on the District.

Recreation Trends

Recreational OHV use in Montana grew by 40% in the last decade and is expected to continue to grow (Montana Fish, Wildlife and Parks 2000). Similarly, the analysis area has experienced additional use over the last decade based on District staff field observations.

[4] Calculations were based on National Forest system lands within the District boundary. Acres were derived from GIS mapping. All numbers were rounded to the nearest whole percent.

The Forest Service produced a national report on OHV use titled *Off- Highway Vehicle Use on National Forests: Volume and Characteristics of Visitors, Special Report to the National OHV Implementation Team - 5 August 2004*. Data used in this analysis came from the National Visitor Use Monitoring (NVUM) program. The research methodology for this program is documented in a General Technical Report (English, et al., 2002). The first sampling cycle occurred from January 1, 2000 to September 30, 2003. During that period, on-site surveying occurred on nearly 23,000 sample days around the country. Over 90,000 visitors finishing a recreation visit were interviewed about their activities, experiences, length of stay, and demographic characteristics. The survey data shows that OHV use is a specialized use of forests and not a major recreational use for most forests. Slightly more than 2,000 of surveyed visitors indicated OHV use was a primary activity, and a little less than 5,400 indicated participation in OHV activity during their visit.

Nationally, about 2.5% (5.2 million visits) of the 205 million recreational visits to National Forest have OHV use as their primary activity[5]. A slightly larger percentage (3.1%) has OHV use as a secondary activity. That is, about 6.3 million visitors reported participating in OHV use, but not as their primary activity. These would include people who engaged in OHV riding during their visits, but who came to the forest primarily for some other activity.

The total numbers of National Forest visits that have OHV use as either a primary or secondary activity is about 11.5 million. The estimates of primary OHV use visitation are similar for most National Forest regions (range 12 – 16% of the national total), except Region 1 (includes the Custer National Forest) and 10 (Alaska). Only 5% (about 274,000 visits) of the total primary OHV use for all National Forests occurs on forests in Region 1. None of the visitors surveyed in Region 10 indicated that OHV use was their primary recreational activity.

Trends in Other Recreation Activities

Recently, a decline in overall participation in outdoor activities has been noted, attributed partially to the growth of leisure choices now available such as the Internet and satellite TV (Roper 2003). Despite this recent trend, with increasing population and growth in income, outdoor recreation participation is expected to grow (Cordell 1999).

A U.S. Fish and Wildlife Service (2004) report indicates that overall hunting participation decreased nationally between 1991-2001, although big-game hunting participation generally remained level and turkey hunting increased. The report indicated that big-game hunting in Montana reflected this trend.

Studies sponsored by FWP and the Forest Service concur with these trends (USDA 2005). However, they also indicate that demand for big-game hunting opportunities is expected to exceed supply for opportunities beginning in 2010. This suggests that hunting opportunities in Montana are expected to level off in the near future (the supply will be at a maximum).

[5] Percentages presented here include visitors who did not provide information on their primary and/or secondary recreation activities. Using just those who did provide that information as a base yields primary OHV use at 3.0%, and those listing OHV as a secondary activity at 3.5%. (English: Off- Highway Vehicle Use on National Forests: Volume and Characteristics of Visitors, Special Report to the National OHV Implementation Team - 5 August 2004)

3.3.1.2 Environmental Consequences - Recreation

The following tables provide a summary of the ROS settings by acres and miles for each alternative. These are used to form much of the analytical basis for comparing the alternatives.

Table 3-4. ROS Setting by Alternative (percent/acres)

ROS Setting	Alternative A	Alternative B		Alternative B Modified		No Action
	Season of Use Yearlong	Season of Use 12/2-8/31	Outside Season of Use 9/1-12/1	Season of Use 12/2-8/31	Outside Season of Use 9/1-12/1	Season of Use Yearlong
Roaded Natural	23% (114,108)	23% (114,027)	23% (114,027)	23% (114,004)	23% (114,004)	23% (116,928)
Semi-Primitive Motorized	64% (320,418)	58% (292,260)	56% (281,485)	59% (296,192)	55% (279,049)	67% (337,798)
Semi-Primitive Non-Motorized	13% (67,734)	19% (95,972)	21% (106,746)	18% (92,063)	22% (109,206)	10% (47,533)

Table 3-5. Summary of Miles[6] of System Roads and Motorized Trails Designated for Public Motorized Use by Alternative.

Route Designation	Alternative A	Alternative B		Alternative B Modified		No Action
	Season of Use Yearlong	Season of Use 12/2-8/31	Outside Season of Use 9/1-12/1	Season of Use 12/2-8/31	Outside Season of Use 9/1-12/1	Season of Use Yearlong
Road – Highway legal vehicles only	101	101	101	101	101	676
Road – All types allowed (motorized mixed use)	37	37	37	37	37	0
Motorized Trail – All motor vehicles allowed	612	405	387	406	379	0
Motorized Trail – Vehicles 50 Inches or Less	0	0	0	17	17	0
Total	750	543	525	561	534	676

Direct and Indirect Effects - Recreation

Alternative A

Recreation Opportunity Spectrum

The above table indicates the District would contain 87 percent (434,526 acres) in motorized settings, and 13 percent (67,734 acres) in non-motorized settings. This is an approximately 20,000 acre shift from motorized to non-motorized settings compared to the No Action Alternative. This is a result of those system routes that could not be designated because there is no public right-of-way.

[6] Comparison between tables may not be exact due to rounding error.

There is no season of use associated with this alternative, so there would not be a seasonal change in ROS settings under this alternative.

Motorized Recreation Miles
There would be 750 miles of roads and trails available yearlong for motorized recreation opportunities.

Motorized Opportunities
Implementation of this alternative would maximize the opportunities for motorized recreation on the District. It provides the greatest number of miles of routes designated for public motorized use, and includes the greatest number of miles of motorized trail. This would be expected to increase the opportunities for motorized recreationists compared the other alternatives. In addition, this alternative would be attractive to users that are seeking semi-primitive motorized types of experiences given the number of motorized trails.

Motorized users have the greatest opportunity to be able to find the type of motorized experience they are seeking under this alternative than Alternative B, B Modified or the No Action Alternative, based on the miles of routes available, variety of vehicle use designations available, and yearlong season of use on all motorized routes.

This alternative would provide a considerable amount of opportunities to operate licensed and unlicensed motor vehicles on the District. Families and those desiring to operate unlicensed motor vehicles would find opportunities to day long trips and motorized loop experiences.

Based on miles of routes, this alternative would be expected to provide more opportunities for persons with disabilities or limited mobility to access the District with motor vehicles than the other alternatives.

Non-Motorized Opportunities
The quality of the outdoor experience for those seeking non-motorized recreational activities would have the second greatest potential to be diminished of all of the alternatives. Although this alternative has more miles of routes than no action, the ROS mapping indicates that there would be more non-motorized settings than under no action. District staff field observations indicate that recreational use is low during the majority of year, so finding non-motorized experiences may not be a cause for concern other than during big-game hunting seasons – the season of heaviest visitor use.

There would be approximately 28,000 acres in non-motorized settings outside of the Hiking and Riding Areas (approximately 40,000 acres).

Dispersed Vehicle Camping
This alternative would provide more dispersed vehicle camping opportunities than the other alternatives being analyzed. Compared to no action, there would be an additional 74 more miles of motorized routes that would provide potential dispersed vehicle camping locations.

Hunting
This alternative provides the maximum opportunity to hunters who desire to scout and retrieve their game by motorized means. Big-game hunters would be likely to find experiences similar to the No

Action Alternative based on ROS settings, and would not be expected to be displaced under this alternative.

Hunters seeking opportunities to hunt without disturbance by motorized vehicles could expect to have more difficulty doing so under this alternative when compared to Alternative B and Alternative B Modified, and slightly more than under the No Action Alternative. This alternative would have a higher potential to displace hunters interested in non-motorized hunting opportunities compared to Alternatives B and B Modified, and slightly less potential than the No Action Alternative. If hunters are displaced, their opportunities to find this experience on the District would be limited, but slightly better than under the No Action Alternative.

Since this alternative represents the existing condition, the overall number of hunters is not expected to be affected by this alternative and is unlikely to be substantively different than total hunter numbers under the No Action Alternative given the limited difference in ROS settings.

Alternative B

Recreation Opportunity Spectrum
The above table indicates that under Alernatives B the District would contain 81 percent (406,287 acres) in motorized settings, and 19 percent (95,972 acres) in non-motorized settings from December 2 to August 31. This is an approximately 48,439 (Alternative B) acre shift from motorized to non-motorized settings compared to the No Action Alternative. The additional non-motorized acres would be dispersed in pockets throughout the District.

From September 1 to December 1, the big-game hunting season, ROS settings on the District would shift two percent more towards non-motorized settings under Alternative B. Semi-primitive non-motorized acres would increase by 10,775 acres. These acres are distributed across three areas on the southern end of the District (see map package) and are separate from the hiking and riding areas.

Motorized Recreation Miles
There would be 543 miles of roads and trails available for motorized recreation opportunities. During the big game hunting season, motorized season of use designations would reduce the number of miles of roads and trails available for public use to 525 miles.

Motorized Opportunities
Implementation of this alternative would provide the least amount of miles for motorized recreation of all the alternatives. Because of the lack of specific user information and numbers, it is difficult to say if the reduced number of miles would actually result in displacement of motorized users, but this alternative does have the greatest *potential* to displace motorized use. District staff field observations indicate that visitor use is low outside of big-game hunting seasons. Consequently, it is likely that the only real potential to displace motorized users is during the big-game hunting season.

The 18-mile reduction in route miles during the big-game hunting season is unlikely to have much additional affect on motorized users in general, but may impact individuals if they have a connection with the specific routes that would not be available at that time of year.

Based strictly on miles of routes, this alternative would be expected to provide fewer opportunities for persons with disabilities or limited mobility to access the District than the other alternatives. It is

difficult to assess the degree of this impact given the absence of user data for the District, but again the real potential for impacts may only be during the big-game hunting season since observed use is relatively low the remainder of the year.

Non-motorized Opportunities
The quality of the outdoor experience has the second highest potential to be improved under this alternative for those interested in non-motorized recreation opportunities during the big-game hunting seasons. The areas created by the season of use designation will give visitors three new areas in addition to the three existing hiking and riding areas to seek out non-motorized opportunities.

District staff field observations of low visitor use outside of the big-game hunting seasons suggests that opportunities for non-motorized experiences for the majority of the year are readily available. Thus, the change in miles and ROS setting proposed under this alternative may essentially enhance non-motorized experiences during a portion of the year when those opportunities are already relatively abundant. Consequently, the value to non-motorized opportunities outside of the big-game hunting season may be limited.

There would be approximately 56,000 acres in non-motorized settings outside of the Hiking and Riding Areas (approximately 40,000 acres) from 12/2-8/31, and approximately 67,000 acres from 9/1-12/1.

Dispersed Vehicle Camping
This alternative would provide fewer dispersed vehicle camping opportunities than the other alternatives being analyzed. Compared to no action, there would be 133 fewer miles of motorized routes that would provide potential dispersed vehicle camping locations during the season of use, and 151 fewer miles during the big-game hunting season.

There is uncertainty about how this may actually impact recreational use, since there is only very limited visitor use information for the District. Those individuals accustomed to using dispersed vehicle camping site adjacent to a route that is not designated may feel a sense of loss. In general, there is a greater potential under this alternative for visitors to find or perceive it harder to find a dispersed camping location.

Hunting
Hunters seeking opportunities to hunt without disturbance by motorized vehicles would have a better chance of doing so under this alternative, when compared to Alternative A and the No Action Alternative, but slightly less than under Alternative B Modified. The increase in semi-primitive non-motorized acres of this alternative outside of the season of use will clearly provide more opportunity. However without specific information on demand for this type of experience, it is difficult to assess whether the demand would be satisfied.

This alternative provides the fewest opportunities for hunters who desire to scout and retrieve their game by motorized means. This alternative would have the highest potential to displace hunters interested in these hunting opportunities. If hunters are displaced, they may be able to find similar opportunities elsewhere on the District since 79 percent of the District would remain in motorized settings under this alternative during the big-game hunting season.

FWP staff generally believes that changes proposed in this alternative may not result in a net loss of hunters. Their impression is that if some hunters are displaced by the proposed actions in this

alternative, they are likely to be replaced by other hunters looking for the opportunities created by the proposed actions (FWP 2008b). Recreation trend information for Montana, cited in the *Trends in Other Recreation Activities* section above, supports the assumption that the types of changes proposed would not be likely to affect the overall total hunter numbers given the strong demand for big-game hunting opportunities.

Alternative B Modified

Recreation Opportunity Spectrum
The above table indicates the District would contain 82 percent (383,196 acres) in motorized settings, and 18 percent (92,063 acres) in non-motorized settings from December 2 to August 31. This is an approximately 44,530 acre shift from motorized to non-motorized settings compared to the No Action Alternative. The additional non-motorized acres would in pockets dispersed throughout the District.

From September1 to December 1, the big-game hunting season, ROS settings on the District would shift four percent more towards non-motorized settings. Semi-primitive non-motorized acres would increase by 17,143 acres. These acres are distributed across six areas on the southern end of the District (see map package), five of which are separate from the hiking and riding areas.

Motorized Recreation Miles
There would be 561 miles of roads and trails available for motorized recreation opportunities. During the big game hunting season, motorized season of use designations would reduce the number of miles of roads and trails available to 534 miles.

Motorized Opportunities
Implementation of this alternative would provide the second lowest amount of miles for motorized recreation of all the alternatives. Because of the lack of specific user information and numbers, it is difficult to say if the reduced number of miles would result in displacement of motorized users. District staff field observations indicate that visitor use is low outside of big-game hunting seasons. Consequently, it is likely that the only real potential to displace motorized users is during the big-game hunting season. This alternative would have less potential to displace hunters during the big-game hunting season than Alternative B, because routes important for hunter access are proposed to be designated in response to hunter comments that were not included in Alternative B.

The 27-mile reduction in route miles during the big-game hunting season is unlikely to have much additional affect on motorized users in general, but may impact individuals if they have a connection with the specific routes that would not be available at that time of year.

Based strictly on miles of routes, this alternative would be expected to provide fewer opportunities for persons with disabilities or limited mobility to access the District than the No Action Alternative or Alternative A, but slightly more than Alternative B. It is difficult to assess the degree of this impact given the absence of user data for the District.

Non-motorized Opportunities
The quality of the outdoor experience has the greatest potential to be improved under this alternative for those interested in non-motorized recreation opportunities during the big-game hunting seasons. The areas created by the season of use designation will give visitors six new areas in addition to the three existing hiking and riding areas to seek out non-motorized opportunities.

District staff field observations of low visitor use outside of the big-game hunting seasons suggests that opportunities for non-motorized experiences for the majority of the year are readily available. Thus the change in miles and ROS setting proposed under this alternative may essentially enhance non-motorized experiences during a portion of the year when those opportunities are already relatively abundant. Consequently, the value to non-motorized opportunities outside of the big-game hunting season may be limited.

There would be approximately 52,000 acres in non-motorized settings outside of the Hiking and Riding Areas (approximately 40,000 acres) from 12/2-8/31, and approximately 69,000 acres from 9/1-12/1.

Dispersed Vehicle Camping
This alternative would provide the second fewest dispersed vehicle camping opportunities of all the alternatives being analyzed. Compared to no action, there would be 115 fewer miles of motorized routes that would provide potential dispersed vehicle camping locations during the season of use, and 142 fewer miles outside of the season of use.

There is uncertainty about how this may actually impact recreational use, since there is only very limited visitor use information for the District. Those individuals accustomed to using dispersed vehicle camping site adjacent to a route that is not designated may feel a sense of loss. In general, there is a greater potential under this alternative for visitors to find or perceive it harder to find a dispersed camping location.

Hunting
Hunters seeking opportunities to hunt without disturbance by motorized vehicles would have the best chance of doing so under this alternative than the other alternatives analyzed. The increase in semi-primitive non-motorized acres of this alternative during big-game hunting season will clearly provide more opportunity. However without specific information on demand for this type of experience, it is difficult to assess whether the demand would be satisfied.

This alternative provides the second lowest amount of opportunity (based on miles of routes) for hunters who desire to scout and retrieve their game by motorized means. This alternative would have the the second highest potential to displace hunters interested in these hunting opportunities. If hunters are displaced, they may be able to find similar opportunities elsewhere on the District since 78 percent of the District would remain in motorized settings under this alternative during big-game hunting season.

FWP staff generally believed that changes proposed in Alternative B would not result in a net loss of hunters. Given the similarity between Alternative B and this alternative, it is reasonable to assume a similar result under this alternative. Their impression is that if some hunters are displaced by the proposed actions in Alternative B, they are likely to be replaced by other hunters looking for the opportunities created by the proposed actions (FWP 2008b). Recreation trend information for Montana, cited in the *Trends in Other Recreation Activities* section above, supports the assumption that the types of changes proposed in this alterantive would not be likely to affect the overall total hunter numbers given the strong demand for big-game hunting opportunities.

No Action Alternative

Recreation Opportunity Spectrum
The above table indicates the District would contain 90 percent (454,726 acres) in motorized settings, and ten percent (47,533 acres) in non-motorized settings. All of the non-motorized acres would be within the hiking and riding areas.

Motorized Recreation Miles
There would be 676 miles of roads available for motorized recreation opportunities. No mixed use roads or motorized trails would be designated.

Motorized Opportunities
The miles designated for public motorized use include routes for which the Forest Service has no legal right-of-way for public access. This could have a couple of implications. The actual miles of roads available to the public may in effect be less, since some of these system roads may not be accessible. There are 55 miles with no legal right-of-way for public access included in this alternative. The public may or may not be able to access them with motor vehicles, and would need to have permission from landowners to be able to use them. This could lead to confusion and may encourage inadvertent motorized trespassing on private lands.

Under this alternative, motorized users may not find opportunities for the types of motorized experiences they are accustomed to on the District. This is primarily because there would be no opportunities to operate unlicensed motor vehicles on the District; all motor vehicles would need to be licensed to operate on the District.

Individuals may find that routes they had grown accustomed to using over the last few years are no longer available for motorized use since only existing system roads would be designated for public motorized use and no non-system routes would be designated. However, it is likely, based on the total miles to be designated, that visitors could find similar motorized experiences and opportunities on the District. The situation would be expected to be similar for District visitors with disabilities or limited mobility seeking motorized opportunities.

Non-motorized Opportunities
Although this alternative has fewer miles of roads than Alternative A, it also has less semi-primitive non-motorized acres. The quality of the outdoor experience for those visitors seeking non-motorized activities may be mixed compared to other alternatives. This is unlikely to meet the desires of those commenters that expressed an interest in having more non-motorized opportunities.

There would be approximately 8,000 acres in non-motorized settings outside of the Hiking and Riding Areas (approximately 40,000 acres).

Dispersed Vehicle Camping
There would be 74 fewer miles of roads available under no action, than under Alternative A, but 133-151 more miles than under Alternative B, depending on the time of year. Visitors are generally believed to be able to find adequate dispersed vehicle camping locations to meet their needs under the existing condition, and most likely would still be able to find ample opportunities under no action. However, individuals that have a connection to a particular dispersed camping location may feel a sense of loss.

Hunting
This alternative provides numerous opportunities to hunters who desire to scout and retrieve their game by motorized means. Big-game hunters would be likely to find experiences similar to the Alternative A, based on ROS settings, and would not be expected to be displaced under this alternative.

Hunters seeking opportunities to hunt without disturbance from motorized vehicles may have difficulty doing so under this alternative. This alternative would have more potential to displace hunters interested in non-motorized hunting opportunities than any of the other alternatives. If hunters are displaced, the only place on the District that they may be able to find the experience they are seeking is in the hiking and riding areas. The ROS settings indicate there is a low probability of finding non-motorized hunting opportunities anywhere else on the District.

Cumulative Effects - Recreation

Past, Present, and Reasonably Foreseeable Activities
Based on public comments on the project, District staff observations, and informal discussions with users, visitors from south-central Montana, including the Billings metro area, and northeastern Wyoming commonly use the area for big game hunting, the primary recreation activity on the District. Discussions with motorized recreationists during the Beartooth Travel Management Planning effort indicated that they commonly travel to the Gallatin National Forest and Lewis and Clark National Forest to recreate, and to a lesser degree to the Helena National Forest. These two user groups, hunters and motorized-focused visitors, are probably not identical, but they may overlap. To provide a broad analysis of the cumulative effects, this analysis will consider recent travel management decisions on the Gallatin, Lewis and Clark, Big Horn, Helena, and Custer National Forests, along with other travel management decisions on public lands in the vicinity of the District.

The following are past, present, or reasonably foreseeable activities that have affected or have the potential to affect motorized and non-motorized recreation opportunities on or in the vicinity of the District.

2001 Tri-State OHV Decision (Forest Service)
The 2001 Tri-State OHV Decision prohibited cross-country vehicle use on Bureau of Land Management and Forest Service lands within Montana, North Dakota, and parts of South Dakota. The ROD for the 2001 Tri-State OHV Decision indicates that cross-country vehicle travel for the Custer, Gallatin, Lewis and Clark, and Helena National Forests was reduced by 64%, 43%, 72%, and 59%, respectively.

2003 Tri-State OHV Decision (Bureau of Land Management)
The 2003 Tri-State OHV Decision prohibited cross-country vehicle use on Bureau of Land Management lands within Montana, North Dakota, and South Dakota. The ROD for the 2003 Tri-State OHV Decision indicates that cross-country motor vehicle travel was reduced by the following amounts: Miles City Field Office - 40%, Billings Field Office – 74%, and Lewistown Field Office – 83%.

Lewis and Clark National Forest - Little Belts, Castles, and North Half of the Crazy Mountains Decision
The Lewis and Clark National Forest (Lewis and Clark NF) decision on the Little Belts, Castles, and North Half of the Crazy Mountains reduced motorized routes by approximately 884 miles (roughly 39%) compared to the No Action Alternative in that analysis. Non-motorized routes increased by approximately 227 miles (roughly 65%) in that same decision.

Helena National Forest - Elkhorn Decision
The Helena National Forest's 1995 decision on travel management in the Elkhorn Mountains area reduced designated motorized routes by approximately 15%, and areas open to motorized vehicle use by 66-95% depending on the season of use.

Helena National Forest - Clancy-Unionville Decision
The Helena National Forest's decision on travel management for the Clancy-Unionville area reduced designated motorized routes by approximately 30%, and areas open to motorized vehicle use by 66-95% depending on the season of use.

Lewis and Clark National Forest – Badger-Two Medicine Decision
The Lewis and Clark National Forest's decision on travel management in the Badger-Two Medicine area reduced miles of motorized routes designated for public motorized use from approximately 200 miles to approximately 1 mile. Non-motorized routes increased from approximately 17 miles to 192 miles in that same decision.

Lewis and Clark National Forest – Big Snowy Mountains Decision
The Lewis and Clark National Forest's decision on the Big Snowy Mountains reduced miles of motorized routes by 70 miles (roughly 69%) compared to no action in the analysis.

Lewis and Clark National Forest - Rocky Mountain District – Birch Creek South Decision
The Lewis and Clark National Forest's decision on the Rocky Mountain District – Birch Creek South reduced miles of motorized routes by 143 miles (roughly 45%) compared to no action in the analysis. Non-motorized routes increased by approximately 118 miles (roughly 86%) in that same decision.

Helena National Forest - North Belts Decision
The Helena National Forest's (Helena NF) Record of Decision on the North Belts Travel Planning reduced the number of miles of motorized routes by approximately 64 miles (roughly 16%) compared to their No Action Alternative.

Helena National Forest - South Belts Decision
The Helena NF's South Belts Travel Plan, which addresses motorized use between 5/15 and 12/1, reduced motorized opportunities by approximately 25 miles (roughly 13%) compared to the No Action Alternative.

Gallatin National Forest Decision
The Gallatin National Forest's Travel Management Record of Decision states the following:

"The total amount of public open system road would remain generally unchanged (approx. 740 miles); however there would be a shift of about 10% of this system from road currently only suitable for high clearance vehicles to road that would accommodate passenger cars. Currently about 315 miles of road

are considered suitable for passenger cars, and under Alternative 7-M it would increase to 400 miles. This alternative also includes objectives to close and restore non-system and user-built roads.

ATV opportunities provided on trails would be reduced from 281 miles to 143 miles (about 50%) and motorcycle opportunities on trails would be reduced from 458 miles to 278 miles (about 40%)."

The miles of non-motorized routes on the Gallatin National Forest remained about the same compared to No Action.

Big Horn National Forest – Hunt Mountain Decision
The Bighorn National Forest's Decision Notice for the Hunt Mountain Travel Management Planning reduced the miles of motorized routes by 19% (9.79 miles) compared to no action.

Bureau of Land Management
Three recent Bureau of Land Management travel management decisions were identified in the vicinity of the District, including the: Acton Recreation Area OHV Travel Management, Horsethief High Priority Area OHV Travel Management, and Shepherd Ah Nei Travel Management decisions.

The Acton and Horsethief decisions did not change the miles available for motorized use. The Shepherd Ah Nei decision reduced motorized miles in that unit from 50 miles to 44 miles, or by 12%.

Upper Missouri River Breaks National Monument Resource Management Plan (RMP)
The BLM completed the RMP for the Upper Missouri River Breaks National Monument in 2008. Miles of motorized routes open to the public yearlong was reduced by 231 miles (44%). Miles of motorized routes open to the public seasonally was increased by 43 miles (63%).

Beartooth Ranger District, Custer National Forest
The Beartooth Ranger District Travel Management Planning record of decision reduced miles of motorized routes available for public motorized use by 7% (20 miles) compared to the No Action Alternative for that analysis. Non-motorized ROS settings were reduced by approximately 2% (3,622 acres).

Large Fire Events
There have been multiple large fire events on the District in the past decade, and still more prior to that timeframe. Roads were temporarily closed during and immediately following large fire events, but there were no changes to the transportation system as a result of large fires in the last decade.

Sioux Ranger District Travel Management Planning
Motorized travel management planning is currently being evaluated on the Sioux Ranger District. The Forest expects a May 2009 decision on Sioux travel management planning. The preferred alternative would result in approximately 99 fewer miles (25% less) of system roads designated for public motorized use for the majority of the year compared to no action, and an additional 116 fewer miles during big-game hunting season. In terms of motorized ROS settings, 94% of the Sioux District would be in motorized ROS settings for the majority of the year and 65% during big-game hunting season under the preferred alternative versus 100% in motorized ROS settings year-round and 76% during the big-game hunting season under the No Action Alternative.

Montana Fish, Wildlife, and Parks Block Management
FWP works with private landowners to obtain hunter access on private lands, known as the Block Management Program. FWP Region 7 contained approximately 3.5 million acres under Block Management in 2008. Carter County, the county containing all of the District's lands in Montana, contained approximately 230,000 acres under Block Management. Lands enrolled in the Block Management Program can vary from year to year, but generally do not tend to fluctuate dramatically. The type of access permitted on lands under Block Management is determined by the landowner. Generally, landowners restrict motor vehicle use to existing routes on the property or require hunters to use designated parking areas and then access the property on foot. In some cases, the number of hunters is controlled in addition to the access. All of the areas are receive considerable hunter use, and many hunters have indicated that they hunt on both Block Management areas and National Forest lands.

Timber Harvest, Range Management Planning, and Vegetation Management
There have been a number of timber harvests, range management planning or vegetative management activities on the District in the past. Timber harvest and vegetation management activities often included creation of temporary roads that were only used during the project and then closed. Some of these projects included construction and/or decommissioning of system roads.

The Forest identified 29 of these types of activities dating back to 1984 on the District. It was clear that the older the activity was, the less influential the activity appeared to be in terms of potential cumulative effects. For example, the older a project was the more potential there was for subsequent activities, decisions, and forest use to have altered the network of routes on the landscape envisioned in these earlier decisions.

The IDT used the seven most recent projects for this assessment, and determined that decisions prior this appeared to have little, if any, identifiable influence on the current transportation system. The seven projects include:

- 1997 Lyon Creek Timber Sale (12 added, 12 ML1, 12 decomm)
- 1998 Goodspeed Timber Sale (included in Lyon Creek Timber Sale quantity)
- 2000 Fly Wilber Timber Sale (4 added, 5 ML 1, 1 decomm)
- 2002 Threemile Stewardship Project (36 decomm, 28 admin [these are both system & non-system routes])
- 2006 Stag Rock Range Analysis (0 added, 3 decomm, 3 ML1, 9 admin)
- 2008Whitetail Hazardous Fuels Reduction (1 decomm, 1 added, 4 ML1, 4 admin)
- 2009 East Otter Hazardous Fuels Reduction (Reasonably Foreseeable) (added 2 miles)

Net Cumulative Effects
The above information suggests that the 2001 and 2003 Tri-State OHV Decisions substantially changed motor vehicle use with respect to cross country vehicle travel in the area evaluated for cumulative effects (see above for description). The alternatives under consideration in this analysis do not include any actions that would further change cross-country vehicle use; therefore no cumulative effects from the proposed alternatives are anticipated specifically related to cross-country vehicle use. However, in terms of overall motorized and non-motorized opportunities, the 2001 Tri-State OHV Decision had a significant impact on reducing motorized opportunities and increasing non-motorized opportunities.

The above information also indicates that several activities contribute to or may potentially contribute to substanstive changes in recreation opportunities available to visitors that use the District:

- 2001 Tri-State OHV Decision (Forest Service),
- 2003 Tri-State OHV Decision (Bureau of Land Management) ,
- Custer National Forest
    - Proposed travel management changes on the Sioux Ranger District,
    - Beartooth Ranger District Travel Management Decision
- Lewis and Clark National Forest
    - Little Belts, Castles, and North Half of the Crazy Mountains Travel Management Decision,
    - Rocky Mountain District – Birch Creek South Travel Management Decision,
    - Badger-Two Medicine Travel Management Decision
- Helena National Forest
    - North Belts Travel Management Decision,
    - South Belts Travel Management Decision,
    - Elkhorn Mountains Travel Management Decision,
    - Big Snowy Mountains Travel Management Decision,
    - Clancy-Unionville Vegetation Manipulation and Travel Management Decision,
- Gallatin National Forest Travel Management Decision,
- Bureau of Land Management - Upper Missour River Breaks National Monument RMP,
- And the various vegetation management activities on the Ashland District in the past decade.

All other identified activities appear to only consist of minor, if any, changes to motorized and non-motorized recreation opportunities.

The alternatives in this analysis represent the following changes in miles of motorized routes compared to the No Action Alternative, a key measurement in determining opportunities:

- Alternative A would increase motorized route miles by 74 miles (11% increase) compared to no action.
- Alternative B would decrease motorized route miles by 133 miles (20%) during the majority of the year and by 151 miles (22%) during the big-game hunting season, compared to no action.
- Alternative B Modified would decrease motorized route miles by 115 miles (17%) during the majority of the year and by 142 miles (21%) during the big-game hunting season, compared to no action.

Alternative A would lessen the cumulative impact of the above activities on motorized recreation opportunities, while decreasing the non-motorized opportunities that they would create. A number of routes would be added to the system expanding the network of motorized routes available for public motorized use. This alternative would have the greatest potential to provide additional opportunities for recreationists that may be displaced by the other decisions and proposals affecting motorized opportunities.

Alternative B and B Modified would contribute to the cumulative decrease in miles of routes/motorized opportunities. Conversely, non-motorized recreation opportunities would cumulatively expand. Cumulatively, the above cited actions, activities, and proposals in combination

with either of these alternatives have potential to displace motorized users and to decrease their chances of finding similar opportunities elsewhere within the area analyzed for cumulative effects.

No threshold for determining when effects on motorized recreation opportunities are significant has been identified.

3.3.1.3 Conclusion - Recreation

The following conclusions are based on the indicators identified in Chapter 2 related to Recreation resources and the analysis in this section.

Concerns related to the loss of motorized recreation opportunities.

Alternative A best responds to concerns related to opportunities for motorized recreation and motorized hunting access, including providing the most miles of system road and motorized trails (750 miles) and nearly the same amount of acres in motorized ROS settings (434,526 acres) as the No Action Alternative.

The remaining alternatives respond to this issue to lesser and varying degrees than Alternative A. The No Action Alternative, while providing roughly the same amount of motorized ROS settings, provides 74 fewer miles of motorized routes. Alternative B and B Modified are very similar and would provide both the fewest miles of motorized routes and acres in motorized ROS settings. Alternative B Modified, however, is likely to be preferable to Alternative B because it proposes to designate routes that were identified as important for big-game hunting and motorized use during public comment on the DEIS for this project.

Concerns related to the loss of non-motorized opportunities.

Alternative B Modified best responds to concerns related to opportunities for non-motorized recreation, especially non-motorized hunting experiences. There would be 92,063 acres in non-motorized settings during the majority of the year (approximately 52,000 acres outside of the Hiking and Riding Areas) and 561 miles of motorized routes. During the big-game hunting seasons, there would be 109,206 acres non-motorized ROS setting acres (approximately 69,000 outside of the Hiking and Riding Areas) and 27 fewer miles of roads and trails.

Alternative B would respond to this concern nearly the same as Alternative B Modified, but would not provide additional non-motorized areas during the big-game hunting season. The remaining alternatives respond to this issue to a lesser degree. Alternative A and the No Action Alternative respond to this concern about the same, although the No Action Alternative may be slightly better since there are fewer miles of system routes associated with this alternative.

Concerns related to opportunities for off-highway legal vehicle operation.

Alternative A best responds to concerns related to opportunities for unlicensed off-highway vehicle operation, including providing the most miles of motorized mixed use roads and motorized trails. There would be 649 combined miles of motorized mixed use roads and motorized trails on the District.

The remaining alternatives respond to this issue to a lesser degree than Alternative A. In descending order of responsiveness, they are:

Alternative B Modified	(433 to 460 miles, depending on the time of year)
Alternative B	(424 to 442 miles, depending on the time of year)
No Action	(0 miles)

Consistency with Laws, Regulations, and Policy

The recreation goal in the Custer National Forest Management Plan is to "provide a broad spectrum of recreation experience opportunities". All alternatives are consistent with the Custer National Forest Management Plan direction.

3.3.2 CULTURAL RESOURCES

Overview of Changes from the Draft to the Final EIS

- Refined effects analysis based on WO direction and final alternative descriptions.
- Added the no action alternative to summary table.
- Results of the historic road analysis are included.

Regulatory Framework

This section contains information on the Archaeological Resources and Traditional Cultural Properties. Cultural resource is a broad term that refers to cultural properties and traditional life way values. A cultural property may be the physical remains of archeological, historical and architectural sites and/or a place of traditional cultural use. Traditional life way values refer to the connection between the landscape and a groups' traditional beliefs, religion or cultural practice.

Since these resources are nonrenewable and easily damaged, laws and regulations exist to help protect them. These include the National Historic Preservation Act (NHPA), the Archeological Resources Protection Act (ARPA), the American Indian Religious Freedom Act (AIRFA) and the Native American Graves Protection and Repatriation Act (NAGPRA). Sacred and culturally important places fall under this purview of the NHPA, AIRFA and the Sacred Lands Executive Order (Executive Order 13007). Native American graves are protected under NAGPRA.

The NHPA and its implementing regulations require that federal agencies take into account the effects of their undertakings on historic properties and provide the Advisory Council on Historic Preservation with an opportunity to comment on those undertakings. The term "historic property" refers to any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion on, the National Register of Historic Places (NRHP).

The Forest Service has been directed to satisfactorily address the National Environmental Policy Act (NEPA) and other related statutes involving cultural resource management and historic preservation which apply for such projects. As stated in the CNF Management Plan (USDA Forest Service 1986:4) "The goal of cultural resource management is to maintain and enhance historic and prehistoric cultural resource values." In 1995, the Custer National Forest (CNF) became a participant in the Montana Programmatic Agreement (MTPA) between the Montana State Historic Preservation Office (MTSHPO), the Advisory Council for Historic Preservation and the Northern Region of the Forest Service regarding the management of cultural resources on National Forest lands in Montana. Goals of the MTPA are to extend beyond the narrow-scoped management perspective of the 1970s and 1980s that focused upon "site identification/recordation and avoidance or mitigation" to a more

informative approach of "cultural resources stewardship". The PA was updated in 2001 to reflect the changes in National Historic Preservation Act Section 106 regulations.

Compliance with the National Historic Preservation Act (NHPA) of 1966, as amended through 2000, is being conducted as directed in the *USDA Forest Service Policy for NHPA compliance in Travel Management: Designated Routes for Motor Vehicle Use* prepared by the Forest Service in consultation with the Advisory Council on Historic Preservation (USDA Forest Service 2005). Under this policy, three specific travel management proposals are considered undertakings: 1) construction of a new road or trail; 2) authorization of motor vehicle use on a route currently closed to vehicles; and 3) the formal recognition of a user-developed (unauthorized) route as a designated route open to motorized vehicles. Existing or formally established system (classified) roads and trails already open to motor vehicle will not be evaluated since their current designation is not considered an undertaking under this policy. The terms and conditions of the MTPA will be followed when user-created (unauthorized) routes are designated as routes open to motorized vehicles.

Coordination with pertinent Tribes has been through project scoping letters, public meetings, agency meetings, letter correspondences, and meetings which outlined the proposed project specifics and requested any concerns that they may have regarding cultural resources or traditional cultural properties. This coordination effort was intended to insure that any tribal concerns or comments were addressed throughout the NEPA process in regards to ARPA, AIRFA, NHPA, NAGPRA and/or Bulletin 38 issues.

3.3.2.1 Affected Environment – Archaeological Resources and Tradition Cultural Properties

The District lies within the Ponderosa Pine Parkland of southeastern Montana which is part of the Northwestern Plains Region. This unique landscape exhibits a mosaic character of upland grasslands, pine forests and woody draws along with dissected plateaus and rugged badlands. Ten major ecozones or environmental land units have been delineated primarily on differences between topography, soil and vegetation (Beckes and Keyser 1983: 57-66).

Human occupation in the Ashland area spans over 10,000 years and is represented by a basic activity pattern consisting of seasonal ventures by small groups of people who exploited various faunal and floral resources in a variety of ways (Beckes and Keyser 1983: 269). Three cultural periods—including Paleo-Indian, Plains Archaic and Late Prehistoric—are represented within the prehistoric time period.

The earliest time period, the Paleo-Indian, is characterized by a human population heavily dependent on hunting of now extinct fauna such as giant bison and mammoth. Large lanceolate projectile points are common diagnostic indicators of this period. The Archaic Period, saw a warming trend referred to as the Altithermal Climatic Episode which was related to modern flora and fauna and saw a shift to a more diversified economy. Big game hunting was supplemented with the processing of plant resources. A variety of large projectile points, including both lanceolate and notched, are diagnostic indicators of this period. The Late Prehistoric Period is marked by the appearance of the bow and arrow on the Northwestern Plains. An increased specialization toward upland living and the utilization of open prairie resources, most importantly bison, characterizes this period. A variety of smaller projectile points are diagnostic indicators of this period.

The Historic Period is usually associated with Euro-American activities such as exploration, military excursions, mining, ranching, trapping and homesteading but Native American tribes predated the Euro-Americans influx into the area. Crow, Cheyenne, Shoshone and Sioux lived or traveled through the area long before contact with Euro-Americans and considered the area encompassing the District as their territory. In 1884 an Executive Order established the Tongue River Reservation for the Northern Cheyenne. The Northern Cheyenne reservation is located to the west of the Ashland District across the Tongue River.

Concurrent with early 1900s homesteading era, within and around the District, the Otter Forest Reserve (later to become the Custer National Forest) was created in 1907. The Forest Service brought a whole new realm of government sponsored activities including logging, livestock grazing, building/road development, fire suppression and recreation. The Civilian Conservation Corps (CCC) played a significant role on the District during the 1930s and was responsible for building or improving a variety of structures including ranger stations and CCC camps, fencelines, range improvements (dams, springbox headworks/cedar tanks and reservoirs), roads and telephone lines.

Previous Investigations

Three early archaeological investigations on the District were conducted during the 1970s (Beckes 1976, Hagen and Kallem nd, McLean 1975) and relied on interviews with local informants for site leads followed by select area field reconnaissance efforts. Nearly two hundred prehistoric or historic sites, consisting of bison kills, cairns, cribbed log structures, lithic artifact scatters, rock art panels and rock shelters—were recorded during these investigations.

A comprehensive prehistoric overview of the District was completed in 1983 (Beckes and Keyser 1983) followed by a broader prehistoric cultural resource overview of southeastern Montana completed in 1988 (Deaver and Deaver 1988). In 1989, as part of a Master's Thesis project, a model of land use patterns was developed for the District in order to predict where archaeological sites should, or should not, be found (Wettstaed 1989).

During the 1990s a unique plant collecting area on the District was investigated utilizing several Northern Cheyenne elders and volunteers. This CNF grant-funded project mapped the density and distribution of a medicinal plant traditionally used by the Northern Cheyenne for ceremonies and healing for over one hundred years. The District location for this plant is the only known collecting area and is identified as a Traditional Cultural Property.

In 1995 an ethnographic overview of the District was completed. This overview identified culturally sensitive sites defined as "Cultural resources associated with traditional Indian ceremonies, cultural practices and important events in tribal history…" and include "…burials, rock art, stone circles of greater than 7m in diameter, monumental rock features, fasting structures, eagle catching pits, sweat lodges, wooden structures, Sun Dance lodges and grounds, offering and prayer locales and historic battle sites." Forty-two culturally sensitive sites were identified on the District by this 1995 overview (Deaver and Kooistra-Manning 1995: 4.88-4.94). Additional culturally sensitive sites have been recorded on the district since this overview was completed.

In 2004 an ethnographic overview of the Tongue River/Powder River Plateau was initiated through a participatory grant between Chief Dull Knife College, Native Action and the CNF. This overview collected cultural site and heritage information including areas of historical and current use by the Northern Cheyenne. Field trips with knowledgable Northern Cheyenne representatives identified

several areas on, and adjacent to, the District that are considered sacred. This information will be used in determining future land management decisions and will provide for valuable general education purposes on the Northern Cheyenne culture, history and their relationship with the lands.

From 1881 up through 1900 at least forty-six Northern Cheyenne families homesteaded along the east side of the Tongue River until they were forced to move west, across the river, onto the reservation. An overview to determine if any of these homesteads were situated on the District, along with seven interviews with descendants of the original homesteaders, was conducted in 2005. Although this research did not locate any homesteads on the District, it did provide a historical overview of the area and locations of Northern Cheyenne homesteads along the east side of the Tongue River immediately adjacent to the District (Brownell 2005).

A recent rock art inventory conducted on the District focused on relocating a limited number of known rock art sites as well as recording several new rock art sites. This research offered possible interpretations of the rock art, ethnic identities and patterns of site utilization (Keyser 2006).

Formal cultural resource investigations, in support of programs such as minerals, range and timber, were initiated on the District during the mid 1970s and have continued to the present. In 1988, immediately following the 16,000 acre Schiller Wildfire, a large block inventory of 6065 acres was conducted and 119 sites were recorded. In 2000 two wildfires (Tobin and Fort Howes Complex) burned over 70,000 acres. Approximately 5500 acres were inventoried following these wildfires and 21 new sites were recorded. The aftermath of these wildfires—resulting in the discovery of numerous sites—attests to the high degree of ground exposure that results with the removal of vegetation and duff material.

Other cultural resource inventories conducted on the District during the past few years have supported Engineering/Roads, Prescribed Fire and Special Use Permit programs. During the past eight years large-scale contract inventories for cultural resources on the District have been conducted in support of range recission, proposed mineral development, roads and vegetation treatment projects.

An overview of Civilian Conservation Corps (CCC) activity on the District during the 1930s was completed in 2002. This overview documented the locations of two CCC camps and discussed in detail five primary work projects conducted by the CCC workforce. These included forest products, range improvements, ranger station construction, road construction and telephone line construction. Several CCC features still present on the district (including stone-armored reservoirs and roads with dry-laid stonework retaining walls and drainage crossing structures) were identified. Five CCC boys who worked on the District were contacted and interviewed regarding recollections of their experiences. Several CCC constructed roads on the District were evaluated and recommended eligible for nomination to the NRHP (Brownell 2002).

Methodology

As of summer 2008, there are 1401 recorded prehistoric or historic sites on the District represented by bison kills, cairns, campsites (containing bone, ceramic, fire-cracked rock and/or stone artifacts) cribbed log structures, drive lines, fasting beds, fire lookouts, historic and prehistoric petroglyphs, homesteads, lithic artifact scatters, quarries, ranger stations, range improvements (livestock tanks, reservoirs), roads, rock shelters, stone circles, and many sites associated with the CCC.

Following the direction provided in the 2005 *USDA Forest Service Policy for NHPA Compliance in Travle Management Designated Routes for Motor Vehicle Use*, the effects analysis focused on the three specific categories: 1) the construction of a new road or trail; 2) the authorization of motor vehicle use on a route currently closed to motorized vehicles; and 3) the formal recognition of a user-developed (unauthorized) route as a designated route open to motor vehicles. Under this direction existing or formally established system roads and trails that are already open to motor vehicles will not be evaluated since their current designation is not considered an undertaking. Upon comparison of the categories with the proposed changes in the Ashland Travel Management plan, category three was found to apply and will be addressed as the undertaking. The terms of the MTPAwill be followed when designating motor vehicle use on user-developed (unauthorized) routes.

To determine the potential effects to historic properties within the Area of Potential Effect (APE), existing system and non-system roads and trails were intersected with the GIS site database of recorded and known cultural resource sites lying within a 600 foot wide corridor. This 600 foot wide corridor is in accordance with the 2001 decision to allow motorized wheeled cross-country travel to access dispersed camping sites (USDA Forest Service 2001) and it defines the Area of Potential Effect when analyzing both direct and indirect effects under all alternatives.

In addition, two historic maps of the District dating to 1928 and to 1957 were compared with the APE maps in an effort to define roads and trails that may be over 50 years old and deserving of further analysis as potential historic properties. Historic reference material, on file at the CNF, was also used to identify roads that had been constructed or reconstructed by the CCC during the 1930s.
A sample of these potentially historic roads were ground truthed and no structural features (bridges, culverts, stonework) or association was found. Any future proposals to change these routes would be evaluated in terms of their potential historic significance.

The GIS analysis and map resources identified 359 recorded cultural resource sites and 50 possible historic roads located within the 600 foot wide road and trail corridor on the District. This represents one quarter of the recorded sites on the District. At least 22 sites are prehistoric sites that have been tentatively dated, ranging from Paleo-Indian Period to Late Prehistoric Period, based upon the presence of diagnostic projectile points. Fifty-seven historic sites are within the APE and include 19 sites associated with the CCC. The following tables describe the CCC asoociated roads and the possible historic roads within the APE.

Table 3-6. CCC Constructed Roads Located Within The APE

Route ID	Route Name	Site Number	NRHP Status
4030	Tenmile-Fifteenmile	Unrecorded	Undetermined
4092	Tenmile Creek	24PR1965	Eligible
4094	Fifteenmile Creek	24PR2136	Eligible
4095	Poker Jim/Cow Creek	24PR2017, 24RB2064	Eligible
4131	O'Dell Creek	24PR2018, 24RB2089	Undetermined
4133	Beaver Creek	24PR2441	Not Eligible
4135	Horse Creek	24PR2025	Undetermined
4422	Whitetail Creek	24PR2137	Undetermined
4434	Indian-Taylor Creek Divide	Unrecorded	Undetermined
4703	Lemonade	24PR2031	Eligible
4767	Beaver-Liscom	24PR2134	Eligible
4769	Beaver-Stacey	24PR2135	Eligible
40941	40941	Unrecorded	Undetermined

Table 3-6. CCC Constructed Roads Located Within The APE

Route ID	Route Name	Site Number	NRHP Status
	Bloom Creek - County	24PR2049	Undetermined
	Taylor Creek - County	24PR2057	Undetermined

Table 3-7. Possible Historic Roads Located Within the APE

Route ID	Route Name	Route ID	Route Name
409412	409412	470313	470313
409412A	409412A	47704	47704
409412C	409412C	4772	Ash Creek
40955	40955	47721	47721
40957	40957	47725	47725
4410	Yager	4773	Cook Creek
41277	41277	47732	47732
41277B	41277B	47733	47733
41313	41313	47753	47753
421212	421212	47754	47754
44091	44091	4776	Wilbur Creek
4421	Stag Rock	4777C	4777C
4425	Cabin Creek	4783	South Ash Creek
4431	Griffin Pass	4784	Taylor-Fifteenmile Creek
4432	Bridge Canyon	47845	47845
4436	Taylor Divide	47847	47847
4436B	4436B	47848	47848
4437	Upper South Fork	4785	Pumpkin-Otter Divide
44372	44372	47853	47853
44372A	44372A	47854	47854
4440	South Plum Creek	47857	47857
44404	44404	478515	478515
4450	Fly Creek	4786	Lyon Creek
4460	Coalmine Project	4787	North Fork Taylor Creek
44601	44601	47902	47902
4464	Doonan Draw	47903	47903
4467	Threemile & Tenmile Divide	47904	47904
44672	44672	47908	47908
4469	Newell Creek	47911	47911
45015	45015	4794	Horse Creek Butte
4502	North Fork Bloom Creek	47944	47944
45051	45051	47944A	47944A
45200	45200	47944B	47944B
47033	47033	47954	47954
4797	Poker Jim-North Fork Lee	4800	South Fork Poker Jim
47971	47971	4804	Paget Creek
47973	47973	4805	King Creek
4798	Wild Hog Butte	4806	Brian Creek

The National Register defines four criteria to be used in the evaluation of sites: (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (d) that have yielded, or may be likely to yield,

information important in prehistory or history (36 CFR Section 60.4). Twenty-eight sites located within the APE have been found eligible for nomination to the NRHP to date.

Six roads are associated with the CCC and considered eligible to the NRHP under criteria (a) and (c). Six archaeological sites are considered eligible to the NRHP based on criterion (d). A summary of the NRHP eligibility status for the 359 sites located in the APE is included in the following table.

Table 3-8. National Register of Historic Places Eligibility Status

NRHP Status	Number
Listed on the NRHP	0
Eligible for nomination to the NRHP	12
Undetermined	341
Not eligible for nomination to the NRHP	6
Total	**359**

Six recorded sites within the APE have been formally determined Not Eligible (NE) for nomination to the NRHP and are not considered historic properties. These sites will not be further considered. Of the 341 remaining sites, those that are currently defined as "undetermined" with respect to NRHP eligibility status will be considered eligible for the purposes of analysis under this travel management plan.

In 1999, the Custer National Forest identified sites that met the national criteria for "priority heritage assets". Priority asset sites are those sites that have had a significant value investment; and/or are eligible for nomination to the National Register of Historic Places (NRHP); and/or are considered "at risk" due to substantial effects to site integrity. Presently on the District, there are 67 sites on this list that are monitored on a five-year cycle. Thirty-six sites within the APEs for the alternatives A , B, and B Modified were identified as priority asset sites (table below).

Table 3-9. Priority Assets within the APE for Alternatives A, B and B Modified.

Site Number	Site Name	Site Type
24PR0174	Cow Creek	Lithic Scatter
24PR0204		Petroglyph
24PR0301	North Fork	Lithic Scatter
24PR0302		Lithic Scatter
24PR0442		Lithic Scatter
24PR0627	Highwalker	Lithic Scatter
24PR0639		Lithic Scatter
24PR1026	Holiday Spring	Lithic Scatter
24PR1034	Griffin Pass	Lithic Scatter
24PR1039	Morris Spring	Lithic Scatter
24PR1135		Lithic Scatter
24PR1181		Lithic Scatter
24PR1566	Whitetail Guard Station	Guard Station
24PR1780		Lithic Scatter
24PR1782		Lithic Scatter
24PR1841	Otter Creek School	Schoolhouse
24PR1922-1924; 24PR1927-1929; 24PR1940; 24PR1965	Tenmile Road	CCC road
24PR1955-1957; 24PR2136	Fifteenmile Road	CCC Road
24PR2017	Cow Creek/Poker Jim Road	CCC Road
24PR2018	O'Dell Creek Road	CCC Road
24PR2025		CCC Drainage Structure

Table 3-9. Priority Assets within the APE for Alternatives A, B and B Modified.

Site Number	Site Name	Site Type
24PR2031	Lemonade Road	CCC Road
24PR2049	Bloom Creek Road	Abandoned CCC Road Segment
24PR2057	Taylor Creek Road	Abandoned CCC Road Segments
24PR2073		Historic Rock Art
24PR2134	Beaver-Liscom Road	CCC Road
24PR2135	Beaver-Stacey Road	CCC Road
24PR2159		Lithic Scatter
24RB0379		Lithic Scatter
24RB1074	Rifle Pit Site	Stone Feature
24RB1998		CCC Drainage Crossing
24RB2064	Cow Creek/Poker Jim Road	CCC Road
24RB2065	Poker Jim Ranger Station	Ranger Station, CCC Spike Camp
24RB2089	O'Dell Creek Road	CCC Road

At least 27 culturally sensitive sites (consisting of an alignment, cairns, a fasting bed, stone circles and stone structures) are located within the APEs near or adjacent to roads. The following table summarizes these culturally sensitive sites.

Table 3-10. Culturally Sensitive Sites Located Within The APE.

Site Type	Number of Sites
Alignment	1
Cairn	17
Cairn & Stone Circle	1
Fasting Bed	1
Stone Circle	5
Stone Structure	2
Total	**27**

In addition to the culturally sensitive sites described above, consultation with the Northern Cheyenne tribe revealed that the Tongue River Breaks, from the Tongue River to the King Mountain Divide south, should be considered a traditional cultural property/ethnographic "landscapes". The characteristics of the ethnographic landscape that contribute to the use of a traditional cultural property (TCP) may include visual setting, qualities of spiritual reflection, renewal and sanctuary; natural setting; and unique ecosystem. The physical environment provides a basis upon which the integral relationships to the TCPs depend. Maintenance of the setting and its relationship with the surrounding lands become vital to the preservation of these sites and to the cultural landscape.

To comply with a 2005 Washington Office directive (USDA Forest Service 2005) for travel management, all non-system routes (roads and trails) that are proposed to be added to the system under the selected alternative will be inventoried for cultural resources and the results analyzed and disclosed in the FEIS. The proposed non-system roads and trails will be inventoried utilizing pedestrian transects within a 600 foot wide corridor centered on these routes. All new cultural resources will be analyzed for any effects to the sites that may be the result from the new route designation.

With the final selection of one of the alternatives any potential negative effects to sites may require review in order to determine what actions are needed that will reduce, remove or mitigate the effects.

Where appropriate, consultation with interested tribes and the MTSHPO will occur during these site reviews.

3.3.2.2 Environmental Consequences – Archaeological Resources and Tradition Cultural Properties

Direct and Indirect Effects

Effects Common to All Alternatives

An effect, according to 36 CFR 800.9(a) of the NRHP, may include an alteration to the historic property's characteristics of location, setting or use. Adverse effects are defined as those that may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association and include but are not limited to 1) physical destruction, damage or alteration of all or part of the property; 2) alteration of the character of the setting when that character contributes to the property's qualification for the National Register and 3) introduction of visual, audible or atmospheric elements that are out of character with the property or that alters its setting. The number of historic properties that may potentially be adversely affected by each alternative is the measure used to compare the alternatives.

Recreational motorized use, especially that of four-wheel drive and other off-highway-vehicles (OHV) has seen an ever-increasing trend since the 1960s. Numerous studies beginning during the early 1970s have documented the detrimental impacts of OHV use on archaeological sites by means of direct or indirect effects (Lyneis et al. 1980: 14; USDA Forest Service 2001: 55; USDA Forest Service 2002: 33). In comparing the motorized travel system on the District from 1928 and 1957 there are only a few recognized road additions during a span of nearly thirty years. But in the following years since then, the number of roads have at least tripled. More roads result in more access to areas and increased effects to cultural resources.

A direct effect occurs when the action of the undertaking itself affects the cultural resource. Direct effects may be described as the breaking, crushing and scattering of cultural material when motorized vehicles are driven across or through sites. Soil compaction from wheel pressure and soil erosion processes may occur following removal of protective ground cover (i.e. vegetation and ground litter). Not only is there soil compaction and erosion as the ground surface becomes exposed, but the ground surface may become deflated. These types of site damage are especially apparent where concentrated and/or repeated vehicle travel occurs that causes rutting. Sites that consist of surface artifacts or features, or that contain intact subsurface cultural materials, are especially prone to damage and losses of valuable information due to motorized vehicle travel (ASPPN I-13 1989).

Actions associated with travel management which could have the potential to adversely affect prehistoric and historic cultural properties include increases in the type, intensity and duration of trail, road or land use. Of particular concern is the increase through the years of user-created roads and trails. The majority of these travel ways has been, and continues to be, created without engineering design and without input from a variety of other resource specialists, including archaeologists. Attempts to use these roads during inclement weather or when the roads are impassible may result in either deep/severe rutting or in the creation of parallel tracks along the initially established road. This action exposes buried cultural material and often churns up the matrix so that artifacts loose their context. Often, sites associated with these user-created travel ways are discovered by chance,

exposing them to archaeologists and public visitor alike. Site damage has already occurred or is ongoing. Visually, as these user-created roads increase in number they become unsightly and may become permanent scars on the landscape.

Actions that have the potential to benefit cultural properties include decreases (but not necessarily closure or obliteration) in the type, intensity or duration of trail and road use where cultural properties are present or where the character of the historic route can be maintained or restored through a travel management decision. Motorized use on, and its effects to, roads must also consider the age of roads and whether or not they represent cultural resources. For example, in the 1930's the CCC workforce built and/or improved at least fifteen roads on the District. Nearly all of these roads are considered historic properties because most of their original alignment and stone work is still intact and in use. In many cases continued use and maintenance of these and other historic roads have a favorable effect to the property, preserving the qualities that make the road eligible for the NRHP. Discontinued use of the road would result in less maintenance and could threaten the preservation of the road. Any proposed changes by the Forest Service to the property would require evaluation and consultation with the MT SHPO.

All routes proposed to be added to the system will require inventory and determination as to whether or not they are historic properties. This additional inventory will add to the historical record on the District and provide new information on the recent past.

An indirect effect is not caused by the action itself but is the secondary result of the undertaking. Increased site access and exposure of sites to the elements may result in a greater chance for looting and artifact displacement from erosion. Soil compaction and artifact displacement can result from foot, horse and motor vehicle traffic and from dispersed camping on prehistoric sites. Soil erosion and artifact looting associated with vegetative cover removal due to traffic and livestock use may also lead to site degradation.

An example of an indirect effect to sites involves the improved or increased access that a road may offer to a motorized vehicle user. In the past, where vehicle access to sites may have been non-existent or limited, so too was the degree of site damage, artifact theft and vandalism. Studies have shown that increased access to public lands display a concurrent increase in the amount of vandalism of cultural resources (ASPPN I-13, 1989). The ability to access distant areas, relatively quickly and with relative ease, via motorized vehicles can result in subsequent looting or vandalism. Highly visible structures are more prone to visits due to their attractive nature as destination points. Large numbers of people, along with inappropriate behavior, can alter or damage the very attributes that make the structure important or attractive as a destination. These behaviors include trampling (leading to erosion or feature damage), theft, wall or feature damage and other types of vandalism.

Sites that contain features, such as cairns, cribbed log structures, stone circles or historic buildings, may become damaged by actually driving over them or simply through acts of theft or vandalism. Motorized vehicles can easily transport equipment (i.e. shovels, screens, hammers, crowbars, high-powered rifles) used to damage or vandalize sites. These same vehicles can be used in theft to remove large items of value, whether this is weathered logs or lumber from a historic building or old mining equipment. These types of damage lessen the sites' integrity and are irreversible.

The simple act of theft or removal of one or more artifacts from a site results in a loss of information about that site. During the 1970s several sites near or crossed by roads were located based on

interviews with local informants. Site 24PR1038 was well known by local artifact collectors who stated that nearly thirty stone circles and several cairns had been obliterated during clearing activity by ranchers. At least one cairn had been completely dismantled by "treasure hunters." Local informants, recollecting their early childhood years, recalled Northern Cheyenne utilizing this site (Beckes 1976: 24).

Site 24PR1048 at one time consisted of two cairns that may have served as aboriginal trail markers along the Otter Creek drainage. A local informant admitted tearing apart one of the cairns but finding no artifacts (Beckes 1976: 31). Site 24RB1074 was referred to by local informants as a "Rifle Pit" from which many 45-70 cartridge cases were found (Beckes 1976: 60). This site has been monitored several times during the past 17 years and at present does not exhibit any evidence of disturbance or dismantling, but during the spring of this year motorized vehicle tracks were observed off the nearby road a few meters from the structure.

Site 24PR1034 is a lithic artifact scatter located along both sides of a road in the northeast portion of the District. When first recorded, local informants had indicated that the site had produced artifacts for years. Monitoring of this site in 2002 observed several small piles of discarded lithic artifacts—including many flakes and several bifacially and unifacially retouched flakes—left by artifact collectors. Site 24RB1990 is located at the end of a road now accessible to the public but gated beyond for administrative use only. Vehicle travel on the road and parking at the gate have damaged the site.

Beneficial indirect effects may include reduction in type and amount of traffic into the more remote areas through a decision to not designate certain routes for motorized use. Should cultural properties, and especially culturally sensitive sites, be located along a road or be crossed by a road, reducing the type and amount of traffic to the site may limit additional site disturbance and help preserve the site.

Designating new roads and/or trails would require more archaeological inventory and environmental assessments which may result in the identification of more TCPs and/or more information on the distribution of culturally significant plant, animal, mineral and fossil resources. This information could be useful to traditional Indian Communities. It is possible that non-system routes converted to system roads and trails can increase or ease access to traditionally significant ceremonial or gathering places. However, increasing or easing of access to traditionally significant ceremonial or gathering areas would make them available for all. There is the potential to decrease the seclusion and quiet necessary for many traditional cultural practices.

Alternative A

Under this alternative, at least 513 recorded cultural resource sites are located within the APE corridor, of which 119 cultural resources may potentially be affected by the proposed actions. As described above, some of these proposals have the potential to cause detrimental effects, such as designating routes that may increase the type, intensity and duration of trail, road or land use where significant cultural resources may occur. This may be the case for the designation of non-system routes proposed to be system roads or motorized trails. Other proposals may beneficially affect some cultural resources by decreasing the type, intensity or duration of trail and road use (but not necessarily closure or obliteration). This may be the case for proposals to add non-system routes for administrative use only.

The following table describes the cultural resources that may be affected by each type of proposed action. Appendix C further describes the number and locations of routes considered under this alternative.

Table 3-11. Alternative A Summary of Cultural Resource Effects by Type of Action.

Type of Proposed Action For Alternative A	Cultural Resources within APE	Priority Asset Sites within APE	Culturally Sensitive Sites within APE
Number of cultural resources within the 600 foot corridor of all designated motorized routes	513	46	42
Actions with Potential to Increase Effects			
Number of sites located within the 600 foot corridor for Non-System routes Proposed to be System Roads or Motorized Trails	85	13	5
Actions with Potential to Decrease Effects			
Number of cultural resources located within the 600 foot corridor for Non-System Routes Proposed for Administrative Use Only	0	0	0
Number of cultural resources located within the 600 foot corridor for System Roads proposed for Administrative Use Only	26	4	2
Number of cultural resources located within the 600 foot corridor for System Roads Not proposed to be Designated for Public Motorized Use	8	0	0

Direct Effects

Under this alternative, at least 85 recorded cultural resource sites are located within the APE corridor that could be adversely affected by the designation of non-system routes. Most of these sites consist of lithic artifact scatters with intact subsurface cultural material and the direct effects consist of rutting or down-cutting of the new trails that pass through the sites. Allowing motor vehicle use on these routes could further expose these deposits resulting in loss of valuable information. Thirteen priority asset sites, four of which are NRHP eligible archaeological sites, could be physically damaged by motorized vehicle use. Site 24PR1034, mentioned earlier may see an increase in vandalism. Nine of the thirteen priority assets are road segments associated with the CCC.

Five sites are considered culturally sensitive sites and, while the direct effects include the same for lithic scatters, the possibility of dislodging stone from cairn, stone circles, and stone features would damage the physical character as well as its traditional qualities. Three of these culturally sensitive sites are cairns.

Designating dispersed camping within 300 feet of designated roads and trails could affect some of the 85 sites identified within the APE under Alternative A. These effects include vehicle rutting on sites or damage to artifacts or features due to being driven over. Permitting dispersed vehicle camping within 300 feet of designated roads and trails may affect some of these sites identified if this activity occurs frequently at the same locations. However, monitoring during the past seven years has not revealed any adverse effects to cultural resources as a result of dispersed vehicle camping.

CCC road segments for Ten Mile, 15 Mile, Beaver-Liscom, O'Dell, Lemonade and Cow Creek/Poker Jim roads would be added to the road system and one CCC road would be added to the motorized trail system. For the CCC road added to the trail system, no change in maintenance and standard is anticipated based upon maintenance guidance for roads and trail found in FSH 7709.59 and FSH 2309.18. Nine historic roads would also be converted to the motorized trail system and 3 historic roads would be added to the road system. These historic roads would be formally recorded and evaluated, adding to our knowledge of the historic road system on the District.

The conversion of several system routes to administrative use only may reduce effects to 26 sites, two of which are cairn sites considered culturally sensitive. A similar reduction of effects for eight sites may occur as a result of not designating several system roads for public motorized use.

Indirect Effects
By adding a number of non-system (user created) roads to the system, access to the more remote areas of the District would increase. As studies have shown, increased access often leads to increased vandalism and theft. The 85 sites located along the added routes could be exposed to vandalism and illegal artifact collection.

Increased access may also affect four culturally sensitive sites by infringing on the isolated character surrounding these sites. This could affect any traditional use that may be associated with these site types.

Designating dispersed camping within 300 feet of designated roads and trails would likely affect some of the 85 sites identified within the APE under Alternative A. These effects include discovery of sites and illegal collection of artifacts or possibly the dismantling of sensitive site features—such as cairns or stone circles—as intentional acts of vandalism or for the construction of campfire rings.

Decreased access along the west side of the Tongue River Breaks may have a beneficial effect for the Tongue River ethnographic landscape and traditional cultural properties by reducing the type and amount of traffic into this area and preserving the seclusion and quiet necessary for many traditional cultural practices.

But decreased access may also make it difficult for traditional practitioners to travel to traditionally significant ceremonial or gathering places. Access for traditional Indian practices is facilitated, however, through E.O.13007 and, more recently, the 2009 Farm Bill.

Alternative B
Under this alternative, at least 440 recorded cultural resource sites are located within the APE corridor, of which 46 cultural resources may be potentially affected by the proposed actions under Alternative B. As described above, some of these proposals have the potential to cause detrimental effects, such as designating routes that may increase the type, intensity and duration of trail, road or land use where significant cultural resources may occur. This may be the case for the designation of non-system routes proposed to be system roads or motorized trails. Other proposals may beneficially affect some cultural resources by decreasing (but not necessarily closure or obliteration) the type, intensity or duration of trail and road use. This may be the case for proposals to add non-system routes for administrative use only.

Most of these sites consist of lithic artifact scatters with intact subsurface cultural material and the direct effects consist of vehicle-caused rutting or down-cutting of the routes that pass through the sites, exposure of cultural deposits, and loss of valuable archaeological information. The following table further describes the cultural resources that may be affected, and under what proposed action may affect these resources. Appendix C further describes the number and locations of routes considered under this alternative.

Table 3-12. Alternative B Summary of Cultural Resource Effects by Type of Action.

Type of Proposed Action For Alternative B	Cultural Resources within APE	Priority Asset Sites within APE	Culturally Sensitive Sites within APE
Number of cultural resources within the 600 foot corridor of all designated motorized routes	440	45	35
Actions with Potential to Increase Effects			
Number of sites located within the 600 foot corridor for Non-System routes Proposed to be System Roads or Motorized Trails	18	8	0
Actions with Potential to Decrease Effects			
Number of cultural resources located within the 600 foot corridor for Non-System Routes Proposed for Administrative Use Only	0	0	0
Number of cultural resources located within the 600 foot corridor for System Roads proposed for Administrative Use Only	12	3	1
Number of cultural resources located within the 600 foot corridor for System Roads Not proposed to be Designated for Public Motorized Use	16	2	2

Direct Effects

Eighteen recorded sites could be affected by the designation of non-system routes proposed to be system routes or trails. Eight of these sites are considered priority assets and include a total of seven CCC road segments for 10 Mile, O'Dell Creek, Bloom Creek, Beaver-Liscom, and 15 Mile, along with one lithic scatter. No recorded culturally sensitive sites would be affected by these route additions.

Three CCC roads (Tenmile-Fifteen #4030, Horse Creek #4135, and Indian-Taylor Creek Divide #4434) are proposed to be converted to motorized system trails. No change in maintenance and standard is anticipated based upon maintenance guidance for roads and trails found in FSH 7709.59 and FSH 2309.18.

Twelve recorded sites are located within the 600 foot corridor along system roads proposed for administrative use only. This may have a beneficial effect for one culturally sensitive site (a cairn), and three priority asset sites (one lithic scatter and two CCC segments). No change in maintenance standard is foreseen for the CCC route segments proposed for administrative use only.

For system roads that will not be designated for public motorized use, there are 16 sites within the 600 foot corridor. Two priority assets along these roads are CCC road segments and two culturally sensitive sites, a stone feature and a cairn. This action may reduce detrimental effects to these culturally sensitive sites. The CCC route segments, however, will no longer be maintained to standard and could fall into disrepair.

Indirect Effects

The addition of non-system (user created) motorized trails opens up new access to areas previously considered somewhat remote and, as studies have found, could increase the occurrence of vandalism and site theft. This can have detrimental effects to culturally sensitive sites where site integrity and setting are important values to protect.

Access to one archaeological site that is eligible to the NRHP would be allowed by the addition of a user created route to the motorized trail system. Increasing access threatens the remote location of the site that has thus far protected the valuable information it contains.

Designating dispersed camping within 300 feet of the added user created could affect eighteen sites identified within the APE under Alternative B. These effects include discovery of sites and illegal collection of artifacts or possibly the dismantling of culturally sensitive site features—such as cairns or stone circles—as intentional acts of vandalism or for the construction of campfire rings.

Restricting access along the Tongue River Breaks may have a beneficial effect for the Tongue River ethnographic landscape and traditional cultural properties by reducing the type and amount of traffic into this area and preserving the seclusion and quiet necessary for many traditional cultural practices.

Alternative B Modified

Effects for Alternative B Modified differs from Alternative B with three more cultural sites (443) located within the APE. One less cultural resource site and one less priority asset would be affected by the designation of non-system routes (user created roads) to system routes. No recorded culturally sensitive sites would be adversely affected by the addition of non-system routes.

Direct Effects
Alternative B Modified may have beneficial effects for 27 sites, located along the corridors for system routes proposed for Administrative use only and system routes not proposed to be designated for public motorized use, by limiting access and use of these routes. Two culturally sensitive sites may be beneficially affected due to the reduction of use through the change of system roads open to public use to administrative use only.

Seven CCC road segments along non-system roads proposed to be system roads or motorized trails would benefit from increased maintenance and preservation of these routes. Two CCC segments along system routes proposed for administrative use only would still be maintained to standard, but three CCC segments along system routes not proposed to be designated for public motorized use have reduced maintenance.

The following table further describes the cultural resources that may be affected by each type of action for this alternative. Appendix C further describes the number and locations of routes considered under this alternative.

Table 3-13. Alternative B Modified Summary of Cultural Resource Effects by Type of Action.

Type of Proposed Action For Alternative B Modified	Cultural Resources within APE	Priority Asset Sites within APE	Culturally Sensitive Sites within APE
Number of cultural resources within the 600 foot corridor of all designated motorized routes	443	45	35
Actions with Potential to Increase Effects			
Number of sites located within the 600 foot corridor for Non-System routes Proposed to be System Roads or Motorized Trails	17	0	0
Actions with Potential to Decrease Effects			
Number of cultural resources located within the 600 foot corridor for Non-System Routes Proposed for Administrative Use Only	0	0	0

Table 3-13. Alternative B Modified Summary of Cultural Resource Effects by Type of Action.

Type of Proposed Action For Alternative B Modified	Cultural Resources within APE	Priority Asset Sites within APE	Culturally Sensitive Sites within APE
Number of cultural resources located within the 600 foot corridor for System Roads proposed for Administrative Use Only	13	4	1
Number of cultural resources located within the 600 foot corridor for System Roads Not proposed to be Designated for Public Motorized Use	19	0	2

Indirect Effects
The addition of non-system (user created) motorized trails opens up new access to areas previously considered somewhat remote and, as studies have found, could increase the occurrence of site vandalism and theft. No recorded culturally sensitive sites or archaeologically eligible to the NRHP were identified under Alternative B Modified along the non-system routes proposed to be system roads or motorized trails.

Designating dispersed camping within 300 feet of the added user created routes could affect seventeen sites identified within the APE under Alternative B Modified. Seven of the 17 sites are CCC road segments and will not be affected by dispersed camping activities.

Further preservation and protection of the Tongue River cultural landscape and traditional cultural properties may be a beneficial effect from restricting and decreasing access under this alternative.

No Action Alternative
The No Action Alternative sets a baseline by considering the existing system road and trails as defined by the CNF Forest Plan, Plan amendments, and all existing Forest Orders. Under the No Action Alternative 494 cultural resource sites have been recorded, of which 46 are classified as priority assets and 27 are considered culturally sensitive sites. The CCC built at least 15 system roads on the District that are still in use. Maintenance of these historic properties as system roads has added years to their preservation and protection.

Direct Effects
Under this alternative, no new historic information would be gained through the addition of new routes to the system. The CCC built system roads would continue to be maintained and protected through their identification as system roads. No new potential CCC routes would be recorded, however, and added to the system. The 46 priority assets would continue to be monitored and any adverse change in their condition would be reported in the MT Annual report.

Indirect Effects
The remote location for three of the NRHP prehistoric locations would be protected through limited access. The culturally sensitive sites would not be subjected to increased access since no new routes would be added to the system. The Tongue River Cultural Landscape would be maintained at its present condition.

Cumulative Effects

There are a number of ongoing and reasonably foreseeable activities on the District that have the potential to affect cultural resources such as fuel treatments, special use permits, and range allotment

plans. Mitigation of the potential effects associated with these activities and site protection measures will continue to be employed in consultation with the MT SHPO. Monitoring site conditions will continue in support of travel management as well as other Forest undertakings such as range development, fuels and timber management. Additional inventory in response to this and future undertakings will add to the understanding of the area prehistory and history.

3.3.2.3 Conclusion – Archaeological Resources and Traditional Cultural Properties

In overall comparisons, Alternative A consists of the highest count of cultural resource sites that may be affected due to the designation of non-system routes to system roads or motorized trails, and the increase of dispersed vehicle camping activities. Alternative B and Alternative B Modified strike a balance between adding to our knowledge of the area through additional inventory, while protecting and preserving the highest number of recorded cultural resource sites, culturally sensitive sites, priority asset sites, historic and CCC roads, and cultural landscapes. The following table compares the action alternatives.

Table 3-14. Summary of Cultural Resource Sites, Priority Asset Sites, and Culturally Sensitive Sites within the APE by Alternative.

Type of Resource	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
Total Number of Cultural Resource Sites within the APE	513	440	443	494
Number of Priority Asset Sites within the APE	46	45	45	46
Number of Culturally Sensitive Sites within the APE	42	35	35	39

For all alternatives, compliance with the NHPA through the MT PA is required. Cultural resource monitoring will be implemented within the Project Area in order to assess the effectiveness of the new plan relative to the protection and preservation of significant heritage resources. This monitoring program will be based upon an adaptive management approach that may necessitate specific changes if site disturbances are observed. Should detrimental effects occur, site evaluative testing and formal consultation with the MT SHPO to identify measures to reduce, remove or mitigate these effects will be necessary. The monitoring results will be presented in the Annual Heritage Report required by the MTPA.

3.3.3 WILDLIFE

Introduction

Public concerns relative to wildlife can be summarized into two primary issues: 1) changes to habitat quality, and 2) effects to wildlife behavior. Habitat concerns include fragmentation, loss, connectivity, and availability of security habitat. Wildlife behavior effects include disturbance, displacement, and responses to noise. Effects for both issues are discussed in general terms in the General Wildlife section as well as in specific species sections relative to those species. Winter over-the-snow travel (i.e. snowmachines, cross-country skiing, etc.) is not part of the current District travel plan process and thus is not discussed. However, winter wheeled motorized vehicle use was considered during analysis.

The District provides habitat for a variety of wildlife species including federally threatened species, ungulates, carnivores, small mammals, resident and migratory birds, amphibians, and reptiles. Travel routes can affect the way many animals use an area because they may bring humans and their associated disturbances into wildlife habitat. The following table displays threatened, endangered, sensitive, and management indicator species on the District, plus other species identified during the public scoping process.

Table 3-15. Wildlife Analysis Table

Species Name	Basic Habitat Description and Occurrence in Project Area	Included in EIS	Rationale and Other Information	Effects Determination For Alternative B[7] Modified
Threatened, Endangered, and Proposed Species				
Black-footed Ferret (*Mustela nigripes*) (Endangered)	Live within large complexes (6,000 to 7,500 acres) of occupied prairie dog colonies (>100 acres) and complexes. Ferrets depend on prairie dog colonies for food, shelter and denning. The Ashland Ranger District supports about 1,100 acres of black-tailed prairie dog colonies. Black-footed ferrets are not known to be present.	Analysis in EIS.	Primary concerns are maintenance of prey base (black-tailed prairie dog colonies).	NLAA
Forest Service Sensitive Species				
American peregrine falcon *(Falco peregrinus anatum)*	Cliff habitat over 200' high with suitable ledges for nest construction. Not known to occur in the project area.	No further analysis will be conducted.	Not in project area	NI
Baird's sparrow *(Ammodramus bairdii)*	Prefers native prairie but structure is more important so may nest in tame grasses. Species present in project area.	Analysis in EIS.	Included in Migratory Birds discussion	NI
Bald Eagle *(Haliaeetus leucocephalus)*[8]	Riparian habitats, forested areas along rivers and lakes, wetlands, and major water bodies. May use uplands and game winter range during winter. Nesting sites usually in large forested areas near large water bodies. The project area used primarily as winter foraging habitat. No known nest sites.	No further analysis will be conducted.	Little nesting habitat and no known nests in project area. Bald eagle presence on District is primarily during winter, and winter over-the-snow travel is not part of the current District travel plan process.	NI
Black-backed woodpecker *(Picoides arcticus)*	Primary habitat is recently burned forested areas, secondary habitat is spruce/fir forests. Habitat present	Analysis in EIS.	Included in Migratory Birds discussion	NI

[7] Options for effects determinations are: For federally listed species **NE** = No effect; **NLAA** = May effect – not likely to adverse affect; **LAA** = May effect – likely to adversely affect; and **BE** = Beneficial effect. For Forest Service sensitive species **NI** = No impact; **MIIH** = May impact individuals but is not likely to cause a trend to Federal listing or loss of viability; **WIFV** = Likely to result in a trend to Federal listing or loss of viability; and **BI** = Beneficial impact. For management indicator species: + = Positive effect; 0 = Neutral effect; and - = Negative effect. For other species of concern: NE = No effect.

[8] Bald eagle delisted effective August 8, 2007 and subsequently managed as a Forest Service Sensitive Species.

Table 3-15. Wildlife Analysis Table

Species Name	Basic Habitat Description and Occurrence in Project Area	Included in EIS	Rationale and Other Information	Effects Determination For Alternative B[7] Modified
	in project area and species is known to be present.			
Blue-gray gnatcatcher *(Polioptila)*	Open stands of juniper and limber pine with intermixed sagebrush. Habitat is not present in the project area.	No further analysis will be conducted	Not in project area.	NI
Burrowin gowl *(Athene unicularia)*	Open grasslands, nesting and roosting in burrows dug by mammals or owls. Species is associated with prairie dogs burrows in the project area. Habitat present in project area and species is known to be present.	No further analysis will be conducted.	No increased access to occupied black-tailed prairie dog habitat is proposed in any alternative.	NI
Greater sage grouse *(Centrocercus urophasianus)*	Sagebrush with intermixed grasslands. No leks are located in project area. Brood-rearing and winter habitat maybe present but the species is not known to occur in the project area.	No further analysis will be conducted.	No increased access to habitat is proposed in any alternative.	NI
Grizzly Bear (*Ursus arctos*)[9]	Remote, well connected forested generalist. Species is not present in the project area.	No further analysis will be conducted	Not in project area.	NI
Harlequin duck *(Histrionicus histrionicus)*	Inhabit fast moving, low gradient clear mountain streams. Species is not present in the project area.	No further analysis will be conducted	Not in project area.	NI
Loggerhead Shrike *(Lanius ludovicianus)*	Grassy pastures that are well grazed, nest in shrubs or small trees, preferably thorny such as hawthorn. Species and habitat are present in project area.	Analysis in EIS.	Included in Migratory Birds discussion	NI
Long-billed curlew *(Numenius americanus)*	Open grasslands or prairie usually near water. No habitat in project area.	No further analysis will be conducted.	Not in project area.	NI
Long-eared myotis *(Myotis evotis)*	Use a variety of habitats but are strongly associated with coniferous forests. Species present in project area.	Analysis in EIS.	Included in Bats discussion. Primary concern is disturbance at roosting sites and hibernacula.	MIIH
Long-legged myotis *(myotis volans)*	Primarily a coniferous-juniper forest bat found at moderate elevations (≥6000ft) but may also inhabit riparian cottonwood bottoms and desert areas. Species present in project area.	Analysis in EIS.	Included in Bats discussion. Primary concern is disturbance at roosting sites and hibernacula.	MIIH
Pallid bat *(Antrozous*	Arid deserts and grasslands with rock outcrops. Species present in	Analysis in EIS.	Included in Bats discussion. Primary	MIIH

[9] Grizzly bear delisted effective April 30, 2007 and subsequently managed as a Forest Service Sensitive Species as directed in "Final Conservation Strategy for the Grizzly Bear in the Yellowstone Ecosystem, Interagency Grizzly Bear Study Team, March 2003."

Table 3-15. Wildlife Analysis Table

Species Name	Basic Habitat Description and Occurrence in Project Area	Included in EIS	Rationale and Other Information	Effects Determination For Alternative B[7] Modified
pallidus)	project area.		concern is disturbance at roosting sites and hibernacula.	
Spotted bat *(Euderma maculatum)*	Desert to montane coniferous forests. Species present in project area.	Analysis in EIS.	Included in Bats discussion. Primary concern is disturbance at roosting sites and hibernacula.	MIIH
Townsend's big-eared bat *(Corynorhinus townsendii)*	Cave and cave-like structures along with forested foraging habitat. Species present in project area.	Analysis in EIS.	Included in Bats discussion. Primary concern is disturbance at roosting sites and hibernacula.	MIIH
Black-tailed prairie dog *(Cynomys ludovicianus)*	Relatively flat grasslands with diggable soils, throughout the central plains. Species present in project area.	See black-footed ferret analysis, no further analysis for prairie dogs will be conducted.	No increased access to habitat is proposed in any alternative.	MIIH
White-tailed prairie dog *(Cynomys leucurus)*	Xeric sites with mixed stands of shrubs and grasses from the Bighorn Basin in Montana to Utah. Species is not present in project area.	No further analysis will be conducted.	Not in project area.	NI
Wolverine *(Gulo gulo)*	Remote subalpine and spruce/fir forested areas. Species is not present in project area.	No further analysis will be conducted.	Not in project area.	NI
Greater short-horned lizard *(Phrynosoma hernandesi)*	Areas with short, sparse grass or sagebrush; flats with pebbly or stony soil; and rock outcrops. Species present in project area.	Analysis in EIS.	Included in General Wildlife Species discussion. Primary concern is direct mortality while crossing roads.	MIIH
Milk Snake *(Lampropeltis triangulum)*	Open sagebrush/grasslands, usually in or near rocky areas. Species present in project area.	Analysis in EIS.	Included in General Wildlife Species discussion. Primary concern is direct mortality while crossing roads.	MIIH
Western hog-nosed snake *(Heterodon nasicus)*	Sagebrush/grassland; arid areas with gravelly or sandy soil. Species present in project area.	Analysis in EIS.	Included in General Wildlife Species discussion. Primary concern is direct mortality while crossing roads.	MIIH
Management Indicator Species[10]				
Northern Goshawk *(Accipiter gentilis)* (H)	Mature forest generalist. Species present in project area.	Analysis in EIS.	Included in Migratory Birds discussion	0
White-tailed deer *(odocoileus*	Grassland to montane conifer forest. Species present in project	Analysis in EIS under elk	Analysis for elk serves as surrogate for white-tailed	0

[10] H = Habitat Indicator Species; K = Key Species

Table 3-15. Wildlife Analysis Table

Species Name	Basic Habitat Description and Occurrence in Project Area	Included in EIS	Rationale and Other Information	Effects Determination For Alternative B[7] Modified
virginianus) (H, K)	area.	section.	deer because they occupy the same habitats in the project area and elk have more restrictive habitat requirements. Impacts of travel are expected to be similar for the two species.	
Ruffed grouse *(Bonasa umbellus)* (H)	Primary habitat includes dense early seral staged forests dominated by aspen, secondary habitat includes other dense deciduous or conifer woodland areas. Species is not present in project area.	No further analysis will be conducted.	Not in project area.	0
Western kingbird *(Tyrannus verticalis)* (H)	Open or partially open country with scattered trees, including agricultural lands. Habitat not present in project area.	No further analysis will be conducted.	Not in project area.	0
Bullock's (Northern) oriole *(Icterus bullockii)* (H)	Open deciduous woodland and riparian areas. Habitat present in project area. Species presence unknown.	Analysis in EIS.	Included in Migratory Birds discussion	0
Yellow warbler *(Dendroica petechia)* (H)	Brushy riparian especially with willows. Species present in project area.	Analysis in EIS.	Included in Migratory Birds discussion	0
Ovenbird *(Seiurus aurocapillus)* (H)	Mid-late successional, closed-canopied deciduous or deciduous/conifer forests with limited understory. Species present in project area.	Analysis in EIS.	Included in Migratory Birds discussion	0
Spotted (Rufous-sided) towhee *(Pipilo maculatus)* (H)	Shrubby riparian areas, woody draws, and woodland undergrowth. Species present in Pryors Unit.	Analysis in EIS.	Included in Migratory Birds discussion	0
Brewer's sparrow *(Spizella Breweri)* (H)	Strongly associated with sagebrush, but also uses other areas with scattered shrubs and short grasses. Species present in project area.	Analysis in EIS.	Included in Migratory Birds discussion	0
Sharp-tailed grouse *(Tympanuchus phasianellus)* (H, K)	Mosaic of dense grass and shrubs with forbs for nesting, woody riparian areas in winter. Species present in project area.	Analysis in EIS.	Included in Migratory Birds discussion	0
Yellowstone Cutthroat trout (*Oncorhynchus clarkii bouvieri)* (H, K)	Upper Yellowstone and Upper Snake River drainages. Species is not present in project area.	No further analysis will be conducted.	Not in project area.	0
Elk *(Cervus*	Grassland to forested alpine areas.	Analysis in EIS.	Main concerns are potential	0

Table 3-15. Wildlife Analysis Table

Species Name	Basic Habitat Description and Occurrence in Project Area	Included in EIS	Rationale and Other Information	Effects Determination For Alternative B[7] Modified
canadensis) (K)	Species present in project area.		for displacement due to recreational travel, and vulnerability during hunting season.	
Golden eagle *(Aquila chrysaetos)* (K)	Open hilly to mountainous areas. Habitat and species present in project area.	Analysis in EIS.	Included in Migratory Birds discussion	0
Merlin *(Falco columbarius)* (K)	Patchy shrub/grassland habitats with large trees to support nesting (secondary nester). Habitat and species present in project area.	Analysis in EIS.	Included in Migratory Birds discussion	0
Mule deer *(Odocoileus hemionus)* (K)	Rugged grassland to forested alpine areas. Species present in project area.	Analysis in EIS under elk section.	Analysis for elk serves as surrogate for mule deer because they occupy the same habitats in the project area and elk have more restrictive habitat requirements. . Impacts of travel are expected to be similar for the two species.	0
Bighorn sheep *(Ovis Canadensis)* (K)	Remote, steep, rugged terrain, such as mountains, canyons, and escarpments where precipitation is low and evaporation is high. Species is not present in project area.	No further analysis will be conducted.	Not in project area.	0
Pronghorn antelope *(Antilocapra Americana)* (K)	Rolling grasslands to mixed sagebrush shrublands. Species present in project area.	No further analysis will be conducted.	No increased access to habitat is proposed in any alternative.	0

Potential effects of the alternatives on the following species and/or their habitats are analyzed in detail: Black-footed ferret; bats (includes Long-eared myotis, long-legged myotis, Pallid bat, Spotted bat, and Townsend's big-eared bat); big game (includes Elk, White-tailed deer and Mule deer); migratory birds (includes Baird's sparrow, Black-backed woodpecker, Loggerhead shrike, Golden eagle, Merlin, Northern goshawk, Bullock's oriole, Yellow warbler, Ovenbird, Spotted Towhee, Brewer's sparrow and Sharp-tailed grouse); and general wildlife species (includes Greater short-horned lizard, Milk Snake, Western hog-nosed snake and other Focal Species).

The list of federally Threatened and Endangered species for the Custer National Forest and counties encompassed by the Ashland Ranger District was verified through the U.S. Fish and Wildlife Service in July 2008 (US Fish and Wildlife Service 2008). The bald eagle was delisted effective August 8, 2007. The only listed species for the Ashland Ranger District is the black-footed ferret.

Applicable background information regarding specific species biological requirements, and general effects including effects of roads and recreation on wildlife, were taken from the Beartooth Travel

Management FEIS, Gallatin National Forest Travel Plan FEIS, the Helena National Forest North Belts Travel Plan Wildlife Report, Effects of Recreation on Rocky Mountain Wildlife – A Review for Montana, and other literature as cited.

3.3.3.1 Affected Environment – Threatened And Endangered Species Black-footed Ferret

Regulatory Framework – Black-footed Ferret

The black-footed ferret was listed as a federally endangered species under the Endangered Species Act (ESA) in March 1967. The recovery plan for the black-footed ferret (USFWS 1988) established the national recovery objectives where are to: increase the captive population of ferrets to 200 breeding adults by 1991; establish a prebreeding census population of 1,500 free-ranging breeding adults in 10 or more different populations with no fewer than 30 breeding adults in each population by the year 2010; and encourage the widest possible distribution of reintroduced animals throughout their historic range (FR Vol. 61, No. 55, March 1996). So far, reintroduction attempts have occurred in Wyoming, Montana, South Dakota, Colorado, and Utah. In January 2002, the Conservation Plan for Black-tailed and White-tailed Prairie Dogs in Montana was approved and implemented in Montana (MTFWP 2002). The overall goal of the plan is to "provide for management of prairie dogs populations and habitats to ensure long-term viability of prairie dogs and associated species" which included black-footed ferrets (MTFWP 2002). In 2003 an annual rule regulating prairie dog shooting on public lands was implemented by the State where prairie dogs could not be shot on public lands from March 1 thru May 31(MTFWP 2003). The no shooting rule was permanently remanded in 2007 so prairie dog shooting on most public land remains open. On January 24, 2008, the U.S. Fish and Wildlife Service reintroduced 8 black-footed ferrets on the Northern Cheyenne Indian Reservation. The nearest release site was about seven miles from the Ashland Ranger District. More ferret releases are scheduled on Tribal lands in Fall 2008 or Winter 2009.

Affected Environment – Black-footed ferret

Black-footed ferrets are intimately tied to prairie dog colonies throughout their range. Research from ferret-occupied prairie dog colonies indicates that the most important attribute of ferret habitat is the distribution and abundance of prairie dogs. Ferrets are therefore limited to the same open habitat used by prairie dogs: grasslands, steppe, and shrub steppe (MTNHP 2008). To support a viable population of ferrets, a prairie dog colony complex of 2500-3000 ha (6,200-7,400 acres) composed of individual colonies at least 12 ha (30 acres) in size, with the majority 50 ha (125 acres) or larger, is needed (Forrest et al., 1988, p. 28). Miller et. al. (1996) found that females with young have never been found on prairie dog colonies less than 49 ha (121 acres). No black-footed ferrets have been documented on the Ranger District since 1936.

Currently there are about 1,088 acres of active black-tailed prairie dog (*Cynomys ludovicianus*) colonies on NFS lands which occupy 0.3% of the 435,822 acres on the Ashland Ranger District. Of the 1,088 acres of colonies, no prairie dog colonies are greater than or equal to 120 acres which is the size required to support one female ferret with young. The four largest colonies range from 75 to 114 acres with an average of 19 acres.

The colony acreage on NFS lands and the distribution pattern of towns is currently inadequate to support black-footed ferrets. As of August 12, 2004 the USFWS removed the black-tailed prairie dog as a candidate for listing under the Endangered Species Act. The black-tailed prairie dog is considered as a USFS Northern Region Sensitive species. Approximately 770 acres (71%) of occupied prairie dog habitat falls within 100 feet of an open motorized route for each alternative. This

portion of the total acres of available prey for black-footed ferrets may be more vulnerable to recreational shooting. However since 2003 when black-tailed prairie dogs were first monitored in the project area, the amount of occupied habitat has increased approximately 50 to 100 acres per year.

3.3.3.2 Environmental Consequences – Threatened And Endangered Species: Black-footed Ferret

Direct and Indirect Effects – Black-footed Ferret

The presence of roads and trails represents a direct loss of habitat that has already occurred, and their use can pose a direct threat of black-footed ferret mortality from vehicles. However, black-footed ferrets are not known to occur in the area and the project area does not support an adequate preybase of prairie dogs to support ferrets. Indirectly, the impacts of roads include increased access for prairie dog shooters that could have a negative impact on prey density. However since 2003 when black-tailed prairie dogs were first monitored in the project area, the amount of occupied habitat has increased approximately 50 to 100 acres per year.

Effects Common to All Alternatives

Direct habitat loss would not increase under any alternative because construction of new routes is not proposed. None of the alternatives analyzed in detail propose increased access to black-footed ferret or black-tailed prairie dog habitat. All of the alternatives provide the same amount of access to prairie dog colonies.

Vehicle-related black-footed ferret mortality is unlikely given the relatively low speeds and traffic volumes on National Forest system roads and the lack of ferrets and adequate habitat.

No vegetation treatment is proposed with this analysis and the components of available habitat would not change.

Alternative A, Alternative B and No Action Alternative

The availability of black-footed ferret habitat would be effectively the same under Alternatives A, B, B Modified, and the No Action.

Cumulative Effects – Black-footed Ferret

Based on the past and current vegetation management on the District, including timber harvest, livestock grazing, prescribed fire, the invasive species program, and other vegetation projects, grassland/shrub steppe vegetation conditions provide some habitat for black-footed ferret and their preferred prey species, black-tailed prairie dogs. The impacts of different types of dispersed recreation including the outfitter/guide program; hunting; recreational shooting; fire suppression; and the lands, minerals, and non-recreation special use programs on the District have been minor. Given that anticipated direct and indirect effects to black-footed ferrets and their habitats from any of the alternatives is small, cumulative effects of past, present, and reasonably foreseeable future activities is also expected to be small.

Consistency with Laws, Regulations, and Policy

All alternatives are consistent with the laws, regulations, policy, and Federal, Regional, and State direction, the Custer National Forest Land and Resource Management Plan, and the conservation Plan for Black-tailed and White-tailed Prairie dogs in Montana (2002).

Determination of Effects – Black-footed Ferret

Implementation of the proposed Federal Action *May Affect, But Is Not Likely To Adversely Affect The Black-Footed Ferret Or Their Habitat.* This determination is based on the following rationale: 1) black-footed ferrets are not known to occur in the area; 2) the project area does not support an adequate preybase to support ferrets; 3) the amount of occupied black-tailed prairie dog habitat continues to increase each year; 4) direct habitat loss would not increase under any alternative because construction of new routes is not proposed; and 5) none of the alternatives propose increased access to black-footed ferret or black-tailed prairie dog habitat. Implementation of the proposed Federal Action *May Impact Individuals Or Habitat But Is Not Likely To Cause A Trend To Federal Listing Or Loss Of Viability For Black-Tailed Prairie Dogs.* This determination is based on the above rationale for ferrets along with the fact that prairie dogs will continue to be killed by recreational shooting until the State imposes an anti-shooting rule.

No recommendations for removing, avoiding, or compensating adverse effects are necessary.

3.3.3.3 Affected Environment – Sensitive Species: Bat Species

Five Forest Service sensitive bat species (Long-eared myotis, long-legged myotis, Pallid bat, Spotted bat, and Townsend's big-eared bat), occur on the District.

Although different bat species have specific habitat needs, some generalizations can be made. During summer, which is the reproductive season, bats may use various roost sites such as rock crevices, caves, talus slopes, snags, buildings, and bridges. Hibernacula are located in underground caverns with temperatures above freezing. Deep limestone caverns are particularly important for hibernating bats in the Rocky Mountains (Adams 2003). Hibernating bats are especially vulnerable to disturbance because when aroused from hibernation, they use winter fat needed to support them until insects are available in the spring. A single arousal most likely costs a bat as much energy as it would normally expend during two to three weeks of hibernation. Thus, frequently aroused hibernating bats may starve before spring (Harvey et al. 1999).

Most bats are very sensitive to disturbance (Schmidt 2003). Human-caused adverse impacts to bats include habitat destruction, direct mortality, vandalism, and disturbance of hibernating and maternity colonies. Disturbance to hibernacula and maternity colonies is a major factor in the decline of many bat species. Human-caused arousal from hibernation costs bats energy that may lead to starvation before spring (Harvey et. al. 1999). The body warmth from a person standing 10 feet below a hibernating bat may be enough to stimulate the bat's arousal (Adams 2003). Disturbance to summer maternity colonies may cause parents to drop or abandon their dependent young (Harvey et. al. 1999). Activities such as rock climbing or caving may take a toll on nursery colonies (Adams 2003).

Surveys for hibernacula, colonial roosts, and maternity colonies have not been conducted on the District. However, potential habitat for hibernacula and colonial roosting is present on the Unit. In addition, documentation of post-lactating females suggests that maternity colonies are also likely to be present. Potential effects of the alternatives on bats in the project area were analyzed in terms of miles of open motorized routes. The reason for using this method is that the presence of motorized routes can facilitate access to caves, thus potentially leading to adverse indirect effects by disturbance of bats at hibernacula, roosting, and maternity sites. Miles of open motorized routes are displayed in the following table.

Table 3-16. Public Motorized Use Route Miles by Alternative – Ashland RD

Alternative	Motorized Route Miles
Alternative A	750
Alternative B	543
Alternative B Modified	559
No Action Alternative	676

On the Ashland District, hibernacula are not expected to be present due to lack of caves. For the same reason, colonial roosts and maternity colonies are also not expected to occur. Non-colonial roosting and maternity sites are more likely to occur in rock crevices in sandstone, siltstone, and mudstone outcrops scattered throughout the District, as well as in tree snags and other habitats. Effects to bats in these settings are more likely to be caused by loss of habitat than by human disturbance at any particular site.

3.3.3.4 Environmental Consequences – Sensitive Species: Bat Species

Direct and Indirect Effects – Bat Species

The presence and use of roads and trails are not expected to directly affect bats or their habitat. However, the presence of motorized routes can facilitate access to bat habitat, particularly to roosting or maternity sites, thus leading to adverse indirect effects by disturbance of bats at these sites.

Alternative A

Alternative A would have the highest number of open motorized route miles (750) in the project area. This alternative would provide the least protection to bat roosting and maternity sites because these sites may be more easily accessible than under the other alternatives. Hibernacula are not likely to occur on the District so no direct or indirect effects are expected on bats during this period of their life cycle when they are most vulnerable.

Alternative B and Alternative B Modified

Alternative B and Alternative B Modified would virtually have the same effects on bats. Both alternatives would have the lower open motorized route miles, 543 miles and 559 miles respectively. Both alternatives provide additional moterized routes that would be seasonally closed from September 1 thru December 1. Hibernacula are not likely to occur on the District so no direct or indirect effects are expected on bats during this period of their life cycle when they are most vulnerable.

No Action

This alternative would have 676 miles of open motorized routes and thus would protect bat roosting and maternity sites overall more than Alternative A and less than Alternatives B and B Modified. Hibernacula are not likely to occur on the District so no direct or indirect effects are expected on bats during this period of their life cycle when they are most vulnerable.

Cumulative Effects - Bat Species

Several factors have likely contributed to cumulative effects to bats in the project area which include past wildfires and timber harvest. Effects of past timber harvest and fires are hard to assess. Most bat species tend to avoid large open habitats when possible. However, many species forage along forest edges. Heterogeneous habitats containing open, brushy, and forested areas provide optimal foraging conditions because of the presence of extensive habitat edge (Adams 2003). Vegetation across the District is comprised of about 50% ponderosa pine forest and 50% grassland/shrub so forest edge ecotones dominant the landscape. Since 2000 over 30% of the District has been burned in wildfires

with essentially no commercial harvest of fire killed trees. Timber harvest has occurred on the District over the last several decades. The extent that cutting units have regenerated is variable, with some naturally regenerated to dense shrub cover, others to seedling and sapling ponderosa pine of varying degrees of canopy cover. The combination of vegetative structure and forest edge likely provides suitable foraging conditions for bats.

Current and future cattle grazing can damage sensitive habitats, particularly riparian systems. Shoreline damage can lead to erosion that lowers water quality and changes stream flow dynamics. Soil damage, particularly along stream and pond shorelines, can suppress vegetation growth and thus lower the diversity of insect prey (Adams 2003). Cattle grazing occurs across most of the District and will continue in the future. One goal of livestock management on the District is to bring non-functioning and functional-at-risk riparian systems up to properly functioning condition. Improvement over time of degraded riparian systems would improve foraging and water quality conditions for bats and thus reduce adverse cumulative effects. Future coal development may also have a potential for negative effects on bats or their habitat in the area.

Consistency with Laws, Regulations, and Policy

The National Forest Management Act (36 CFR 219.19) directs federal agencies to manage habitat to provide for viable populations of all native and desired non-native fish and wildlife species. The five bat species analyzed are native to this area, and are classified as Forest Service sensitive species. Sensitive species are those for which population viability is of concern. Direction for management of sensitive species is contained in the Forest Service Manual (FSM 2672.1), which states that these species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for Federal listing. This analysis considered potential for alternative scenarios to have adverse impacts on bats and thus is consistent with the above direction.

Determination of Effects - Bat Species

Implementation of the proposed Federal Action *May Impact Individuals Or Habitat But Is Not Likely To Cause A Trend To Federal Listing Or Loss Of Viability For Bat Species***.** This determination is based on the following rationale: 1) hibernacula for the five bat species does not occur in the project area; 2) public access to potential roosting and maternity sites is most likely low across the project area; 3) the preferred alternative reduces open motorized routes by 324 miles (37% reduction); 4) direct habitat loss would not increase under any alternative because construction of new routes is not proposed; and 5) none of the alternatives propose increased access to sensitive bat species habitat.

No recommendations for removing, avoiding, or compensating adverse effects are necessary.

3.3.3.5 Affected Environment – Management Indicator Species: Big Game Species

The elk analysis serves as a surrogate for mule deer and white-tailed deer. The rationale for this is based on the large amount of overlap in habitat use and needs between deer and elk on the District; the amount of scientific literature available for elk and the effects of roads; and impacts of travel management on the District are expected to be very similar for these three species.

Big Game Habitat Use and Travel

Many studies have shown that motorized access influences elk habitat use (Lyon 1983,, Frederick 1991, Lyon and Christensen 2002, Rumble et al. 2005, Stubblefield et al. 2006). Elk have repeatedly

been shown to avoid habitat adjacent to open roads (Lyon et al. 1985, Millspaugh et al. 2000). Declines in habitat use have been reported within 0.25-1.8 miles of open roads (Lyon and Christensen 2002), but substantial reductions in habitat use are normally confined to <0.5 miles of an open road. Many variables influence elk habitat use relative to open roads.

Observed declines in habitat use adjacent to roads have led to the development of elk habitat effectiveness models. Habitat effectiveness refers to the percentage of available habitat that is usable by elk outside the hunting season (Lyon and Christensen 1992). The literature contains several recommendations for managing open roads within summer elk habitat. Using Lyon's model for habitat effectiveness based entirely on road density (Lyon 1983), Christensen et al. (1993) recommended that in areas where elk are one of the primary resource considerations should have habitat effectiveness of 50% or greater (open road density <1.9 mi/sq mi). Areas with <50% habitat effectiveness (>1.9 mi/sq mi) were expected to make only minimal contributions to elk management goals (Christensen et al. 1993) (see the table below for motorized route density). However, the 2005 Montana Elk Management Plan does not contain objectives or recommendations for management of open road density within summer elk habitat.

Most studies involving the effects of motorized uses on elk involved roads with passenger vehicle use rather than motorized trails where ATVs and/or motorcycles are used. Therefore, there is very little data available to use in assessing the impacts of motorized trails on elk. Wisdom et al. (2004) discussed preliminary findings from a controlled experimental study evaluating the effects of ATVs, mountain bikes, hiking, and horseback riding on elk and mule deer. Their initial results indicate that elk exhibited much higher rates of movement (or greater displacement) and probability of flight response from ATVs and mountain bikes compared to horses and hikers. Canfield et al. (1999) and Toweill and Thomas (2002) both state that the effects of open motorized trail use are likely similar to those resulting from open roads. The two uses are similar in that both allow easier access to areas that would otherwise be inaccessible without considerable effort using non-motorized transportation. Therefore, travel route densities incorporating motorized trails cannot be compared to published habitat effectiveness models, but they can be used to compare Travel Plan effects among alternatives. As with open road density and habitat effectiveness values, the existing literature does not identify a clear link between open motorized route densities and elk population demographics. Therefore, conclusions on expected travel management planning impacts will only address disturbance and displacement of elk (big game) from suitable habitat and not population responses.

Big Game Vulnerability and Travel

Studies have been conducted to determine factors influencing elk vulnerability to hunting and management solutions to the problem of low mature bull elk numbers. One of the conclusions was that motorized access is one of the major factors influencing elk vulnerability, along with hunter numbers, availability of security cover, topography, hunting season structure and length, hunting equipment technology and others. Data have consistently shown that elk mortality rates increase with increasing open road density, because the number of hunters and their distribution both tend to increase with increasing road density (Skovlin et al. 2002, Millspaugh et al. 2000). This is especially true for bulls because hunting regulations have traditionally allowed greater opportunity for harvesting them compared to cows (Vore and Desimone 1991).

Motorized access is one of the few factors affecting elk vulnerability that the Forest Service has management authority for. Hillis et al. (1991) provided guidelines for managing elk habitat to limit elk vulnerability. The key concept was to provide security areas for elk during the hunting season where they are less vulnerable to harvest. They defined secure areas as >250 acres in size and >0.5

mile from an open road, and recommended that they comprise >30% of the analysis unit (see the table below for elk security by alternative). Although open roads have the largest effect on elk vulnerability, restricted roads also have an impact because they provide easier access for hunters using non-motorized transportation (Skovlin et al. 2002). Lyon and Burcham (1998) found that elk hunters are likely to use closed roads to access areas farthest from open roads. The Hillis guidelines for secure areas included a recommendation to minimize closed roads within elk security areas, but did not provide standards for accomplishing this (Hillis et al. 1991). The 30% secure habitat level should be viewed as the minimum necessary to avoid excessive bull elk mortality during the hunting season, realizing that more may be necessary in some districts due to variables such as topography, vegetation cover, and hunting pressure. Elk security habitat and open motorized route density by alternative are displayed in the following table.

Table 3-17. Percent Elk Security Habitat and Vulnerability by Alternative.

	Alternative A	Alternative B	Modified Alternative B	No Action
% Elk Security	28.33	36.25	35.53	24.90
% Elk security w/ Seasonal Route Closures	NA	37.69	37.5	NA
Open Motorized Route Density (mi./sq.mi.)	1.09	0.83	0.85	1.00
Open Motorized Route Density w/ Seasonal Route Closure (mi./sq.mi.)	NA	0.80	0.82	NA

The Montana Final Elk Management Plan gives population objectives and general habitat management strategies for each Elk Management Unit (EMU) (Montana Fish, Wildlife and Parks 2005). Habitat objectives stated in the plan for the Custer Forest EMU (the EMU encompassing all of the District) are to work cooperatively with private and public land managers to maintain and improve existing elk habitat. The Custer Forest EMU is located in Big Horn, Treasure, Rosebud, Custer, Fallon, Powder River, and Carter Counties in southeastern Montana. The Custer Forest EMU encompasses 14,378 square miles of land where about 45% (6,400 square miles) provides elk habitat. About 25% of the EMU falls on public land with the rest falling on private property. Approximately 12.3% of the suitable elk habitat in the EMU falls within the project area. About 63% of the current elk distribution is on private lands. State big game managers estimate that approximately 800 to 1000 elk are present in the EMU. Elk numbers are currently managed based on the level of landowner tolerance to elk depredation on private lands. The State is currently trying to maintain 500 post-hunting season elk in the EMU.

3.3.3.6 Environmental Consequences – Management Indicator Species: Elk

Direct and Indirect Effects – Big Game Species

Effects Common to All Alternatives

All alternatives meet the access management recommendations (see Big Game Habitat Use and Travel section above) for elk in the project area. Open motorized route densities would range from 0.83 to 1.09 mi/sq mi which are below Christensen et al's.(1993) recommendation to manage roads at <1.9 mi/sq mi for areas where elk are one of the primary resource considerations. Secure elk habitat in the project area (see Big Game Vulnerability and Travel section above) would range from 19% to 23%, which is below the 30% minimum recommended by Hillis et al. (1991). Elk habitat within the project

area for all alternatives would be categorized as year-round habitat with no distinct areas for seasonal use (e.g. winter range).

Since elk analysis is used as a surrogate for mule deer and white-tailed deer, effects described for elk would also apply to deer.

Alternative A
Alternative A would have the highest open motorized route density (1.09 mi/sq mi) and would provide the lowest elk security cover (28%). Recommendations for access management would be met for elk under this alternative. Management recommendations for elk vulnerability would not be met by this alternative.

Alternative B and Alternative B Modified
Alternative B and Alternative B Modified would virtually have the same effects on elk. Both alternatives would have the low open motorized route density during most of the year and lower open moterized route densities during the hunting season (see previous table). Both alternatives would provide high elk security cover during year and higher yet during the hunting season (see previous table). Both Alternative B and Alternative B Modified would meet recommendations for access management and for elk vulnerability.

No Action
This alternative would have open motorized route density of 1.0 mi/sq mi and security cover of 25%, both similar to Alternative A. Recommendations for access management would be met for elk under this alternative. Management recommendations for elk vulnerability would not be met by this alternative.

Cumulative Effects – Big Game Species
Several past and ongoing habitat enhancement activities on the District have improved habitat for elk. These activities include thinning and prescribed burning on elk range to improve forage quality and availability, and to increase the acreage of available habitat by reducing conifer species that have gradually encroached onto year-round range. The long-term aspen regeneration program benefits elk by improving forage and cover. Spraying of invasive plant species reduces competition with native plants that provide forage for elk.

Current and future cattle grazing can damage sensitive habitats, particularly riparian systems. Cattle grazing occurs across most of the District and will continue in the future. One goal of livestock management on the District is to improve vegetative condition in areas that have been degraded by past grazing practices. Improvement in the health of native vegetation may benefit elk in the short and long term time frames.

Housing developments on private land adjacent to the Forest are not an issue, at least for the near future, because most private lands are large blocks with few owners.

Density of motorized non-Forest Service roads within the Forest boundary is 0.15 mi/sq mi. for all of the alternatives. Contributions of these roads to adverse cumulative effects within the Forest boundary are expected to be minimal.

Consistency with Laws, Regulations, and Policy
The Custer National Forest Management Plan contains relevant direction for management of big game populations. The mitigation measure for key wildlife species, including big game species, relative to travel management planning states, "Where necessary to protect wildlife values, access and/or traffic will be restricted in key wildlife habitats during critical periods." In addition, the 2005 Montana Final Elk Management Plan provides relevant management direction for elk habitat. This analysis considered guidance from the above documents as well as from pertinent literature.

Determination of Effects – Big Game Species
Implementation of the proposed Federal Action will have a *Neutral Impact On Big Game Species***.** This determination is based on the following rationale: 1) all alternatives meet the access management recommendations; 2) the preferred alternative would have the low open motorized route density (0.85 mi/sq mi) and would provide a highest level of elk security cover (36%); 3) open road densities and elk security would be minimally improved with seasonal road closures; 4) the preferred alternative reduces open motorized routes by 324 miles (37% reduction); 5) direct habitat loss would not increase under any alternative because construction of new routes is not proposed; and 6) the alternatives are consistent with the Montana Statewide Elk Management Plan (2005).

No recommendations for removing, avoiding, or compensating adverse effects are necessary.

3.3.3.7 Affected Environment – Migratory Birds

Regulatory Framework
Migratory bird species are protected under the Migratory Bird Treaty Act (16 USC 703-711). A January, 2001 Executive Order requires agencies to ensure that environmental analyses evaluate the effects of federal actions and agency plans on migratory birds, with emphasis on species of concern. Species of concern include those listed under the Endangered Species Act, Forest Service Sensitive Species, and those identified as species of concern by the Montana Natural Heritage Program and the Montana Department of Fish, Wildlife and Parks (MTNHP 2007, MTFWP 2007). This discussion addresses potential effects of the Travel Plan alternatives on migratory bird species in general, including Forest Service Sensitive Species and Management Indicator Species.

Affected Environment - Migratory Birds
The following avian Forest Service Sensitive Species are present on the District: Baird's sparrow, Black-backed woodpecker, and Loggerhead shrike. The following birds are Management Indicator Species on the District: Golden eagle, Merlin, Northern goshawk, Bullock's oriole, Yellow warbler, Ovenbird, Spotted Towhee, and Brewer's sparrow. It is difficult to address effects to migratory bird species collectively, since travel management actions can have adverse effects on some species, while being neutral or benefiting others. However, it would not be practical to attempt to address all migratory bird species separately. Therefore, the migratory bird discussion addresses effects of travel management actions on bird species and habitat in general, including that for sensitive and management indicator species, and resident species Northern goshawk.

Migratory bird species are a very diverse group and thus occupy all types of habitat available on the District, including ponds, streams, wetlands, riparian areas, grasslands, shrub lands, deciduous forest, coniferous forest, mixed forest, recently burned forest, rock outcrops, talus, and sheer cliff walls. Many migratory bird species use habitat on the District as breeding grounds, while others breed in more northern climes and winter here. Some species are habitat specialists and are relatively

restricted to certain cover types such as wetlands, riparian, forest interior or cliff habitat. Others are habitat generalists and can occupy a wide variety of cover types. Some bird species are extremely sensitive to habitat modifications and human disturbance, particularly in breeding areas, while others are much more tolerant of human intrusions, and might actually benefit from habitat modifications resulting from human activities.

Habitat Alteration

Travel management can affect habitat fragmentation by dissecting contiguous vegetation types with road and trail corridors. Fragmentation effects have been reported to impact bird species in riparian habitat and grass/shrub lands (Joslin and Youmans 1999), but most of the attention to this issue has been focused on fragmentation of forest habitat.

Road and trail corridors through continuous forest habitat can lead to increased nest predation rates since smaller forest patches may be easier for predators to penetrate, and roads and trails provide travel corridors for predators to access forest interior from nearby open habitat (Joslin and Youmans 1999, Askins 1994).

Road and trail corridors are relatively permanent features on the landscape, and can result in forest fragmentation by creating permanent openings in the forest canopy. Since road and trail corridors remain in the same location for many years, they can become learned features used by multiple generations of predatory and/or parasitic species (Askins 1994).

Rich et al (1994) studied the impacts of forest fragmentation associated with cleared road corridors on bird species in southern New Jersey. They found significantly greater relative abundance of forest interior bird species in edge habitat along narrow (approximately 8 m or 26 ft wide) unpaved forest roads than along wider (16 m or 53 ft wide) paved secondary roads. No significant differences in forest interior bird species abundance was found between narrow unpaved Forest road edges and forest interior habitat. Based on these findings, they concluded that forest interior nesters did not perceive a difference between forest interior habitat and edge habitat along unpaved forest roads. However, although most forest interior nesting species did not appear to avoid edge habitat along paved or unpaved forest road corridors, there were differential rates of nest predation and brood parasitism along varying widths of road corridors, suggesting that some corridors, particularly wider corridors with mowed edges, may be creating ecological traps for some migratory species of forest interior nesting songbirds.

Hutto et al. (1995) examined the rate of bird detections between on-road and off-road point counts in Montana. The majority of all species detected were found in both on-road and off-road points. However, points along roads less than 10 m (33 ft) wide did not show a difference in number of species detected from off-road points, whereas point counts along wider roads detected significantly more bird species than found in corresponding off-road points. Most species detected in the on-road points were those that typically forage in forest openings and shrubby habitat often present along road corridors. Those species detected in greater proportions in off-road points were forest interior associates. The most notable differences in number of species detected for on-road and off-road points occurred in forested cover types, with closed canopy forest showing the greatest difference, followed by open forest, and then early succession forest types.

Corridor width appears to influence bird species composition and associated nest predation and parasitism rates along roadways. Studies that specifically addressed the fragmentation impacts of road

corridors on bird species (Rich et al. 1994, Askins 1994 and Hutto et al. 1995) generally reported that narrow (8-10 m, 26-33 ft) road corridors had few notable impacts on nesting bird species, whereas wider corridors, particularly where shoulders were maintained with mowing, had more notable effects associated with nest predation and brood parasitism. Roadside vegetation on the Forest is periodically managed through brush removal, but only the high use roads receive treatment, and only when the need arises (i.e., there is no set schedule for brush removal). Unpaved Forest road edges are rarely ever mowed, and therefore do not typically provide the type of grassy roadside vegetation preferred by cowbirds and some edge-associated nest predators.

Disturbance
The presence of travel facilities on the landscape generally affects bird species through habitat modification and associated impacts discussed above. The presence of humans using travel facilities typically affects birds through disturbance mechanisms. Knight and Gutzwiller (1995) stated: *"human occupation and activity are clearly and directly correlated with declines in breeding populations of birds."* Human disturbance associated with travel management can elicit both physiological and behavioral responses from birds, which can affect reproductive success and survival.

Forman et al. (2003) reported that breeding birds seem to be affected by noise disturbance associated with traffic on roads and trails. Songbirds appear to be sensitive to very low noise levels. The noise level that population densities of woodland birds declined at averaged 42 decibels (dB), with a density decline occurring at 35 dB for the most sensitive woodland species. For grassland species, population densities declined when noise levels reached an average of 48 dB, with a decline occurring at 43 dB for the most sensitive species (Foreman and Alexander 1998). While most studies have shown grassland and forest birds to appear adversely affected by traffic noise, other studies have found most species to be neutral or to increase in numbers (Kaseloo and Tyson 2004).

Although noise associated with human travel is certainly a disturbance factor that can influence bird behavior, birds are able to adapt and habituate more quickly to mechanical (or motorized) noise than to human presence (Knight and Gutzwiller 1995). Therefore, non-motorized use on and off trails may be a more severe disturbance factor for some birds than motorized travel restricted to designated routes.

3.3.3.8 Environmental Consequences – Migratory Birds

Direct and Indirect Effects

Effects Common to All Alternatives
Most of the habitat alteration (e.g. modification, loss and fragmentation) associated with District travel management has already occurred. The consequences of past habitat change are likely beneficial for some bird species and detrimental to others.

Alternative A
Of the three Alternatives considered, Alternative A represents a maximum for both habitat alteration effects and disturbance impacts to migratory bird species. At a route density of 1.09 mi/sq mi, Alternative A would contain an overall higher motorized travel route density as well as total motorized route miles on the District. Adverse effects would be greatest on bird species susceptible to changes in habitat and to human disturbance.

Alternative B, Alternative B Modified, and No Action

Average motorized route density across the District would range from 0.83 to 1.00 mi/sq mi for Alternatives B, B Modified, and No Action. The total number of motorized route miles would be similar for these two alternatives. Adverse affects to susceptible bird species would therefore be essentially the same, but slightly less than under Alternative A.

Cumulative Effects – Migratory Birds

It is difficult to address cumulative effects to migratory bird species collectively since various management actions can have adverse effects on some species, while having no effect or benefiting others. It would not be practical to attempt to address all species individually. Therefore, this section summarizes cumulative effects of land uses to bird species in general, focusing on activities considered to have the greatest impacts on birds.

Timber harvest and fuel reduction projects on the District have involved removal of understory vegetation such as shrubs, young conifers and lower tree branches, as well as removal of mature trees. Such manipulation of habitat components can influence survival and reproductive rates of migratory bird species by altering cover, forage and predator/prey relationships. Changing habitat structure through fuel reduction projects could ultimately influence bird species composition in treated areas (USDA Forest Service. 2006.)

Large-scale wildfires and human-caused fires have altered bird habitat. Most bird species native to this area are adapted to our fire dependent ecosystem. Large-scale high intensity burns are largely responsible for maintaining natural forest succession patterns and providing habitat diversity. Lightning-caused fires typically occur mid to late summer when most young birds are fledged and are capable of rapid and prolonged flight to escape wild fire. Human-caused fire can occur any time of year, and prescribed fires on the District are often planned for spring-time ignition in order to use high fuel moisture levels, standing water and/or snow to help contain fire within prescribed burn units. Spring burns occur during the nesting season when birds are vulnerable, and could result in reproductive failure for some individuals.

Fire suppression has increased the proportion of mature forest on the landscape, potentially to the detriment of some grass and shrub nesting bird species. Natural fire regimes are responsible for maintaining forest succession patterns and providing habitat diversity. However, past fire suppression efforts have resulted in unnatural levels of fuel buildup, which is now having the effect of producing proportionately more catastrophic wild fires, and consequently having severe impacts on native habitat.

Livestock grazing can affect migratory birds in a number of ways, such as destruction or disturbance of ground and shrub nests, removal of ground cover, and attraction of cowbirds. Grazing on the District has lead to degradation of bird habitat in some areas, particularly in certain riparian habitats. However, improved grazing standards are helping reduce negative effects.

Construction, maintenance, and use of campgrounds, picnic areas, and other developed recreation sites have altered the vegetation at those sites. Reduction in vegetation, particularly riparian shrubs, has likely reduced key nesting habitat for some bird species. Dispersed recreation sites have likely resulted in similar impacts as developed campgrounds.

Projected effects of reasonably foreseeable programs and activities have potential for both positive and negative cumulative effects to migratory birds and their habitat. Unmanaged recreation, invasive species, unnatural fuel buildup, and loss of open space are four major ecological threats recognized by public land management entities. Generally speaking, traditional land management practices are trending toward more ecologically sensitive programs. Accordingly, management practices are being redesigned to have less negative impacts on the land, while still allowing for the maximum spectrum of land uses within the capability of resources. On the other hand, private development is occurring adjacent to the Forest boundary, resulting in permanent habitat loss and greater potential for direct mortality than most actions predicted to occur on public land (USDA Forest Service. 2006).

Consistency with Laws, Regulations, and Policy

Management of migratory bird species and their habitats are governed by a wide variety of authorities. Most direction regarding conservation of these species falls under the umbrella of the Migratory Bird Treaty Act (16 USC 703-712) and an associated Presidential Executive Order. Under this Act, which implements various treaties and conventions for the protection of migratory birds, it is unlawful to take, kill or possess any migratory birds, except as regulated by authorized hunting programs. Executive Order 13186 directs Federal agencies whose actions have a measurable negative impact on migratory bird populations to incorporate migratory bird conservation into planning processes and take reasonable steps that include restoring and enhancing habitat. The proposed District Travel direction has taken migratory bird conservation issues into account through effects analyses, and thus is consistent with the above direction.

Determination of Effects – Migratory Birds

Implementation of the proposed Federal Action will have a *Neutral Impact On Migratory Bird Species***.** This determination is based on the following rationale: 1) the preferred alternative would have the low open motorized route density (0.85 mi/sq mi); 2) the preferred alternative reduces open motorized routes by 324 miles (37% reduction); and 3) direct habitat loss would not increase under any alternative because construction of new routes is not proposed.

No recommendations for removing, avoiding, or compensating adverse effects are necessary.

3.3.3.9 Affected Environment – General Wildlife

Focal species are species used as surrogates in assessing ecological integrity (FR Vol 65 No 218, November 2000). The distribution and abundance of focal species can indicate the integrity of the larger ecosystems that they belong to. They also can "play key roles in maintaining community structure and processes" (Gaines et al, 2003) and thus can be indicators of species diversity. Focal species associated with each wildlife group (as selected by Gaines et al 2003) that are relevant to this analysis are shown in the following table.

Table 3-18. Focal Wildlife Species

Wildlife Group	Focal Species
Wide-ranging carnivore	Mountain lion
Ungulates	Mule deer, elk
Late-successional-forest associated species	Northern goshawk, brown creeper, white-breasted nuthatch
Riparian-associated species	Bald eagle, black-capped chickadee
Primary cavity nesters	Three-toed woodpecker
Grassland/Shrub-Steppe-associated species	Greater short-horned lizard, Milk Snake, Western hog-nosed snake

Gaines et al (2003) conducted a literature review to document the effects of roads, motorized trails, non-motorized trails, and other linear recreation routes on focal wildlife species. The most common interaction identified in the literature relative to motorized roads and trails was displacement and avoidance, where animals altered their use of habitats in response to the motorized routes. Disturbance at a specific site was also commonly identified and was usually associated with wildlife nesting, breeding, or rearing of young. Other frequently reported interactions associated with roads or road networks included collisions between animals and vehicles, and edge effects.

The interactions associated with non-motorized trails were similar to that of motorized trails and include displacement, avoidance, and disturbance at a specific site during a critical period. The interaction varied depending upon wildlife species, with some more sensitive to motorized trail use and others more sensitive to non-motorized trail use. Although both forms of recreation have effects on wildlife, motorized trails showed a greater magnitude of effects, such as longer wildlife-displacement distances, for a larger number of focal species (Gaines et al. 2003). The following table details documented effects of roads and trails on wildlife habitat or populations.

Table 3-19. Documented Effects Associated with Roads and Trails

Road- and trail-associated factors	Effects of factors	Wildlife group affected
Hunting & trapping	Mortality from hunting or trapping as facilitated by road and trail access	Wide-ranging carnivores Ungulates
Poaching	Increased illegal take of animals as facilitated by trails and roads	Wide-ranging carnivores Ungulates
Collisions	Death or injury resulting from a motorized vehicle running over or hitting an animal	Wide-ranging carnivores Late successional Riparian associated Ungulates
Negative human interactions	Increased mortality of animals owing to increased contact with humans, as facilitated by road and trail access	Wide-ranging carnivores Late successional Ungulates
Movement barrier or filter	Alteration of dispersal or other movements as posed by a road or trail itself or by human activities on or near a road or trail or network	Wide-ranging carnivores Late successional Riparian associated Ungulates
Displacement or avoidance	Spatial shifts in populations or individual animals from a road or trail or network in relation to human activities on or near a road or trail or network.	Wide-ranging carnivores Late successional Riparian associated Ungulates
Habitat loss and fragmentation	Loss and resulting fragmentation of habitat owing to the establishment of roads and trails, road and trail networks, and associated human activities	Wide-ranging carnivores Late successional Riparian associated Ungulates
Edge effects	Changes to habitat microclimates associated with the edge induced by roads or trails	Late successional
Snag or downed log reduction	Reduction in density of large snags and downed logs owing to their removal near roads or campsites, as facilitated by road access	Late successional Riparian associated Primary cavity excavators
Route for competitors or predators	A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise	Wide-ranging carnivores Late successional Riparian associated Primary cavity excavators
Disturbance at a specific site	Displacement of individual animals from a specific location that is being used for reproduction and	Wide-ranging carnivores Late successional

Table 3-19. Documented Effects Associated with Roads and Trails

Road- and trail-associated factors	Effects of factors	Wildlife group affected
	rearing young	Riparian associated Ungulates
Physiological response	Changes in heart rate or level of stress hormones as a result of proximity to a road or trail	Ungulates Late successional

For this analysis, road and trail factors will be grouped and discussed under the topics of Mortality and Habitat Modification/Changes to Behavior.

Mortality

Large numbers of animals are killed annually on roads. The rate of mortality is directly related to vehicle speed (Lyon 1985), although road width and traffic volume also affect roadkill rates (Forman and Alexander 1998). Since forest roads are not designed for high-speed traffic, direct mortality on forest roads is usually not important relative to large mammals (Lyon 1985). Forest carnivores are an exception because their large home ranges make them especially vulnerable to road mortality (Baker and Knight 2000). Amphibians and reptiles are particularly susceptible on two-lane roads with low to moderate traffic (Forman and Alexander 1998).

A study that analyzed over 100 bird and mammal species in England concluded that roadkill rates may not affect population size on a national scale (Forman and Alexander 1998). However, rates of roadkill mortality can be high enough to reduce population densities at the local level (Forman et al. 2003).

The presence of roads can lead indirectly, as well as directly, to wildlife mortality. Roads provide human access that can result in hunting, trapping, and poaching. The numbers of miles of designated motorized routes on the District are as follows:

Table 3-20. Public Motorized Use Route Miles by Alternative – Ashland RD

Alternative	Motorized Route Miles
Alternative A	750
Alternative B	543
Alternative B Modified	559
No Action Alternative	676

Since small, slow-moving animals are susceptible to mortality even on narrow roads, motorized trails were included in the above road mileages.

Habitat Modification/Changes to Behavior

Animals may respond either positively or negatively to the presence of a road. Response can occur through the mechanisms of shifts in home range, altered movement patterns, altered reproductive success, altered escape response, and altered physiological state (Trombulak and Frissell 1999).

Trombulak and Frissell reference numerous studies that document behavioral changes due to roads. Both black bears and grizzly bears shifted their home ranges away from areas with high road densities (Brody and Pelton 1989, McLellan and Shackleton 1988). Elk in Montana preferred spring feeding at sites away from visible roads (Grover and Thompson 1986). Mountain lion home ranges are in areas with lower densities of improved dirt roads (Van Dyke, et al. 1986). In contrast, turkey vultures

preferentially establish home ranges in areas with greater road densities (Coleman and Frasier 1989), probably because of increased carrion resulting from roadkill.

Roads may also act as barriers to movement, particularly for small mammals and wetland species such as amphibians and turtles. Road width and traffic density are major factors contributing to barrier effect, whereas road surface is generally a minor factor. Some large mammals, such as wolverine, appear to not be affected by the presence of roads as far as home range size and shape is concerned (Forman and Alexander 1998). Others including pronghorn antelope (Bruns 1977) and mountain lions (Van Dyke et al 1986) seem reluctant to cross roads.
Knight and Cole (1995a) presented specific effects of recreational activities typically associated with roads and trails on wildlife. Backpacking, hiking, and horseback riding elicited flight and/or elevated heart rates, and displacement. Motorized vehicles including motorcycles, ATVs, quadricycles, dune buggies, amphibious vehicles, and air-cushion vehicles potentially cause disturbance (flight and/or stress) and redistribution.

Noise is one of the major factors in wildlife displacement and habitat loss. Noise can be defined as any "human-made sound that alters the behavior of animals or interferes with their normal functioning" (Bowles 1995). Some sounds are either higher or lower than what humans and some terrestrial animals can hear. Characteristics such as a species hearing ability, ability to escape sound, habituation to noise, and other factors need to be considered when assessing effects of noise on wildlife (Finegold, et al 2004). Kaseloo and Tyson (2004) discuss numerous studies of effects of noise on specific species and species groups. Review of the results indicates that apparent affects of specific noise levels is quite variable between on species.

Decibel levels (dB) of some vehicles commonly used on the National Forest include: 1) automobile from a distance of 25 feet – 80 dB (Truax 1999); 2) diesel truck from 50 feet – 84 dB (Federal Interagency Committee on Noise 1992); 3) motorcycle - 88 to 100 dB (Galen Carol 2007, Truax 1999); and 4) truck without muffler – 90 dB (Earthlink 2008) Decibel levels for other vehicles pertinent to the Ashland Travel Management, including ATV's, were not found.

A number of studies have shown that wild ungulates and carnivores increase movement in response to aircraft, snowmobiles, construction noise, road traffic, and walking visitors. Large mammals alter habitat use for 1-2 days after being disturbed by noise. Large mammals are able to adapt to predictable disturbance by avoiding an area during this time period. Mammals will habituate to noises without negative consequences, but do not habituate to being hunted, which actually amplifies their responses. Mammals can track noise and respond to noise that is approaching directly rather than to noise approaching them tangentially. Mammals may also abandon newborn young in response to noise. Startled carnivores may kill and eat their own young. Short-term aversive responses in mammals vary from mild reactions such as becoming alert to more severe activity such as running away while urinating or defecating (Bowles 1995).

In general, with repeated exposures to either motorized or non-motorized activity, animals habituate or adapt both physiologically and behaviorally. Unfamiliar noise is more likely to arouse an animal than a harmless, familiar noise. Animals may have one of three responses to noise: attraction, tolerance or aversion. Mild responses may be difficult to detect. If mammals are repeatedly exposed to the same noise stimulus without negative associations, responses decline rapidly. Vertebrates can track the direction of movement and typically respond more strongly to direct approaches than to tangential passes (Knight and Gutzweiler 1995).

Some species do respond positively to the presence of roads and trails. Routes may increase habitat for some species that prefer edges. New microhabits may be created along roads, such as at bridges that bats may use for roosting. Habitat enhancements may occur along roads, such as perches for raptors, increased forage from planted species, and carrion from road kills (Forman et al 2003).

To analyze the general effects of motorized routes on wildlife, a one km buffer on each side of a route was used as suggested by Ruediger (1996). This is considered the "virtual footprint" (Forman et al. 2003) of the route on the land. This is an average, but the true impacts of routes vary significantly with terrain, vegetation, amount and types of use on the route, species-specific behavior, and other factors. Only Forest Service motorized routes on the Ashland Ranger District were analyzed. The percent of the Ashland Ranger District untouched by the two kilometer corridor along motorized routes is referred to as "core". The results are shown in the following table. The percent of the District outside the two kilometer footprint is the area where wildlife generally is undisturbed by travel routes and the activities that accompany them. Research has been conducted on the specific response of some wildlife species to motorized routes. Refer to other analyses for species such as black-footed ferrets and elk. These analyses are tailored to the species, with reviews of species-specific research, while the analysis presented here is very general.

Table 3-21. Percent of Ashland Ranger District That is Core for Habitat Wildlife

Alternative A	Alternative B	Alternative B Modified	No Action
22%	28%	28%	18%

In general, effects of motorized roads and trails on most wildlife species are negative (Boyle and Samson 1985). The effects may vary by wildlife species and by individual. Effects also vary by the type of activity occurring on the road or trail. Seasonal closures of routes may offer some benefit to wildlife. Some routes were selected for seasonal closures during important times of year for a particular species, particularly big game. If motorized routes are closed when and where these activities occur, animals can function with less energy expenditure and more efficiency.

3.3.3.10 Environmental Consequences – General Wildlife

Direct and Indirect Effects

Effects Common to All Alternatives

Mortality: Approximately 78 miles of higher speed unpaved roads (maintenance level 3) are on the District. These roads are rated for passenger vehicles with speeds up to 35 miles per hour. No changes are proposed for higher speed unpaved roads. The potential for animal mortality caused by collision with vehicles on maintenance level three roads would be the same under all alternatives.

Habitat Modification /Changes to Behavior: Ruediger (1996) estimates that displacement of some species, or indirect habitat loss due to roads, may average 1 km on each side of a highway in a forested area and up to 3 km on each side in open habitats. For the affected area for general wildlife, we assumed a 1 km buffer on each side of both motorized and non-motorized routes, recognizing that this is probably an overestimate of some effects and an underestimate of others in all alternatives.

The percent of the project area available as core habitat would be progressively increase from the No Action Alternative to Alternative B Modified (see previous table). Core habitat is the same for Alternative B and Alternative B Modified.

Alternative A
Mortality: This alternative has the highest number of open motorized route miles and thus the greatest potential for mortality, particularly of small, slow moving animals such as reptiles.

Habitat Modification /Changes to Behavior: The potential for habitat modification and changes to behavior would mostly likely be the highest for this alternative since 750 miles of public motorized routes are available.

Alternative B
Mortality: With the lowest open motorized route miles (543), this alternative has the lowest potential for leading to wildlife mortality and supports the highest percentage of core habitat.

Habitat Modification /Changes to Behavior: The potential for habitat modification and changes to behavior would mostly likely be the lowest for this alternative since it provides the lowest amount, 750 miles, of public motorized routes.

Alternative B Modified
Mortality: With the second lowest open motorized route miles (559), this alternative has a low potential for leading to wildlife mortality and supports the same percentage of core habitat as Alternative B.

Habitat Modification /Changes to Behavior: The potential for habitat modification and changes to behavior would mostly likely be low for this alternative since it provides only 559 miles of public motorized routes.

No Action
Mortality: The open motorized route miles, and thus the potential for mortality, would be less than Alternative A but higher than Alternative B. This alternative provides the lowest amount of Core Habitat.

Habitat Modification/Changes to Behavior: The potential for habitat modification and changes to behavior would mostly likely be the second highest for this alternative since 676 miles of public motorized routes are available.

Cumulative Effects – General Wildlife
Mortality: Most of the mortality that occurs to wildlife species occurs on high speed, paved routes such as highways. Mortality on these types of roads can be significant for some species at some times of year. This is a cumulative effect that adds to effects on National Forest System routes.

Habitat Modification /Changes to Behavior: The analysis of indirect habitat loss or displacement was presented for public Forest Service motorized routes on the Ashland Ranger District only. There is also a cumulative effect of private, county, state and federal roads on the National Forest or adjacent lands that were not considered in this analysis. The impacts to wildlife on private land and displacement of wildlife from private land are a cumulative effect that is likely to continue to increase.

There are cumulative effects of the human activity associated with the use of roads and trails. There are also effects of the activities that humans do when they use roads and trails, including hunting, fishing, trapping, firewood cutting, viewing wildlife, etc. All of these activities can potentially disturb wildlife, and some can cause direct mortality (Knight and Cole 1995). Hiking, biking, fishing, ATV use, horseback riding, dispersed camping, and other recreational activities are projected to increase sizably over the next ten to twenty years. This will gradually add to cumulative impacts over time.

Dispersed recreation has increased on the Forest, and the appreciation for nonconsumptive uses of wildlife has also increased. Increased human use of the Forest displaces wildlife and can degrade habitat. Recreational residence sites remove wildlife habitat and may displace wildlife in those areas. Outfitter/guides offer non-consumptive wildlife activities as well as take many hunters into the Forest. Outfitter/guiding is regulated, and probably is less impactive to wildlife than non-outfitted activities (USDA Forest Service 2006). Conservation easements on private lands outside the Forest protect habitat and are beneficial to wildlife.

The presence of hiking and riding areas has led to the availability of habitat that is non-motorized and where wildlife is relatively undisturbed by large numbers of people.

Livestock grazing will continue on the District. Improved range management practices and monitoring of range condition are expected to improve wildlife habitat. Control of noxious weeds is important for maintaining high quality wildlife habitat and will continue in the future. Efforts to restore native vegetation to the landscape or enhance species that are declining are beneficial to wildlife.

Future improvements of FS roads and motorized routes may increase the impact of these facilities to wildlife by encouraging greater use. Other routes would be closed to public use, which would benefit wildlife in general.

An increase in dispersed recreation in which many of the dispersed users are interested in wildlife may actually be somewhat detrimental to the resource they wish to see, photograph, or hunt. Additional education of the public on their wildlife resource is important so that wildlife habitat is protected as are the animals that use it. Increasing public use will decrease the ability of wildlife to fully occupy available habitat, and some species are more likely to be affected than others.

Consistency with Laws, Regulations, and Policy

The wildlife goal in the Custer National Forest Management Plan is to "manage and/or improve key wildlife and fisheries habitats, to enhance habitat quality and diversity, and to provide wildlife and fish-oriented recreation opportunities." Forest Service Manual 2672.4 requires review of "all Forest Service planned, funded, executed, or permitted programs and activities for possible effects on endangered, threatened, proposed, or sensitive species." All alternatives are consistent with the Custer National Forest Management Plan and Forest Service Manual direction.

Determination of Effects – General Wildlife

Implementation of the proposed Federal Action will have a *Neutral Impact On General Wildlife Species And May Impact Individuals Or Habitat But Is Not Likely To Cause A Trend To Federal Listing Or Loss Of Viability For Reptile Species.* This determination is based on the following rationale: 1) the preferred alternative would have the second lowest number of open motorized routes

(559); 2) the preferred alternative reduces open motorized routes by 324 miles (37% reduction); 3) direct habitat loss would not increase under any alternative because construction of new routes is not proposed; 4) the preferred alternative supports the highest percentage of core habitat; and 5) even with the proposed travel plan modifications some wildlife mortality will continue to occur across the District's road system.

No recommendations for removing, avoiding, or compensating adverse effects are necessary.

3.3.3.11 Conclusion - Wildlife

Wildlife effects analysis was conducted based on regulatory framework for threatened, endangered, sensitive, management indicator, and other species of concern. Conservation strategy standards and guidelines and literature-based recommended guidelines were also considered. Analysis for black-footed ferret was based on motorized route density and potential effects on black-tailed prairie dog colonies. Analysis for elk was based on both motorized route density and secure habitat. Relative comparisons of available habitat and/or motorized route density were also conducted between alternatives for species and groups lacking conservation strategies, standards, or guidelines. The following table outlines effects determinations for wildlife species.

Table 3-22. Wildlife Effects Determinations [11]

Species Name	Alternative A	Alternative B	Alternative B Modified	No Action
Threatened, Endangered, and Proposed Species				
Black-footed Ferret (*Mustela nigripes*) (Endangered)	NLAA	NLAA	NLAA	NLAA
Forest Service Sensitive Species				
American peregrine falcon *(Falco peregrinus anatum)*	NI	NI	NI	NI
Baird's sparrow *(Ammodramus bairdii)*	NI	NI	NI	NI
Bald Eagle *(Haliaeetus leucocephalus)* [12]	NI	NI	NI	NI
Black-backed woodpecker *(Picoides arcticus)*	NI	NI	NI	NI
Blue-gray gnatcatcher *(Polioptila)*	NI	NI	NI	NI
Burrowing owl *(Athene cunicularia)*	NI	NI	NI	NI
Greater sage grouse *(Centrocercus urophasianus)*	NI	NI	NI	NI
Grizzly Bear (*Ursus arctos*) [13]	NI	NI	NI	NI

[11] Options for effects determinations are: For federally listed species: NE = No effect; NLAA = May effect – not likely to adverse affect; LAA = May effect – likely to adversely affect; and BE = Beneficial effect. For Forest Service sensitive species: NI = No impact; MIIH = May impact individuals but is not likely to cause a trend to Federal listing or loss of viability; WIFV = Likely to result in a trend to Federal listing or loss of viability; and BI = Beneficial impact. For management indicator species: + = Positive effect; 0 = Neutral effect; and - = Negative effect. For other species of concern: NE = No effect.

[12] Bald eagle delisted effective August 8, 2007 and subsequently managed as a Forest Service Sensitive Species.

[13] Grizzly bear delisted effective April 30, 2007 and subsequently managed as a Forest Service Sensitive Species as directed in "Final Conservation Strategy for the Grizzly Bear in the Yellowstone Ecosystem, Interagency Grizzly Bear Study Team, March 2003."

Table 3-22. Wildlife Effects Determinations[11]

Species Name	Alternative A	Alternative B	Alternative B Modified	No Action
Harlequin duck *(Histrionicus histrionicus)*	NI	NI	NI	NI
Loggerhead Shrike *(Lanius ludovicianus)*	NI	NI	NI	NI
Long-billed curlew *(Numenius americanus)*	NI	NI	NI	NI
Long-eared myotis *(Myotis evotis)*	MIIH	MIIH	MIIH	MIIH
Long-legged myotis *(myotis volans)*	MIIH	MIIH	MIIH	MIIH
Pallid bat *(Antrozous pallidus)*	MIIH	MIIH	MIIH	MIIH
Spotted bat *(Euderma maculatum)*	MIIH	MIIH	MIIH	MIIH
Townsend's big-eared bat *(Corynorhinus townsendii)*	MIIH	MIIH	MIIH	MIIH
Black-tailed prairie dog *(Cynomys ludovicianus)*	MIIH	MIIH	MIIH	MIIH
White-tailed prairie dog *(Cynomys leucurus)*	NI	NI	NI	NI
Wolverine *(Gulo gulo)*	NI	NI	NI	NI
Greater short-horned lizard *(Phrynosoma hernandesi)*	MIIH	MIIH	MIIH	MIIH
Milk Snake *(Lampropeltis triangulum)*	MIIH	MIIH	MIIH	MIIH
Western hog-nosed snake *(Heterodon nasicus)*	MIIH	MIIH	MIIH	MIIH
Management Indicator Species[14]				
Northern Goshawk *(Accipiter gentilis)* (H)	0	0	0	0
White-tailed deer *(Odocoileus virginianus)* (H, K)	0	0	0	0
Ruffed grouse *(Bonasa umbellus)* (H)	0	0	0	0
Western kingbird *(Tyrannus verticalis)* (H)	0	0	0	0
Bullock's (Northern) oriole *(Icterus bullockii)* (H)	0	0	0	0
Yellow warbler *(Dendroica petechia)* (H)	0	0	0	0
Oven bird *(Seiurus aurocapillus)* (H)	0	0	0	0
Spotted (Rufous-sided) towhee *(Pipilo maculatus)* (H)	0	0	0	0
Brewer's sparrow *(Spizella Breweri)* (H)	0	0	0	0
Sharp-tailed grouse	0	0	0	0

[14] H = Habitat Indicator Species; K = Key Species

Table 3-22. Wildlife Effects Determinations [11]

Species Name	Alternative A	Alternative B	Alternative B Modified	No Action
(Tympanuchus phasianellus) (H, K)				
Elk *(Cervus canadensis)* (K)	0	0	0	0
Golden eagle *(Aquila chrysaetos)* (K)	0	0	0	0
Merlin *(Falco columbarius)* (K)	0	0	0	0
Mule deer *(Odocoileus hemionus)* (K)	0	0	0	0
Bighorn sheep *(Ovis Canadensis)* (K)	0	0	0	0
Pronghorn antelope *(Antilocapra Americana)* (K)	0	0	0	0

3.4 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES – OTHER ISSUES

3.4.1 WATER QUALITY, FISHERIES, AND AQUATICS

Overview of Changes from the Draft to the Final EIS

- Changes involved additional narrative to clarify analysis results and address comments received on the DEIS.
- Changes were also made in a few watershed risk categories and action risk categories. Two low risk watersheds were changed to moderate; South Fork Grand River- Sand Creek and Snow Creek. The action risk category for season of use changed from an action that decreases risk to an action that does not change risk. The action risk category for addition of non-system roads for public and administrative use changed and is now relative to whether this action is compared to the existing condition or the no-action condition. See Table 3-25 and discussion under the section Relative Route Risks by Action.

Introduction

This section outlines affected environment and environmental effects of travel management to water resources. This section also addresses the impacts of motorized uses on Forest Service Region 1 sensitive fish and amphibian species, management indicator aquatic species, and aquatic habitat.

Changes between DEIS and FEIS: Most of the changes involved additional narrative to clarify analysis results and address comments received on the DEIS. Changes were also made in a few action risk categories. The action risk categories for addition of non-system roads for public and administrative use changed and are now relative to whether this action is compared to the existing condition or the no-action condition. See Table 3-25 and discussion under the section Relative Route Risks by Action.

3.4.1.1 Affected Environment – Water Quality

Applicable Laws, Regulations, and Policy

Federal Clean Water Act requires Federal Agencies to comply with all federal, state, and local requirements, administrative authority, process and sanctions related to the control and abatement of water pollution (CWA, Sections 313(a) and 319(k)). The Act gives authority to individual States to develop, review, and enforce water quality standards under Section 303. This section also requires the States to identify existing water bodies that do not meet water quality standards, and develop plans to meet them. These plans are commonly called TMDLs, an acronym for total maximum daily load.

Federal Multiple Use Sustained Yield Act of 1960 sets policy to define why the national forests were established and how they should be administered relative to outdoor recreation, range, timber, watershed, and wildlife and fish purposes. [T]hat some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output (16 USC 2 (I); Sec 528).

The Montana Department of Environmental Quality (MTDEQ) has classified all waters within the Montana portion of the analysis area as C-3 waters. The beneficial uses associated with this classification include; bathing, swimming, and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl, and furbearers. The quality of these waters is naturally marginal for drinking, culinary and food processing purposes, agricultural and industrial water supply. Degradation which will impact established beneficial uses will not be allowed. (Administrative Rules of Montana (ARM) 17.30.611 2008).

The Montana Surface Water Quality Standards require that land management activities must not generate pollutants in excess of those that are naturally occurring, regardless of the stream's classification. Under ARM 17.30.623 (2) (f) "No increases are allowed above naturally occurring concentrations of sediment, settleable solids, oils, or floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife." Naturally occurring is defined in ARM 17.30.602 (19) as: "the water quality condition resulting from runoff or percolation, over which man has no control, or from developed lands where all reasonable land, soil and water conservation practices have been applied". Reasonable land, soil and water conservation practices are similar to Best Management Practices (BMPs). BMPs are considered reasonable only if beneficial uses are fully supported. BMPs are further discussed under the section Soil and Water Conservation Practices.

Riparian and stream conditions are assessed by MTDEQ to determine the level of beneficial uses support. Streams that do not fully support their uses do not fully meet water quality standards. The status of water quality assessment and Total Maximum Daily Load (TMDL) development of streams are identified in a biennial report from MTDEQ (2006). The 2006 Montana 305(b)/303(d) Water Quality Assessment Database lists one stream adjacent to the analysis area where one or more uses are impaired and a TMDL is required (Category 5). Refer to the Table 3-24 for more detail on TMDL streams.

The State of Montana has the authority to develop TMDLs. On streams with multiple ownerships, the Forest Service cooperates with the State and other adjacent landowners in the development process.

Additionally, the fact that a particular stream is listed does not preclude management activities from occurring. Montana Code Annotated (MCA) 75-5-703(10)(c), states: (10) Pending completion of a TMDL on a water body listed pursuant to MCA 75-5-702: (c) new or expanded non-point source activities affecting a listed water body may commence and continue their activities provided those activities are conducted in accordance with reasonable land, soil, and water conservation practices (MCA 2008).

2005 Travel Management Final Rule provides the following direction related to water quality: (b) Specific criteria for designation of trails and areas. [C]onsider effects on the following, with the objective of minimizing: (1) Damage to soil, watershed, vegetation and other forest resources. (36 CFR 212.55).

Custer National Forest Land and Resources Management Plan identifies management goals for soil, water and riparian resources under Chapter II - Forest Wide Management Direction and Chapter III – Management Area Direction. The Forest Plan goal for watershed management is to: [E]nsure that soil productivity is maintained and that water quality is maintained at a level which meets or exceeds state water quality standards (page 4). The objectives for soil and water resources are: Continue to produce water that meets State water quality standards. National Forest System lands will be managed so that the soil and watershed conditions are in a desirable condition and will remain in that condition for the foreseeable future. Soil and water quality objectives are designed to assure that these resources meet State water quality objectives and BMPs (Best Management Practices) are incorporated to assure this (page 5). The goal for riparian areas include: [M]anage for water quality, provide diverse vegetation, and protect key wildlife habitat in these areas from conflicting uses and uses and activities that adversely impact these areas will be mitigated (page 3). The objectives for riparian areas include recognition of their unique values, and management direction is to be designed to protect these key wildlife habitats and improve water quality: [T]hese areas will be managed in relation to various legally mandated requirements including, but not limited to, those associated with floodplains, wetlands, water quality, dredged and fill material, endangered species, and cultural resources (page 5). The goals for Management Area M (Riparian) are: Manage to protect from conflicting uses in order to provide healthy, self-perpetuating plant and water communities that will have optimum diversity and density of understory and overstory vegetation (page 80).

Soil and Water Conservation Practices (or BMPs) are the primary mechanism to comply with state and federal water quality law by minimizing water quality impacts from non-point source pollution while still allowing dispersed land management activities to occur on National Forest System land. To reach these objectives the Forest Service developed the R1/R4 Forest Service Soil and Water Conservation Practices Handbook (USDA Forest Service 1995). This handbook is not available on the Region 1 internet website, but is available from the project file. A revised handbook is anticipated from the Washington Office in 2008.

Practices specific to travel management include: 11.01 - Determination of Cumulative Watershed Effects, 11.09 - Management by Closure to Use, 12.10 - Management of Off-Road Vehicle Use, 12.11 - Protection of Water Quality Within Developed and Dispersed Recreation Areas, 12.12 - Location of Pack and Riding Stock Facilities in Wilderness, Primitive, and Backcountry Areas, 15.01 - General Guidelines for Transportation Planning, 15.02 - General Guidelines for the Location and Design of Roads and Trails, 15.03 - Road and Trail Erosion Control Plan, 15.21 - Maintenance of Roads, 15.23 - Traffic Control During Wet Periods, and 15.27 - Trail Maintenance and Rehabilitation. The

effectiveness of these BMPs and other road maintenance and construction BMPs can be found in Logan (2001), Seyedbagheri (1996), and USDA-FS (2002).

Introduction - Water Quality

Both natural events and human activities have the potential to impact soil, water and riparian resources across both forest and range land. Significant natural events include wildfire and floods, while the most significant human activities include mining, livestock grazing, roads/trails, floodplain development, timber harvest and recreation. The degree of impact depends upon the soil and hydrologic characteristics of the watershed and how sensitive and resilient they are to these disturbances. Soil and hydrologic characteristics vary extensively across the landscape and are dictated by local landform, geologic material and climate.

Natural Characteristics and Processes

Watersheds, undisturbed by human influences, are not static systems. Deep snow packs and heavy spring rains can cause substantial flooding, landslides and instream erosion. Wildfire, wind, or insect and disease mortality can drastically alter the vegetative composition of a watershed. Depending on the extent of mortality and rate of stand decomposition, impacts to stream systems can also be substantial. Beneficial uses, including fisheries habitat, can be negatively affected by these natural events. However, watersheds left undisturbed after natural events, can and do recover rapidly, and ultimately provide conditions that fully support all beneficial uses within a relatively short period of time. These natural disturbances occur infrequently, which allows for significant and generally rapid recovery of hydrologic and erosional processes prior to the next major disturbance event. This results in pulse effects to water resources, which are moderate to high in magnitude, but low in frequency. Within the current climatic regime and prior to significant human influence, stream systems have developed under pulse type disturbances.

Geology, Landform, Erosion and Sediment

The underlying geology within the project area is intermixed sedimentary beds of clay, silt and sand. These structures have weathered to form steep cliff features along portions of the perimeter of most land units, while landforms along the remaining perimeter are less steep and more convex in nature.

Erosion is a natural process of geologic decomposition that occurs in all watersheds. The rate at which it occurs is a function of soil and stream characteristics, precipitation and flow regimes, and vegetative cover. There are three basic types of erosion; 1) detachment and routing of individual soil particles from the land surface; 2) mass wasting such as landslides and slumps; and 3) detachment and mobilization of stream channel banks or bottom material, i.e., instream erosion. All of these processes produce “sediment,” and all stream systems transport sediment. Sediment is a loosely used term that can refer to a wide range of channel substrate particle sizes, i.e., silt, sand, gravel, cobble, boulder, etc. The larger particle sizes are generally produced through instream erosion or mass wasting and are commonly referred to as bedload. The finer particles that are suspended in flowing water can be produced through all of the erosion processes mentioned above.

Geology and landforms within the analysis area have produced soils that are generally stable and not highly erodible when adequately vegetated. MacDonald and Stednick (2003) suggest that undisturbed forested watersheds typically have very low erosion rates because of high infiltration rates and limited surface runoff. Erosion rates have been estimated at less than 0.1 tons per acre per year for most forested areas in the interior western U.S. (Patric et al. 1984). Stednick (2000) summarized research concerning timber management in the Northern Rockies which also suggests that erosion rates for

undisturbed forested landscapes (control watersheds, no harvest/roads) are very low (0 - 0.09 t/ac/yr). Therefore, in the absence of wildfire, hillslope surface erosion within undisturbed areas across the analysis area is considered to be nearly non-existent. The exception to this occurs on steep, high energy (south facing) landforms composed of fine textured material. Due to dry site conditions and steep slopes, vegetation can be sparse. Episodic precipitation events that saturate these soils can result in landslides (rotational slumps) that release substantial amounts of sediment downslope. However, at the broad scale, instream erosion is considered the dominant erosion process across the analysis area.

Precipitation and Flow Regimes

Elevations across the land units range from under 3400 to over 4300 feet. Based on a 30 year period of record, the average annual precipitation associated with these elevations range from 14 to 20 inches (MTNRIS 2008). The majority of the precipitation falls as spring snow or rain from April through June.

Precipitation levels and geologic formations result in the ephemeral flow regimes for the majority of the drainages within the land units. Short perennial streams do however, occur below many spring sites. Spring (groundwater) discharge results in relatively constant flow throughout the year, although infrequent but significant peaks can occur during heavy spring snow and rain events that produce overland flow.

Historically, beaver played a significant role throughout the project area through the development of extensive dam/pond networks. Beaver populations have been reduced relative to historic levels. Although temporary, beaver dams and ponds are an important component of riparian systems. They help to trap and store both sediment and water. A reduction in beaver populations over the years has likely resulted in lower water tables and lower late season streamflows along small, low elevation streams.

Vegetative composition is largely defined by climate and soils, but natural agents including fire, insects or disease, and wind can drastically alter vegetative cover. Over the last three decades, timber stands have been affected by wildfire on just under 131,000 acres across the District. Wildfire events have likely resulted in substantial increases in localized surface erosion although sediment delivery to perennial streams has not been quantified. Surface erosion and sediment transport subsides to back ground levels generally within five years as ground vegetation recovers.

Human Influences

Humans have influenced watersheds and water quality for centuries. Prior to European settlement, Native Americans used fire to manipulate vegetation which influenced hydrologic processes at the local scale. As European settlement occurred, so did uncontrolled beaver harvest, timber harvest and forage harvest through livestock grazing. All of these activities had long term impacts to watershed characteristics and hydrologic processes.

Currently, many activities influence water quality and natural channel processes including livestock grazing, crop production, floodplain development, timber harvest and transportation systems. Some of these activities are constant or occur on an annual basis, e.g., transportation systems or livestock grazing. The effects from these types of activities are considered chronic. Although chronic effects are generally low to moderate in magnitude, they occur with moderate to high frequency. In contrast to pulse effects discussed previously, chronic effects may not allow for significant recovery of the soil and water resource over time.

Livestock Grazing

Livestock grazing has occurred within the analysis area since the late 1800s. Livestock numbers have decreased over the years; in some allotments quite substantially. Currently there are 52 allotments providing 130,262 AUMs on 367,000 acres of suitable range on the District. Recent range analyses have identified issues concerning livestock grazing impacts to riparian systems and water quality. In general, livestock grazing can impact riparian systems through overuse of streamside vegetation and destabilization of streambanks. Water quality impacts can occur by increasing levels of fine sediment, increasing water temperature or changing flow regimes. The 2004 Lee Creek, 2007 Stag Rock, and 2009 Home Creek Range Analysis Decisions proposed changes in range management to address these issues. Range management planning across the remainder of the analysis area is ongoing.

Floodplain Development

Residential development in floodplains has the potential to affect natural floodplain processes by reducing the ability of floodwaters to access their historic floodplain. These developments include building structures, elevated driveways, bank rip-rap and stream crossing structures. When floodwaters are more confined to the main channel, streamflow velocities generally increase, which results in more damage to streambanks and human structures downstream. The cumulative effect on floodplain processes from of all structures within a given valley bottom can be substantial. Floodplain development within the Forest boundary occurs on the District along Home Creek, Otter Creek and tributaries of Otter Creek.

Timber Harvest and Prescribed Fire

Timber harvest over the last three decades encompasses just over 9000 acres on the District. Prescribed fire over the last two decades encompasses approximately 22,000 acres on the District. On a watershed basis, neither harvest nor prescribed burn activities are substantial enough to be detrimental to water resources. Both of these activities have helped to reduce fuel loads and potential for future catastrophic wildfires.

Transportation Systems- General Influences on Water Resources

Roads modify natural drainage networks and accelerate erosion processes. These changes can alter physical processes in streams, leading to changes in streamflow regimes, sediment transport and storage, channel bank and bed configurations, substrate composition, and stability of slopes adjacent to streams (Furniss et al. 1991). Numerous studies have identified unpaved roads as a major source of sediment in streams (Elliot 2000). Sudgen and Woods (2007) measured 20 unsurfaced road plots in western Montana and found average annual sediment yields to be 5.4 Mg/ha/yr (14.7 tons/ac/yr). In relation to other transportation systems (motorized/non-motorized trails), roads open to full size vehicles pose the greatest risk of impact to water resources due to 1) largest tread width, 2) largest weight, size and force of vehicle, and 3) generally higher use levels.

Motorized two-track trails can also negatively affect streams. Meadows (2007) suggests that ATV trails are high-runoff, high-sediment producing strips on low-runoff, low-sediment producing landscapes. For six study sites across six states, he found that sediment concentrations generally tended to increase with increasing disturbance levels. Although runoff did not appear to increase for the Montana site, sediment increased by approximately 625%, compared to the undisturbed, pre-traffic forest floor.

Motorized and non-motorized single track trails can also negatively affect streams, but the degree of affect is determined by the mode of travel. Deluca et al. (1998) found a substantial increase in sediment supply from horse traffic when compared to foot or llama traffic. Wilson and Seney (1994) documented similar conclusions concerning horse traffic. They also suggest that two-wheeled cycle traffic (motor/bi-cycle) results in less sediment than either horse or foot traffic, although the actual data appears to suggest foot traffic produces the least sediment. These two studies documented opposite results concerning sediment production on wet trails. Wilson and Seney (1994) documented increased sediment production on wetted trails, whereas Deluca et al. (1998) found no increase. Cole (1991) found, in a study of three trails in the Selway-Bitterroot Wilderness of Montana, that although most individual trail segments experienced change, there was no net erosion over an 11 year period.

Unplanned (user created) routes have the potential to be the most detrimental to water quality when routes are improperly located adjacent to streams. Incorporating adequate BMPs into the design, construction and maintenance phases of all routes can minimize negative effects to the greatest extent feasible and still provide a long-term transportation network.

Transportation route impacts on wetlands were identified where routes are known to intersect wetlands, or narrow riparian/stream corridors. Thirteen routes with unimproved crossings occur on the District. Appendix D provides observations and recommendations for these sites. Anticipated effects on these wetland sites from the proposed actions are disclosed in the Environmental Consequences section.

Individual route risks have not been evaluated from site specific GIS spatial data or field data as this data has not been generated or collected across the District. Additionally, cumulative impacts of individual routes at the watershed scale have also not been quantified on-ground or instream. Instead, existing route networks were evaluated cumulatively at the watershed scale through GIS to determine relative risks to water resources. Since impacts to water quality generally occur from concentrated road surface flows routed directly to streams at crossing locations (bridges, culverts or fords), stream crossings were a key variable in the evaluation. All routes, regardless of ownership were included in the evaluation, although routes with Forest Service jurisdiction were also summarized separately as these are the routes potentially affected by the proposed actions. Refer to the next section for the results of this evaluation.

Affected Environment Summary

The water resource affected environment analysis is a broad scale, risk based assessment. Risks are determined at the 6 HUC (hydrologic unit code) watershed scale from GIS spatial data. A summary of selected natural characteristics and human activities are provided in Table 3-23. Quantifiable Forest Service activities include past timber harvest, fire (prescribed fire and wildfire), and existing transportation system attributes (route miles and number of stream crossings). All watersheds have some level of past and present agricultural activity (crop production and/or livestock grazing). Other than the information provided above on Forest Service range allotments, the effects of agricultural activities to water resources have not been assessed. Six HUC watersheds were used as the analysis area for the affected environment because the area encompassed (10,000 to 40,000 acres) provides a reasonable and manageable number of analysis units across the District (40). Smaller or larger watersheds would not provide better information for the deciding officer concerning water resource effects.

Watersheds were assigned a risk level to help focus cumulative effects analysis for water resources. The risk level is based on 1) perennial stream crossings by FS routes, 2) total perennial stream miles, 3) intermittent stream crossings by FS routes, and 4) TMDL listed streams. **High** risk watersheds have Forest Service roads with perennial stream crossings, exceptionally high number of intermittent crossings on Forest Service Roads, or are TMDL category 5 streams with intermittent crossings on Forest Service roads. **Moderate** risk watersheds have more than one mile of Forest Service roads and some level of perennial streams downslope. The remaining watersheds are **Low risk** and were not carried forward to the direct and indirect effects analysis, but are included in cumulative effects. Of the 40 watersheds on the District, 12 are rated high risk, 16 moderate and 12 low.

As mentioned previously, riparian and stream conditions are also assessed by the MTDEQ to determine the level of beneficial use support. Impaired streams with known pollutant related sources require a TMDL (Category 4A and 5 streams). Category 4A streams have all necessary TMDLs in place, while category 5 streams still need TMDLs developed. Impaired streams with no known pollutant related sources do not require a TMDL (Category 4C streams). Category 1 streams fully support all beneficial uses, while category 3 streams have not had all beneficial uses assessed. This assessment provides the best information on current stream conditions below the Forest boundary. A summary of streams identified on the 2006 303(d) List are provided in Table 3-24.

Table 3-23. Summary of Watershed Characteristics and Watershed Scale Influences on the District

Watershed #	Watershed Name	Watershed Acres	Percent Watershed Forest Service	Total Perennial Stream Miles	FS Perennial Stream Miles	Harvest Acres	Fire Acres	Total Road Miles	FS Road Miles	Total Stream Crossings	FS Intermittent Crossings	FS Perennial Crossings	Watershed (Road) Risk
100901020210	Otter Creek-Brian Creek	36062	78	37	21	376	19851	104	50	182	60	9	HIGH
100901020602	Ash Creek	10779	71	2	2	0	1673	17	5	30	7	7	HIGH
100901020203	Otter Creek-Horse Creek	21585	90	21	19	47	7891	47	27	67	31	6	HIGH
100901020601	Upper Beaver Creek	14298	98	5	5	478	886	41	30	42	28	2	HIGH
100901020209	Fifteenmile Creek	22566	66	2	2	86	3790	60	29	69	17	2	HIGH
100901020208	Elk Creek	19754	68	5	5	0	48	58	24	77	27	1	HIGH
100901020205	Taylor Creek	29059	100	2	2	268	5690	87	41	83	35	1	HIGH
100902070206	Bloom Creek	30311	82	2	2	266	4832	56	28	64	40	1	HIGH
100901020301	Tenmile Creek	27351	89	1	1	0	2983	63	22	90	31	1	HIGH
100901010803	Lee Creek[1]	30049	63	1	1	0	5617	78	24	116	33	1	HIGH
100901020303	Home Creek	37810	89	5	4	2860	13879	128	66	160	100	0	HIGH
100901010804	East Fork Hanging Women Creek[1]	22019	94	2	2	538	3187	54	36	75	54	0	HIGH
100901020104	Lower Bear Creek	13516	94	9	9	3	2120	39	26	59	34	0	MOD
100901020404	Poker Jim Creek	12811	89	6	6	165	1399	19	13	33	15	0	MOD
100901020406	O'Dell Creek	29692	92	5	5	603	20867	64	43	92	59	0	MOD
100901020603	Middle Beaver Creek	18883	50	6	1	0	35	49	20	81	31	0	MOD
100901020204	Indian Creek	33062	49	1	1	72	168	87	19	104	26	0	MOD
100901020501	Tongue River-Double E Creek	15151	23	8	1	0	428	39	3	44	4	0	MOD
100901020206	Lyon Creek	19615	100	1	1	785	1962	51	29	45	29	0	MOD
100901020103	Little Bear Creek	18833	14	1	1	0	302	49	3	51	2	0	MOD
100902070204	Powder River-Plum Creek	22555	25	12	1	0	5386	39	9	44	10	0	MOD
100901020302	Threemile Creek	32925	88	1	1	160	19113	81	36	93	54	0	MOD
100901021102	Lower Little Pumpkin Creek	39175	12	1	1	59	150	115	9	144	10	0	MOD
100901020409	Tongue River-King Creek	31387	34	14	0	0	9686	71	17	107	47	0	MOD
100901020407	Tongue River-Poker Teechee Creek	21367	24	11	0	0	1	50	6	78	25	0	MOD

Table 3-23. Summary of Watershed Characteristics and Watershed Scale Influences on the District

Watershed #	Watershed Name	Watershed Acres	Percent Watershed Forest Service	Total Perennial Stream Miles	FS Perennial Stream Miles	Harvest Acres	Fire Acres	Total Road Miles	FS Road Miles	Total Stream Crossings	FS Intermittent Crossings	FS Perennial Crossings	Watershed (Road) Risk
100901020304	East Fork Otter Creek	29127	90	1	0	1985	3681	89	35	115	51	0	MOD
100901010801	Lower Hanging Women Creek[1]	33404	8	23	0	0	1	72	3	92	0	0	MOD
100901020305	Otter Creek-Newell Creek	30339	18	38	0	0	4191	66	4	82	7	0	MOD
100901020504	Tongue River-Colbert Coulee	26625	5	8	0	0	348	17	1	15	1	0	LOW
100901021002	Pumpkin Creek-Doonan Gulch	35691	17	0	0	31	2410	85	12	118	9	0	LOW
100901021101	Upper Little Pumpkin Creek	27095	76	0	0	356	9	94	20	118	19	0	LOW
100901020703	Liscom Creek	30444	32	0	0	0	31	93	14	168	44	0	LOW
100901020207	Paget Creek	9042	96	0	0	194	8250	31	22	30	23	0	LOW
100901021003	Pumpkin Creek-Fiftyfour Creek	38844	11	0	0	0	16	97	4	117	13	0	LOW
100901021001	Headwaters Pumpkin Creek	27201	6	0	0	0	5	90	4	98	5	0	LOW
100901020403	Tongue River-Birney Creek	27298	8	18	0	0	0	60	1	85	0	0	LOW
100901020411	Tongue River-Walking Horse Coulee	17669	6	9	0	0	949	57	0	53	0	0	LOW
100901020604	Lower Beaver Creek	15080	9	10	0	0	0	22	0	36	0	0	LOW
100901020505	Tongue River-Bringoff Creek	33093	7	11	0	0	1090	26	0	31	0	0	LOW
100902070209	Fire Creek	17365	2	0	0	0	0	26	0	40	0	0	LOW
SUM	40 watersheds	1008934	na	277	93	9332	152924	2470	736	3228	981	31	H-12 M-16 L-12

[1] TMDL listed stream or tributary to.

Table 3-24. Summary of Streams on the 2006 Montana 303(d) List Within or Immediately Adjacent to the District

Stream	Probable Impaired Use	Probable Cause of Impairment	Probable Source of Impairment	Location
TMDL Category 5 Streams (TMDLs Required)				
Hanging Woman Creek	Aquatic Life Support (P) Warm Water Fishery (P) Drinking Water (na)	Sediment/siltation	Grazing in Riparian or Shoreline Zones Streambank Modifications/destablization	Stroud Creek to Tongue River- tributary channels on Forest.
TMDL Category 3 Streams (TMDLs Not Currently Required- insufficient data)				
Beaver Creek	All uses not assessed			Headwaters to Tongue River- tributary channels on Forest.
Little Pumpkin Creek	All uses not assessed			Headwaters to Pumpkin Creek- tributary channels on Forest.
Otter Creek	All uses not assessed			Headwaters to Tongue River- tributary channels on Forest.
Powder River	All uses not assessed			Wyoming border to Little Powder River- tributary channels on Forest.
Pumpkin Creek	All uses not assessed			Headwaters to Tongue River- tributary channels on Forest.

*P= partial use support

The 2006 Montana 305(b)/303(d) Water Quality Report lists only one stream adjacent to the analysis area that requires TMDLs: Lower Hanging Woman Creek (MTDEQ 2006). Impaired uses include aquatic life and warm water fisheries. Probable causes for impairment are sediment/siltation. Probable sources are grazing in riparian areas and streambank modification. Transportation systems on National Forest System land have the potential to influence aquatic life and warm water fisheries in this stream by contributing sediment to tributary channels in Lee Creek and EF Hanging Woman Creek.

Category 3 TMDL streams have not had beneficial uses assessed, and therefore causes and sources have not been identified. However, moderate and high risk watersheds with Category 3 TMDL streams carried forward to effects analysis include the following watersheds: Upper Beaver Creek, Lower Little Pumpkin Creek, Otter Creek-Brian, Otter Creek-Horse, Otter Creek-Newell, and Powder River-Plum.

3.4.1.2 Environmental Consequences – Water Quality

Effects Common to All Action Alternatives - Water Quality

Individual route risk is evaluated for direct, indirect or cumulative effects based on whether the proposed action for the individual route will increase, decrease or have no effect on risk. From a NEPA standpoint, only routes with proposed actions will have an associated risk. In contrast, routes with no proposed actions, e.g., existing system routes with no proposed change in management will have no change in risk. These routes are accounted for in the cumulative effects section.

Direct Effects
Relative to transportation systems, only the installation, reconstruction, or active removal and restoration of stream crossing structures result in direct effects to water quality, because the effect occurs during implementation of the action. For this analaysis, fords are also considered a stream crossing structure. Since there are no actions proposed to actively change specific stream crossings under this analysis, there are no direct effects to evaluate.

Indirect Effects
Indirect effects occur at a later time or distance from the proposed action. For example, a non-system route upslope from a stream and proposed for public use could potentially result in sediment delivery to the stream during wet periods. However, this potential effect would likely occur at a later time than the decision to designate the route, and would be some distance downslope from the designated route, hence a indirect effect.

Only routes with proposed actions are evaluated for indirect effects. Existing system routes that are designated without further actions, or non-system routes not converted to system routes, are not considered proposed actions under this analysis. However, these routes are incorporated into the cumulative effects analysis below as default actions. Proposed actions for individual routes under this analysis include designating non-system routes for public or administrative use, not designating existing system routes, designating system roads for administrative use only, converting system roads to trails, applying a season of use, or changing the mode of travel (vehicle).

Relative Route Risks By Action
Indirect and cumulative effects are based on whether the action for an individual route will increase, decrease or have no effect on route risk to water resources. For indirect effects, as presented in Tables

3-26 and 27, the influence of the proposed action on risk is based on a comparison with the no action condition. For cumulative effects, as presented in Table 3-28, the influence of the proposed and default actions on risk are based on a comparison with the existing condition. This rationale is displayed in the following table.

Table 3-25. Summary of Relative Route Risks by Action and Condition

Action	Change in Route Risk as Compared to Existing Condition	Change in Route Risk as Compared to No Action Condition
Proposed Actions Under Action Alternatives		
Add (designate non-system routes for public use)	No Change	Increase
Add (designate non-system routes for administrative use)	Decrease	Increase
Administrative (designate system routes for administrative use)	Decrease	Decrease
Do Not Designate (system routes)	Decrease	Decrease
Convert/Season (change from roads to trails and apply season of use 12/1-8/31)	Decrease	Decrease
Vehicle (change mode of travel)	No Change	No Change
Convert (change roads to trails)	No Change	No Change
No Camping	No Change	No Change
Default Actions Under No Action Alternative		
Do Not Designate (non-system routes)	Decrease	na
Designate (system routes)	No Change	na

The only action that would tend to increase risk to water resources is designating non-system roads for public or administrative motorized use. Designating non-system roads adds additional route miles to the landscape for the long-term, thereby maintaining the risk of indirect and cumulative effects to water resources. However, this is only an increase in risk when compared to the No-Action Alternative, because under the No-Action these routes would not be designated. Under the existing condition, these routes are already on the landscape and available for public use, and therefore designating them for public use is no change in risk. Additionally, designating them for administrative use only should reduce existing use and therefore risk.

Changing the mode of travel from highway legal vehicle to all motorized vehicles is not expected to change the type of vehicles that currently use these routes. Likewise, converting roads to trails is not expected to change the type of vehicle or level of use, nor the level or priority for maintenance along these routes. Therefore, these actions would not substantially change risk to water resources.

The remaining actions would tend to decrease risk to water resources. Changing the seasonal use period (yearlong to 12/1-8/31) related to the fall hunting season has the potential to reduce surface erosion, rutting and maintenance needs when roads are wet prior to freeze-up. This decrease in risk overrides the no change in risk identified for converting roads to trails where the actions coincide. Converting system routes to administrative use reduces traffic and allows revegetation of the road surface to occur, both of which reduce erosion over the long-term. Not designating system and non-system routes reduces route miles on the landscape over the long-term, thereby reducing potential erosion and risk to water resources.

Effects by Alternative - Water Quality

The proposed actions for individual routes are summarized for moderate and high risk watersheds by whether the actions increase or decrease risk. Refer to the following table. Low risk watersheds are not evaluated for indirect effects because they either do not contain perennial streams, or roads on National Forest System land, or are Category 5 TMDL streams. They are however, accounted for under cumulative effects.

Alternative A - Indirect Effects
This alternative proposes actions that increase risk to water resources in 26 of the 28 moderate and high risk watersheds on the District, while actions that decrease risk are proposed in 21 watersheds. Overall, there is a net increase in risk in 19 (68%) watersheds, while net risk decreases in eight watersheds. Nine of the 19 watersheds with a net increase are high risk watersheds. The sole reason for the increase is due to the addition of non-system roads to the transportation system. Risk remains unchanged in one watershed.

Under Alternative A, one route previously identified with potential wetland concerns will have actions proposed to address these concerns. This is a system route that will be converted to administrative use only. The other routes are identified in Appendix D as future restoration opportunities.

One watershed that is a tributary to a category 5 TMDL stream has proposed actions that result in a net decrease in risk, while two other watersheds with category 5 TMDL issues have actions that result in a net increase in risk. Of the six moderate and high risk watersheds with category 3 TMDL streams, three have actions that increase net risk to water resources, while two have actions that decrease net risk and one has no net change.

Alternative B and B Modified - Indirect Effects
This alternative proposes actions that increase risk to water resources in 21 of the 28 moderate and high risk watersheds on the District, while actions that decrease risk are proposed in 27 watersheds. Overall, there is a net increase in risk in only three (11%) watersheds, while net risk decreases in 24 watersheds. None of the watershed with a net increase are high risk watershed or have category 5 TMDL streams. The reasons for the decrease in risk are due to designating system routes for administrative use only, applying a season of use to converted roads, and not designating some system routes. Risk remains unchanged in one watershed.

Under these alterntives, two routes previously identified with potential wetland concerns will have actions proposed to address these concerns. These are system routes that will be converted to administrative use only. The other routes are identified in Appendix D as future restoration opportunities.

All three watersheds with category 5 TMDL issues have actions that result in a net decrease in risk. Additionally, all six moderate and high risk watersheds with category 3 TMDL streams have actions that decrease net risk to water resources.

Table 3-26. Summary of Route Miles by Action Risk for Moderate and High Risk Watersheds When Compared to the No-Action Condition

Watershed	Alternative A		Alternative B		Alternative B Modified	
	Increase Risk	Decrease Risk	Increase Risk	Decrease Risk	Increase Risk	Decrease Risk
Ash Creek	0.1	0.4	0.0	0.4	0.0	0.7
Bloom Creek	9.2	1.3	5.2	7.6	5.2	8.9
East Fork Hanging Women Creek[1]	7.0	0.0	1.8	7.3	1.8	11.1
East Fork Otter Creek	3.5	8.7	1.6	17.6	1.6	17.2
Elk Creek	3.8	2.7	0.2	7.6	0.2	7.6
Fifteenmile Creek	2.4	0.8	0.4	4.7	1.4	4.7
Home Creek	9.5	3.8	4.8	9.7	4.8	8.2
Indian Creek	4.0	3.1	2.4	5.9	2.4	7.7
Lee Creek[1]	2.9	3.7	0.6	11.4	0.0	11.4
Little Bear Creek	1.4	0.1	0.8	0.1	0.8	0.3
Lower Bear Creek	2.3	0.0	1.5	4.8	1.5	4.8
Lower Hanging Women Creek[1]	1.4	0.4	1.0	2.4	1.0	2.4
Lower Little Pumpkin Creek	0.8	1.2	0.8	2.3	0.8	1.2
Lyon Creek	8.9	1.9	3.5	1.9	3.5	2.6
Middle Beaver Creek	0.2	3.0	0.0	12.6	0.0	7.7
O'Dell Creek	3.4	3.0	0.9	12.1	1.1	12.0
Otter Creek-Brian Creek	2.6	3.3	1.8	9.7	1.8	10.2
Otter Creek-Horse Creek	5.2	0.2	0.0	9.5	0.2	9.3
Otter Creek-Newell Creek	0.0	0.0	0.0	0.0	0.0	0.0
Poker Jim Creek	0.1	0.0	0.1	1.6	0.1	9.6
Powder River-Plum Creek	2.8	1.7	0.0	4.3	0.0	4.3
Taylor Creek	9.1	1.5	4.3	6.7	4.3	8.8
Tenmile Creek	2.7	0.3	1.8	2.6	1.8	2.6
Threemile Creek	7.0	0.0	3.3	0.1	6.1	3.3
Tongue River-Double E Creek	0.0	2.9	0.0	2.9	0.0	2.9
Tongue River-King Creek	1.1	0.0	0.0	0.3	0.0	2.2
Tongue River-Poker Teechee Creek	0.4	2.9	0.3	2.9	0.3	2.5
Upper Beaver Creek	4.7	0.0	0.5	8.2	2.9	3.3
Total Miles by Action Risk	**96.5**	**46.9**	**37.6**	**157.3**	**43.5**	**167.6**
Number of watersheds with a increase or decrease in risk	**26**	**21**	**21**	**27**	**21**	**27**
Number of watersheds with a *net* increase or decrease in risk	**19**	**8**	**3**	**24**	**3**	**24**

[1] TMDL listed stream or tributary to.

Comparison of Indirect Effects

The following table provides a summary of indirect effects for all actions in all watersheds by risk category; increase, decrease or no change in risk. For all actions across the District, a net increase in risk occurs under Alternative A (+8%), while a net decrease in risk occurs under Alternative B (-20%) and B Modified (-19%). Due to the coarse nature of this risk analysis, the difference between Alternative B and B Modified is likely not significant.

Table 3-27. Summary of Route Miles *with* Proposed Actions When Compared to the No Action Condition

Actions that Increase Risk	Alternative A	Alternative B	Alternative B Modified
Add (designate non-system routes for public and administrative use)	124.7	55.0	62.4
Total Miles that Increase Risk	**124.7**	**55.0**	**62.4**
Actions that Decrease Risk			
Administrative (designate system routes for administrative use only)	44.1	91.1	80.7
Do Not Designate (system routes)	21.9	75.2	80.7
Convert/Season	0.0	16.9	25.7
Total Miles that Decrease Risk	**66.0**	**183.2**	**187.1**
Actions that Don't Change Risk			
Vehicle	33.8	33.8	33.8
Convert	491.7	374.9	374.4
Total Miles –Actions that Do Not Change Risk	**525.5**	**408.7**	**408.2**
Total Miles – All Actions	**716.2**	**646.9**	**657.7**
Percent Net Increase or Decrease in Risk ((increase miles – decrease miles)/total miles)	**+8%**	**-20%**	**-19%**

No Action Alternative

See discussion of No Action Alternative in the cumulative effects section below.

Cumulative Effects - Effects of All Routes Including Those Without Proposed Actions

All alternatives include routes *without* proposed actions. Actions for these routes are termed default actions and include some system routes that will be designated without further action, and some non-system routes that will not be designated without further action. These default actions are compared against the existing condition to determine risks. Designating system routes is not expected to change any characteristic of the route in terms of current use or impact and therefore this default action will not change risk to water resources. On the other hand, not designating non-system routes will remove the route from the landscape, thereby reducing any existing effects and future risks to water resources. The following table summarizes miles of routes with default actions, and cumulatively by including routes with proposed actions.

Table 3-28. Summary of All Routes Across the District With and Without Proposed Actions When Compared to Existing Condition

	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
NF System Road Miles – Designate System Routes for Public and Admin Use - No Change In Risk	144.7	144.7	141.3	736.6
NF Non-system Road Miles – Do Not Designate - Decrease Risk	41.4	111.1	105.1	163.2
Total Miles for Routes with Default Actions	**186.1**	**255.8**	**246.4**	**899.8**
Miles for Actions that Increase Risk (no proposed actions increase risk when compared to the existing condition- see Table 3-25)	0.0	0.0	0.0	0.0
Miles for Actions that Decrease Risk (designating system/non-system routes for administrative use only, applying a season of use	69.0	221.3	222.8	0.0

Table 3-28. Summary of All Routes Across the District With and Without Proposed Actions When Compared to Existing Condition

	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
to converted roads, and not designating system routes)				
Miles for Actions that Don't Change Risk (vehicle, convert, add non-system to public use)	647.2	425.6	434.9	0.0
Total Miles for Routes with Proposed Actions	**716.2**	**646.9**	**657.7**	**0.0**
Total Miles for All Routes with Increased Risk	0.0	0.0	0.0	0.0
Total Miles for All Routes with Decreased Risk	110.4	332.4	327.9	163.2
Total Miles for All Routes with No Change in Risk	791.9	570.3	576.2	736.6
Total Miles - All Routes	**902.3**	**902.7**	**904.1**	**899.8**
Percent Net Increase or Decrease in Cumulative Risk ((increase miles – decrease miles)/total miles)	**-12%**	**-37%**	**-36%**	**-18%**

Action Alternatives

These alternatives designate varying levels of system routes without any additional actions to reduce risks to water resources. All action alternatives designate substantially less miles than the No Action Alternative. Alternatives B and B Modified designate less non-system miles than Alternative A, thereby further reducing risks from these routes. Cumulatively across the District, a net decrease in risk occurs under all action alternatives from -12 percent in Alternative A to -37 percent under Alternative B. Due to the coarse nature of this risk analysis, the difference between Alternative B and B Modified is likely not significant.

.

No Action Alternative

This alternative designates the most system routes without any additional actions to reduce risks to water resources. However, it also designates the least amount of non-system routes. Not designating these routes reduces risk over the long-term as the routes disappear from the landscape, either naturally or through active rehabilitation. Cumulatively across the District, a net decrease in risk of -18 percent occurs under the No Action Alternative.

Under this alternative, no routes previously identified with potential wetland concerns will have actions proposed to address these issues. These routes and concerns are identified in Appendix D as future restoration opportunities.

Effects Common to All Alternatives at the Watersheds Scale

Sediment modeling was not incorporated into the effects analysis for water quality for many reasons. First of all, natural erosion rates specific to the Custer National Forest have not been developed and extrapolating rates from other Forests would only increase errors associated with the model results. Additionally, except for wildfire, road construction and harvest of green timber stands, surface erosion rates have not been developed for other frequent activities on the forest. Therefore, from a cumulative effects standpoint, existing sediment models are not adequate to quantify to a single cumulative value, the effects of all the diverse activities in individual drainages including wildfire/prescribed fire, dispersed camping, off-highway vehicle use, grazing, floodplain development, timber harvest, and transportation networks. Nor are they capable of distinguishing between all the different actions associated with this travel management analysis. A combination of individual models could prove useful, but a large amount of additional data (on-ground and spatial) would be necessary to obtain valid results. The only way to address these various activities cumulatively for this travel management analysis is to address each activity individually and then qualify, in general terms, the cumulative

effects between specific activities where appropriate. Additionally, thresholds for sediment yield increases are extremely difficult to identify and have not been identified for the Custer National Forest. Existing activities are discussed previously under the section – Affected Environment – Water Quality.

Finally, existing models can have very high errors associated with their results. Elliot (2000) indicates that, at best, any predicted runoff or erosion value, by any model, will be within plus or minus 50 percent of the true value. The high degree of error associated with cumulative effects models make it difficult, if not impossible, to compare results between alternatives because confidence intervals overlap.

At the 6 HUC watershed scale, the proposed actions are not likely to be substantial enough to cause detectable changes in water quality, quantity or channel processes under any alternative. Although the effect of an individual action on a specific route could be detectable in the nearest watercourse immediately downslope, it is unlikely to be detectable at the mouth of watersheds ranging from 10,000 to 40,000 acres. Additionally, the effects of all actions are indirect as previously discussed. They will occur at different times in different locations and at different magnitudes across these large watersheds. The effects are therefore diluted; temporally and spatially.

Natural disturbance events will continue to influence hydrologic and erosional processes across all watersheds. Given the current vegetative conditions and associated fuel accumulations in some watersheds, there is potential for wildfires to occur that may be outside the range of conditions (intensity and duration) that have occurred over the last few hundred years. Depending on the intensity and area burned, accelerated soil erosion is likely, particularly where hydrophobic soils may be formed. Significant channel adjustments could be expected in these watersheds, especially during years of average or higher precipitation/runoff conditions. Stream systems will however stabilize as vegetative recovery occurs during post-fire years. Transportation systems could compound the effects of post-fire flood events, especially where routes are not maintained to standard. It is reasonable to assume that current road conditions and maintenance needs will continue into the future. Based on the 2004 Ashland Landscape Assessment, the combination of existing roads and wildfire potential results in a relatively high risk of impact to water resources in two watersheds on the District; Threemile Creek and Home Creek (Nienow 2004).

Past and present timber harvest activities and prescribed fire will continue to be a minimal influence on water resources as described under the affected environment. However, other human influences including transportation systems, grazing, recreation, and floodplain developments are likely to continue to cause chronic effects to water resources as discussed previously.

3.4.1.3 Conclusion - Water Quality

From a District-wide cumulative summary, the preferred alternative would decrease net risk along 36 percent of the 904 total route miles evaluated. By comparison, Alternative A would decrese net risk along only 12 percent of the total route miles, while the no-action alternative would decrease net risk along 18 percent. Alternative B is very similar to the preferred alternative at 37 percent net decrease.

Currently, some routes have documented water quality impacts and therefore, may not comply with Forest Plan direction or state and federal water quality regulations. Compliance relative to the Decision to be made for this EIS, only pertains to those routes with a proposed action. These routes

have actions proposed which are the first steps toward addressing water quality impacts. Additional activities, outside of this proposal, that would further reduce water quality impacts are identified in Appendix D - Opportunities. From a NEPA standpoint, routes with no proposed actions that have known water quality impacts are not a compliance issue relative to the Decision to be made, because this project is not the cause of those impacts (i.e. they are existing impacts). However, water quality impacts should still be addressed through measures outside this process and recommended actions for these routes are also identified in Appendix D - Opportunities. Full compliance with Forest Plan direction and state and federal water quality regulations under all alternatives would occur in the future as these actions or rehabilitation measures are implemented.

3.4.1.4 Affected Environment – Fisheries and Aquatics

Applicable Laws, Regulations, and Policy

The *Clean Water Act* requires States to identify existing water bodies that do not meet water quality standards, and develop plans to meet them. *Montana Water Quality Law*, as directed by the Clean Water Act, developed a water quality classification system, developed water quality standards to be applied to various water classes, and identified water bodies that do not meet standards.

The Montana Department of Environmental Quality (MTDEQ) has classified all waters within the analysis area as C-3 waters. The beneficial uses associated with this classification include; bathing, swimming, and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl, and furbearers.

The *1995 Presidential Executive Order 12962* directs Federal agencies to "improve the quantity, function, sustainable productivity, and distribution of aquatic resources for increased recreational fishing opportunity by evaluating the effects of federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order."

As part of the *National Environmental Policy Act* (NEPA) decision-making process, proposed Forest Service programs or activities are to be reviewed to determine how an action will affect any sensitive species (FSM 2670.32). The goal of the analysis should be to avoid or minimize impacts to sensitive species. Three sensitive amphibian species are present in the project area. These include the Great Plains Toad *Bufo cognatus*, Northern Leopard Frog *Rana pipiens*, and Plains Spadefoot *Spea bombifron*. Sensitive fish species considered in this analysis include the Northern Redbelly Dace *Phoxinus eos* and Sturgeon Chub *Macrhybopsis gelida*. Although the project area is within the historic distribution of these sensitive fish species, there has been no documented occurrence of either fish species in the project area.

The 1987 *Custer National Forest Land and Resources Management Plan* directs that management activities should enhance habitat quality and diversity, and to provide fish-oriented recreation opportunities. Most of the critical habitat areas have been incorporated into management areas that maintain or improve these key habitats. Fisheries management is considered in all management areas and the level of habitat management is projected to increase over time.

Fish and Amphibian Distribution

The Ashland District Travel Management Plan project area spans across 40 individual watersheds (6^{th} level hydrologic unit code). Custer National Forest system lands comprise about one-half (49.6 %) of

the total acreage of the 40 watersheds (500,928 acres of 1,008,934 acres total). The project area encompasses headwater tributaries, springs, and impoundments that support diverse populations of endemic fish and amphibian species.

There are no sensitive fish species documented in the project area. However, waters on the Ashland Ranger District are within the historic distribution of the Northern Red Belly Dace and the Sturgeon Chub. These species are listed as ***Sensitive*** by Region 1 of Forest Service, although neither species has been observed or documented on the District.

Other fish species considered in this analysis include: 1) native nonsensitive species, including the Black Bullhead *Ameiurus melas*, Brook Stickleback *Cualea inconstans*, Fathead Minnow *Pimephales promelas*, and Lake Chub *Couesius plumbeus* and, 2) exotic recreational species, including Black Crappie *Pomoxis nigromaculatus*, Green Sunfish *Lepomis cyanellus*, Large Mouth Bass *Micropterus salmoides*, Rainbow Trout *Oncorhynchus mykiss*, and Yellow Perch *Perca flavescens*..

Sensitive amphibian species present in the project area include the Great Plains Toad, Northern Leopard Frog, and Plains Spadefoot. Common nonsensitive amphibian species found throughout the project area include the Boreal Chorus Frog *Pseudacris maculata*, Tiger Salamander *Ambystoma tigrinum*, and Woodhouse's Toad *Bufo woodhousii*.

In 2005, 111 macroinvertebrate taxa were reported from 16 perennial sites inventoried on the Ashland Ranger District. Average macroinvertebrate taxa richness per site was 25 and the highest taxa richness reported at 2 sites was 38. Five of the 16 sites were ranked non-impaired (good to excellent biological integrity), 6 were slightly-impaired and 5 moderately-impaired (Stagliano et al. 2006).

Great Plains Toad (Bufo cognatus)

The Great Plains toad is recognized as a distinct species that ranges across the Great Plains from central Mexico to southeastern Alberta (Maxell 2000). In Montana, Great Plains Toads are found across the eastern plains, especially on the plateaus between and flanking the Yellowstone and Missouri Rivers, and have been documented east of Shelby, Great Falls, Lewiston, and Billings Montana (Maxell 2000; Werner et al. 2004).

The Great Plains Toad is found in headwater drainages and onto prairies, where they are seen around glacial potholes, stock reservoirs, irrigation ditches, and smaller coulees (Werner et al. 2004). The Great Plains toad is a rapid burrower when active and occupies shallow burrows during the day (Fischer et al. 1999, MFWP 2008). This species enters water only to breed, and emergence and breeding periods are triggered by early summer thunderstorms after which the toads immediately move to breeding areas (Fischer et al. 1999, MFWP 2008). Breeding takes place anytime between mid-May and mid-July (Fischer et al. 1999). Females lay up to 45,000 eggs and communal egg laying is common; eggs hatch in two to three days and tadpoles metamorphose in three to six weeks (Werner et al. 2004). Sexual maturity is achieved at two to three years of age (Werner et al. 2004).

Great Plains toads have only been documented at about 30 localities across the plains east of the Rocky Mountains and their status across this region is largely unknown (Maxell 2000). Risk factors relevant to the viability of populations of this species are likely to include grazing, use of pesticides and herbicides, nonindigenous species, road and trail development, on- and off-road vehicle use, development of water impoundments, habitat loss/fragmentation, and metapopulation impacts (Maxell 2000). There are five documented observations of Great Plains Toads on the Ashland Ranger District.

Northern Leopard Frog (Rana pipiens)

The Northern leopard frog historically ranged from Newfoundland and northern Alberta in the north to the Great Lakes region, the desert Southwest and the Great Basin in the south (Maxell 2000). A number of isolated populations historically existed in the Pacific Northwest and California (Stebbins 1985; as reported in Maxell 2000). In Montana they have been documented across the eastern plains and in many of the mountain valleys on both sides of the Continental Divide at elevations up to 6,700 feet (Werner et al. 2004).

The Northern leopard frog is found in, and adjacent to, permanent slow moving or standing water bodies with considerable vegetation, but may range widely into moist meadows, grassy woodlands and even agricultural areas (Nussbaum et al. 1983; as reported in Maxell 2000). Adults feed on invertebrates, but may cannibalize smaller individuals. Adults overwinter on the bottom surface of permanent water bodies, under rubble in streams or in underground crevices that don't freeze. Northern leopard frogs breed from mid-March to early June (Maxell 2000). Mating occurs when males congregate in shallow water and begin calling during the day (Maxell 2000). Eggs are laid at the water surface in large, globular masses of 150 to 500 (Maxell 2000). Juveniles may move as much as 8 kilometers from their natal ponds to their adult seasonal territories (Dole 1971; as reported in Maxell 2000). Young and adult frogs often disperse into marsh and forest habitats, but are not usually found far from open water (Maxell 2000).

Over the last few decades the Northern leopard frog has undergone declines across much of the western portion of their range (Stebbins and Cohen 1995; as reported in Maxell 2000). Most Northern leopard frogs in western Montana became extinct in the 1970's or early 1980's. The only 2 population centers known to exist in western Montana are near Kalispell and Eureka (Maxell 2000). However, the northern leopard frog is still abundant and widespread in southeastern Montana and northwestern South Dakota (Reichel 1995; as reported in Hendricks and Reichel 1996). Although this species is relatively common on Ashland District of the Custer National Forest, they are considered a *Sensitive Species* due to population declines in the western portion of their historic range.

Plains Spadefoot (Spea bombifrons)

The Plains Spadefoot is documented only sparsely in central and eastern Montana, including sightings in the mountain valleys of the upper Missouri watershed at elevations up to 5,000 ft (Maxell 2000, Werner et al. 2004).

Spadefoots are a prairie species, associated with areas of sandy soil or gravel-loam (Werner et al. 2004). Their lifestyle associates them with large temporary wetlands easily flooded after heavy rains (Fischer et al. 1999). When conditions are such that adults retreat underground, the spades on the hind feet are used to dig backwards into the soil until pockets of moist soil are encountered, sometimes at depths of almost a meter (MFWP 2008). Plains Spadefoots are seldom encountered outside the breeding season since they spend most daylight hours underground (Werner 2004). The Plains Spadefoot reaches sexually maturity at one to two years of age and breeding generally takes place from May to August following heavy rainfall at temperatures above 54° F (Fischer 1999, Werner et al. 2004). Females lay close to one thousand eggs, tadpoles develop in two to six days, and metamorphosis occurs from three to six weeks (Werner at al. 2004).

In the past 125 years, this species has been documented at about 40 localities across the plains and in the mountain valleys east of the Continental Divide and their status across this region is almost completely unknown (Maxell 2000). Risk factors relevant to the viability of populations of the Plains

Spadefoot are likely to include grazing, road and trail development, on- and off-road vehicle use, use of pesticides and herbicides, development of water impoundments, habitat loss/fragmentation, and metapopulation impacts (Maxell 2000). Six current, documented observations exist for the Plains Spadefoot on the Ashland Ranger District.

Watershed Condition and Stream Habitat Characteristics

For the purpose of this analysis generalizations of watershed condition, and potential impacts to aquatic habitat and biota relative to travel routes, were inferred from: 1) perennial stream crossings by FS routes, 3) total perennial stream miles, 3) intermittent stream crossings by FS routes, and 4) TMDL listed streams. Sediment delivery and riparian habitat loss are generally positively related to the aforementioned route related variables, and generally but not universally are indicative of reduced aquatic habitat capability (e.g., Furniss et al. 1991, Dunham and Rieman 1999, Forman et al. 2003). Habitat quality within watersheds is variable, in part because of other land use activities and because the ultimate effects of travel routes also depend on location of those routes, geology and soils of the watershed, maintenance of the routes, and other factors (Furniss et al. 1991).

There is a distinction between travel route effects and the effects of various modes of travel. In some cases, the actual use, or mode of travel is inconsequential. Rather, it is the facility (road or trail) that has the potential to impact aquatic habitat and biota. Often, roads have more impacts than trails because of their wider prisms, larger cut-and-fill slopes and more extensive ditch routing systems. However, motorized and mixed use trails also hold potential to disturb soils and increase erosion. Sediment production from All Terrain Vehicle (ATV) use on 10 user created route segments was reported to be six times higher than sediment production on 21 forest road segments in the Upper South Platte River watershed in Colorado (Welsh 2008). Deluca et al. (1998) found horses consistently produced more sediment than hikers or llamas, and horses have also been reported to produce higher sediment yields than hikers, mountain bikers, and motorcycles on similar trails (Wilson and Seney 1994). Although all transportation routes and uses (motorized and nonmotorized) can produce sediment, Best Management Practices (BMP), facility improvements, and scheduled maintenance can minimize potential for adverse effects to aquatic systems on all routes.

Influences of Transportation Systems on Aquatic Habitat and Biota

Potential effects of travel routes and various modes of travel on aquatic habitat and species are combined under one primary aquatics issue (effects to aquatic habitat and biota). However, the issue is segregated into various components of concern. Those components are: 1) Travel route impacts on stream channel form and function, including sediment delivery to streams and subsequent effects on aquatic habitat and biota; 2) Travel route impacts on riparian ecosystems; 3) Travel route impacts on habitat fragmentation; and 4) Travel route impacts on exploitation and modification of recreational and native fisheries.

Stream Channel Form and Function

Travel routes may affect stream channel form and function, including sediment delivery to streams and subsequent effects on aquatic habitat and biota. Roads and trails constructed for Forest travel disturb soils and increase the potential for erosion and sediment transport and deposition in streams (Furniss et al. 1991, Forman et al. 2003). Likewise, motorized and non-motorized uses (motorcycles, ATVs, horses, mountain bikes, and hikers) can further disturb soils and increase potential for erosion and sediment delivery. Sediment concerns are generally highest when roads and trails are not sufficiently drained (Furniss et al. 1991). Water and sediment can concentrate on roads and trails during spring snowmelt runoff or periods of intense rain and be delivered to streams. With sufficient

drainage, water and sediment from upland segments of trails and roads can be diverted off trails or roads, filtered through forest vegetation, and not routed to streams (Furniss et al. 1991). As such, upland segments of roads and trails can generally be designed to mitigate sediment delivery concerns. One primary concern is erosion and sediment delivery from road and trail segments near stream crossings (Furniss et al. 1991, Forman et al. 2003).

Sediment entering stream channels can affect channel shape and form, stream substrates, and the structure of fish and amphibian habitats (Everest et al. 1987, Hicks et al. 1991, Waters 1995, McIntosh et al. 2000, Werner et al. 2004). Common responses of macroinvertebrate communities to elevated concentrations of sediment can include decreased total abundance, decreased number of species, and a shift from a community of sediment intolerant species to a community of sediment tolerant species. To evaluate the effects travel routes and modes of travel have on sediment and aquatic habitats, one must project changes in erosion and sediment delivery against the structural framework of the channel. Streams are not similar in terms of their inherent sensitivity to changes in streamflow or sediment discharge, their inherent stability, or their ability to recover from sediment related change (Rosgen 1996, Hogan and Ward 1997). Furthermore, stream habitats described in terms of pools, riffles and spawning gravel are geomorphic entities that are selectively influenced or controlled by channel type, streamflows and sediment inputs (Rosgen 1996, Hogan and Ward 1997).

Pools are the result of local scour or impoundment induced by structural controls (e.g., boulders, large woody debris) in the channel or streambank (Rosgen 1996, Hogan and Ward 1997). Pools are areas of higher velocity during peak flows, but at low flows their depth creates a depositional environment for fine sediment. Increased sediment from roads and trails can influence the amount and quality of pool habitat if sediment increases are sufficient to alter channel morphology by filling in pools and increase width/depth ratios. For lower-gradient, more sensitive channel types with moderate sensitivity to increased sediment, excessive sediment loading can reduce maximum pool depth and residual pool volume thereby reducing the quality and availability of pool habitats important to fish and amphibians (Rosgen 1996, Hogan and Ward 1997, Werner 2004).

Riparian Ecosystems

Forest roads and trails constructed for travel activities within riparian corridors can alter or remove riparian vegetative communities, with direct and indirect impacts on riparian and stream ecosystems (Furniss et al. 1991, Forman 2003). Riparian vegetation modification may directly remove security cover and reduce stream shading, resulting in increased water temperatures in summer and colder temperatures in winter. Removal of riparian vegetation may indirectly result in reduced streambank stability and sediment filtering capacity of vegetation, both of which can result in increased sediment delivery rates with effects as described above (e.g., Thornton et al. 1997). Riparian vegetation modification may also change stream channel form and function, and may modify aquatic food webs and nutrient cycles. Potential for changes in channel form and function is also related to the inherent stability of various channel types. Removal of riparian vegetation in amphibian breeding, incubating and rearing habitats may reduce its suitability for those functions and may increase vulnerability of the amphibians to predation (Maxell 2000, Forman et al. 2003).

Habitat Fragmentation

Roads and trails can fragment aquatic habitats where stream crossings create barriers for upstream movement of aquatic species (Furniss et al. 1991). This typically occurs where culverts and fords are not designed to allow for upstream fish and amphibian passage. Crossings with culverts can be barriers usually because of outfall barriers, excessive velocities, insufficient water depths, disorienting

turbulent flow patterns, lack of resting pools below the barrier or a combination of these conditions. Aquatic organisms upstream of the barrier are then geographically and hence, reproductively isolated from the downstream population. Habitat fragmentation can reduce viability of fish populations by a variety of stochastic, deterministic and genetic mechanisms (e.g., Rieman et al. 1993). Based on field reviews and recent culvert replacement information, no existing, perennial stream/route crossings on the District are known to hinder aquatic organism passage.

Exploitation of Recreational and Native Fisheries

Travel routes that lead to popular fishing destinations may have an indirect effect on fish populations by over-exploiting fish stocks that are vulnerable to high angling pressure. Over-exploitation of fish stocks may result in population declines (e.g., Rieman and McIntyre 1993). Population declines in small fish populations may render them at higher risk of extinction (Rieman et al. 1993).

The Montana Department of Fish, Wildlife and Parks (MFWP) manage fish and wildlife populations throughout the state. Lake management plans have been developed for most lakes and reservoirs throughout the Custer National Forest. These plans address recruitment potential and angling pressure effects. Where natural recruitment does not meet population goals, supplemental stocking is generally prescribed. Lake management plans and special regulations effectively mitigate the over-exploitation component of the aquatics issue. Thus, this component is dismissed from further detailed analysis.

Transportation Systems Analysis

Roads and trails were evaluated for impacts to water quality or natural channel processes (Water Quality Section). This analysis evaluates the subsequent potential impacts to aquatic habitat and biota in relation to those impacts. An in depth review of effects of roads and trails on fish and amphibians, and their habitats is provided by Furniss et al. (1991), Maxell (2000), and Forman et al. (2003).

The potential for routes to impact water quality was evaluated based on the number of perennial stream crossings by FS routes, total perennial stream miles, intermittent stream crossings by FS routes, and TMDL listed streams. Values obtained from the analysis provide an index of potential water quality impact, or route risk to water quality. The route value is not intended to predict an absolute value or level of impact to water quality, aquatic systems, or species, rather a hierarchical approach to prioritizing impact potential by category: Low, Moderate, and High Risk. A summary of selected natural characteristics, human activities, and aquatic species presence are provided in Table 3-29 by 6 HUC (hydrologic unit code) watersheds. Quantifiable Forest Service activities include past timber harvest, fire (prescribed fire and wildfire), and existing transportation system attributes. Potential effects to fish and amphibians and their habitats related to proposed actions are evaluated under indirect effects by action alternative.

Table 3-29. Summary of Watershed Characteristics, Watershed Scale Influences, Fisheries Resources, Sensitive Amphibians and Macroinvertebrate Communities on the Ashland Ranger District.

Watershed #	Watershed Name	Watershed Acres	Percent Watershed Forest Service	FS Perennial Stream Miles	Harvest Acres	Fire Acres	FS Road Miles	Total Stream Crossings	FS Intermittent Crossings	FS Perennial Crossings	Watershed (Road) Risk	Fisheries Resource*	Sensitive Amphibians**	Macroinvertebrates***
100901020210	Otter Creek-Brian Creek	36,062	78	21	376	19,851	50	182	60	9	HIGH	NNS	GPT, NLF, PSF	R
100901020602	Ash Creek	1,0779	71	2	0	1,673	5	30	7	7	HIGH	--	--	--
100901020203	Otter Creek-Horse Creek	21,585	90	19	47	7,891	27	67	31	6	HIGH	NNS	NLF	P
100901020601	Upper Beaver Creek	14,298	98	5	478	886	30	42	28	2	HIGH	--	--	--
100901020209	Fifteenmile Creek	22,566	66	2	86	3,790	29	69	17	2	HIGH	--	NLF	--
100901020208	Elk Creek	19,754	68	5	0	48	24	77	27	1	HIGH	--	NLF	--
100901020205	Taylor Creek	29,059	100	2	268	5,690	41	83	35	1	HIGH	ER	NLF	P
100902070206	Bloom Creek	30,311	82	2	266	4,832	28	64	40	1	HIGH	--	NLF	P
100901020301	Tenmile Creek	27,351	89	1	0	2,983	22	90	31	1	HIGH	--	NLF, PSF	--
100901010803	Lee Creek	30,049	63	1	0	5,617	24	116	33	1	HIGH	--	NLF	--
100901020303	Home Creek	37,810	89	4	2860	13,879	66	160	100	0	HIGH	--	GPT, NLF, PSF	--
100901010804	East Fork Hanging Women Creek[1]	22,019	94	2	538	3,187	36	75	54	0	HIGH	--	GPT, NLF	R
100901020104	Lower Bear Creek	13,516	94	9	3	2,120	26	59	34	0	MOD	NNS	NLF	P
100901020404	Poker Jim Creek	12,811	89	6	165	1,399	13	33	15	0	MOD	NNS	GPT, NLF	--
100901020406	O'Dell Creek	29,692	92	5	603	20,867	43	92	59	0	MOD	ER	GPT, NLF	R
100901020603	Middle Beaver Creek	18,883	50	1	0	35	20	81	31	0	MOD	--	NLF	--
100901020204	Indian Creek	33,062	49	1	72	168	19	104	26	0	MOD	--	--	--
100901020501	Tongue River-Double E Creek	15,151	23	1	0	428	3	44	4	0	MOD	--	--	--
100901020206	Lyon Creek	19,615	100	1	785	1,962	29	45	29	0	MOD	ER	NLF	--

Table 3-29. Summary of Watershed Characteristics, Watershed Scale Influences, Fisheries Resources, Sensitive Amphibians and Macroinvertebrate Communities on the Ashland Ranger District.

Watershed #	Watershed Name	Watershed Acres	Percent Watershed Forest Service	FS Perennial Stream Miles	Harvest Acres	Fire Acres	FS Road Miles	Total Stream Crossings	FS Intermittent Crossings	FS Perennial Crossings	Watershed (Road) Risk	Fisheries Resource*	Sensitive Amphibians**	Macroinvertebrates***
100901020103	Little Bear Creek	18,833	14	1	0	302	3	51	2	0	MOD		NLF	
100902070204	Powder River-Plum Creek	22,555	25	1	0	5,386	9	44	10	0	MOD	--	NLF	--
100901020302	Threemile Creek	32,925	88	1	160	19,113	36	93	54	0	MOD	--	NLF, PSF	--
100901021102	Lower Little Pumpkin Creek	39,175	12	1	59	150	9	144	10	0	MOD	--	--	--
100901020409	Tongue River-King Creek	31,387	34	0	0	9,686	17	107	47	0	MOD	--	--	--
100901020407	Tongue River-Poker Teechee Creek	21,367	24	0	0	1	6	78	25	0	MOD	--	--	--
100901020304	East Fork Otter Creek	29,127	90	0	1,985	3,681	35	115	51	0	MOD	--	NLF	--
100901010801	Lower Hanging Women Creek[1]	33,404	8	0	0	1	3	92	0	0	MOD	--	--	--
100901020305	Otter Creek-Newell Creek	30,339	18	0	0	4191	4	82	7	0	MOD	--	--	--
100901020504	Tongue River-Colbert Coulee	26,625	5	0	0	348	1	15	1	0	LOW	--	--	--
100901021002	Pumpkin Creek-Doonan Gulch	35,691	17	0	31	2410	12	118	9	0	LOW	--	--	--
100901021101	Upper Little Pumpkin Creek	27,095	76	0	356	9	20	118	19	0	LOW	--	NLF	--
100901020703	Liscom Creek	30,444	32	0	0	31	14	168	44	0	LOW	--	--	P
100901020207	Paget Creek	9,042	96	0	194	8,250	22	30	23	0	LOW	--	--	--
100901021003	Pumpkin Creek-Fiftyfour Creek	38,844	11	0	0	16	4	117	13	0	LOW	--	--	--
100901021001	Headwaters Pumpkin Creek	27,201	6	0	0	5	4	98	5	0	LOW	--	--	--
100901020403	Tongue River-Birney Creek	27,298	8	0	0	0	1	85	0	0	LOW	--	--	--
100901020411	Tongue River-Walking	17,669	6	0	0	949	0	53	0	0	LOW	--	--	--

Table 3-29. Summary of Watershed Characteristics, Watershed Scale Influences, Fisheries Resources, Sensitive Amphibians and Macroinvertebrate Communities on the Ashland Ranger District.

Watershed #	Watershed Name	Watershed Acres	Percent Watershed Forest Service	FS Perennial Stream Miles	Harvest Acres	Fire Acres	FS Road Miles	Total Stream Crossings	FS Intermittent Crossings	FS Perennial Crossings	Watershed (Road) Risk	Fisheries Resource*	Sensitive Amphibians**	Macroinvertebrates***
	Horse Coulee													
100901020604	Lower Beaver Creek	15,080	9	0	0	0	0	36	0	0	LOW	--	NLF	P
100901020505	Tongue River-Bringoff Creek	33,093	7	0	0	1,090	0	31	0	0	LOW	--	--	--
100902070209	Fire Creek	17,365	2	0	0	0	0	40	0	0	LOW	--	--	--
SUM		1,008,934	NA	93	9,332	152,924	736	3,228	981	31	H-12 M-16 L-12	NA	NA	NA

[1] TMDL listed stream or tributary to.

* Fisheries Resources: ER - Exotic Recreational Species, NNS - Native Nonsensitive Species.

** Sensitive Amphibians Species: GPT - Great Plains Toad, NLF - Northern Leopard Frog, PSF- Plains Spadefoot.

*** Macroinvertebrate sites: R - Sites with rare taxa, P- Sites with potential to recover to biologically intact condition (Stagliano et al. 2006).

3.4.1.5 Environmental Consequences – Fisheries and Aquatic

Effects Common to All Action Alternatives – Fisheries and Aquatics

Direct Effects
Direct effects are those resulting in the direct mortality of fish or amphibians, or the destruction of fish or amphibian habitat. Direct effects occur at the same time and place as the proposed activity. Relative to transportation systems, only the installation, reconstruction or removal of stream crossing structures, and route construction or decommissioning could result in direct effects to fish and amphibians. The proposed actions in the project area do not include any route related construction activities that would result in direct effects to aquatic habitats or biota. Therefore, no direct effects are evaluated in this analysis.

Indirect Effects
Indirect effects occur at a later time or distance from the proposed action. Indirect effects are those resulting in changes to fish and amphibian habitat, individuals, or populations as a result of changes in the aquatic environment. Detrimental effects to aquatic species could result from increased sediment levels entering stream channels, wetlands, springs or impoundments, changes in streambank stability due to near-bank activities, and modification in water temperature regimes induced by a reduction in riparian vegetation.

Routes with proposed actions are evaluated for indirect effects to fisheries and amphibians. A summary of route related actions and the potential for these actions to reduce or not reduce the risk of impacting water quality can be found in the Water Quality Section, *Related Route Risk By Action* (Table 3-25). In general terms, the only actions that would tend to increase risk are designating non-system roads or trails (routes) for public or administrative motorized use. These actions, when compared to the No Action Alternative, add additional route miles to the landscape, and do not reduce the risk of indirect and cumulative effects to aquatic ecosystems. However, these routes already exist on the landscape and are currently available for public use. Therefore, there would be no change in risk when comparing non-system route designation actions to the existing condition. All other proposed actions would tend to decrease risk or not change risk for comparisons to both the No Action Alternative and the existing condition. Decreased risk actions include: 1) converting system roads to administrative use, and 2) not designating system and non-system routes.

Effects by Alternative – Fisheries and Aquatics
Indirect effects to fisheries resources, sensitive amphibians, and macroinvertebrate communities for moderate and high risk watersheds are displayed in Table 3-30. Low risk watersheds are not evaluated for indirect effects to aquatic resources because they either do not contain perennial streams, or roads on National Forest System land, or both.

Alternative A - Indirect Effects
Fifteen of the 19 fisheries resource, sensitive amphibian, and macroinvertebrate watersheds (referred to hereafter as *aquatic resource watersheds*) have a net increase in risk under Alternative A (Table 3-30). The increased risk to aquatic resource watersheds is attributed to the addition of 84 miles of non-system roads to the transportation system and only 36 miles of route related actions that reduce risk. Therefore, there is a net increase in risk of 48 miles under Alternative A.

Table 3-30. Summary of Route Miles by Risk for Moderate and High Risk Watersheds and for Fisheries Resource, Sensitive Amphibian, and Macroinvertebrate Watersheds When Compared to the No Action Alternative

Watershed	Alternative A		Alternative B		Alternative B Modified	
	Increase Risk	Decrease Risk	Increase Risk	Decrease Risk	Increase Risk	Decrease Risk
Ash Creek	0.1	0.4	0.0	0.4	0.0	0.7
Bloom Creek[A]	9.2	1.3	5.2	7.6	5.2	8.9
East Fork Hanging Women Creek[A,M]	7.0	0.0	1.8	7.3	1.8	11.1
East Fork Otter Creek[A]	3.5	8.7	1.6	17.6	1.6	17.2
Elk Creek[A]	3.8	2.7	0.2	7.6	0.2	7.6
Fifteenmile Creek[A]	2.4	0.8	0.4	4.7	1.4	4.7
Home Creek[A]	9.5	3.8	4.8	9.7	4.8	8.2
Indian Creek	4.0	3.1	2.4	5.9	2.4	7.7
Lee Creek[A]	2.9	3.7	0.6	11.4	0.0	11.4
Little Bear Creek[A]	1.4	0.1	0.8	0.1	0.8	0.3
Lower Bear Creek[A,F,M]	2.3	0.0	1.5	4.8	1.5	4.8
Lower Hanging Women Creek[1]	1.4	0.4	1.0	2.4	1.0	2.4
Lower Little Pumpkin Creek	0.8	1.2	0.8	2.3	0.8	1.2
Lyon Creek[A]	8.9	1.9	3.5	1.9	3.5	2.6
Middle Beaver Creek[A]	0.2	3.0	0.0	12.6	0.0	7.7
O'Dell Creek[A,F,M]	3.4	3.0	0.9	12.1	1.1	12.0
Otter Creek-Brian Creek[A,F,M]	2.6	3.3	1.8	9.7	1.8	10.2
Otter Creek-Horse Creek[A,F,M]	5.2	0.2	0.0	9.5	0.2	9.3
Otter Creek-Newell Creek	0.0	0.0	0.0	0.0	0.0	0.0
Poker Jim Creek[A,F]	0.1	0.0	0.1	1.6	0.1	9.6
Powder River-Plum Creek[A]	2.8	1.7	0.0	4.3	0.0	4.3
Taylor Creek[A,F,M]	9.1	1.5	4.3	6.7	4.3	8.8
Tenmile Creek[A]	2.7	0.3	1.8	2.6	1.8	2.6
Threemile Creek[A]	7.0	0.0	3.3	0.1	6.1	3.3
Tongue River-Double E Creek	0.0	2.9	0.0	2.9	0.0	2.9
Tongue River-King Creek	1.1	0.0	0.0	0.3	0.0	2.2
Tongue River-Poker Teechee Creek	0.4	2.9	0.3	2.9	0.3	2.5
Upper Beaver Creek	4.7	0.0	0.5	8.2	2.9	3.3
Total Miles by Action Risk	**96.5**	**46.9**	**37.6**	**157.3**	**43.5**	**167.6**
Total Miles For Aquatic Resource Watersheds (Fisheries, Sensitive Amphibian, and Macroinvertebrate Combined)	**84**	**36**	**32.6**	**131.9**	**36.2**	**144.6**

[A] Sensitive Amphibian Watershed
[F] Fisheries Resource Watershed
[M] Macroinvertebrate Watershed

Alternative B - Indirect Effects

Alternative B proposes actions that result in a net decrease in risk in 16 of the 19 moderate and high risk aquatic resource watersheds (Table 3-30). The net decreased risk is attributed to 131.9 miles of route related actions that reduce risk and 32.6 miles that increase risk. The 3 aquatic resource

watersheds that have a net increase in risk include the Little Bear Creek, Lyon Creek, and Threemile Creek watersheds. All of these 3 watersheds harbor sensitive amphibian species. However, the net increased risk of 5.5 total miles for these watersheds is associated with 3.6 miles of actions that designate non-system routes to administrative use, and 1.9 miles related to designating non-system routes to public use routes. Therefore, although these routes will remain on the landscape, 3.6 miles will receive low levels of use and their designation should have negligible to nonexistent indirect effects to sensitive amphibian species. The designation of 1.9 miles of non-system routes to public use routes would occur in two moderate risk aquatic resource watersheds (Lyons Creek and Threemile Creek).

Alternative B Modified - Indirect Effects

Alternative B Modified proposes actions that result in a net decrease in risk in 16 of the 19 moderate and high risk aquatic resource watersheds (Table 3-30). The net decreased risk is attributed to 144.6 miles of route related actions that reduce risk and 36.2 miles that increase risk. The 3 aquatic resource watersheds that have a net increase in risk include the Little Bear Creek, Lyon Creek, and Threemile Creek watersheds. All of these 3 watersheds harbor sensitive amphibian species. However, the net increased risk of 4.2 total miles for these watersheds is associated with 2.3 miles of actions that designate non-system routes to administrative use, and 1.9 miles related to designating non-system routes to public use routes. Therefore, although these routes will remain on the landscape, 2.6 miles will receive low levels of use and their designation should have negligible to nonexistent indirect effects to sensitive amphibian species. The designation of 1.9 miles of non-system routes to public use routes would occur in two moderate risk aquatic resource watersheds (Lyons Creek and Threemile Creek).

No Action Alternative

See discussion of No Action Alternative below in ***Cumulative Effects*** sections.

Cumulative Effects

Cumulative effects are defined as "the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (CFR 40 1508.7). Past, present, and reasonably foreseeable events and activities that have and will likely continue to incrementally impact aquatic species and their habitats, in the 40 watersheds (on and off CNF) of the project area, include: wildfire/prescribed fire, mining, grazing, timber harvest, transportation networks**,** and recreation (camping, fishing, hunting, etc.).

Effects Determination by Alternative

No Federally listed threatened or endangered fish or amphibian species, designated critical habitat, fish or amphibian species proposed for Federal listing, or proposed critical habitat occur in the project area. Forest Service sensitive fish and amphibian species considered in this analysis include the Northern Redbelly Dace, Sturgeon Chub, Great Plains Toad, Northern Leopard Frog, and Plains Spadefoot. The following table summarizes the potential effects to aquatic species in the project area.

Table 3-31. Determination of potential impacts to sensitive fish and amphibian species, recreational fisheries, and macroinvertebrate communities

Aquatic Species Determination [15]				
Alternative	**Alternative A**	**Alternative B**	**Alternative B Modified**	**No Action Alternative**
Northern Redbelly Dace *Phoxinus eos*	NI	NI	NI	NI
Sturgeon Chub *Macrhybopsis gelida*	NI	NI	NI	NI
Great Plains Toad *Bufo cognatus*	NI	NI	NI	NI
Northern Leopard Frog *Rana pipiens*	MIIH	BI	BI	MIIH
Plains Spadefoot *Spea bombifron*	MIIH	BI	BI	MIIH
Recreational Fish Species	MIIH	BI	BI	MIIH
Macroinvertebrate Communities	MIIH	BI	BI	MIIH

Cumulative Effects - Effects of All Routes Including Those Without Proposed Actions

Existing condition allows for motorized use of all routes on the Forest landscape unless signed otherwise, including system and non-system routes. Therefore, if the existing condition were to continue into the foreseeable future there would be no reduction in risk to aquatic species and habitat, and any existing impacts and risks in the 19 aquatic resource occupied watersheds (Table 3-29) would be expected to continue until route maintenance occurred. All alternatives, including the No Action Alternative, include routes without proposed actions. Under the action alternatives, actions would occur by default for these routes, whereby some system routes would be designated and some non-system routes would not be designated without further action. When these default actions are compared against the existing condition there is a marked difference among the action alternatives in the percent decrease in cumulative risk to water quality and consequently to aquatic biota and their habitat. Alternative B Modified has a 36% decrease in risk to water quality in relation to existing condition, while Alternative A would have a 12% decrease, Alternative B a 37% decrease and the No Action Alternative an 18% decrease (Table 3-28, Water Quality Section).

Action Alternatives

The cumulative effects of the individual action alternatives (A, B, and B Modified) when combined with past activities and natural processes, would result in minimal negative impacts to aquatic biota, including sensitive aquatic species, and their habitats throughout the project area. However, Alternative B Modified provides greater protection for aquatic resources than Alternatives A and B (net decrease in risk of 108.4 miles versus net decreases of 48 and 99.3 miles; Table 3-30), and all action alternatives designate substantially less miles than the No Action Alternative.

No Action Alternative

[15] **NI** = No Impact; **MIIH =** May Impact Individuals or Habitat but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species; **WIFV** = Likely to result in a trend to Federal listing or loss of viability; and **BI** = Beneficial impact.

Nineteen of 28 moderate and high risk watersheds and 3 of the 12 low risk watersheds on the Ashland District harbor fisheries, sensitive amphibians, or macroinvertebrate resources (Table 3-29). The No Action Alternative designates the most system routes within these watersheds without any additional actions to reduce risk to aquatic resources (736.6 miles; Table 3-28 Water Quality Section). Sedimentation produced from these additional routes would potentially impact aquatic habitat and species across the District.

Effects Common to All Alternatives at the Watersheds Scale

The cumulative effects of the individual alternatives when combined with past activities and natural processes would result in negligible negative impacts to aquatic biota, including sensitive aquatic species, and their habitats throughout the project area.

At the watershed scale, proposed actions are not considered to be substantial enough to cause measurable changes in water quality, quantity or channel processes under any action alternative. Consequently, cumulative effects to aquatic species and their habitats are not anticipated to result from any of the action alternatives. However, various actions proposed under the action alternatives have the potential to reduce or not reduce the risk of impacts to aquatic habitats and species. Alternatives B and B Modified include the most route mile actions that would result in beneficial impacts (reduce risk) to aquatic systems.

3.4.1.6 Conclusion - Fisheries and Aquatics

Proposed actions with site specific effects that potentially increase risk of adverse impacts to aquatic habitat and species are negligible under Alternatives B and B Modified. Compliance relative to the Record of Decision for this DEIS, only pertains to those routes with proposed actions. Under Alternatives B and B Modified, actions related to moderate and high risk routes are expected to benefit or maintain aquatic habitats, and fish and amphibian species. Only minimal indirect effects to sensitive aquatic species are anticipated under Alternative A. Therefore, the Ashland District is anticipated to move towards compliance with Forest Plan standards and state and federal water quality regulations under any action alternative. However, Alternatives B and B Modified initiate the most rapid rate of recovery and compliance should be achieved in the shortest timeframe under these alternatives. Alternative B Modified provides greater protection for aquatic resources than Alternative B (net decrease in risk of 108.4 miles versus a net decrease of 99.3 miles; Table 3-30).

Appendix D includes opportunities to reduce impacts to water quality, aquatic habitat and biota where there are: 1) site specific impacts from existing routes not associated with the proposed action, and 2) proposed actions with potential to improve conditions but do not eliminate impacts. However, construction, reconstruction, maintenance and decommissioning proposals will require future and separate NEPA decisions.

Relative to sensitive fish and amphibian species, none of the alternatives are likely to result in a trend towards Federal listing or loss of viability. The following table summarizes the effects determinations for sensitive aquatic species and aquatic species of concern.

Table 3-32. Fisheries and Aquatics Effects Summary

Indicator	Alternative A	Alternative B	Alternative B Modified	No Action
Sensitive Fish and Amphibian Species				
Number of Species with No Impact or Beneficial Impacts	3	5	5	3
Number of Species with potential to effect individuals or Habitat but will not Likely Contribute to a trend towards Federal Listing or Loss of Viability to the Population or Species	2	0	0	2
Number of Species likely to result in a trend to Federal listing or loss of viability	0	0	0	0
Recreational Fish Species				
Alternatives with No Impact or Beneficial Impact	No	Yes	Yes	No
Alternatives with potential to effect individuals or Habitat but will not Likely Contribute to a Loss of Viability to the Population or Species	Yes	No	No	Yes
Rare Macroinvertebrate Populations				
Alternatives with No Impact or Beneficial Impact	No	Yes	Yes	No
Alternatives with potential to effect individuals or Habitat but will not Likely Contribute to a Loss of Viability to the Population or Species	Yes	No	No	Yes

3.4.2 SOILS

Overview of Changes from the Draft to the Final EIS

- Additional narrative to clarify analysis results and address comments received on the DEIS.
- Analysis of Alternative B Modified.

Introduction

Adding routes to the system and designating motorized uses on roads and trails could increase soil compaction and soil erosion leading to a decrease in soil productivity, and soil quality.

3.4.2.1 Affected Environment – Soils

The project area is located in southeast Montana on the Ashland Ranger District. The Ashland Ranger District is part of the Powder River Basin Section of the Great Plains-Palouse Dry Steppe Province. The area includes gently rolling to steep dissected plains on the Missouri Plateau. There are some steep, flat topped buttes, badland like topography, and eroded escarpments. The Soil Survey of Powder River Area, Montana (USDA SCS, 1971) was used to determine erosion hazards ratings, suitability of the landscape for natural surfaced roads, and describe landforms for the Ashland District. Soil survey information can be downloaded from the soil data mart on the World Wide Web at http://soildatamart.nrcs.usda.gov/. (Montana soil survey information is also available at (http://nris.state.mt.us/nrcs/soils/datapage.html or http://www.mt.nrcs.usda.gov/soils/mtsoils/official.html). Soil survey information reports can also be accessed directly from the web using Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/).

Erosion risk ratings are provided from the county soil survey data. They are estimates of the potential for erosion after soil disturbance and are based on the inherent soil resistance to erosion and the erosive forces acting upon them. Slight hazard implies little to no potential for erosion; moderate hazard indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion control measures are needed; and a severe hazard implies that considerable erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion control measures are needed. Of the current Forest Service routes approximately 1% is classified in the slight hazard rating, 34% in moderate, 65% in severe, and a trace has not been rated.

The ratings for the suitability for natural surface roads interpretation indicate the suitability for using the natural surface of the soil for roads. The ratings are based on slope, rock fragments on the surface, plasticity index, content of sand,, the Unified classification of the soil, depth to a water table, ponding, flooding, and the hazard of soil slippage. The soils are described as well suited, moderately suited, or poorly suited to this use. Well suited indicates the soil has features that are favorable for the specified kind of roads and has no limitations. Good performance can be expected, and little or no maintenance is needed. Moderately suited indicates the soil has features that are moderately favorable for the specified kind of roads. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. Poorly suited indicate the soil has one or more properties that are unfavorable for the specified kind of roads. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. Of the current Forest Service routes only a trace is classified as well suited for using the natural surface of the soil for roads, approximately 43% are moderately suited, 57% are poorly suited and a trace has not been rated.

Not rated is used for those map units that do not have soil components that can be rated for the particular use. For example, rock outcrop would be not rated.

Soil map units may contain one or more ratings based on soil components of the map unit. Since the locations of the different components are not mapped, the map unit ratings depict the most severe rating for the soils within the map unit. For example, if one soil component has a moderate rating while another soil component in the same map unit has a slight rating, the map unit was given a moderate rating. In some map units the most severe or limiting rating may comprise the lowest percentage of the map unit. For example in the Powder River Soil Survey, the Ringling-Relan association, 6 to 25 percent slopes, map unit Ru, is rated as having severe erosion hazard, but only 45% of the map unit actually has that rating, while 55% of the unit may have a more favorable rating. These ratings do not mean that management (i.e. roads and trails) should not occur or exist on soils with a specific rating but rather what types of mitigation and management are needed to minimize the impact, and are used as a comparison in the analysis of effects.

The interpretations for the suitability for natural surface roads and trails are very similar to the erosion hazard rating. Information for both are displayed in the tables but discussion will focus on the erosion hazard, as that has the most direct effect on soil productivity. Data presented show the miles of roads and trails in soil map units that have at least one soil component that has a specific hazard rating, and depicts the most limiting rating for the soil map unit. These interpretations are a guide to how soils identified in these map units might respond to management. In most cases, on site investigation is needed to accurately identify soils and hazard ratings. It is highly likely that the miles of routes on high erosion hazard soils is less than that identified.

Regulatory Framework

Forest and Rangeland Renewable Resource Planning Act of 1974 and National Forest Management Act of 1976

In response to requirements set forth in these two Acts, final rules on National Forest System Land and Resource Management Planning established specific minimum management requirements to be met in accomplishing the goals and objectives for National Forest System lands. These requirements were intended to guide the development, analysis, approval, implementation, monitoring, and evaluation of forest plans. Requirements specific to soils are found in 36 CFR 219.27, volume 47, #190, 09/30/82 (Federal Register 1982) as follows:

> (a) Resource protection. All management prescriptions shall:
>
> (1) Conserve soil and water resources and not allow significant or permanent impairment of the productivity of the land;
>
> (2) Consistent with the relative resource values involved, minimize serious or long-lasting hazards from flood, wind, wildfire, erosion.
>
> (f) Soil and Water Conservation.
>
> Conservation of soil and water resources involves the analysis, protection, enhancement, treatment, and evaluation of soil and water resources and their responses under management and shall be guided by instructions in official technical handbooks. These handbooks must show specific ways to avoid or mitigate damage, and maintain or enhance productivity on specific sites. These handbooks may be regional in scope or, where feasible, specific to physiographic or climatic provinces.

Multiple Use Sustained Yield Act of 1960

It is the policy of the Congress that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes (16 USC 2 (I); Sec 528). The terms multiple use and sustained yield are defined as:

> Multiple use: The management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.
>
> Sustained yield: The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the national forests without impairment of the productivity of the land.

Regional Direction

The most recent soil quality standards were adopted by the Northern Region Regional Office effective November 12, 1999. (Forest Service Manual (FSM) 2500 - WATERSHED AND AIR

MANAGEMENT, R-1 SUPPLEMENT 2500-99-1). The objectives are: To meet direction in the National Forest Management Act of 1976 and other legal mandates. To manage National Forest System lands under ecosystem management principles without permanent impairment of land productivity and to maintain or improve soil quality.

Custer National Forest Land and Resources Management Plan

Management goals for soil, water and riparian resources are identified in the Forest Plan under Chapter II - Forest Wide Management Direction and Chapter III – Management Area Direction.

The Forest Plan goal for watershed management is to:

> "[E]nsure that soil productivity is maintained and that water quality is maintained at a level which meets or exceeds state water quality standards." (page 4)

Forest Plan objectives for soil and water resources are:

> "National Forest System lands will be managed so that the soil and watershed conditions are in a desirable condition and will remain in that condition for the foreseeable future. Soil and water quality objectives are designed to assure that these resources meet State water quality objectives and BMP's (Best Management Practices) are incorporated to assure this." (page 5)

Soil Productivity

The Region 1 soil quality standards apply to lands where vegetation and water resource management are the principal objectives, that is, timber sales, grazing pastures or allotments, wildlife habitat, and riparian areas (USDA Forest Service, 1999). Roads and trails are a "dedicated use" for lands that comprise the road prism and right of way. The affected land is managed for transportation uses and is not managed for vegetation production or water resources. Therefore, the R1 soil quality standards do not apply to this analysis. However, the decision made in this project will affect the amount of land in productive capability. By adding routes to the system and designating or not designating a route for specific use might have an impact on other projects and that project's ability to meet Regional policy regarding soil quality.

Roads and trails do have an impact on soil productivity, especially when users veer off the established travelway to bypass wet or muddy sections of the road or trail, bypass switchbacks, and create shortcuts. User created routes eliminates the protective vegetative cover, compacts the exposed soil surface, generates and concentrates runoff, and causes accelerated soil erosion.

Some impacts to soils and soil productivity are normally accepted as a necessary cost to provide access to public lands, as long as most impacts are limited to the immediate area of disturbance, the road or trail can be maintained at a reasonable cost, and permits use as long as it's needed. Implementing Best Management Practices (BMPs) are intended to meet these objectives. There are some unclassified roads and trails that are not on the transportation system, as well as those that are on the system that are causing soil impacts beyond what is normally accepted because they fail to meet the standards of BMPs. Some of the reasons they may not meet standards is they are improperly located, do not have adequate drainage to prevent accelerated erosion and deposition, and are difficult to maintain for long term use. Often this leads to pioneering new routes or trails to get around sections that are difficult to traverse. This leads to more soil that is exposed, compacted, and eroded. The end result is an increasing amount of soil disturbance and associated impacts, both to the road and off-site.

Soil Crusts

Information on distribution and extent of soil crusts in the area is generally lacking. There are no references to soil crusts in the Soil Survey of the project area. Soil crusts are commonly found in more arid regions where vegetative cover is generally sparse, typically in semiarid and arid environments throughout the world. Areas in the United States where crusts are a prominent feature of the landscape include the Great Basin, Colorado Plateau, Sonoran Desert, and the inner Columbia Basin. (http://www.soilcrust.org/crust101.htm). Because of the environmental factors soil crusts are probably very limited in the Ashland Ranger District.

Soil crusts most likely do not occur on existing roads and trails due to type and level of existing disturbance. Off-road travel by motor vehicle is currently prohibited except for dispersed camping within 300 feet of the road. The majority of dispersed campsites currently have some level of disturbance; soil crusts are probably not very prevalent in these areas. These dispersed campsites are most likely not located in the drier open areas in the area but are more generally found in areas with higher vegetative cover, some shade, and at higher elevations. (Also, see the section on vegetation for additional discussion on dispersed campsite availability.) Generally, soil crusts will not be affected by designating roads and trails, since no new construction is being considered at this time.

3.4.2.2 Environmental Consequences - Soils

Direct and Indirect Effects

Effects Common to All Alternatives

Soil effects resulting from development and use of forest roads and trails have been fairly well documented (Gucinski, et al, 2001, Wilson and Seney, 1994, Weaver and Dale, 1978). Effects from roads and trails can vary by standard and condition.

Soil effects from roads and trails include removal of vegetative cover, compaction, degradation of soil structure, decreased infiltration and water holding capacity, reduction in soil organic material, accelerated erosion, and potential mass failure including landslides or slumps. These types of impacts can occur on motorized or non-motorized roads and trails. Erosion tends to be least on roads and trails with flat grades and more severe on roads and trails with steeper gradients.

Soil crusts probably do exist in the project area though the extent and distribution are not well known. There might be impacts to soil crusts mainly due to off-trail travel. Off-trail travel by stock, foot, and motorized travel could have a negative impact on soil crusts where they exist.

For roads identified as Administrative use only the less use they get the more vegetation will become established and potential erosion reduced. Some roads may be used consistently throughout the year while others may be used periodically, or maybe not at all some years. This should lead to an overall reduction in potential erosion and sediment generation from these roads.

Effects Common to All Action Alternatives

Effects on soils from roads vary by standard and condition. The area that roads and their associated disturbance occupy is removed from the productive soil base. Runoff from roads affects soil productivity by eroding soil from and adjacent to the road, and by depositing sediment on areas below

the road. These effects are slight on well maintained, high standard roads. Other roads have more serious effects that tend to be localized on road segments where surface drainage is inadequate.

Routes that are not designated for public motorized use and for which no administrative use has been identified may be considered candidates for decommissioning or rehabilitation. These routes, with the exclusion of motorized traffic, should begin to revegetate and over time, continue to have improved soil productivity and eventually be brought back to the productive soil base.

Roads and trails impact and disrupt the natural function of the soil resource, and are long-term commitments to that specific use. This is considered an irretrievable commitment of the soil resource for as long as the road or trail exists. Soil function and productivity on roads and trails can be recovered and the Forest Service has considerable experience in rehabilitating old roads with fairly successful results (Kolka and Smidt, 2004).

An indirect effect from the action alternatives would take place as roads and trails identified as system routes (including conversion from non-system routes) are reconstructed, relocated, or maintained to meet standards and incorporate BMPs, which would reduce soil effects from these roads and trails.

Comparisons of erosion hazard ratings by alternative are found in the following table.

Table 3-33. Miles[16] of Routes by Erosion Hazard Rating and Designation for Each Alternative

Road Erosion Hazard Rating	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
Administrative Use				
Slight	0	1	1	0
Moderate	31	49	48	20
Severe	61	124	110	39
Subtotal	92	174	159	59
Not Designated				
Slight	0	2	2	1
Moderate	17	54	52	41
Severe	24	109	107	104
Subtotal	41	165	161	146
Public Motorized Use				
Slight	6	4	4	5
Moderate	252	196	204	239
Severe	469	338	354	428
Subtotal	742	539	562	672

Alternative A

Direct Effects

This alternative would have the greatest impact on soils for the action alternatives. This alternative would add approximately 22 miles of routes for administrative use and 41 miles of routes for public motorized use on landforms with severe erosion hazard compared to the No Action Alternative. This includes adding routes to the system and changes in designation.

[16] Small differences in mileage figures between this and other tables are due to GIS analysis and rounding errors.

This alternative would prohibit motorized travel on 41 miles of routes (24 miles on landforms with severe erosion hazard, see table above), allowing vegetation to reestablish. This would reduce erosion and concentrated runoff from these sites. These areas would eventually be returned to productive capability.

This alternative would add 123 miles of non-system roads and trails to the Forest transportation system. Of this, 89 miles (86 miles Public use and 3 miles Administrative use) would be on landscapes that have a severe erosion hazard rating

Indirect Effects
Off-site deposition of eroded material, soil erosion from roads and trails, and concentrated runoff would be reduced over time as more of the road and trail system is revegetated or is brought up to standard and BMPs are implemented.

Alternative B

Direct Effects
This alternative would add 85 miles of routes for administrative use and decrease by 90 miles the routes available for public motorized use on landforms with severe erosion hazard compared to the No Action Alternative. This includes adding routes to the system and changes in designation.

This alternative would prohibit motorized travel on 165 miles of routes (109 miles on landscapes with severe erosion hazard, see above table), allowing vegetation to reestablish. This would reduce erosion and concentrated runoff from these sites.

There are approximately 55 miles of non-system roads and trails being added to the transportation system. Of this, 42 miles (12 miles Public use and 30 miles Administrative use) would be on landscapes that have a severe erosion hazard rating.

Indirect Effects
Off-site deposition of eroded material, soil erosion from roads and trails, and concentrated runoff would be reduced over time as more of the road and trail system is revegetated or is brought up to standard and BMPs are implemented.

Alternative B Modified

Direct Effects
This alternative would add 71 miles of routes for administrative use and decrease by 74 miles the routes available for public motorized use on landforms with severe erosion hazard compared to the No Action Alternative. This includes adding routes to the system, changes in designation, and addressing the undetermined routes.

This alternative would prohibit motorized travel on 161 miles of routes (107 miles on landscapes with severe erosion hazard, see above table), allowing vegetation to reestablish. This would reduce erosion and concentrated runoff from these sites.

There are approximately 64 miles of non-system roads and trails being added to the transportation system. Of this, 47 miles (18 miles Public use and 29 miles Administrative use) would be on landscapes that have a severe erosion hazard rating.

Indirect Effects
Off-site deposition of eroded material, soil erosion from roads and trails, and concentrated runoff would be reduced over time as more of the road and trail system is revegetated or is brought up to standard and BMPs are implemented.

No Action Alternative

Direct Effects
This alternative only includes those routes that are currently in the transportation system. There are 672 miles of routes that would be available for public use. There are approximately 146 miles of non-system roads that would not be designated and would be available for rehabilitation and return of natural vegetation and eventually be returned to the productive land base. Concentrated runoff and erosion would be reduced from these sites.

Existing low standard roads and trails would continue to erode and concentrate runoff and erosion at present rates. Existing sites where soil erosion is a concern will continue to erode and contribute sediment, especially where public use occurs. The area of soil productivity effects would continue to expand as new trail segments are developed to get around areas that are eroded.

Indirect Effects
Off-site deposition of eroded material, soil erosion from roads and trails, and concentrated runoff would be reduced over time as more of the road and trail system is revegetated or is brought up to standard and BMPs are implemented.

Cumulative Effects
Cumulative effects occur when past present or foreseeable activities overlap in both time and space with the proposed activities. Thus, cumulative effects are limited to the areas where the proposed activities would occur. In other words, cumulative effects would occur only where proposed activities would occur where previous management has affected soil conditions. Activities outside of the locations of proposed management are not subject to cumulative effects because they do not overlap spatially with the lands being proposed for management in the Ashland Ranger District Travel Management Project. Soil effects do not extend off of the piece of ground where they occur.

Cumulative effects consist of the impacts from all past, present, future and proposed activities that overlap in time and space with the proposed project.

Past, Present, and Reasonably Foreseeable Activities
The current vegetative treatment and mining activities that do occur in the analysis area incorporate BMPs and produce relatively few soil impacts relating to roads and trails. There is a possibility that new roads will be constructed and added to the system in the future. These could be designated for public use or for administrative use only. If these roads were to be added to the transportation system, it would increase the compaction and potential runoff and erosion for the specific road. The location and analysis of the proposed roads would be determined based on site specific analysis to reduce the

potential impacts on soils. Timber sales are audited for compliance with BMPs and are monitored to see that design features that reduce soil effects are implemented.

The continuation of livestock grazing activities will overlap with the proposed action in both time and space. They could potentially contribute to the effects. A possibility exists that new roads will be constructed and/or added to the transportation system in the future. This might occur if new range infrastructure is identified as a need for continued management. These could be designated for public use or for Administrative Use only. If these roads were to be added to the transportation system, it would increase the compaction and potential runoff and erosion for the specific road. The location and analysis of the proposed roads would be determined based on site specific analysis to reduce the potential impacts on soils. Another impact might occur if livestock grazing occurs where vegetation is beginning to reestablish, either naturally or through reclamation activities, on routes that are not designated. Continued grazing might reduce the vegetative cover, slowing reclamation.

The decision made in this project will affect the amount of land committed to a dedicated use. By adding routes to the system or designating/not designating a route for specific use, this project might have an impact on other projects and that project's ability to meet Regional policy regarding soil quality.

3.4.2.3 Conclusion - Soils

Roads and trails impact and disrupt the natural function of the soil resource, and are long-term commitments to that specific use. Routes not designated for public motorized use will begin to revegetate and improve soil productivity.

Alternative A would provide the greatest number of miles of routes available for public use and the least number of miles of routes to return to productive capability over time.

Alternative B and Alternative B Modified would provide an intermediate number of miles for public motorized use compared to Alternatives A and No Action. Alternative B and Alternative B Modified would have fewer miles of routes available to the public for motorized use on landforms with high erosion hazard compared to Alternative A and the No Action Alternative, though more miles of roads would be designated for administrative use. Alternative B Modified would decrease the miles of roads and trails, designated for public motorized use, on soils that have severe erosion rating by 73 miles compared to the No Action Alternative and by 59 miles the miles of roads on soils rated as poorly suitable for Natural Surface Roads and Trails. Alternative B would decrease the miles of roads and trails, designated for Public use, on soils that have severe erosion rating by 90 miles compared to the No Action Alternative and by 76 miles the miles of roads on soils rated as poorly suitable for Natural Surface Roads and Trails.

Alternative A would increase by 40 miles the roads and trails, for public motorized use, on soils having severe erosion hazard compared to the No Action Alternative.

Soil crusts most likely do not occur on existing roads and trails due to type and level of existing disturbance. Generally, soil crusts will not be affected by designating roads and trails, since no new construction is being considered at this time.

Consistency with Laws, Regulation, and Policy
All Forest Plan management direction would be met by the proposed action.

3.4.3 VEGETATION

Overview of Changes from the Draft to the Final EIS
- Minor editing changes and the addition of analysis for Alternative B Modified.

Introduction
Analysis of associated travel disturbances on vegetation, weed spread, and sensitive plants are addressed under the general heading of Vegetation.

3.4.3.1 Affected Environment – Vegetation

Introduction
There is a concern that designation of travel routes allows for disturbance of native vegetation by vehicles, camping, hiking, mountain biking, and pack and saddle stock. Vegetation has various abilities to recover from disturbance depending upon frequency, duration, and timing of disturbance and species ability to resist disturbance.

Regulatory Framework
36 CFR 219.20 outlines direction regarding ecological sustainability. Plans should provide for maintenance or restoration of ecosystems at appropriate spatial and temporal scales determined by the responsible official. The spatial scale for this analysis is the project area and the temporal scale is the planning horizon of the decision resulting from this analysis, identified as ten years.

Overview-Vegetation
Vegetation of the Ashland Ranger District is floristically rich and diverse. The diversity is composed of many community types including ponderosa pine (5), aspen (1), green ash woodland (3), cottonwood (6), Rocky Mountain juniper (1), silver sage shrubland (1), big sage shrubland (4), skunkbush sumac shrubland (2), buffaloberry (1), western snowberry (1), horizontal juniper (1), grasslands (22), and herbaceous riparian (19). About half of the District is forested with ponderosa pine and half is grasslands/shrublands. About 30% of the District's vegetation has been affected by wildfires.

Factors Influencing Area Impacted and Severity of Impact
The overall impact of a travel use on vegetation is a function of both the area impacted and the severity of impact within the disturbed area. Within the scope of this analysis, travel related impacts to vegetation include disturbances from camping and vehicle use. Factors that influence the severity of vegetation impact include duration and frequency of use, vegetation resistance and resilience, and season of use.

Duration and Frequency of Use
It is recognized that impacts might occur anywhere along designated travel routes. However, there is a higher probability of more severe vegetation impacts in areas where people tend to frequent repeatedly. These areas are typically near water, vistas, shade, and other areas on gentle terrain

suitable for camping (usually 0 to 4% slopes). Sites that are used infrequently and sites that are capable of resisting deterioration will usually be less impacted than those that are used frequently and those that are readily disturbed. For example, in long-established campsites, the magnitude of vegetation impact is determined as much by the ability of vegetation to recover from disturbance as by the ability to resist disturbance.

Resistance and Resilience

Aspects of vulnerability of vegetation having impacts and ability to recover include attributes of resistance and resilience. Resistance refers to the ability of vegetation to resist change when trampled. Resilience refers to the ability of vegetation to recover following the cessation of trampling and tolerate a cycle of disturbance and recovery.

Resistant vegetation types, such as sedges, are able to absorb 25 to 30 times as much trampling as the least resistant type, such as ferns (Cole 1993b). Plant characteristics, notably the position of the plants' perennating bud and physiological characteristics such as reproductive capacity and growth rates, also influence resilience (Cole 1995a,b,c). Morphological characteristics are primary factor influencing plant resistance to trampling. Grasses and sedges have flexible stems growing in mats or tufts. More fragile are woody plants and taller herbs. Complete loss of vegetation cover occurs quickly in shady forested areas, less quickly in open areas with resistant grassy vegetation (Leung & Marion, 1996). The resilience of plants, their ability to recover following trampling disturbance, varies substantially by habitat, with higher recovery in the most productive environments such as those with higher soil fertility and moisture. For example, recovery rates are high in riparian and grassland areas.

Recovery in forested systems is typically moderate to high. In contrast, trampling impacts in less resilient environments, such as arid environments, require a long time to recover (Leung & Marion, 1996).

Effects Analysis Methodology-Vegetation

General potential effects to vegetation are based on literature reviews. Geographical Information System (GIS) methods were used to assess the magnitude of area potentially impacted and potential risk categories based on various elements of frequency and duration of trampling, and vegetation resistance and resilience.

Duration and Frequency of Use

Potential Infrequent Use Areas – Potential Use Corridors

Impacts might occur within each Alternative's potential impact corridor along designated travel routes. Sites that are used infrequently and sites that are capable of resisting deterioration will usually be less impacted than those that are used frequently and readily disturbed

The following buffers from designated routes were used to describe the Potential Use Corridor by Alternative. For designated motorized routes with an allowance for dispersed vehicle camping access, a 300 foot buffer was applied all alternativesIt is recognized that not all estimated acreage will be affected and therefore results will be on the conservative side.

Potential Frequent Use Areas – 0 to 4% Slopes
There is a higher probability for more severe vegetation impacts in areas where people tend to visit repeatedly or with longer duration of use. These areas are typically near water, vistas, shade, and other areas on gentle terrain suitable for camping (usually 0 to 4% slopes).

Zero to 4% slopes were used to represent potential frequent use areas, found within each Alternative's potential use corridors, and are intersected with elements outlined in the resistance and resilience section below. The 0 to 4% slope class was used because people tend to concentrate for longer durations of use at campsites or areas in gentle terrain. It is recognized that not all estimated acreage will be affected and therefore results will be on the conservative side.

Resistance and Resilience
All vegetation cover types from satellite imagery (SILC3 post-large wildfires) are addressed within the following two risk groupings based on degree of vulnerability to resist impacts (resistance) and ability to recover (resiliency). The two groups are intersected with the frequent and infrequent use areas outlined above.

Because grasslands, shrub/grass, and open woodland vegetation types tend to have higher resistance (lower vulnerability to trampling) and resilience (higher resiliency to recover) elements, these cover types are used to represent areas of low risk for impacts.

Because forested vegetation types (greater that 65% canopy cover) tend to have lower resistance to impacts and moderate to high resiliency to recover, these cover types are used to represent areas of moderate risk for impacts.

High risk category (alpine / subalpine and desert / semi-desert) is not considered in this analysis since these areas do not occur in the analysis area.

Measurable Attributes
Based on the above discussion, the magnitude of area potentially impacted is stratified by risk of impacts in low and moderate risk categories. Where vehicle access for dispersed camping is allowed, potential use within each Alternative's corridor is projected to have less frequency of use (not all the area within the corridor will be traveled since one must use the most direct route to a campsite). These areas were identified through the intersection of cover type resistance / resilience groupings in each of the two risk categories with each of the Alternative's use corridors. These areas were further intersected with the risk category cover type groups within a 0 to 4% slope class. The 0 to 4% slope class represents the area with higher probability for concentrated use and severity of impact such as camping. The measurement is in acres and percent of potentially impacted acres compared to total project area acres. It is recognized that not all estimated acreage will be affected and therefore results will be on the conservative side.

3.4.3.2 Environmental Consequences – Vegetation

Direct and Indirect Effects-Vegetation

General Effects Common to All Alternatives

Trampling
Crushing or treading upon vegetation, either by foot, hoof, or tire, contributes to a wide range of vegetation impacts, including damage to plant leaves, stems, and roots, reduction in vegetation height, change in the composition of species, and loss of plants and vegetative cover. Trampling can quickly break down vegetation cover and create a visible route that attracts additional use. Complete loss of vegetation cover occurs quickly in shady forested areas, less quickly in open areas with resistant grassy vegetation. Regardless, studies have consistently revealed that impacts can occur with initial or low use, with a diminishing increase in impact associated with increasing levels of traffic (Hammit & Cole, 1998; Leung & Marion, 1996). Once trampling occurs, the rate of vegetative recovery can vary, depending on the site's resistance and resilience to disturbance.

Soil compaction from repeated trampling can affect plant growth by reducing moisture availability and precluding adequate taproot penetration to deeper soil horizons. In turn, the size and abundance of native plants may be reduced. Above-ground portions of plants also may be reduced through breakage or crushing, potentially leading to reductions in photosynthetic capacity, poor reproduction, and diminished litter cover. Likewise, blankets of fugitive dust raised by motorized traffic can disrupt photosynthetic processes, thereby suppressing plant growth and vigor, especially along motorized routes. In turn, reduced vegetation cover may permit invasive and/or non-native plants—particularly shallow-rooted annual grasses and early successional species capable of rapid establishment and growth—to spread and dominate the plant community, thus diminishing overall local biodiversity.

Compositional changes in the vegetation along trail corridors can have both beneficial and adverse effects. Trampling-resistant plants provide a durable groundcover that reduces soil loss by wind and water runoff, and root systems that stabilize soils against displacement by heavy traffic. Many of introduced species are disturbance-associated and are naturally limited to areas where the vegetation is routinely trampled or cut back. However, a few invasive non-native species, once introduced to trail corridors, are able to out-compete native plants and spread away from the trail corridor in undisturbed habitats. Some of these species form dense cover that crowd out or displace native plants (see Weeds Section).

Camping
Vegetation composition of campsites is not changed by infrequent camping for short periods. However, aerial plant parts will be broken and flowering in the season of impact may be affected. Long-term or frequent camping, even for one season, results in the destruction of vegetation, leaving barren compacted areas.

The creation of fire-rings impacts vegetation through burning, and the covering of vegetation with rocks. Revegetation is likely to be slow, because of changes in soil characteristics from such as loss of nitrogen, phosphorus, sulphur, and organic matter. The firewood used in campfires often comes from dead trees, but living trees have also been used, often to an extent which exceeds their capacity for regeneration.

Minor impacts associated with camping include the death of vegetation covered with garbage, partly-burned wood, or rocks removed from campsites. Digging of pits for garbage disposal and the removal of rocks from campsites -result in the creation of small bare areas, which are often enlarged by erosional processes and trampling.

Vehicles
The overall impact of a vehicle on vegetation is a function of both the area impacted and the severity of impact within the disturbed area. The severity of vegetation impact within a disturbed area can be higher than hiking, mountain biking, and stock use based on weight (a dirt bike weighs 100-200 pounds, whereas typical ATV can weigh up to 900 lbs, or up to several tons for 4x4 Off Road Vehicles), power, tire-surface area (tire footprint), and wheel slip that can cause greater compression on soils and vegetation as well as vegetation shearing. Vehicle impacts to vegetation can be exacerbated by rutting during wet periods due to low bearing capacity of soft soils (Affleck. 2005).

Direct impacts of vehicle activities on vegetation include reduced vegetation cover and growth rates, and increased potential for non-native and pioneering species to become established, thus altering vegetation communities. In certain instances, however, the impervious nature of compacted routes could result in runoff that generates greater moisture availability immediately along motorized routes. In turn, this would promote increased vegetation cover and plant abundance farther away. Repeated off-route activity results in the crushing, breaking and overall reduction of vegetative cover. Detours around snowbanks or mud holes are sometimes made by vehicles, and parallel motorized routes can become widely spaced.

Indirect effects of vehicle activities on vegetation are tied to soil properties altered by vehicle traffic, as soil properties typically influence vegetation growth. Motorized roads and trails also create edge habitats, which can generate conditions that promote the encroachment of non-native and invasive plant species. Other indirect effects include increased amounts of airborne dust raised by traffic. Fugitive dust on plant foliage can inhibit plant growth rate, size, and survivorship. Vehicle passes can also result in indirect effects including damaging germinating seeds, and weakening plants making them more susceptible to disease and insect predation. Vehicles can result in changes in plant species composition.

Weeds
An effect of travel and trampling can be the establishment and spread of weeds. These effects are further described in the Weed portion of the Vegetation section.

Magnitude and Settings of Potential Effects on Vegetation
The following table summarizes potential amount of vulnerability for vegetation impacts for each Alternative by risk categories based on various elements of frequency and duration of trampling, and vegetation resistance and resilience. It is recognized that not all estimated acreage will be affected and therefore results will be on the conservative side.

Table 3-34. Potential Vegetation Impacts by Risk Category - Ashland

Attributes	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
Moderate Risk Areas				
Acres Potential Frequent Use Areas [17] (% of Project Area)	20 (Trace)	10 (Trace)	10 (Trace)	20 (Trace)
Acres Potential Infrequent Use Areas [18] (% of Project Area)	773 (Trace)	403 (Trace)	415 (Trace)	686 (Trace)
Miles in Moderate Risk Area	9	4	4	8
Low Risk Areas				
Acres Potential Frequent Use Areas [19] (% of Project Area)	6530 (1%)	5088(1%)	5241(1%)	6036(1%)
Acres Potential Infrequent Use Areas [20] (% of Project Area)	42759(10%)	31309 (7%)	32248(7%)	39153 (9%)
Miles in Low Risk Area	711	514	530	640

Cumulative Effects-Vegetation

Fuels reduction, prescribed burning, livestock grazing, and timber management projects are currently planned and will continue to be planned for the District. These projects and any associated road use or construction have potential to impact vegetation. Projects are designed to minimize impacts to vegetation.

Use of existing designated routes and associated 300 foot allowance for access to vehicle camping, in combination with the proposed actions, have potential to impact vegetation within the project area.

Implementation of any of the alternatives considered in this analysis would not be expected to contribute to significant cumulative effects associated with vegetation. Anticipated future projects or activities are fewer in number and less disruptive from a resource extraction point of view than those projects or activities that have taken place in the past.

3.4.3.3 Conclusion - Vegetation

Because it is seldom possible to control or even document the past use or predict future use, estimates of the impacts caused by different use frequencies are imprecise. The ability to predict the effects of different intensities of various uses is low. However, the amounts of potentially affected area, projected within the context of moderate risk categories based on various elements of frequency, duration, timing, and vegetation resistance and resilience are displayed in the Potential Vegetation Impacts by Risk Category table above. It is recognized that not all estimated acreage will be affected and therefore results are on the conservative side.

Under all alternatives, when compared against similar vegetation types, potential impacts from *frequent* use within the 0 to 4% slopes of the route's corridor in moderate and low risk areas could occur in about one percent of the project area. Potential impacts from *infrequent* use within the

[17] Frequent Use Areas with Moderate Risk: Areas of 0-4% slopes within 300' of motorized routes in Ponderosa pine types with greater than 65% canopy cover.

[18] Infrequent Use Areas with Moderate Risk: Areas of greater than 4% slopes within 300' of motorized routes in Ponderosa pine types with greater than 65% canopy cover.

[19] Frequent Use Areas with Low Risk: Areas of 0-4% slopes within 300' of motorized routes in community types with less than 65% canopy cover.

[20] Infrequent Use Areas with Low Risk: Areas of greater than 4% slopes within 300' of motorized routes in Ponderosa pine types with less than 65% canopy cover.

route's corridor in moderate and low risk areas could occur in about 7% and 10% of the project area, respectively.

Moderate risk category potential impact ranges from 413 (Alternative B) to 793 acres (Alternative A). This is less than one percent of the project area. Low risk category potential impact ranges from 49,289 (Alternative B) to 36,397 acres (Alternative A). This is about 7 to 11% of the project area.

Table 3-35. Potential Vegetation Impacts by Risk Category - Ashland

Attributes	Alternate A Change from No Action	Alternative B Change from No Action	Alternative B Modified Change from No Action
Moderate Risk Areas			
Acres Potential Frequent Use Areas	Increases by 0 Acres	Decreases by 10 Acres	Decreases by 10 Acres
Acres Potential Infrequent Use Areas	Increases by 87 Acres	Decreases by 283 Acres	Decreases by 271 Acres
Miles in Moderate Risk Area	Increases by 1 Mile	Decreases by 4 Miles	Decreases by 4 Miles
Low Risk Areas			
Acres Potential Frequent Use Areas	Increases by 494 Acres	Decreases by 948 Acres	Decreases by 795 Acres
Acres Potential Infrequent Use Areas	Increases by 3606 Acres	Decreases by 7844 Acres	Decreases by 6905 Acres
Miles in Low Risk Area	Increases by 71 Miles	Decreases by 126 Miles	Decreases by 110 Miles

While impacts resulting from camping and vehicles can be locally very significant, the total area of impact is small when compared to various ecosystems of the project area. The level of acceptable impact over a given area is within the discretion of the deciding official for this project as outlined in the regulatory framework for this section. Selection of any alternative would be consistent with the regulatory framework relative to vegetation sustainability at the level of this project's scale.

3.4.3.4 Affected Environment – Weeds

Introduction

There is concern that travel management can influence the spread of noxious weeds and invasive plants. Also, the Forest Service has identified invasive species as one of the top threats to the health of National Forests. In this document, the terms "weeds", "noxious weeds' and "invasive plants" are used synonymously. Invasive weeds are defined as any non-native plant, which when established is or may become destructive and difficult to control by ordinary means of cultivation or other control practices. "Noxious" weeds are those non-native plants that are legally listed as weeds by the state or county.

Use of motorized routes contributes to the spread of weeds. Weeds can significantly alter the composition of native plant communities resulting in decreases in habitat quality for wildlife, reduced forage for livestock, increased erosion and increased sediment levels in streams, and decreases in aesthetic/recreational quality of wild lands (Sheley, R and J. Petroff. 1999).

The District follows many strategies to reduce populations of weeds and to prevent further infestation. For instance: best management practices are followed (Forest Service Manual Section 2080 (FSM2080)); standard and special provisions are included in timber sale contracts; a Forest-wide special order requiring weed-free hay and feed for stock has been implemented; weed-free gravel in road construction projects is required, and competitive seeding of disturbed sites is done with native vegetation. All districts on the Forest have implemented integrated weed management programs that include prevention through public education, along with biological, mechanical and chemical weed suppression.

Regulatory Framework

Nearly all users and interested parties desire complete prevention and eradication of noxious weeds on the Forest, but not necessarily at the expense of their use and enjoyment of the Forest. Neither are there sufficient resources or technology available to completely eradicate existing weed infestations within the planning horizon. The 1987 Custer National Forest Plan (Forest Plan - FP) directs control of noxious weeds as a priority item (FP Page II-3) where the goal is to implement an "integrated pest management program aimed at controlling new starts, priority areas of minor infestations. Holding actions will be implemented on areas of existing large infestations." Additionally, the Forest Service Manual 2080 (1. b. (5)) requires a weed risk assessment be conducted for all projects that could spread weeds. Additional regulatory framework for integrated weed management is found in the 2006 Custer NF Weed Management FEIS (project file), which is incorporated by reference into this analysis. The overall goal of is to maintain or restore healthy plant communities that are relatively weed resistant, while meeting other land-use objectives such as forage production, wildlife habitat maintenance, or recreational land maintenance.

Overview

An extensive scientific literature review was recently conducted for the 2006 Custer NF Weed Management EIS (project file). Weeds have many vectors for dispersal, such as people, wind, water, and animals. Although wind and water contribute to weed dispersal, travel management does not influence these forms of seed dispersal; consequently, they are not addressed in this analysis.

Research has shown that motorized vehicles tend to have a greater capacity for spreading weeds than non-motorized travel (Tyser and Worley, 1992). The current weed inventory for the Custer National Forest shows this same correlation; more weeds are present along motorized routes than along non-motorized routes. The bulk of the remaining Ashland District infestations occur in areas that have been burned by wildfire. According to the Custer weed survey data as of 2006, of the infestations occurring near motorized routes, about 70 percent of the infestations occur within the first 100 feet of motorized routes.

Current Weed Conditions

Some weed species are extremely hardy, competitive, and have the ability to displace native plant species and permanently alter the structure, composition and function of native plant communities. These species are considered very invasive and are typically listed as noxious by States. Of the 2000 plus vascular plant species that have been documented on the Custer National Forest, five are considered noxious weeds on the District. Currently there are approximately 4038 recorded acres infested with noxious weeds in the District boundary. Sites are generally small and widely scattered with many populations occurring along main National Forest System roads. Canopy density averages between 5-35 percent. Canada thistle, spotted knapweed, leafy spurge, and some houndstongue are the predominant noxious weed species on the District.

Human Influence

Human activities of grazing, timber harvest, road construction, recreation (camping, fishing, hunting, trail riding, back packing) and forest administration contribute, to various degrees, to the introduction and spread of weeds. Motorized vehicles and equipment contribute the most to introduction and spread of noxious weeds because of vehicle mobility and size, and/or distance of travel within a given time. Weed seeds become stuck in tire tread and in under carriage mud, pulled off and lodged in the

framework, drug out upon unloading from passenger and cargo compartments or deposited with contaminated cargo (e.g., gravel, hay, straw).

Trend

Nationally, National Forest System lands have an estimated six to seven million acres that are infested with noxious weeds. This figure is increasing at an exponential rate of 8-12 percent per year. An increase in inventoried infestations has occurred over the past 20 years due, in large part, to large scale wildfires and better inventory. In addition to annual appropriations, various grants and partnerships have been successful in adding resources to annual control measures. Treatment priority criteria are used because resources are generally not sufficient to treat all infestations (CNF Weed Management FEIS, 2006). Spread vector areas such as motorized routes are high in priority for treatment. The Custer National Forest could experience further invasion in the very near future, especially in light of some of the large scale wildfires that have occurred and will likely continue to occur.

To counter the continuing spread, the Forest has had an active prevention and control program to reduce the impacts of invasive noxious weeds for over 25 years. Chemical weed control has historically been the primary tool for noxious weed control in the analysis area.

Effects Analysis Methodology

The degree of risk from some of the most threatening species can be evaluated when completing project weed risk assessments. The probability of exposure of each site to plant propagules affecting dispersal, the susceptibility of an area to species' establishment, and the level of threat to susceptible areas can be evaluated. Overlaying weed inventories and designated public motorized routes, with this susceptibility assessment can further identify areas that are potentially at risk from invasion. A spatially explicit analytic model using a Geographic Information System (GIS) was used to map and calculate the acres at risk to invasive weeds (Project Record).

Level of Risk

Susceptibility, threat, and probability of exposure can be combined to model the degree of risk across a project area from some of the most threatening weed species. A risk assessment (Mantas, 2003) was completed for several weeds occurring in the USFS Northern Region, East of the Continental Divide (http://www.fs.fed.us/r1/cohesive_strategy/datafr.htm). This information was referenced in determining area susceptibility and threat levels.

Weed Susceptibility

Susceptibility is an estimate of the vulnerability of different habitats to colonization and establishment of a weed species. Even without any disturbance on the landscape, some areas are susceptible to the infestation by invasive plants. Because most of the weed species that occur on the District are considered aggressive in most non-forested and sparsely forested settings, these vegetation types are considered to be susceptible to weed invasion. Approximately 95% of the District is naturally susceptible to weed invasion. These areas are usually open areas with limited or no shade from tree overstory.

A 400 foot buffer from each side of a motorized route was used for each alternative and helps assess indirect effects. This accounts for allowable dispersed camping within 300 feet of a route, along with a 100 foot addition for potential weed spread beyond the 300 foot dispersed camping allowance. These specific Alternative buffers were intersected with areas rated as susceptible to weed infestation.

Weed Threat

Threat refers to the estimated degree of change in structure, function or composition that a weed species would have on a potential natural vegetation type. Because the noxious weed species that occur on the District are considered aggressive, they all occur in the high threat class.

Weed Exposure

Exposure refers to the probability that an area would be exposed to seeds from noxious weeds. The exposure classes used in this analysis are high exposure (motorized routes designated for public use) and low to no exposure (motorized routes designated for administrative use only[21] and non-motorized travel). An average of 70% of a road related infestations on the Forest occur within the first 100 feet of the buffer, about 82% occurs within the first 300 feet, and 95% occurs within the first 400 feet of motorized routes.

Existing weed infestions within a 400 foot buffer from motorized routes was used to assess direct effects from exposure to weeds since most of the weed infestations, associated with motorized routes, are found within this distance. The effects analysis assumption used is that weed establishment in areas susceptible to weed infestation can spread within this 400 foot distance within the ten year planning horizon of the travel management decision if left untreated. However, road related infestations are given high priority for treatment since motorized routes are typically primary vectors for spread. Exposure to weed spread within 400 feet of a motorized route is less that that portrayed in the following table due to the likelihood of weed treatment and the fact that the bulk of road-related infestations occur within the first 100 feet. Therefore, the 400 foot buffer was used as a conservative approach for an analysis measurement.

3.4.3.5 Environmental Consequences – Weeds

Direct and Indirect Effects-Weeds

The direct effect of motorized travel routes within susceptible areas for weed invasion is an increase in weed density and distribution. The following table is used to make Alternative comparisons. The corridor associated with the Alternative A has the most acres currently infested with weeds (1869 acres), and Alternative B has the least (1646 acres). The motorized routes going through infested areas range from 41 - 46%.

Table 3-36. Weed Infestations and Public Motorized Routes – Ashland

	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
Total Infested Acres within 400' Buffer	1869	1646	1650	1811
Percent of Infested within 4038 Inventoried net Acres of Weeds[22]	46%	41%	41%	45%

[21] Motorized routes designated for administrative use fall within a controlled setting either through permit with associated terms and conditions or use by Forest Service employees where best management practices are required. Also, these routes tend to have less frequent travel and low duration of use which also lessen impacts compared to more frequent use by the general public who always are not aware of protective measures to take in preventing and combating noxious weeds.

[22] Most of the remaining acreage not occurring adjacent to motorized routes are a result of wildfire effects or animal vectors.

Table 3-36. Weed Infestations and Public Motorized Routes – Ashland

	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
Miles of Designated Routes bisecting Weed Infestations	90	77	77	86

The following table summarizes indirect effects. Indirect effects include the risk of vegetation becoming infested from vehicles carrying and dropping weed seeds into areas susceptible to weed growth. Once aggressive weeds are introduced into the susceptible area, it would continue to spread and displace native plants, even if the area is not disturbed.

The indirect effect for each alternative is based on the total number of acres susceptible to weeds that intersected the respective Alternative's buffer of motorized routes. For each Alternative, about 95% of the buffered areas are susceptible to weed infestations. Alternative A has the greatest area at high-risk of weed invasion near motorized travel routes (62,717 acres), while Alternative B has the least (46,665 acres). The areas of high susceptibility are summarized in the following table:

Table 3-37. Susceptibility to Weed Infestation by Alternative - Ashland

Susceptible Area within Route Corridor [23]	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
Susceptible Acres	62,717	46,665	48,138	57,606
Percent of Area within Route Corridor infested with Weeds (Acres)	3	3	3	3

Cumulative Effects-Weeds

All of the activities identified as past and present activities in the beginning portion of this chapter, have influenced the spread of weeds. Future activities have the potential to spread weeds.

The common elements associated with most weed infestations are ground disturbance, wildfire, and use of motorized vehicles. Once the weeds are introduced into an area they generally continue to spread into adjacent areas. Weeds will continue to be spread as a result of resource management and other human activities. The mitigation measures that are addressed in the Forest Service Manual 2080 are being implemented and will help to slow the spread of weeds.

If a disturbance (such as a fire or timber harvest) occurred in a high-risk area with an existing weed problem and the area has motorized routes, the cumulative impact will exasperate the problem. In this situation the weeds may spread quickly to new areas and may rapidly increase in density. Having motorized travel in these areas may carry the weeds to new locations. The best management practices outlined in Forest Service Manual 2080 will help to reduce the spread rate but may not prevent the spread altogether.

Current on-going activities may have a cumulative negative effect by increasing the introduction and spread of noxious weeds. Livestock grazing may transport weed seed between private or other lands and the Forest, or from place to place on the Forest, by carrying seed in the hair or digestive tract.

[23] 400 foot buffer from motorized route under all alternatives. See Methodology section.

Livestock may also increase seed germination by reducing vegetation competition in areas of improper grazing and by ground disturbance in areas of excessive trailing. Wildlife and birds can similarly transport weed seed in hair, feathers and digestive tracts. Weed seeds are also transported by wind and water and wildfire provides improved germination.

3.4.3.6 Conclusion - Weeds

Since there is a high association with motorized routes and weed infestations, Alternatives A and No Action have a higher probability for weed spread than Alternatives B and B Modified.

Table 3-38. Summary of Changes in Effects *Compared to the No Action Alternative* - Ashland

Change from the No Action Alternative	Alternative A	Alternative B	Alternative B Modified
Exposure to Current Weed Infestations			
Change in motorized route corridor exposure to weed infestation acreage from No Action (% change from No Action)	Motorized route corridor exposure to weed infestations increased by 58 Acres (3%)	Motorized route corridor exposure to weed infestations reduced by 165 Acres (9%)	Motorized route corridor exposure to weed infestations reduced by 161 Acres (9%)
Weed Susceptibility			
Change in acreage of Weed Susceptible areas, within motorized route corridor, from No Action (% change from No Action)	Weed Susceptible Area increased by 5,111 (9%) Acres	Weed Susceptible Area reduced by 10,941 Acres (19%)	Weed Susceptible Area reduced by 11,941 Acres (20%)

Many agents will continue to transport weeds and weed seeds, regardless of the decision on travel, but the fewer the agents, the less weed spread. However, removing all use would defeat the purpose of the public lands, and is not public policy, and still would not totally eliminate the spread of weeds. Therefore, noxious weed management requires a balance of use restriction, public education, implementation of best management practices (BMPs), and effective treatment measures. The more the public voluntarily accepts and implements weed prevention practices, less restrictions and expensive weed control will be required.

Per existing policy, a noxious weed risk analysis will be done for each project and appropriate BMP measures (FSM 2080, R1 Supplement 2000-2001-1) included in each environmental analysis, permit, and contract and will help reduce cumulative effects. Each project and public use area will be monitored for noxious weeds and the implementation and effectiveness of BMP mitigation measures, prioritized by the degree of risk. The Forest Service will continue prevention, public education and appropriate weed treatment measures.

All action alternatives are consistent with the Laws, Regulations, Policy, and Federal, Regional, State, and Custer Forest Plan. Of these regulatory directions, only the FSM 2080 addresses travel management with respect to weed management. A weed risk assessment is part of this analysis and meets this policy.

3.4.3.7 Affected Environment – Sensitive Plants

Introduction

Forest Service sensitive species are defined as "Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by: a) significant current or predicted downward trends in population numbers or density or b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution."

Regulatory Framework

The *1987 Custer National Forest Land and Resource Management Plan* (Forest Plan) and *Forest Service Manual 2670.22 Sensitive Species* provides for sensitive plants. *Forest Service policy* regarding biological evaluations is summarized in Forest Service Manual (FSM) 2672.4. The intent of the biological evaluation process is to assess the potential impacts of proposed management activities, and ensure that such activities will not jeopardize the continued existence of species listed, or proposed to be listed, as Endangered or Threatened by the U. S. Fish and Wildlife Service and species designated as sensitive by the Regional Forester.

Overview

Only species with known locations or potential habitat on the District are addressed in the analysis and outlined in the following table. Three species are known to occupy habitat and have documented occurrences in the District.

Table 3-39. R-1 Sensitive Plant Species - Ashland

Common & Scientific Name	Type [24]	Global Rank [25]	State Rank [26]	Habitat	Closest known population	Flowering Period	Fruiting Period
BADLANDS / SPARSE TO DRY HILLSLOPES							
Barr's milkvetch (Known) *Astragalus barrii*	2	G3	S2/S3	Gullied knolls, buttes, and barren hilltops, often on calcareous soft shale and siltstone. Elev. 2940 - 4000 ft.	Home Creek Area (1 populations); Lyon Creek Area (2 populations); Bloom Creek Area (2 populations); Otter Creek Area (9 populations); King Creek Area (1 populations);	May-early June	May-June

[24] Scale of risk, per Region 1 Species at Risk Protocol: Type 1: Threatened, Endangered or Proposed (ESA); Type 2: Range-wide Imperilment; Type 3: Regional/State Imperilment

[25] and [25] The international network of Natural Heritage Programs employs a standardized ranking system to denote global (range-wide) and state status (Association for Biodiversity Information 2001). Species are assigned numeric ranks ranging from 1 (critically imperiled) to 5 (demonstrably secure), reflecting the relative degree to which they are "at-risk". 1 = Critically imperiled because of extreme rarity and/or other factors making it highly vulnerable to extinction; 2 = Imperiled because of rarity and/or other factors demonstrably making it vulnerable to extinction; 3 = Vulnerable because of rarity or restricted range and/or other factors, even though it may be abundant at some of its locations; 4 = Apparently secure, though it may be quite rare in parts of its range, especially at the periphery; 5 = Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery; T = Rank for subspecific taxon (subspecies, variety, or population); appended to the global rank for the full species, e.g. G4T3

Table 3-39. R-1 Sensitive Plant Species - Ashland

Common & Scientific Name	Type [24]	Global Rank [25]	State Rank [26]	Habitat	Closest known population	Flowering Period	Fruiting Period
Nuttall Desert-Parsley (Known) *Lomatium nuttallii* [27]	3	G3	S1	Open, rocky, mid to lower hillslopes on sandstone, siltstone, or clayey shale. Elev. 3400-7200 ft.	Poker Jim Creek	June	July
MESIC CONDITIONS							
Pregnant sedge (Known) *Carex gravida var. gravida*	3	G5	S1	Open woods, often in ravines with deciduous trees, on the plains. Elev. 3,880 –4,000 ft.	East Fork Otter Creek; Hay Creek		July

The following table outlines routes where potential impacts could occur.

Table 3-40. Motorized Routes Adjacent to Sensitive Plant Populations - Ashland

Route Name	Route ID#	Sensitive Plant
Picnic Area / Campground	4095a	Pregnant sedge
Stocker Branch	4021	Pregnant sedge
Ft. Howes Comm. Site	44211	Barr's milkvetch
4503	4503	Barr's milkvetch

Effects Analysis Methodology-Sensitive Plants

The analysis is based on known sensitive plant occurrences as provided by the Montana Natural Heritage Program (MNHP 2008), recent survey findings, and habitat potential or habitat/site characteristics (landtype, habitat type, aspect, and elevation). Information used came from data on file at the Custer National Forest, literature review (Heidel, et.al., 1995; Heidel, et.al, 1996; Heidel, et.al, 2002; Heidel, 2004; Barton, et.al, 2003; Hansen, et.al, 1987; Mincemoyer. 2006; MNHP. 2008; NatureServe. 2007; Schmoller, 1993; Schmoller, 1995; USDA Forest Service. 2001; USDA, 2008; USDI, 2005; Vanderhorst, et.al, 1998; and WYNDD, 2008).

The potential direct effects are direct mortality which may come from more frequent ground disturbing activities within or near sensitive plant populations, such as camping or infrequent disturbance from accessing dispersed campsites. To estimate frequent disturbance potential, a 0-4% slope was overlain in GIS within the motorized route access corridor for parking/vehicle access to dispersed camping (300 foot buffer for vehicle access to dispersed camping for each alternative).

[27] *Lomatium nuttallii*, although not listed in the Region 1 2004 sensitive plant list, has been added as a species of concern due to new information that there are known populations of this regional sensitive species on the Ashland District. Concurrence with this action made by Regional Botanist, June 2005.

Indirect effects may come from frequency and duration of camping use resulting in more difficult recovery due to soil compaction and vegetation composition change (including weeds) which may out-compete sensitive plants. A 400 foot buffer was applied to each alternatives' designated routes to address access to dispersed camping allowance (300 feet) and additional area for weed spread potential (an additional 100 feet). Weed spread assumptions are found in the Weed section of this chapter.

Direct and indirect vulnerabilities and exposures are evaluated to make a biological assessment effects determination on each species.

3.4.3.8 Environmental Consequences – Sensitive Plants

Direct and Indirect Effects-Sensitive Plants
Actions proposed in all Alternatives have the potential to affect populations of sensitive plants. The potential direct effects from motorized routes are direct mortality of plants which may come from ground disturbing activities within sensitive plant populations, such accessing dispersed camping sites and dispersed camping.

Indirect effects may come from accessing dispersed camp areas and camping use. These uses can create more difficult plant recovery due to soil compaction and vegetation composition change (including weeds) which may out-compete sensitive plants.

Some activities associated with the roads and trails do have the potential to negatively affect individual plants, but should not cause population viability losses. Vehicle or human travel outside the road or trail prism could negatively impact plants through direct removal or damage. Weed establishment along roads and trails could out-compete desired vegetation and negatively affect sensitive plant species. Most road and trail maintenance activities that stay within the existing prism would not pose a direct threat to those plant populations that are established along roads or trails.

Vulnerability and Exposure
Two known species' populations are exposed (see table above) and moderately vulnerable to direct effects from travel management. All of the species habitats have potential for being susceptible to noxious weed spread as an indirect effect of travel management (see Weed section of this chapter). Population or habitat exposure and vulnerabilities to direct and indirect effects are displayed in the following table.

Table 3-41. Sensitive Plant Vulnerability - Ashland

Species	Direct Effects – Populations / Habitats Vulnerable to Direct Disturbance	Indirect Effects - Habitat Vulnerable to Weed Spread
Barr's milkvetch *Astragalus barrii*	Low; the habitat's terrain is not typically amenable for dispersed vehicle camping. Known populations do not occur within access corridor under any alternative.	Moderate vulnerability - habitat can be vulnerable to weed spread, but Low exposure - populations not within 400 foot indirect effects corridor.

Table 3-41. Sensitive Plant Vulnerability - Ashland

Species	Direct Effects – Populations / Habitats Vulnerable to Direct Disturbance	Indirect Effects - Habitat Vulnerable to Weed Spread
Nuttall Desert-Parsley *Lomatium nuttallii*[28]	Low; legal access to known populations does not exist due to adjacent private land.	Moderate vulnerability - habitat can be vulnerable to weed spread, but Low exposure - populations not within 400 foot indirect effects corridor.
Pregnant sedge *Carex gravida var. gravida*	Moderate; one route crosses through one known location – no known historic dispersed camping adjacent to the route.	Moderate vulnerability - habitat can be vulnerable to weed spread. Moderate exposure – habitat within 400 feet of designated routes under any alternative.

There are no direct or indirect effects to Barr's milkvetch or Nuttal's desert parsley. There could be direct or indirect effects to pregnant sedge populations.

Direct and indirect vulnerabilities and exposures, outlined in previous tables, were given an adjective rating and evaluated to make a biological assessment effects determination for each species as displayed in the following table. Implementation of any alternative would not be anticipated to move any sensitive plant species within the project area toward federal listing.

Table 3-42. Effects Determination - Ashland

Species	Effects Components	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
Barr's milkvetch (Known) *Astragalus barrii*	Vulnerability - Direct	Low	Low	Low	Low
	Exposure - Direct	Low	Low	Low	Low
	Vulnerability - Indirect	Moderate	Moderate	Moderate	Moderate
	Exposure - Indirect	Low	Low	Low	Low
	Effects Determination	NI[29]	NI	NI	NI
Nuttall Desert-Parsley (Known) *Lomatium nuttallii*	Vulnerability - Direct	Low	Low	Low	Low
	Exposure - Direct	Low	Low	Low	Low
	Vulnerability - Indirect	Moderate	Moderate	Moderate	Moderate
	Exposure - Indirect	Low	Low	Low	Low
	Effects Determination	NI	NI	NI	NI
Pregnant sedge (Known) *Carex gravida var. gravida*	Vulnerability - Direct	Moderate	Moderate	Moderate	Moderate
	Exposure - Direct	Moderate	Moderate	Moderate	Moderate
	Vulnerability - Indirect	Moderate	Moderate	Moderate	Moderate
	Exposure - Indirect	Moderate	Moderate	Moderate	Moderate
	Effects Determination	MIIH[30]	MIIH	MIIH	MIIH

[28] *Lomatium nuttallii*, although not listed in the Region 1 2004 sensitive plant list, has been added as a species of concern due to new information that there are known populations of this regional sensitive species on the Ashland District. Concurrence with this action made by Regional Botanist, June 2005.

[29] NI = No Impact

[30] MIIH: May Impact Individuals or Habitat but will not Likely Contribute to a trend towards Federal Listing or Loss of Viability to the Population or Species

Cumulative Effects-Sensitive Plants

Fuels reduction and timber management projects are currently planned and will continue to be planned for the District. These projects and any associated road use or construction have the potential to detrimentally impact individual plants and/or populations through direct plant removal or damage, ground disturbance, forest vegetation successional shifts, or habitat alteration (e.g. shade reduction) within or adjacent to plant populations. Prescribed burning and/or wildfire (natural and human-caused) also have the potential to detrimentally impact sensitive plants. These actions, without mitigation, may kill individual plants or entire populations, modify habitat (understory and overstory vegetation) to an unsuitable condition, or remove the habitat entirely. Permitted grazing has potential to impact sensitive plants. However, prior to implementation of future management decisions, site-specific analysis and field surveys, where appropriate, would be completed to identify sensitive plant populations, determine potential effects to the populations from the actions, and design alternatives and/or prescribe mitigation measures to minimize impacts. Typically, adverse actions to plant populations would be avoided.

Roadside low density infestations of various noxious weeds are found adjacent to routes, but none are known to exist near known populations of sensitive plant species that occur within 400 feet of motorized route corridor under any alternative.

Travel along these routes by Forest users increases the potential that weed seed will be spread to other portions of the motorized route system and may establish within or adjacent to sensitive plant populations. Invasive species pose a risk to sensitive plants through direct competition. Herbicide application to manage invasive species also has the potential to kill sensitive plants. To help protect sensitive species, the 2006 Custer Weed Management EIS and Record of Decision directs that periodic inspections of known populations for the presence of invasive weeds is done. Herbicide applications along roads and trails would comply with product label requirements and protection measures described in the 2006 Custer Weed Management EIS.

Implementation of any of the alternatives considered in this analysis would not be expected to contribute to significant cumulative effects. Anticipated future projects or activities are fewer in number and less disruptive from a resource extraction point of view than those projects or activities that have taken place in the past. Past activities or projects have not precluded the establishment and existence of known sensitive plant populations throughout the project area where appropriate habitats are found. Therefore, continuation of less impactive projects or activities would not be anticipated to contribute significantly to cumulative effects.

3.4.3.9 Conclusion - Sensitive Plants

Under all alternatives, two of the three species assessed are anticipated to have no impact. Any alternative may impact individuals or habitat of one species but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Table 3-43. Effects Determination Summary - Ashland

Species	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
Known Populations				
Barr's milkvetch *Astragalus barrii*	No Impact [31]	No Impact	No Impact	No Impact
Nuttall Desert-Parsley *Lomatium nuttallii*	No Impact	No Impact	No Impact	No Impact
Pregnant sedge *Carex gravida var. gravida*	MIIH [32]	MIIH	MIIH	MIIH

Table 3-44. Summary of Number of Species by Effects Determination - Ashland

Effects Determination	Alternative A	Alternative B	Alternative B Modified	No Action Alternative
Number of Species with No Impact	2	2	2	2
Number of Species with potential to effect individuals or Habitat but will not Likely Contribute to a trend towards Federal Listing or Loss of Viability to the Population or Species	1	1	1	1

All alternatives are consistent with the laws, regualations, policy, and Custer Forest Plan. Selection of any alternative would be consistent with the regulatory framework relative to sensitive plants.

- End of Chapter 3 -

[31] NI: No Impact

[32] MIIH: May Impact Individuals or Habitat but will not Likely Contribute to a trend towards Federal Listing or Loss of Viability to the Population or Species