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Final Environmental Impact Statement

Ochoco Summit Trail System

Ochoco National Forest
Crook and Wheeler Counties, Oregon

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Ochoco Summit Trail System Project
Final
Environmental Impact Statement
Crook County, Oregon

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Abstract: This Final Environmental Impact Statement analyzes four alternatives related to the development of a trail for motorized off-highway vehicles (OHVs) on the Ochoco National Forest. Alternative 1 is the no action alternative, which would not develop or designate trail for OHVs. Alternative 2 is the proposed action; it would create a 170-mile trail network, providing areas intended for use by motorcycles, ATVs, and Jeeps and 4 x 4 trucks. Alternative 3 would create a 101-mile trail network, providing areas intended for use by motorcycles and ATVS, and would not designate a trail system intended for jeeps and 4 x 4s. Alternative 4 would create a 212-mile trail network, providing areas for all three classes of off-highway vehicles. The Responsible Official has identified Alternative 3 as the preferred alternative.

Forest Plan amendments (FPAs) would be required to implement any action alternative. Alternatives 2 and 4 would require five FPAs; four FPAs would amend Standards and Guidelines within specific Old Growth Management Areas (MA-F6) to allow limited motorized trail construction/designation and one FPA would amend Forest-wide Standards and Guidelines to allow limited motorized trail construction/designation on scablands. Alternative 3 would require one fewer FPA in Old Growth Management Areas, but would still require the FPA for trail construction/designation on scabland.

Reader's Guide

This Final Environmental Impact Statement (FEIS) contains information about a project proposal that would create and designate a trail system intended for motorized recreation. The information in this FEIS is organized to facilitate consideration of the environmental effects by the public and by the Forest Supervisor of the Ochoco National Forest, who is responsible for deciding whether or not to implement the Proposed Action or another alternative considered for this proposal.

Understanding the structure of this document is important to an overall understanding of the information required in an EIS. The following provides an overview of the components of this document.

Table of Contents: A table of contents is provided at the beginning of the document. Lists of tables and figures are also included.

Executive Summary: The summary of the FEIS provides a concise overview of the Purpose and Need for action, the Key Issues that became apparent during the public scoping period, and a comparison of the environmental effects of the alternatives.

Chapter 1. Purpose and Need for Action: Chapter 1 describes the Purpose and Need for the proposal, and the Proposed Action. It includes Management Direction for the project, and the Decision Framework. Public Involvement and the Issues generated by public comments are explained here.

Chapter 2. Alternatives, including the Proposed Action: Chapter 2 includes a description of the alternative development process, and discussions on alternatives and actions considered but eliminated from detailed analysis. The focus of this chapter is Alternatives Considered in Detail, including the No Action (Alternative 1), the Proposed Action (Alternative 2) as developed by the Forest Service that focused the analysis for this project, and two additional alternatives, Alternative 3 and Alternative 4, which respond to several planning issues. Mitigation measures to reduce potential resource impacts are documented in this chapter. Also included in this chapter is a comparison of alternatives that summarizes data in a table format. Finally, monitoring needs are presented at the end of this chapter that will provide important information regarding the specificity and effectiveness of treatments and mitigations

***Chapter 3. Affected Environment and Environmental Consequences*:** Chapter 3 describes current physical, biological, and social and economic environments within the area of influence of the Proposed Actions. This information provides the baseline for assessment and comparison of the potential impacts of the action alternatives. In addition, this chapter provides a comprehensive scientific and analytical comparison of the potential environmental impacts of the action alternatives to the No Action Alternative. In order to facilitate comparison of information provided, this chapter is organized and subdivided into resource areas/disciplines in a manner appropriate to the affected environment for this area.

Chapter 4. Consultation and Coordination: Chapter 4 lists the individuals, Federal, State and local agencies and tribes that the Forest Service consulted during the development of this FEIS. It also discloses the distribution of the document including Federal Agencies, federally recognized tribes, State and local governments and organizations and individuals representing a wide range of views. The references, glossary, and index are in the last part of this chapter.

Appendices: The appendices provide response to comments on the draft EIS, recommendations that were made by the interdisciplinary team after analyzing comments, and other information. Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Ochoco National Forest, Prineville, Oregon.

Acronyms used in this Document

ATV	All-terrain vehicle
BCC	Birds of Conservation Concern
BE	Biological Evaluation
BI	Beneficial Impact
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWD	Coarse Woody Debris
CWM	Coarse Woody Material
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act of 1973
FPA	Forest Plan Amendment
FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	Geographical Information Systems
IDT	Interdisciplinary Team
INFISH	Inland Native Fish Strategy
IRA	Inventoried Roadless Area
LRMP	Ochoco National Forest Land and Resource Management Plan
MA	Management Area
MIIH	May Impact Individuals or Habitat but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
MIS	Management Indicator Species
NE	No Effect
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NHPA	National Historic Preservation Act
NI	No Impact
NOA	Notice of Availability
NOI	Notice of Intent
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OHV	Off-Highway Vehicle
PAG	Plant Association Group
PDC	Project Design Criteria
PETS	Proposed, Endangered, Threatened, and Sensitive Species
PFA	Post Fledging Area
PM	Particulate Matter
PWA	Potential Wilderness Area
RHCA	Riparian Habitat Conservation Area
S&G	Standard and Guide
SSRA	Smoke Sensitive Receptor Area
TES	Threatened, Endangered, Sensitive
UMZ	Upper Management Zone
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

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EXECUTIVE SUMMARY

This Final Environmental Impact Statement (FEIS) discloses the effects of constructing and designating a motorized trail system within the Ochoco Summit Trail System project area on the Ochoco National Forest. The approximately 301,580-acre project area is in close proximity to the city of Prineville, Oregon.

Until recently, the Ochoco National Forest was open to cross-country motorized travel; the 2011 Travel Management Project Record of Decision authorized motorized travel only on designated routes. Elimination of cross-country motorized travel limited access for off-highway vehicle (OHV) recreationists on the Ochoco National Forest to open mixed-use roads and limited OHV trail areas. The Ochoco Summit project is needed to provide a designated and managed trail system designed for OHV recreation.

This section of the FEIS will display a comparison of the actions proposed within the project alternatives and a brief summary of the expected effects of these actions.

Each action alternative includes resource protection measures, monitoring and mitigation to reduce or eliminate unwanted effects; resource protection measures include trail design features to reduce sedimentation, signage to improve safety for trail users and other recreationists, and a season of use (see FEIS, Chapter 2). Each action alternative includes Forest Plan amendments. Four amendments in Alternatives 2 and 4 (three in Alternative 3) would modifiy standards and guidelines in Old Growth Management Areas (MA-F6) to allow motorized recreation, and one amendment in all action alternatives would amend standards and guidelines to permit motorized trail to cross scabland.

The alternatives vary by miles of trail in the designated trail system; in all alternatives existing mixed-use roads identified in the Motor Vehicle Use Map would remain available for OHV travel. The alternatives were developed to address issues that arose during scoping. Chapter 1 of the FEIS describes the issues that were raised by the public, which are:

1. The proposed action trail system is too small and lacks quality (complexity, range of difficulty levels, dispersion of users, etc).
2. The trail system could impact big game habitat.
3. The trail system could impact water quality or cause degradation of fish habitat.
4. The trail system could create or exacerbate conflict between motorized and non-motorized recreationists.

Based on the purpose and need and response to issues, the Responsible Official identified Alternative 3 as the preferred alternative. The draft EIS was circulated for public review and comment, and the Forest Service received 235 separate communications representing a wide range of opinions and concerns. Based on analysis of the comments, the Ochoco Summit project interdisciplinary team developed a number of modifications to the preferred alternative for consideration by the Responsible Official; these are described in FEIS Appendix B. Table ES-1 summarizes the alternatives.

Table ES-1. Comparison of the alternatives.

	Alt. 1	Alt. 2	Alt. 3	Alt. 3 Mod.	Alt. 4
Total miles in Designated System Routes (including mixed-use roads)	0	170	101	129	212
Total miles of OHV trail	0	124	88	100	158

	Alt. 1	Alt. 2	Alt. 3	Alt. 3 Mod.	Alt. 4
Miles of Class I Trail	0	55	35	40	95
Miles of Class II Trail	0	20	0	12	18
Miles of Class III Trail	0	49	53	49	45
Miles of trail not on GIS roads ("new construction")	0	69	50	50	84
Estimated Construction Cost	0	$978,500	$759,000	$535,047	$1,071,000

Chapter 3 and Appendix B of the FEIS describe the direct, indirect and cumulative effects of implementing the actions. All action alternatives would create and designate a trail system for OHV recreation. The effects on recreation, and on other resources such as soils, water quality, aquatic species, and wildlife are disclosed. Table ES-2 summarizes some of the measured effects on recreation; interpretation of these and other numbers is provided in Chapter 3 of the FEIS.

Table ES-2. Summary of some measured effects on recreation, by alternative, of the Ochoco Summit Trail System project.

Measure	Alt.1	Alt. 2	Alt. 3	Alt. 3 Mod.	Alt. 4
Number of Dispersed Campsites within which OHV noise from the developed trail system might be greater than 45 db	0	35	18	22	37
Miles of Keeton Trail within the >45 db noiseband	0	0.03	0.02	0.02	0.02
Number of Developed Recreation Sites within which OHV noise from the developed trail system might be greater than 45 db	0	4	4	3	5
Crossings with highway legal only roads	0	20	16	14	23

All action alternatives would be expected to have localized effects on riparian areas and water quality. Table ES-3 summarizes the measures for some effects to riparian areas and water quality. Full discussion of effects is provided in Chapter 3 and Appendix B of the FEIS.

Table ES-3. Summary of some measures related to water quality in the Ochoco Summit project area.

Measure	Alt 1	Alt 2	Alt 3	Alt 3 Mod.	Alt 4
Miles of trail system in RHCA	0	18	7	10.6	22
Total creek/wetland crossings	0	142	62	52	170
Class 1 & 2 riparian crossings	0	27	16	11	27
Class 3 riparian crossings	0	4	5	3	11
Class 4 riparian crossings	0	76	34	28	92
Class 9 riparian crossings	0	35	7	10	40
Increased motorized route density – 6th Field (number of subwatersheds)	0	11	9	11	13

All alternatives would be expected to have localized effects on some wildlife, aquatic, and plant species within the project area. Continued viability of all Management Indicator Species is anticipated. Table ES-4 summarizes the effects determinations to Threatened, Endangered and Sensitive species, other wildlife species, and special habitat areas for each alternative, including the No Action alternative. Full discussion of effects is provided in Chapter 3 and Appendix B of the FEIS.

Table ES-4. Summary of effects determinations to Threatened, Endangered and Sensitive species and Forest Plan Management Indicator Species by alternative for the Ochoco Summit project.

Species	Alt 1	Alt 2	Alt 3	Alt 3 Mod	Alt 4
Terrestrial Wildlife and Insects					
Bald Eagle	NI	NI	NI	NI	NI
Upland Sandpiper	NI	NI	NI	NI	NI
Bufflehead	MIIH	MIIH	MIIH	MIIH	MIIH
American Peregrine Falcon	NI	NI	NI	NI	NI
Tricolored Blackbird	NI	NI	NI	NI	NI
Lewis' Woodpecker	NI	NI	NI	NI	NI
White-Headed Woodpecker	NI	NI	NI	NI	NI
Greater Sage-Grouse	NI	NI	NI	NI	NI
California Wolverine	MIIH	MIIH	MIIH	MIIH	MIIH
Pygmy Rabbit	NI	NI	NI	NI	NI
Townsend's Big-Eared Bat	NI	NI	NI	NI	NI
Silver-Bordered Fritillary	NI	NI	NI	NI	NI
Johnson's Hairstreak	NI	MIIH	MIIH	MIIH	MIIH
Aquatic Species					
Bull trout	NE	NE	NE	NE	NE
Mid-Columbia River steelhead trout	NE	NE	NE	NE	NE
Redband trout	NI	MIIH	MIIH	MIIH	MIIH
Columbia spotted frog	NI	MIIH	MIIH	MIIH	MIIH
West Slope cutthroat trout	NI	NI	NI	NI	NI
Mid-Columbia River spring chinook EFH	NI	NI	NI	NI	NI
Shortface lanx	NI	NI	NI	NI	NI
Crater Lake tightcoil	NI	NI	NI	NI	NI
Pristine springsnail	NI	NI	NI	NI	NI
Sensitive Plants					
Achnatherum hendersonii	NI	MIIH	MIIH	MIIH	MIIH
Achnatherum wallowaensis	NI	MIIH	MIIH	MIIH	MIIH
Astragalus diaphanus* var. *diurnus	NI	NI	NI	NI	NI
Astragalus peckii	NI	NI	NI	NI	NI
Astragalus tegetarioides	NI	NI	NI	NI	NI
Botrychium ascendens	NI	MIIH	MIIH	MIIH	MIIH
Botrychium crenulatum	NI	MIIH	MIIH	MIIH	MIIH
Botrychium minganense	NI	MIIH	MIIH	MIIH	MIIH
Botrychium montanum	NI	MIIH	MIIH	MIIH	MIIH
Botrychium paradoxum	NI	MIIH	MIIH	MIIH	MIIH
Calochortus longebarbatus* var. *peckii	NI	MIIH	MIIH	MIIH	MIIH
Camissonia pygmaea	NI	NI	NI	NI	NI
Carex abrupta	NI	MIIH	MIIH	MIIH	MIIH
Carex diandra	NI	NI	NI	NI	NI
Carex lasiocarpa* var. *americana	NI	MIIH	MIIH	MIIH	MIIH
Carex retrorsa	NI	MIIH	MIIH	MIIH	MIIH
Cheilanthes feei	NI	NI	NI	NI	NI
Cyperus lupulinus ssp. lupulinus	NI	NI	NI	NI	NI
Elatine brachysperma	NI	NI	NI	NI	NI
Eleocharis bolanderi	NI	MIIH	MIIH	MIIH	MIIH
Eriogonum cusickii	NI	MIIH	MIIH	MIIH	MIIH
Heliotropium curassavicum	NI	NI	NI	NI	NI
Lipocarpha aristulata	NI	NI	NI	NI	NI
Lomatium ochocense	NI	NI	NI	NI	NI
Mimulus evanescens	NI	NI	NI	NI	NI

Species	Alt 1	Alt 2	Alt 3	Alt 3 Mod	Alt 4
Muhlenbergia minutissima	NI	NI	NI	NI	NI
Penstemon peckii	NI	NI	NI	NI	NI
Potamogeton diversifolius	NI	NI	NI	NI	NI
Rorippa columbiae	NI	NI	NI	NI	NI
Rotala ramosior	NI	NI	NI	NI	NI
Salix wolfii	NI	NI	NI	NI	NI
Talinum spinescens (Phemeranthus spinescens)	NI	NI	NI	NI	NI
Thelypodium eucosmum	NI	NI	NI	NI	NI
Utricularia minor	NI	NI	NI	NI	NI
Helodium blandowii	NI	NI	NI	NI	NI
Tomentypnum nitens	NI	NI	NI	NI	NI
Tortula mucronifolia	NI	MIIH	MIIH	MIIH	MIIH
Dermatocarpon meiophyllizum	NI	MIIH	MIIH	MIIH	MIIH
Texosporium santi-jacobi	NI	NI	NI	NI	NI
Other Wildlife					
Miles of system within 660' of hawk/owl nest	0	0.25	0	0	0
Miles of system within1/4 mi of osprey nest	0	0.6	0.46	0.46	0.46
Special Habitat Areas					
Miles of system within Old Growth Management Areas	0	2.59	1.44	1.47	2.54
Acres and miles of designated trail system in special habitat (Shrub-scabland)	0 acres 0 miles	29.1 ac 24.0 mi	10.8 ac 8.9 mi	22.0 ac 18.1 m	33.2 ac 27.4 m

NE=No Effect
NI = No Impact
NIIH = May impact individuals or habitat, but would not likely contribute to a trend toward federal listing or loss of viability to the population or species

Analysis disclosed in Chapter 3 of the FEIS indicates that no action alternative would affect any Inventoried Roadless Area or potential wilderness area. No Wilderness areas would be affected, except possibly by increased noise in a very limited area. The Wild Horse Herd Management Area on Lookout Mountain Ranger District would not be affected. Opportunities for quiet recreation would continue to be available throughout the majority of the project area, as well as across the remainder of the Ochoco National Forest.

CHANGES BETWEEN DRAFT AND FINAL EIS

Summary

- Replaced entire Summary from the draft EIS with a shorter Executive Summary.
- Added "Reader's Guide" and list of acronyms to the pages before the Table of Contents.

Chapter 1

- Added discussion to clarify the Purpose and Need for the project.
- Minor spelling and grammatical corrections.

Chapter 2

- Added, to all action alternatives, a Forest Plan amendment to standards and guidelines related to operation of motor vehicles on scablands.
- Minor spelling and grammatical corrections.

Chapter 3

- Combined the "Hydrology" and "Aqutic Species" sections from the draft EIS into one section in the final EIS to improve clarity.
- Added discussion to the analysis in the "Wilderness, Inventoried Roadless, and Unroaded Areas" section.
- Added sections titled "Effects of Forest Plan Amendments" and "Climate Change and Carbon Cycling."
- Minor spelling and grammatical corrections.

Chapter 4

- Updated contributors to the EIS.
- Minor spelling and grammatical corrections.

Appendices

- Added Appendix A – Response to Comments.
- Added Appendix B – Recommended Modifications to Alternative 3.
- Added Appendix C – Letters from Agencies.
- Moved draft EIS Appendix A – Maps to Appendix D.
- Added Appendix E, which contains maps created for the FEIS.

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CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

Background

Motor vehicles are an appropriate way for people to enjoy the National Forests, in the right places, in the right manner and with proper management. It is Forest Service policy to provide a diversity of road and trail opportunities for experiencing a variety of environments and modes of travel that are consistent with the National Forest recreation role and land capability (Forest Service Manual 2353.03(2)).

As the availability and capability of OHVs have grown, more Americans are enjoying access and recreation opportunities on National Forests and Grasslands. However, a substantial increase in OHV use is exceeding the ability of the Forest Service to manage National Forest System lands for multiple uses. Unmanaged recreation, including impacts from off-highway vehicles, was identified by former Forest Service Chief Dale Bosworth as one of four key threats to sustaining the nation's forests and grasslands. The proliferation of unplanned, unauthorized and non-sustainable roads and trails created by cross-country travel adversely impacts the environment, justifying the need for regulating unmanaged motor vehicle travel. The Travel Management Rule provides policy for ending this trend of unauthorized route proliferation and managing the Forest transportation system in a sustainable manner through designation of motorized National Forest System (NFS) roads, trails, and areas, and the subsequent prohibition of cross country travel by regulation (36 CFR 261.13).

Locally, as well as regionally and nationally, unmanaged OHV use on federal lands has resulted in unplanned roads and trails, soil erosion, watershed and wildlife habitat damage, impacts to cultural sites, safety concerns, trespass and vandalism on adjacent private land and increased conflict between motorized and non-motorized recreational experiences. Perceptions of crowding and user conflict are occurring in some areas of the Forest. Current regulations prohibit trail construction and operation of vehicles in a manner that damages the land, wildlife or vegetation. These regulations have not proven sufficient to control the proliferation of unauthorized routes or environmental damage. According to the OHV IRIS (Internet Research Report Series)[1] report, regional and national OHV use days have increased 42 percent from 2001-2007 (Cordell, 2008). Parallel trends in local OHV use have been noted locally with the population growth of Central Oregon. Increased OHV use and related impacts have been observed by Forest Service personnel as well as by other agencies, non-governmental organizations (NGOs) and the general public. Similar situations have occurred throughout the nation, leading to the Travel Management Rule that governs OHVs and other motor vehicle use on National Forests and Grasslands.

The 2005 Travel Management Rule directed each National Forest to designate roads, trails and areas that are open to motor vehicle use on a motor vehicle use map. Motor vehicle use off of designated roads and trails and outside designated areas was prohibited by regulation (36 CFR 261.13). A series of public meetings were held across the Deschutes and Ochoco National Forests between 2006 and 2009 to explain the Travel Management Rule, gather input on the National Forest System (NFS) roads and trails, and discuss changes to the NFS roads and trails. The two-forest-level Travel Management EIS (2011) was informed by that process. The 2011 Deschutes and Ochoco Travel Management Record of Decision (ROD) designated routes and areas that are available for motorized use. Of the roads that remain open for travel, some are restricted to highway-legal vehicles while others provide opportunities for mixed or shared use by highway-legal and nonhighway-legal

[1] Off-Highway Vehicle Recreation in the United States and its Regions and States: A National Report from the National Survey on Recreation and the Environment (NSRE) February, 2008 by: H. Ken Cordell, Carter J. Betz, Gary T. Green, and Becky Stephens.

motorized vehicles. Generally, cross-country travel is no longer available to off-road motorized vehicles. During the travel management planning process, the Deschutes and Ochoco National Forest supervisors expressed intent to conduct site specific projects to evaluate development of designated routes and/or areas for Off Highway Vehicle (OHV) use. The Ochoco Summit Trail System project is one site-specific effort.

Purpose and Need for Action

There is a need to provide a designated trail system for motorized recreation on the Ochoco National Forest in a suitable and sustainable location[2] while considering other forest uses.

The 2011Deschutes and Ochoco Travel Management ROD changed the opportunity for OHV use on the Ochoco National Forest. Prior to the decision, OHVs could legally be operated anywhere on the Forest except where specifically prohibited. The 2011 decision reduced the recreation opportunity previously available to OHV recreationists; in order to offset this reduction in OHV opportunity, the Ochoco National Forest Supervisor decided to pursue creating and designating a trail system intended for OHV operation.

There is currently only one motorized trail in a forested setting on the Ochoco National Forest, the Green Mountain Trail. At just over eight miles, it is not of sufficient length to provide a day of riding to an experienced rider, let alone a weekend of opportunity. In addition, the Deschutes and Ochoco Travel Management ROD identified specific roads as open for motorized mixed use. Motorized mixed use allows concurrent use of a road by highway-legal vehicles (such as a standard passenger vehicle) and vehicles that are not highway-legal (such as off-highway motorcycles or ATVs). Refer to Crimmins (2006)[3] for more detailed descriptions of vehicle types. However, mixed-use roads are not equivalent to trails; National Forest System (NFS) roads are designed primarily for highway-legal vehicles such as passenger cars or log trucks, and are often too wide and too smooth to provide a course with sufficient technical difficulty to keep OHV riders interested and challenged.

Public comment on the Travel Management project, as well as conversations with Forest users during several public meetings indicated that many Forest visitors were interested in maintaining opportunities for OHV recreation on the Ochoco National Forest. Information from these same sources indicated concerns about conflicts between motorized recreation and other types of recreation, and effects of unmanaged OHV operation on Forest resources. Considering the reduction of OHV opportunity following the 2011 Travel Management decision and recognizing that it is Forest Service policy to provide a diversity of road and trail opportunities for experiencing a variety of environments and modes of travel, the following Needs for Change were identified, which led to the development of the statement of Purpose and Need.

There is a need to designate a system of roads, trails and areas open to motorized recreational vehicles that will provide legal public access, protect natural resources, and minimize conflicts between motorized and non-motorized recreational use on the Ochoco National Forest.

There is a need to change the existing system of NFS motorized-use trails on the Ochoco National Forest to provide a sufficient number and length of trail to disperse recreational users and make a sustainable network of trails.

[2] The term "sustainable location" refers to non-sensitive areas on the landscape that can tolerate motorized use over time, such as upland/drier sites.

[3] Management Guidelines for OHV Recreation. 2006 by: Tom M. Crimmins in association with the National Off-Highway Vehicle Conservation Council.

There is a need to provide a diversity of off-highway motorized recreation opportunities, including opportunities for 4x4 vehicles, ATVs and motorcycles, to offset the loss of opportunities following the 2011 Travel Management decision.

The Ochoco Summit Trail System project will not analyze nor change over-snow motorized travel. It will also not include regulation of non-motorized travel including hiking, skiing, horseback riding or bicycling.

Forest Plan Direction and Other Guidance

The Ochoco National Forest Land and Resource Management Plan (Forest Plan) was approved in 1989, and has since been amended by several decisions. The Forest Plan, as amended, provides guidance for management activities on the Ochoco National Forest. The Forest Plan establishes goals, objectives, and desired future conditions, identifies management areas within the Forest, and provides standards and guidelines for each management area as well as Forest-wide standards and guidelines. In 1995, the Inland Native Fish Strategy (INFISH) Decision Notice amended the Forest Plan. INFISH added goals and objectives for inland native fish habitat condition and function, and identified Riparian Habitat Conservation Areas (RHCAs) where management activities will meet interim standards and guidelines. This analysis is tiered to the Final Environmental Impact Statement (FEIS) for the Forest Plan, as amended.

Forest Plan Management Areas

The major Ochoco National Forest management areas in the project area include (see Map 2):

MA-F22, General Forest (195,735 ac) - The emphasis for this area is to produce timber and forage while meeting the Forest-wide standards and guidelines for all resources (Forest Plan, p. 4-86). Motorized use on designated routes is encouraged (Forest Plan, p. 4-190).

MA-F21, General Forest Winter Range (25,183 ac) - The emphasis for this area is to manage for timber production with management activities designed and implemented to recognize big game habitat needs (Forest Plan, p. 4-84). Motorized use on designated trails and routes is allowed, but such use is restricted to designated open roads between December 1 and May 1 (Forest Plan, p. 4-189).

MA-F20, Winter Range (17,827 ac) – Winter range is to be managed for big game habitat. Road and trail use is to be limited to one mile of open access per section between December 1 and May 1 (Forest Plan, p. 4-83). Motorized use on designated routes is allowed (Forest Plan, p. 4-189).

MA-F11, Lookout Mountain Recreation Area (14,365 ac) - The emphasis for this area is to maintain a natural setting, provide continued opportunities for high quality semiprimitive recreational activities and wildlife habitat, and maintain healthy forests (Forest Plan, p. 4-68). Year-round trails to facilitate the use of the area by horseback riders, mountain bikers, hikers, snowmobilers and cross-country skiers will be developed (Forest Plan, p. 4-188).

MA-F26, Visual Management Corridor (11,478 ac) – The emphasis for this area is to maintain the natural appearing character of the Forest major travel routes, where management activities are usually not evident or are visually subordinate to the surrounding landscape (Forest Plan, p. 4-95).

MA-F6, Old Growth Management Area (7,693 ac) - Habitat will be provided for wildlife species dependent upon old-growth stands with pileated woodpecker as the management indicator species. The desired conditions for these areas are stands of mixed conifer and ponderosa pine with multi-layered canopy with shaded conditions and a large number of snags. Prescribed fire may be evident if natural fuels accumulate to dangerous levels, threatening the existence of the old-growth stand, or where vegetation manipulation is needed to maintain stand structure and species composition (Forest

Plan, p. 4-58). No motorized or mechanized use is allowed in Old Growth Management Areas (Forest Plan, p. 4-188 – 4-189).

MA-F7, Summit Trail (5,901 ac) - Acres of the project area that are along the Summit Historic Trail include 221 acres of Partial Visual Retention Corridor and 25 acres of Visual Retention Corridor. The Summit Trail is a historic resource, and was found eligible for nomination to the National Register of Historic Places in January 1987. The emphasis of this management area is to protect the existing integrity of the Summit Trail and enhance and interpret significant segments for public enjoyment and education. Pristine segments of the trail will be managed to protect, interpret and preserve their historic qualities (Forest Plan, p. 4-60-61).

MA-F2, Bridge Creek Wilderness (5,355 ac) – Emphasis in the Bridge Creek Wilderness Area is to protect the wilderness ecosystems and manage use to maintain a natural setting and preserve solitude. Bridge Creek Wilderness is to be managed as a nontrailed wilderness (Forest Plan, p. 4-51). Generally, no motorized or mechanized use is allowed on trails (Forest Plan, p. 4-188).

MA-F8, Rock/Cottonwood Roadless Area (5,098 ac) - The emphasis for this area is to allow timber harvest while protecting the anadromous fishery, sensitive soils on steep slopes and big game habitat (Forest Plan, p. 4-64).

MA-F25, US Highway 26 Visual Corridor (3,801 ac) - The emphasis for this area is to maintain and enhance scenery for travelers along U.S. Highway 26 (Forest Plan, p. 4-93).

MA-F24, North Fork Crooked River (NFCR) Scenic Corridor (1,948 ac) - The emphasis for this area is to maintain and enhance the natural appearing landscape and protect the scenic river designation, or where in MA-F6 apply old growth prescriptions where they are more restrictive (Forest Plan, p. 4-91). This is segment 3 and 4 of the NFCR Wild and Scenic River Plan (1993) with the objective of managing for semiprimitive nonmotorized recreation opportunities (NFCR, p. 10).

MA-F5, Research Natural Area (1,923 ac) - The emphasis for this area is to allow natural processes to occur for research purposes and education; to provide baselines against which other activities may be measured, sites for study of natural processes in undisturbed ecosystems; and gene pool preserves for both plant and animal species (Forest Plan, p. 4-56).

MA-F23, NFCR Recreation Corridor (1,225 ac) - The emphasis for this area is to maintain the appearance of a natural landscape in the foreground view from Forest Road 42 to enhance recreational and scenic values; and to protect and enhance public use and enjoyment of the river segment (Forest Plan, p. 4-89). This is segment 1 of the NFCR Wild and Scenic River Plan (1993) with the objective of riparian improvement, maintaining meadow ecosystems and Roaded Natural recreation opportunities (NFCR, p. 10).

NFCR Recreation Area (1,144 ac) - The emphasis for this area is to maintain the appearance of a natural landscape in the foreground view from Forest Road 42 to enhance recreational and scenic values; and to protect and enhance public use and enjoyment of the river segment (Forest Plan, p. 4-89). This is segment 2 of the NFCR Wild and Scenic River Plan (1993) with the objective of maintaining a Roaded Natural setting using viewpoints and the developed campground (Deep Creek) to inform visitors about the Wild and Scenic River (NFCR, p. 10)

MA-F4, NFCR Wilderness Study Area – The emphasis for this area is to maintain the existing conditions of the area for potential wilderness designation pending a decision by Congress, or until the area is released from further consideration.

MA-F27, Round Mountain National Recreation Trail (1,018 ac) - The emphasis in this area is to protect and manage for scenic qualities that make the trail corridor an attractive recreational setting. Rehabilitate trail sites where management activities conflict with National Recreation Trail objectives. Visitors to this management area will note a natural appearing forest along the majority of

the trail route. The outer boundary of the management area will generally not exceed 600 feet on either side of the Round Mountain National Recreation Trail (Forest Plan, p. 4-96).

MA-F19, Deep Creek Recreation Area (901 ac) - The emphasis in this area is to provide a near natural setting for recreational pursuits within the area where management activities are not visually evident (Forest Plan, p. 4-81).

MA-F13, Developed Recreation/Facilities (690 ac) - The emphasis in this area is to provide safe, healthful and aesthetic facilities for people to utilize while they are pursuing a variety of recreational experiences within a relatively natural outdoor setting (Forest Plan, p.4-71).

MA-F12, Eagle Roosting Area (264 ac) - The emphasis in this area is to provide winter roosting habitat for migrating bald eagles annually during the period December through April (Forest Plan, p. 4-70). The annual emphasis period has been changed to November 1 through April 30 based on best available science (Isaacs 2003).

MA-15, Riparian – The Riparian management area overlays the entire project wherever it is adjacent to water. Management emphasis in riparian areas is to maintain or improve water quality through management of streamside vegetation and habitat, and to meet temperature and turbidity levels as required by state standards under the Clean Water Act.

INFISH

The Inland Native Fish Strategy (INFISH) was intended to be interim direction to protect habitat and populations of resident native fish and to provide for options for management. The INFISH delineated RHCAs where riparian-dependent resources receive primary emphasis. These RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems. These areas will be managed to maintain or restore water quality, stream channel integrity, channel processes, sediment regimes, instream flows, diversity and productivity of plant communities in riparian zones, and riparian and aquatic habitats to foster unique genetic fish stocks that evolved within the specific region. RHCAs run through and overlay other allocations.

Recreation Management is addressed in INFISH (1995 p. A-9). It states:

RM-1. Design, construct, and operate recreation facilities, including trails and dispersed sites, in a manner that does not retard or prevent attainment of the Riparian Management Objectives and avoids adverse effects on inland native fish. Complete watershed analysis prior to construction of new recreation facilities in Riparian Habitat conservation Areas within priority watershed. For existing recreation facilities inside Riparian Habitat Conservation Areas, assure that the facilities or use of the facilities would not prevent attainment of Riparian Management Objectives or adversely affect inland native fish. Relocate or close recreation facilities where Riparian Management Objectives cannot be met or adverse effects on inland native fish cannot be avoided.

RM-2. Adjust dispersed and developed recreation practices that retard or prevent attainment of Riparian Management Objectives or adversely affect inland native fish. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective in meeting riparian Management Objectives and avoiding adverse effects on inland native fish, eliminate the practice or occupancy.

Implementing INFISH is to achieve a high level of habitat diversity and complexity through a combination of habitat features, to meet the life-history requirements of the fish community inhabiting a watershed. Project proposals are to not retard the attainment of RMOs. To “retard” would mean to slow the rate of recovery below the near natural rate of recovery if no additional human caused disturbance was placed on the system (INFISH 1995 p. A-3).

Proposed Action

The action proposed by the Forest Service to meet the purpose and need is to create a trail network that would include approximately 124 miles of proposed OHV trail and 45 miles of open National Forest System (NFS) roads that connect trail segments or contribute to the network by providing alternate "get-back" routes or other recreational experiences. The trail system would include about 69 miles of trail for Class I vehicles, 48 miles for Class II vehicles, and 52 miles for Class III vehicles. Trail systems for each vehicle class would also include staging areas and trailheads. Staging areas would each have at least one vault toilet, a picnic table, and a kiosk or sign board to provide information and maps. Other amenities, including supervised youth riding areas, defined camp sites, and warm-up loops are proposed at some staging area locations. Picnic tables and/or benches and interpretive signing are proposed at points along some trails. Please refer to Chapter 2, Alternatives Considered in Detail, for a detailed description of the proposed action.

Decision Framework

The Responsible Official for this proposal is the Forest Supervisor of the Ochoco National Forest. The Responsible Official will decide whether to:

- Select the proposed action;
- Select an action alternative that has been considered in detail;
- Modify an action alternative;
- Select the no action alternative;
- Identify what mitigation measures and monitoring will apply.

In making this decision, the Responsible Official will consider how well the alternatives lead to providing a quality motorized recreation experience, minimizing disturbance to big game and big game habitat, minimizing effects to water quality and fish habitat, and managing conflicts between motorized and nonmotorized recreationists. The Responsible Official will also consider comments submitted by other governments, other agencies, individuals, organizations, and adjacent landowners.

Public and Intergovernmental Involvement

Pre-Scoping

The Ochoco National Forest maintains working relationships with a broad spectrum of stakeholders including Deschutes Basin Provincial Advisory Committee (PAC), the PAC Travel Management Working Group, Crook County Natural Resources Planning Committee (CCNRPC), non-governmental organizations (NGOs), and other resource management agencies (County, State, Federal and interagency). Between February and November of 2009, the Ochoco National Forest encouraged early involvement by posting information on the web, by making presentations and by interacting with a variety of recreational groups, sportsmen and women, permit holders, adjacent land owners, special interest groups and the general public. Communications on the project also occurred during meetings and field tours with collaborative groups including the PAC and their Travel Management Working Group, and the CCNRPC. Information on this project was also provided at other Central Oregon Travel Management public meetings, and postcards were sent to the Forest-level Travel Management mailing list encouraging recipients to check the box to be put on the Ochoco Summit project mailing list. Throughout this time, early involvement was encouraged, and many comments were received. These pre-NEPA contacts helped to define areas of concern and options for providing opportunities, which in turn helped shape the strategy that was used during

development of the Proposed Action. Some recreation groups offered to partner in the construction, monitoring and maintenance of proposed trails and facilities, while others offered to help with rehabilitation and restoration of existing unauthorized routes. The project Interdisciplinary Team learned about some issues and concerns, as well as opportunities; the Ochoco National Forest looks forward to continuing partnerships and fostering new and diverse alliances as a by-product of this planning effort.

It was during the pre-scoping process that the boundaries of the project area were determined. Initially, the area identified for development of a designated OHV trail system was in the McKay Creek subwatershed near Prineville, Oregon. Communication with stakeholder groups, however, determined that there was a distinct lack of common support for such an undertaking in that location. Further stakeholder meetings indicated that there was common support for development of a proposed action within the area that became the Ochoco Summit project area (please see Map 1).

While many individuals and organizations recognize that both motorized and non-motorized recreation are legitimate uses of NFS lands, input received during the pre-scoping process fell primarily into two categories. In the first category, comments advocated for off-road (trail) opportunities for motorized use (ATVs, 4x4s and motorcycles). Users were interested in having trails available to them that provide more interesting and challenging experiences than those provided by open roads maintained for standard vehicle types (eg. passenger cars and pick-up trucks). Conversely, others advocated for reducing existing motorized use, with no adoption of any new systems of OHV routes. This category of respondents would prefer to see motorized recreation confined to open roads or existing OHV areas (outside of the Ochoco Summit project area). Other respondents believe that both motorized and non-motorized use can be accommodated if strategically planned, well-mapped and signed, maintained and enforced.

Some of the concerns expressed during our discussions with the public and other agencies were:

- Resource concerns including effects to wildlife, fish, streams, sensitive habitats, forage and weeds.
- Inadequate quality of experience for off-highway vehicle use on open roads; in particular there should be provision of varied motorized use types, loop opportunities, learner opportunities, and difficulty levels of sufficient variety and scale to make a successful network of trails.
- Retention of non-motorized use experience, potential noise levels.
- Retention of traditional motorized recreational experience, noise/traffic levels.
- Concern for increasing off-highway vehicle use on the Forest: shifting from low profile, local and low density use to high profile, destination or high density use.
- User conflicts associated with motorized/non-motorized recreation.
- Economic sustainability of road and trail system.
- Monitoring, maintenance and enforcement of appropriate use.
- Potential economic benefits to communities that rely on recreation-tourism.
- Potential impacts to adjacent land owners.
- Potential impacts to livestock and range improvements on permitted allotments.

The project Interdisciplinary Team relied heavily on information received during these pre-scoping efforts to design a proposed action to meet the Purpose and Need while considering all the concerns listed above.

Public and Intergovernmental Scoping

The Ochoco National Forest circulated its Proposed Action for the Ochoco Summit project in November of 2009; a letter was mailed and/or emailed to individuals and organizations on the

project's mailing list. National outreach took place when the Notice of Intent to prepare an Environmental Impact Statement (NOI) was published in the *Federal Register* on November 20, 2009. The NOI asked for public comment on the proposal to be submitted on or before December 21, 2009. Letters were written to local Tribal Governments to advise them of the Proposed Action and to invite their involvement in the planning process.

The Forest Service received 70 comment letters and emails from the public and from other agencies. The Interdisciplinary Team used the issues raised in these letters and emails to develop alternatives to the Proposed Action. The issues are described in the section titled "Issues" in this FEIS.

Circulation of the draft EIS for Review and Comment

The draft EIS was released to the public for review and comment on February 8, 2013, with the publication of a Notice of Availability in the *Federal Register* (78 FR 9388). The Forest Service received 235 separate comment communications (letters, emails, and written comments submitted during public meetings). All comments were considered; responses to substantive comments are included in Appendix A of the final EIS.

Issues

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…". A list of non-significant issues and reasons regarding their categorization as non-significant may be found at the Lookout Mountain Ranger District, Prineville, Oregon, in the project record.

As for significant issues, the Forest Service identified the following issues during scoping:

Issue 1: The proposed action trail system is too small and lacks quality (complexity, range of difficulty levels, dispersion of users, etc).

Class I (ATV) users would prefer:

- More miles to disperse users
- More loops, especially near staging areas
- More options, decision points
- Better range of difficulty, especially more difficult
- Separate ATV riding area from 4x4 routes
- Include destinations and viewpoints
- Include north/south connection other than on jeep routes

Class II (jeep and 4x4) users would prefer:

- More trail, less or no open mixed use roads
- Remove all gravel surfaces, bladed roads
- Need array of challenging routes, range from easy to difficult
- Separate jeep trails from ATV routes

Class III (motorcycle) users would prefer:

- More miles for more saddle time and more interesting experience

- Multiple trails from staging areas and/or loops
- Move trails off of open roads
- Move trails off of jeep trail
- Include long loops and destinations

Measures to compare the alternatives include:

- Class I opportunities:
  - Miles of "new construction" trails (class I)
  - Miles of road-to-trail conversion (class I)
  - Miles of connecting road necessary to link class I trail segments
  - Number of staging areas (class I)
  - Number of decision points (trail-to-trail intersections)
  - Number of decision points (trail-to-mixed use road intersections)
  - Miles of trail within 5 mile radius of center of staging areas
  - Number of distinct class I trail loops within 5 mile radius of center of staging areas
  - Percent of total class I legal trail miles available that are shared with jeeps.
  - Number of selected destinations and viewpoints accessed (Slide Mtn, Pisgah, Peterson Point).
- Class II opportunities:
  - Miles of "new construction" trails (class II)
  - Miles of road to trail conversion (class II)
  - Miles of connecting road necessary to link class II trail segments
  - Number of decision points (trail-to-trail intersections).
  - Number of decision points (trail-to-mixed use road intersections).
  - Number of selected destinations and viewpoints accessed (Peterson Lava, Jones Lava, Jones South Lava)
- Class III opportunities:
  - Miles of "new construction" trails (class III)
  - Miles of road-to-trail conversion (class III)
  - Miles of connecting road necessary to link class III trail segments
  - Number of staging areas (class I and III)
  - Miles of trail within 5 mile radius of center of class III staging areas
  - Number of distinct class III trail loops within 5 mile radius of center of Class III staging areas
  - Miles of ski trail included in class I and III networks
  - % of total class III trail miles available that are shared with ATV only
  - % of total class III trail miles available that are shared with jeeps and ATV
  - Number of decision points (trail-to-trail class III only intersections)
  - Number of decision points (trail-to-trail all classes intersections)
  - Number of decision points (class III trail-to-mixed use road intersections)

Issue 2: The trail system could impact big game habitat.

- Human/motorized use can disturb or displace big game from preferred habitat or from public to private land.
- Road density and increased motorized route density can impact big game behavior, reproduction and survival.
- The effectiveness of security areas for elk can be reduced or eliminated by human use (especially motorized).

Measures to compare the alternatives include:

- Open road density by Forest Plan management allocation and by 5th field watershed
- Open road plus motorized trail density by Forest Plan allocation and by 5th field watershed
- Acres of elk security habitat by 5th field watershed, as defined by patches > or = 250 acres and > ½ mile from any open road or motorized trail (Hillis)
- Acres of elk security habitat by 5th field watershed, as defined by acres >1/2 mile from open road regardless of patch size (Rowland, Naylor, Preisler, Johnson, Thomas)
- miles of trail > ½ mile from open road and within 2 miles of private land
- Miles of trail > ½ mile from open road and within elk calving areas or RMEF summer range
- Miles of trail within winter range and general forest winter range, or ODFW winter range, or RMEF winter range,/crucial winter range
- Acres by 5th field watershed within ¼ mile of any motorized route (high disturbance zone)
- Acres by 5th field watershed >1 mile from any motorized route (low or no disturbance zone)

Issue 3: The trail system could impact water quality or cause degradation of fish habitat.

- Trail could directly impact fish habitat at and below stream crossings.
- Trail could reduce effectiveness of recent and ongoing restoration efforts (Deep Cr, Crazy Cr, Little Summit Cr, Allen Cr).
- Desire no net degradation of 303(d) listed streams (shade, designated crossings).
- Potential impact to drainage patterns (concentration of flow, change in release rates, sediment mobilization and delivery).
- Potential impacts to streambanks.
- Potential changes to upland soil movement and delivery to riparian areas.
- Potential contamination of surface or ground water (petroleum, bacterial, chemical).

Measures to compare the alternatives include:

- Miles of trail in restoration watersheds (Deep Cr, Allen Cr)
- Miles of trail in anadromous watersheds (Rock Cr)
- Number total trail-over-stream crossings by stream class by 6th field watershed
- Number of new construction trail-over-stream crossings, on 303d within each 6th field watershed
- Number of total trail-over-stream crossings on 303d, by stream class within each 6th field watershed
- Miles of new construction trails by 6th field watershed, sum by 5th field watershed
- Miles of road-to-trail conversion by 6th field watershed, sum by 5th field watershed
- RER: miles of trail plus open roads by stream class I, II and III within three adjacency bands: 0- 200'; 201-400'; 401-600'.
- Hydraulic net: density of open and closed roads plus trails by 5th field watershed
- Miles of trail on unstable slope based on slope/erosion hazard map

Issue 4: The trail system could create or exacerbate conflict between motorized and non-motorized recreationists.

- Noise impacts vs. "natural quiet" experience
- Impacts to Recreation Opportunity Spectrum (ROS):
- Semiprimitive nonmotorized (RNA, Old Growth)
- Semiprimitive nonmotorized, snowmobiles allowed Dec 1-May 1 (Rock Crk/Cottonwood Crk, North Fork Crooked River Scenic Corridor)
- Roaded Natural (Deep Creek Rec. Area, Summit National Historic Trail, riparian, Bandit Springs, North Fork Crooked River Rec. Corridor)
- Roaded Natural, Roaded Modified or Rural (visual management corridors)

- Impacts to Wilderness Recreation Spectrum
- Primitive and semiprimitive nonmotorized (Wilderness, Wilderness Study Area)
- Impacts to developed recreation sites
- Impacts to dispersed recreation camp sites
- Opportunity to achieve and balance S&Gs on LRMP pg 4-183, 4-189 and 4-190
- Impact of trails on angler and hunter satisfaction and success
- Impact of trails on non-consumptive recreational use (bird watching, wild flower viewing, wildlife photography, sight-seeing, etc)
- Impact to non-motorized trails (hiking, horseback, mtn biking, Nordic skiing)

Measures to compare the alternatives include:

- Estimated user days
- Acres of potential noise disturbance by trail type based on decibel levels and average distance heard
- Acres of Semiprimitive Non-motorized ROS (RNA, Old Growth, Rock Crk/Cottonwood Crk, North Fork Crooked River Scenic Corridor) from which sounds of OHVs might be audible at > 45 db.
- Acres of Roaded Natural ROS (Deep Creek Recreation Area, Summit National Historic Trail, Riparian Area, Bandit Springs Recreation Area, North Fork Crooked River Recreation Corridor, Round Mountain National Recreation Trail) from which sounds of OHVs might be audible at > 45 db.
- Acres of Roaded Natural, Roaded Modified or Rural (Eagle Roosting Areas, Developed Recreation, Dispersed Recreation, Winter Range, General Forest Winter Range, General Forest, Highway 26 Visual Corridor, Visual Management Corridors, Facilities) from which sounds of OHVs might be audible at > 45 db.)
- Acres of Wilderness Recreation Spectrum, Primitive and Semiprimitive (Bridge Creek Wilderness, North Fork Crooked River Wilderness Study Area) from which sounds of OHVs might be audible at > 45 db.
- Number of developed recreation sites (campgrounds, cabins, etc) from which sounds of OHVs might be audible at > 45 db.
- Number of dispersed sites (dispersed recreation camp sites in LRMP) from which sounds of OHVs might be audible at > 45 db.
- Miles of dispersed camping roads (MVUM) from which sounds of OHVs might be audible at > 45 db.
- Miles of non-motorized trails, trailhead or trail shelters (LRMP) from which sounds of OHVs might be audible at > 45 db.
- Miles of non-motorized non-system horse trails, endurance ride staging areas and horse trail group camp sites from which sounds of OHVs might be audible at > 45 db.

CHAPTER 2. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Introduction

This chapter describes and compares the alternatives considered for the Ochoco Summit Trail System. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental, social and economic effects of implementing each alternative.

Alternatives Considered in Detail

The Forest Service developed 4 alternatives, including the No Action and Proposed Action alternatives, in response to issues raised by the public.

Alternative 1 (No Action)

Alternative 1 is the No Action Alternative is included as a baseline comparison of continuing the existing conditions without implementing the proposed actions as required by the CEQ Regulations (40 CFR 1502.14). Alternative 1 would not implement any changes in the current management direction regarding motorized access. Enforcement of existing restrictions found in the Ochoco National Forest Plan and site-specific decisions would continue. This includes past decisions to close or decommission National Forest system roads that may not have been implemented through physical barriers or signing, or where the closure method was limited to not conducting routine maintenance activities. The current management direction for travel would be directed by the management plan that is in place. A decision has been made on the forest-level Travel Management Plan (which implements the 2005 Travel Management Rule). The direction included in that decision is the current management direction.

Alternative 2 (Proposed Action)

Alternative 2 focuses on designating motorized trails and supporting areas, in conjunction with opportunities that would remain on mixed use roads identified in the forest-level Travel Management EIS. Table 1 provides a summary of actions proposed in Alternative 2.

The Proposed Action would:

Designate a system of trails and areas (including staging areas, play areas, riding areas where young riders may be supervised by adults, learner/warm-up loops, picnic and camping areas) by class of vehicle and season of use.

Utilize designated open motorized mixed use roads as connecters between trail segments.

Designate areas for developed and dispersed camping activities with legal trail access.

Implement rehabilitation or restoration activities in previously damaged areas and interconnecting unauthorized or user-created routes to promote recovery, and to prevent confusion about which routes are open and which are not.

Establish directional, informational and interpretive signing to: facilitate proper trail use, safety and enforcement; to provide public information and education; to define trail, riding area, staging area and camp sites locations; to promote recovery of rehabilitation and restoration sites; and to encourage reporting of violations, restoration or maintenance needs.

Motorized trails would be open for use by specified vehicle type, seasonally between May 1 and November 1 of each year, except on Paulina Ranger District, where trails would close at the beginning of the restriction period specified for the Rager Cooperative Travel Management Area, and would remain closed until May 1 of each year.

Non-motorized use would not be prohibited on proposed motorized trails.

Camping would be allowed at staging areas within designated camp sites, as well as in dispersed camp sites at trailheads or as allowed in the current Travel Management Plan.

Maps 3 and 4 show the network of proposed roads, trails and areas included in the proposed action, the project area boundary and a background of existing open roads. The Proposed Action maps show where the proposed routes and supporting areas are located and how the routes overlay existing soil disturbance as identified by the presence of existing NFS roads. Refer to the legend for route color codes: existing disturbance is shown by the two colors used to display roads (orange, green). The Proposed Action maps also display quality of user experience as determined by whether the proposed route provides potential for trail features (narrow, winding, challenging) or whether it falls on an open road (easy travel, easy access, mixed traffic). Refer to the legend for route color codes: road-to-trail conversions are proposed on closed/decommissioned roads (green), while new trail construction is proposed on route segments that are not on NFS roads (blue). Routes on open mixed use roads are shown in orange.

Trails would be designed with width and difficulty appropriate for each intended vehicle type, while roads designated as open in the forest-level Travel Management EIS would not be narrowed to trail standards (ie. designated open roads would remain designated open roads). Trail widths would be based on intended vehicle types, which are also displayed on Maps 3 and 4. Refer to the legend for vehicle types I, II and III. Motorcycle-only trails (single track) would be designed for 24” wide clearance and are displayed on the maps as a dashed line. Only single track vehicles would be allowed on single track trails (ie. no ATVs or 4x4s). All-terrain vehicle (ATV) trails would be designed for 50” wide clearance and are displayed as a dotted line on the maps. ATV trails would be available for use by ATVs and motorcycles but not 4x4s or side-by-side buggies. Class II trails would be designed for 80” wide clearance and are displayed on the maps as a line with cross bars. Class II trails would be available for use by any vehicle with an outside maximum width of less than 80” (jeeps, ¼ ton trucks and SUVs, side-by-side buggies, rock crawlers, etc.)

This project does not propose to change roads that would be open or closed to motorized access under the forest-level Travel Management EIS. The routes shown on these maps include proposed trails as well as about 45 miles of interconnected roads that are designated for mixed use by highway legal and non-highway legal vehicles (OHVs and passenger cars/trucks). The open roads are not changed from the forest-level EIS, but are shown on the Proposed Action map as they serve as connectors between trail segments, or they enhance loop opportunities/options for trail users.

***The Proposed Action trail network includes*:**

Overall, the OHV network displayed on the Proposed Action map includes approximately 124 miles of proposed OHV trail and 45 miles of open National Forest System (NFS) roads that connect trail segments or contribute to the network by providing alternate “get-back” routes or other recreational experiences (also see Table 1).

Of the total 69 miles in the Class I vehicle (ATV) network, 14 miles are on open roads, 25 miles are on closed or decommissioned road beds and 30 miles are not on NFS roads. This would allow for up to 55 miles of 50" wide trail through conversion of old road beds and new trail construction combined. In addition all Class II trails would be available for use by ATVs. Mixed use roads identified under the forest-wide Travel Management EIS would also remain available for use by ATVs.

Of the total 48 miles in the Class II vehicle (jeep, small truck and buggy) network, 28 miles are on open roads, 8 miles are on closed or decommissioned road beds and 12 miles are not on NFS roads. This would allow for up to 20 miles of 80" wide trail through conversion of old road beds and new trail construction combined. Mixed use roads identified under the forest-wide Travel Management EIS would remain available for use by non-highway-legal jeeps and buggies and highway-legal vehicles would have access to all roads identified as open in the forest-wide EIS.

Of the total 52 miles of Class III vehicle (motorcycle) network, 4 miles are on open roads, 23 miles are on closed or decommissioned road beds and 26 miles are not on NFS roads. This would allow for up to 49 miles of 24" wide trail through conversion of old road beds and new trail construction combined. In addition all Class I and II trails would be available for use by motorcycles. Mixed use roads identified under the forest-wide Travel Management EIS would remain available for use by non-highway-legal motorcycles and highway-legal vehicles would have access to all roads identified as open in the forest-wide EIS.

***The Proposed Action motorized use areas include*:**

In support of the proposed Class I network, four staging areas and two trailheads are proposed along the west half of the ATV route (west of the class II network), while two staging areas and one trailhead are proposed along the east half of the ATV route (east of the class II network). Proposed staging area locations include: Ochoco Divide Snow Park, Ahalt Mineral Source, Walton Snow Park, Scott's Mineral Source, Aspen Mineral Source and Road 600. Proposed trailhead access points include: Road 350 south of Indian Butte, road 550 at Allen Creek and Road 500 north of Jones Lava. Class I staging areas and trailheads would also be available for use by motorcycles (Class I and III).

In support of the proposed Class II network, two staging areas and three trailheads are proposed along the designated route. Class II staging areas and trailheads are distributed in order to provide access to a variety of terrain features and camp sites. Staging area locations include: Peterson Lava and Ross/Peterson ridge. Proposed trailhead access points include: East Porter Creek, Looney/Porter lava and Scott's Camp Mineral Source. Class II staging areas would also be available for use by ATVs and motorcycles (Class I, II and III).

In support of the proposed Class III network, two staging areas are proposed along the motorcycle-only route. Staging area locations include: Cottonwood Pit Mineral Source and Six Corners Mineral Source. Trails out of these staging areas would only be available for use by motorcycles (Class III only).

***Amenities*:**

Under the Proposed Action staging areas would provide amenities to support the intended use for each specific area. All staging areas would include at least one vault toilet, a picnic table and a kiosk or sign board with informational/directional signs and maps. Site specific amenities for each staging area are as follows:

Ochoco Divide Snow Park would retain existing level of facilities (paved parking area, one vault toilet and a sign board). The objective for this staging area would be to provide access for trail users who travel/camp in recreational vehicles that are generally self-contained and require little additional

amenities. This staging area would include a simple warm-up or learner loop, and would generally be an entry point for visitors planning to travel eastward on the trail.

Ahalt Mineral Source would be improved to support ATV and motorcycle staging. The objective for this area would be to provide for use by trail riders with a range of experience levels, for day or overnight use, for play area and/or for trail access. Amenities that would be needed include at least two vault toilets, defined and hardened camp sites, play area boundary markers, supervised youth rider area (markers or fence), picnic tables and sign boards.

Walton Snow Park would be improved to support ATV and motorcycle staging. The objective for this area would be to provide a trail access point for day or overnight use. Amenities that would be added include one more vault toilet, picnic tables and sign boards (near the existing toilet) and directional signing to keep users headed north from the staging area.

Scott's Mineral Source would be improved to support ATV and motorcycle staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a simple warm-up or learner loop, but would generally be intended to be an entry point for visitors planning to travel the east/west trail corridor. Amenities that would be added include at least one vault toilet, defined camp sites, picnic tables, sign boards and directional signing to lead riders onto the trail out of the staging area.

Aspen Mineral Source would be improved to support ATV and motorcycle staging. The objective for this area would be to provide for use by trail riders with a range of experience levels, for day or overnight use, for play area and/or for trail access. Amenities that would be needed include at least one vault toilet, defined camp sites, play area boundary and hazard markers, supervised youth rider area (markers or fence), picnic tables and sign boards.

Road 600 Staging Area would be improved to support ATV and motorcycle staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a simple warm-up or learner loop, but would generally be intended to be an entry point for visitors planning to travel north. Amenities that would be added include at least one vault toilet, defined camp sites, picnic tables, sign boards and directional signing to lead riders onto the trail out of the staging area.

Peterson Lava would be improved to support class II vehicle (jeep, etc) staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a short rock crawl loop (easy to moderate), but would generally be intended to be an entry point for visitors planning to travel throughout the class II area, or south on the jeep trail. Amenities that would be added include at least one vault toilet, defined camp sites, picnic tables, sign boards, haz-mat supply, and directional signing.

Ross/Peterson ridge would be improved to support class II staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would provide an entry point for visitors planning to travel throughout the class II area, or quick access to the south end of the jeep trail. Amenities that would be added include a hardened parking area, at least one vault toilet, defined camp sites, picnic tables, sign boards, haz-mat supply, and directional signing.

Cottonwood Pit Mineral Source would retain existing level of facilities but would serve as a motorcycle staging area. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a warm-up or learner loop and supervised youth riding area, but would generally be intended to be an entry point for visitors planning to travel east or west on the single-track trail loop. Amenities that would be added include a hardened parking area, picnic tables and sign boards (near the existing toilet) and directional signing to lead users to the trails out of the staging area.

Six Corners Mineral Source would be improved to support motorcycle staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a warm-up or learner loop and a supervised youth riding area, but would generally be intended to be an entry point for visitors planning to travel the single-track trail loop. Amenities that would be added include at least one vault toilet, defined camp sites, picnic tables, supervised youth rider area markers or fence, sign boards and directional signing to lead riders onto the trail out of the staging area.

Throughout the area, trailheads would remain as dispersed camp sites without developed recreation amenities such as toilets and picnic tables. Trailhead markers with informational signboards would be installed at mapped trailhead locations. At these locations hardening of surfaces for camp sites, turn-arounds and parking areas, and defining of campsites, would occur as needed. Other dispersed camp sites do occur along the trail that will not be mapped, these camp sites will generally not be modified, but trail routes passing by these sites would have directional signs and entrance filters (entrance devices to control vehicle size) installed, and camp sites defined as needed.

Selected locations along proposed trails would be improved to provide opportunities for sight- seeing, interpretive signing, rest/regroup areas and trail-side picnics. These locations would be at scenic viewpoints, points of interest, shady spots, etc. Improvements would be limited to picnic tables and/or benches and interpretive signing.

Table 1. Summary of proposed motorized trails and areas, Alternative 2, Ochoco Summit Trail System project.

Trail Type	Proposed Action – trail miles	Staging Areas	Mapped Trail Heads
Motorcycle (<24”) Trail	49	2	0
ATV (vehicles <50”) Trail	55	6	3
4x4 (vehicles <80”) Trail	20	2	3
Total	**124**	**10**	**6**

Non-Significant Amendments to Forest Plan

Alternative 2 includes five site-specific amendments to the Ochoco Land and Resource Management Plan. Each of these is related to designation of motorized crossings in Old Growth Management Areas (MA-F6) allocated in the 1989 LRMP other than on constant service roads (4-232, 4-234). One additional project-specific amendment would allow designation/construction of motorized trail on scabland.

- Amend Old Growth Management Area (OG-D1-08) at Indian Butte to include motorized recreation only on designated routes including one new crossing to connect between roads 2200-306 and 2200-309.
- Amend Old Growth Management Area (OG-D1-12) at East Porter to include motorized recreation only on designated routes including one new crossing at Looney Creek to connect between roads 4200-430 and 4200-440.
- Amend Old Growth Management Area (OG-D2-11) near Chamberlin Spring to include motorized recreation only on designated routes including one crossing on closed road 4250-700 to connect between roads 4250-610 and 1200-440.
- Amend Old Growth Management Area (OG-D2-02) near Deep Creek to include motorized recreation only on designated routes including one new crossing.
- Amend the Forest-wide Standard and Guideline for Recreation (LRMP 4-177) that states: “ORV use on scablands will be limited to snowmobiles operating on an adequate snow base.” The Standard and Guideline would be amended to allow crossing over of scablands on designated routes primarily on existing disturbance (old road beds).

Alternative 3

Alternative 3 was developed in response to Key Issues 2, 3 and 4, and is intended to provide motorized trails and areas at a lesser scale to reduce potential for impacts to water quality, fish and wildlife, and to reduce conflict between motorized and non-motorized recreational use. Table 2 provides a summary of actions proposed under Alternative 3.

Alternative 3 would:

Alternative 3 offers many of the features described for Alternative 2 with the following exceptions:

Motorized trails would be open for use by specified vehicle type, seasonally between June 1 and September 30 of each year, except on Paulina Ranger District, where trails would close at the earlier date of September 30 or the beginning of the restriction period specified for the Rager Cooperative Travel Management Area, and would remain closed until June 1 of each year.

The motorcycle (Class III) loop trail does not include the side loop in the Derr and upper Jackson Creek area that was in the Proposed Action. It also does not include the staging area or associated trails at Forest Road 4200-600, or the staging and play areas and associated trails at and around Aspen Pit compared to Alternative 2. It also does not include the staging area at Peterson Lava or any of the trailheads from Alternative 2.

Compared to the Alternative 2, the class I staging and parking areas at Ahalt Pit are not included; the singular (there-and-back) ATV (class II) route between Indian Butte (at Forest Road 2200-350) and Scott's camp is not included; and none of the trailheads are included in this alternative.

Alternative 3 does not include designated trails or staging areas for class II vehicles (jeeps and buggies).

Maps 5 and 6 show the network of proposed roads, trails and areas included in Alternative 3, the project area boundary and a background of existing open roads. The alternative maps show where the proposed routes and supporting areas are located and how the routes overlay existing soil disturbance as identified by the presence of existing NFS roads. Refer to the legend for route color codes: existing disturbance is shown by the two colors used to display roads (orange, green). The alternative maps also display quality of user experience as determined by whether the proposed route provides potential for trail features (narrow, winding, challenging) or whether it falls on an open road (easy travel, easy access, mixed traffic). Refer to the legend for route color codes: road-to-trail conversions are proposed on closed/decommissioned roads (green), while new trail construction is proposed on route segments that are not on NFS roads (blue). Routes on open mixed use roads are shown in orange.

Trails would be designed with width and difficulty appropriate for each intended vehicle type, while roads designated as open in the forest-level Travel Management EIS would not be narrowed to trail standards (i.e. designated open roads would remain designated open roads). Trail widths would be based on intended vehicle types, which are also displayed on Maps 5 and 6. Refer to the legend for vehicle types I and III. Motorcycle-only trails (single track) would be designed for 24" wide clearance and are displayed on the maps as a dashed line. Only single track vehicles would be allowed on single track trails (ie. no ATVs or 4x4s). All-terrain vehicle (ATV) trails would be designed for 50" wide clearance and are displayed as a dotted line on the maps. ATV trails would be available for use by ATVs and motorcycles but not 4x4s or side-by-side buggies. Alternative 3 does not include designated trails for class II vehicles (jeeps and buggies).

This project does not propose to change roads that would be open or closed to motorized access under the forest-level Travel Management EIS. The routes shown on these maps include proposed trails (approximately 88 miles) as well as about 13 miles of interconnected roads that are designated for mixed use by highway legal and non-highway legal vehicles (OHVs and passenger cars/trucks). The

open roads are not changed from the forest-level EIS, but are shown on the Alternative 3 map as they serve as connectors between trail segments, or they enhance loop opportunities/options for trail users.

***Alternative 3 trail network includes*:**

In contrast to Alternative 2, this alternative includes two discrete riding areas for class I and III (ATVs and motorcycles) that are separated by an area without designated trails:

A single track (class III) loop between Peterson Lava and Six Corners is included that incorporates some of the proposed jeep trail route locations from the Proposed Action alternative. This alternative does include one of the central tie-through trails between Paulina Butte and Jackson Creek. This alternative does retain staging areas at both Cottonwood Pit and Six Corners Mineral Source and their associated amenities. The Class III loop would include 9 miles of open mixed-use road, 25 miles of trail on closed or decommissioned road beds, and 28 miles of trail that are not on NFS roads.

A series of interconnected 50” trails (class I and III) and loops between Ochoco Divide Snow Park, Walton Snow Park and road 2200-350 are included. Additional loops on the west end are included compared to the Proposed Action in order to provide adequate trail miles within a more compact area, multiple decision points and alternate loop options. Staging areas at Ochoco Divide Snow Park and Walton Snow Park are included in this alternative. This section of trail system would include 4 miles on open, mixed-use roads, 12 miles of trail on closed or decommissioned road beds, and 22 miles of trail that are not on NFS roads.

***The Alternative 3 motorized use areas include*:**

In support of the proposed Class I network, two staging areas are proposed along the ATV route (in the west end of the project area). Proposed staging area locations include: Ochoco Divide Snow Park and Walton Snow Park. Class I staging areas would also be available for use by motorcycles (Class III).

In support of the proposed Class III network, two staging areas are proposed along the motorcycle-only route. Staging area locations include: Cottonwood Pit Mineral Source and Six Corners Mineral Source. Trails out of these staging areas would only be available for use by motorcycles (Class III only).

***Amenities*:**

Under Alternative 3 staging areas would provide amenities to support the intended use for each specific area. All staging areas would include at least one vault toilet, a picnic table and a kiosk or sign board with informational/directional signs and maps. Site specific amenities for each staging area are as follows:

Ochoco Divide Snow Park would retain existing level of facilities (paved parking area, one vault toilet and a sign board). The objective for this staging area would be to provide access for trail users who travel/camp in recreational vehicles that are generally self-contained and require little additional amenities. This staging area would include a simple warm-up or learner loop, and would generally be an entry point for visitors planning to travel eastward on the trail.

Walton Snow Park would be improved to support ATV and motorcycle staging. The objective for this area would be to provide a trail access point for day or overnight use. Amenities that would be added include one more vault toilet, picnic tables and sign boards (near the existing toilet) and directional signing to keep users headed north from the staging area.

Cottonwood Pit Mineral Source would retain existing level of facilities but would serve as a motorcycle staging area. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a warm-up or learner loop and supervised youth riding area, but would generally be intended to be an entry point for visitors planning to travel east or west

on the single-track trail loop. Amenities that would be added include a hardened parking area, picnic tables and sign boards (near the existing toilet) and directional signing to lead users to the trails out of the staging area.

Six Corners Mineral Source would be improved to support motorcycle staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a warm-up or learner loop and a supervised youth riding area, but would generally be intended to be an entry point for visitors planning to travel the single-track trail loop. Amenities that would be added include at least one vault toilet, defined camp sites, picnic tables, supervised youth rider area markers or fence, sign boards and directional signing to lead riders onto the trail out of the staging area.

Dispersed camp sites do occur along the trail that will not be mapped, these camp sites will generally not be modified, but trail routes passing by these sites would have directional signs and entrance filters (entrance devices to control vehicle size) installed, and camp sites defined as needed. Camping would be allowed as in dispersed camp sites as allowed in the current Travel Management Plan. Selected locations along proposed trails would be improved to provide opportunities for sight- seeing, interpretive signing, rest/regroup areas and trail-side picnics. These locations would be at scenic viewpoints, points of interest, shady spots, etc. Improvements would be limited to picnic tables and/or benches and interpretive signing.

Table 2. Summary of proposed Ochoco Summit Trail System, Alternative 3, motorized trails and areas.

Trail Type	Proposed Action – trail miles	Staging Areas	Mapped Trail Heads
Motorcycle (<24”) Trail	53	2	0
ATV (vehicles <50”) Trail	35	2	0
4x4 (vehicles <80”) Trail	0	0	0
Total	**88**	**4**	**0**

Non-Significant Amendments to Forest Plan

Alternative 3 includes four site-specific amendments to the Ochoco Land and Resource Management Plan. Each of these is related to designation of motorized crossings in Old Growth Management Areas (MA-F6) allocated in the 1989 LRMP other than on constant service roads (4-232, 4-234). One additional project-specific amendment would allow designation/construction of motorized trail on scabland.

- Old Growth Management Area (OG-D1-08) at Indian Butte to include motorized recreation only on designated routes including one new crossing to connect between roads 2200-306 and 2200-309.
- Old Growth Management Area (OG-D1-12) at East Porter to include motorized recreation only on designated routes including one new crossing at Looney Creek to connect between roads 4200-430 and 4200-440.
- Old Growth Management Area (OG-D2-02) near Deep Creek to include motorized recreation only on designated routes including one new crossing.
- Amend the Forest-wide Standard and Guideline for Recreation (LRMP 4-177) that states: “ORV use on scablands will be limited to snowmobiles operating on an adequate snow base.” The Standard and Guideline would be amended to allow crossing over of scablands on designated routes primarily on existing disturbance (old road beds).

Alternative 4

Alternative 4 was developed in response to Issue 1; it includes trails for class I, II and III vehicles over more area and with more miles than the Proposed Action. The associated staging areas, trailheads and play areas are similar to the Proposed Action, except: 1) moving ATV staging areas from Scott's Mineral Source to Allen Creek and moving Aspen Pit Staging Area to the ridge east of Happy Camp Creek; 2) dropping of ATV trailheads on rds 2200-350 and 550, 3) dropping of two trailheads at Porter Creek. We anticipate a larger number of trail miles for all three vehicle types, and a higher percentage of class II trails not on roads compared to Proposed Action, but likely less total miles for class II due to exclusion of open roads from the class II network. Table 4 provides a summary of actions proposed under Alternative 4.

Alternative 4 would:

Alternative 4 offers the same features described for Alternative 2, but over a slightly larger area, with more trail miles and fewer supporting facilities such as trailheads.

Maps 7 and 8 show the network of proposed roads, trails and areas included in Alternative 4, the project area boundary and a background of existing open roads. The Alternative 4 maps show where the proposed routes and supporting areas are located and how the routes overlay existing soil disturbance as identified by the presence of existing NFS roads. Refer to the legend for route color codes: existing disturbance is shown by the two colors used to display roads (orange, green). The Alternative maps also display quality of user experience as determined by whether the proposed route provides potential for trail features (narrow, winding, challenging) or whether it falls on an open road (easy travel, easy access, mixed traffic). Refer to the legend for route color codes: road-to-trail conversions are proposed on closed/decommissioned roads (green), while new trail construction is proposed on route segments that are not on NFS roads (blue). Routes on open mixed use roads are shown in orange.

Trails would be designed with width and difficulty appropriate for each intended vehicle type, while roads designated as open in the forest-level Travel Management EIS would not be narrowed to trail standards (i.e. designated open roads would remain designated open roads). Trail widths would be based on intended vehicle types, which are also displayed on Maps 7 and 8. Refer to the legend for vehicle types I, II and III. Motorcycle-only trails (single track) would be designed for 24" wide clearance and are displayed on the maps as a dashed line. Only single track vehicles would be allowed on single track trails (i.e. no ATVs or 4x4s). ATV trails would be designed for 50" wide clearance and are displayed as a dotted line on the maps. ATV trails would be available for use by ATVs and motorcycles but not 4x4s or side-by-side buggies. Class II trails would be designed for 80" wide clearance and are displayed on the maps as a line with cross bars. Class II trails would be available for use by any vehicle with an outside maximum width of less than 80" (jeeps, ¼ ton trucks and SUVs, side-by-side buggies, rock crawlers, etc.).

This project does not propose to change roads that would be open or closed to motorized access under the forest-level Travel Management EIS. The routes shown on these maps include proposed trails (approximately 158 miles) as well as about 53 miles of interconnected roads that are designated for mixed use by highway legal and non-highway legal vehicles (OHVs and passenger cars/trucks). The open roads are not changed from the forest-level EIS, but are shown on the Proposed Action map as they serve as connectors between trail segments, or they enhance loop opportunities/options for trail users.

***The Alternative 4 trail network includes*:**

Similar to the Proposed Action this alternative features several interconnected trail systems:

Class I network includes a series of shorter interconnecting loops, offering numerous decision points, on the west end. This portion of the ATV network would be served by 4 staging areas (Ochoco Divide, Ahalt, Walton and Scotts Mineral Source). In the east central part of the project area there would be a moderate size loop generally east of the Jeep area and west of the motorcycle loops, served by two staging areas (Happy Camp/Double Corral ridge, and 4200-600 mineral source. This central loop could be ridden entirely without entering the jeep area, but ATV and motorcycle riders could choose to use the jeep trails being provided three legal points of access. The Class I network would include 34 miles of open mixed-use roads, 47 miles of trail on closed or decommissioned road beds, and 48 miles of trail that are not on NFS roads.

Class II network would include a series of 80” trails created by a combination of new construction and road-to-trail conversion, served by two staging areas and one trailhead. These trail segments would be connected with the minimal amount of open mixed use road necessary to get from one staging area to the other, and to connect from one discrete trail segment to the next. Though other alternate loop options would remain available on mixed use roads, extra opportunities would not be included in the system of designated routes and would not be managed as designated trail routes. Camp areas would be within 300’ of open roads and would not have exclusive use by class II vehicles. All 80” trails would be available to any rubber tired vehicle with a maximum width of 80”, though some routes would be posted as not recommended for certain vehicle types. The Class II network would include 11 miles on open mixed-use roads, 7 miles of trail on closed or decommissioned road beds, and 11 miles of trail that are not on NFS roads.

Class III network would include a series of interconnected loops ranging from short to long, offering numerous decision points. The motorcycle only network would be served by two staging areas (Six Corners and Cottonwood Pit). The motorcycle only network would interconnects with the central ATV system, providing more options for class III riders without having to enter the jeep area. Class III vehicles could use the entire system of trails if they choose to do so, however they could also travel from the west end to the east end without having to travel on a class II trail. However, to do so they would have to make connections between the west end network and the central /eastern networks on mixed used road 2630 and 2630-750 or 2630-800. The Class III network would include 8 miles of open mixed use roads, 22 miles of trail on closed or decommissioned road beds, and 22 miles of trail that are not on open roads.

***The Alternative 4 motorized use areas include*:**

In support of the proposed Class I network, four staging areas are proposed along the west half of the ATV route (west of the class II network), while two staging areas are proposed along the east half of the ATV route (east of the class II network). Proposed staging area locations include: Ochoco Divide Snow Park, Ahalt Mineral Source, Walton Snow Park, Scott’s Mineral Source, Happy Camp/Double Corral Ridge and Road 600. Class I staging areas would also be available for use by motorcycles (Class I and III).

In support of the proposed Class II network, two staging areas are proposed along the designated route. Class II staging areas are distributed in order to provide access to a variety of terrain features and camp sites. Staging area locations include: Peterson Lava and Ross/Peterson ridge. Class II staging areas would also be available for use by ATVs and motorcycles (Class I, II and III).

In support of the proposed Class III network, two staging areas are proposed along the motorcycle-only route. Staging area locations include: Cottonwood Pit Mineral Source and Six Corners Mineral Source. Trails out of these staging areas would only be available for use by motorcycles (Class III only).

***Amenities*:**

Under the Proposed Action staging areas would provide amenities to support the intended use for each specific area. All staging areas would include at least one vault toilet, a picnic table and a kiosk or sign board with informational/directional signs and maps. Site specific amenities for each staging area are as follows:

Ochoco Divide Snow Park would retain existing level of facilities (paved parking area, one vault toilet and a sign board). The objective for this staging area would be to provide access for trail users who travel/camp in recreational vehicles that are generally self-contained and require little additional amenities. This staging area would include a simple warm-up or learner loop, and would generally be an entry point for visitors planning to travel eastward on the trail. Amenities that would be needed include sign boards and directional signing.

Ahalt Mineral Source would be improved to support ATV and motorcycle staging. The objective for this area would be to provide for use by trail riders with a range of experience levels, for day or overnight use, for play area and/or for trail access. Amenities that would be needed include at least two vault toilets, defined and hardened camp sites, play area boundary markers, riding area where youth could be supervised (markers or fence), picnic tables, sign boards and directional signing.

Walton Snow Park would be improved to support ATV and motorcycle staging. The objective for this area would be to provide a trail access point for day or overnight use. Amenities that would be added include one more vault toilet, picnic tables and sign boards (near the existing toilet) and directional signing to keep users headed north from the staging area.

Scott's Mineral Source would be improved to support ATV and motorcycle staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a simple warm-up or learner loop, but would generally be intended to be an entry point for visitors planning to travel the east/west trail corridor. Amenities that would be added include at least one vault toilet, defined camp sites, picnic tables, sign boards and directional signing to lead riders onto the trail out of the staging area.

Happy Camp/Double Corral Ridge staging area, approximately 1 mile east of Aspen Mineral Source (near FS Road 30/850, would be improved to support ATV and motorcycle staging. The objective for this area would be to provide for use by trail riders with a range of experience levels, for day or overnight use, for trail access. Amenities that would be needed include at least one vault toilet, defined camp sites, a simple warm-up or learner loop, picnic tables, sign boards and directional signing.

Road 600 Staging Area would be improved to support ATV and motorcycle staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a simple warm-up or learner loop, but would generally be intended to be an entry point for visitors planning to travel north. Amenities that would be added include at least one vault toilet, defined camp sites, picnic tables, sign boards and directional signing to lead riders onto the trail out of the staging area.

Peterson Lava would be improved to support class II vehicle (jeep, etc) staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a short rock crawl loop (easy to moderate), but would generally be intended to be an entry point for visitors planning to travel throughout the class II area, or south on the jeep trail. Amenities that would be added include at least one vault toilet, defined camp sites, picnic tables, sign boards, haz-mat supply, and directional signing.

Ross/Peterson ridge would be improved to support class II staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would provide an entry

point for visitors planning to travel throughout the class II area, or quick access to the south end of the jeep trail. Amenities that would be added include a hardened parking area, at least one vault toilet, defined camp sites, picnic tables, sign boards, haz-mat supply, and directional signing.

Cottonwood Pit Mineral Source would retain existing level of facilities but would serve as a motorcycle staging area. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a warm-up or learner loop and riding area where youth could be supervised, but would generally be intended to be an entry point for visitors planning to travel east or west on the single-track trail loop. Amenities that would be added include a hardened parking area, picnic tables and sign boards (near the existing toilet) and directional signing to lead users to the trails out of the staging area.

Six Corners Mineral Source would be improved to support motorcycle staging. The objective for this area would be to provide a trail access point for day or overnight use. This staging area would include a warm-up or learner loop and a riding area where youth could be supervised, but would generally be intended to be an entry point for visitors planning to travel the single-track trail loop. Amenities that would be added include at least one vault toilet, defined camp sites, picnic tables, supervised youth rider area markers or fence, sign boards and directional signing to lead riders onto the trail out of the staging area.

Dispersed camp sites that occur along the trail will not be mapped; these camp sites generally will not be modified, but trail routes passing by these sites would have directional signs and entrance filters (entrance devices to control vehicle size) installed, and camp sites defined as needed. Camping would be allowed as in dispersed camp sites as allowed in the current Travel Management Plan. Selected locations along proposed trails would be improved to provide opportunities for sight- seeing, interpretive signing, rest/regroup areas and trail-side picnics. These locations would be at scenic viewpoints, points of interest, shady spots, etc. Improvements would be limited to picnic tables and/or benches and interpretive signing.

Table 3. Summary of proposed Ochoco Summit Trail System, Alternative 4, motorized trails and areas.

Trail Type	Proposed Action – trail miles	Staging Areas	Mapped Trail Heads
Motorcycle (<24”) Trail	45	2	0
ATV (vehicles <50”) Trail	95	6	0
4x4 (vehicles <80”) Trail	18	2	0
Total	**158**	**10**	**0**

Non-Significant Amendments to Forest Plan

Alternative 2 includes five site-specific amendments to the Ochoco Land and Resource Management Plan. Each of these is related to designation of motorized crossings in Old Growth Management Areas (MA-F6) allocated in the 1989 LRMP other than on constant service roads (4-232, 4-234). One additional project-specific amendment would allow designation/construction of motorized trail on scabland.

- Amend Old Growth Management Area (OG-D1-08) at Indian Butte to include motorized recreation only on designated routes including one new crossing to connect between roads 2200-306 and 2200-309.
- Amend Old Growth Management Area (OG-D1-12) at East Porter to include motorized recreation only on designated routes including one new crossing at Looney Creek to connect between roads 4200-430 and 4200-440.

- Amend Old Growth Management Area (OG-D2-11) near Chamberlin Spring to include motorized recreation only on designated routes including one crossing on closed road 4250-700 to connect between roads 4250-610 and 1200-440.
- Amend Old Growth Management Area (OG-D2-02) near Deep Creek to include motorized recreation only on designated routes including one new crossing.
- Amend the Forest-wide Standard and Guideline for Recreation (LRMP 4-177) that states: "ORV use on scablands will be limited to snowmobiles operating on an adequate snow base." The Standard and Guideline would be amended to allow crossing over of scablands on designated routes primarily on existing disturbance (old road beds).

Other Information for all Action Alternatives

No action alternative proposes any changes to the current management of motorized winter over-snow recreation.

The following uses are exempted from the proposed motor vehicle use designations:

- Aircraft;
- Watercraft;
- Over-snow vehicles;
- Limited administrative use by the Forest Service;
- Use of any fire, military, emergency, or law enforcement vehicle for emergency purposes;
- Authorized use of any combat or combat support vehicle for national defense purposes;
- Law enforcement response to violations of law, including pursuit; and
- Motor vehicle use that is specifically authorized under a written authorization under federal law or regulations, or approved permit.

The use of motor vehicles off the designated system for purpose of big game retrieval would not be allowed. Proposed timing restrictions to mitigate the potential for disturbance during construction and maintenance of trails, or during restoration activities, for various wildlife, fisheries and other resource conditions would be displayed in the Design Criteria section of this EIS.

Resource Protection Measures

The following features are incorporated into the design of alternatives. Project Design Features are sideboards and assumptions that were used in development of specific alternatives. Mitigation measures are those that are site specific, usually have a specific unit(s) assigned to them, and are used to avoid, minimize, rectify, reduce, or compensate an impact (40 CFR 1508.20). For example, a Project Design Feature may include a seasonal closure for an unknown nest site (if discovered); a mitigation measure would place a seasonal closure on a known nest site specific to a trail system. Project Design Features and mitigation measures are used as a basis for determining and disclosing effects in the Environmental Consequences discussions.

Project Design Criteria Common to All Action Alternatives

The Forest Service developed the following design criteria to be used as part of each action alternative.

OHV Trail Design

- The design, construction and management parameters in the following documents will be used as guidelines when designing the OHV trails for this project.
- *Forest Service Handbook* 2309.18_20

- *Off-Highway Motorcycle & ATV Trails Guidelines for Design, Construction, Maintenance and User Satisfaction* (Wernex 1994)
- *Trail Construction and Maintenance Notebook – 2007 Edition* (Forest Service Technology and Development Program 2007)
- *Trail Planning, Design & Development Guidelines* (Minnesota Department of Natural Resources 2006)
- *Management Guidelines for OHV Recreation* (Crimmins 2006)
- *Sustainable OHV Trails: Layout and Design Clinic* (Recconnect 2009)
- Forest Service Handbook identifies trail construction standards as "trail classes." These trail classes are not the same as OHV vehicle classes which coincide with proposed trails described throughout this DEIS as Class I, Class II and Class III trails. Other than in this project design element, in this DEIS Class I trails refer to trails for ATVs with a maximum width of 50"; Class II trails refer to trails for 4x4's (jeeps and buggies) with a maximum width of 80"; and Class III trails refer to trails for motorcycles with a maximum width of 24". Design Element: Trail Management objectives will be developed for each new route designated as part of the Ochoco Summit OHV Trail system. FSH 2309.18_20 design parameters would be used as follows: Trail Class 2 will be used for motorcycle trails; ATV trails will be a mix of Trail Class 2 and Trail Class 3 standards; and Four-wheel drive trails (> 50") will be designed using the Trail Class 2 standard.
- Trails will be designed and managed to offer a variety of rider experiences. This will be accomplished by using a blend of tight and open trails (curvilinear features with a variety of sinuosity) that provide a diversity of settings, speeds and challenges.
- Designated routes utilizing existing road beds or routes will be enhanced (narrowed, roughened, etc.) as needed to increase safety and improve rider experience.
- Trail locations and design will provide views, as well as changes in setting, vegetation, soils and topography to the extent possible.
- Curves may be super-elevated (banked) where practical, using natural terrain, to improve flow of the trail and reduce widening. Native or natural appearing materials will be used where necessary to discourage off trail excursion and to narrow and roughen the trails.
- All trails, except learner loops, will be designated for two-way traffic (single trail width with turnouts).
- Trails will be designed to cross cattle guards on a tangent (perpendicular crossing on a straight segment of trail).
- Trails will be designed to minimize sediment transfer to watercourses by using rolling dips, rolling the grade, and reversing grade to facilitate distribution of water off the trail and to prevent run-off from concentrating and running down the trail. Erosion controlling and water diverting structures will be installed when trail tread modifications are not feasible.
- Water crossings and approaches to water crossings will utilize design elements described for water quality and aquatic organisms (see below).
- Trails will be maintained using hand tools, trail groomers (drag pulled by ATV) and when needed a Sweco trail dozer. Other mechanized equipment, appropriately sized to maintain trail width, may be used if available and/or needed.
- Trail, staging area and kiosk signing will generally conform to the COHVOPS sign plan. To the extent possible, sign colors, shapes and messages will be consistent with other COHVOPS trail systems. Information describing appropriate user behavior and ethics will be provided at all designated Staging Areas and Trailheads. Emphasis will be on using TREAD LIGHTLY! and LEAVE NO TRACE programs to educate the public. Information on hunting seasons, State of Oregon Hunting and ATV laws, livestock and other safety concerns will be provided at staging areas.

- A designated trail system will incorporate trail rangers, information kiosks, trail maps, and signs. In addition, federal law enforcement officers will enforce the travel management regulations within the project area.
- Compliance and education patrols will be conducted on a regular basis throughout the season of use and intermittently during closed periods.

Transportation

- Where the proposed trail crosses the highway legal only routes, driving safety is a concern for both the OHV rider and the driving public. These intersections will require additional signing for the trail user.
- OHV trail approaches to highway legal only routes will be designed to allow trail users to stop and look both ways prior to crossing the road.
- Supplemental Engineering Analysis will be performed on portions of Roads 1250, 2630, 38, 3810, 4250, 4254, 4270 and 4276 to determine what requirements are necessary to allow for safe use by a mix of highway-legal and non-highway-legal vehicles. As needed, actions (such as brushing or signing) will be taken to meet safe use requirements for mixed use traffic on segments of these roads included in the selected alternative.

Recreation

- Routes intended for motorized travel on the designated trail system will be posted with directional signs.
- Areas intended for motorized travel in “play areas” will have signs posted on boundaries of the designated area.
- Routes not intended for motorized travel that cross designated OHV routes will be identified at crossings with the appropriate trail marker (ie. Nordic ski trail, horse trail, snowmobile trail, or hiking trail markers) so that they are easily identified as not being part of the designated OHV trail system.
- Unwanted unauthorized or user created roads and trails that cross designated OHV routes will be physically closed or concealed to discourage/prohibit motorized use. Examples of closure methods include, but are not limited to, gates or fences, ripping and seeding, recontouring, placement of felled trees, roots and/or rocks, or planting with native trees or shrubs. Physical closures will be implemented over time, in a prioritized order, where resource damage is occurring and/or where sensitive fish, wildlife or rare plant habitats are being affected.
- Any new route designated as part of the trail system will be given a system number.
- A Sign Plan will be developed and on-the-ground signing will be used to clearly identify travel routes and the allowed modes of travel.
- Trails and supporting facilities within visual corridors will be designed to meet Forest Plan Visual Quality Objectives.

Minerals and Geology

- Avoid or minimize disturbance within or adjacent to existing noxious weed infestations. Develop a control plan to prevent weed spread in mineral material sources. This could include fencing and gates to control traffic into active portions of rock pits.
- Access for mining activities will be coordinated with mining claimants as needed. Mining Reference – 36 CFR 228A and 228C, Ochoco NF 1989 Forest Plan S&G Pg. 4-171.

Water Quality and Aquatic Organisms

- Stream approaches must be in an area that has the least grade or steepness perpendicular to the stream. This reduces the length of the crossings and amount of sediment that could enter

streams from trails in RHCAs and allows for proper water drainage to prevent rutting, rilling and/or gullying.

- Where possible utilize reverse grades (low point of trail coinciding with naturally occurring dips or swales to facilitate drainage) when approaching streams in order to minimize runoff down the trail and movement of sediment toward the stream. When reverse grades are used, there must be adequate filtering (distance, vegetation, or geology) between the dip and any active stream channel to prevent movement of sediment into active stream channels.
- Out slope and harden approaches to streams using materials such as concrete blocks or similar materials that strengthen unstable surfaces. These treatments prevent movement of soil, gravels, and other surface materials. Hardening will occur where the trail enters and exits the stream crossing to a gradient break for no more than 100 feet. At this point, construct rolling dips or other cross drainage structures of such size that they would disperse water from the trail and be durable enough to hold up to the expected type and level of traffic. If the trail continues up hill, continue constructing the rolling dips or other cross drainage structures approximately every 50 feet, or where there is a break in grade, to prevent channelizing sediment into streams especially during snow melt, rain events, or rain-on-snow events. This will prevent rutting and movement of surface materials into streams during the wet season, (mid-October to mid-June) (USDA Forest Service 2006), or during rain events throughout the summer season provided there is sufficient vegetation on the margins of the trail (Welsh 2008).
- Seeps and springs will be managed using Class III and IV RHCAs as specified in INFISH and PACFISH. This includes springs and seeps within dormant landslide terrain. Ochoco NF S&G Mass Wasting (Pg 4-196-197). Reroute trails to avoid meadows, seeps, and springs. If not possible, puncheon stringers need to be elevated above the meadow. This will allow for continuance of vegetation and prevent cutting off flow of water during wet periods, allowing continued access for frogs and other organisms that inhabit the area.
- New construction of Class I, II, and III stream trail crossings or culvert replacement at existing culverts will be bridges or culverts and will meet the Regional (PNW) Aquatic Organism Passage Guidelines (sized for the 100-year flood and pass all aquatic organisms).
- Trail maintenance will not occur during the wet season (mid-October to mid-June) when the potential for soil erosion and water quality degradation exists. Under coordination with the Hydrologist or Fishery Biologist, this restriction could be waived by the Responsible Official under dry conditions and with a specific erosion control plan (e.g. rocking, waterbarring, seeding, mulching, barricading).
- In water work will occur in accordance with the *Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, Oregon Dept. of Fish and Wildlife[4].
- Water drainage facilities and trail treads on trails in RHCAs will be maintained as needed to avoid trail gullying and erosion that would increase sedimentation into Class I, II and III streams. If rutting, rilling, and gullying do occur, the affected trails (or areas) will be shut down until rehabilitated or until reconstructed to alleviate erosion at affected sites.
- Trail construction including crossings, staging areas or any other construction to occur in the Upper North Fork Crooked River Watershed that are identified in the BAER 2006 (Maxwell Fire) report will be field reviewed for having completed vegetation restoration from the fire before any activity proposed in the OHV EIS is implemented.
- Road Conversion to Trail Forest Service National Best Management Practices Program:
- Reclaim unneeded road width, cut, and fill slopes when converting a road for future use as a trail.

[4] http://www.dfw.state.or.us/lands/inwater/Oregon_Guidelines_for_Timing_of_%20InWater_Work2008.pdf

- Use suitable measures to stabilize reclaimed sections to avoid or minimize undesired access and to restore a desired ecologic structures or functions.
- Use suitable measures to ensure that surface drainage will intercept, collect, and remove water from the trail surface and surrounding slopes in a manner that minimizes concentrated flow and erosion on the trail surfaces without frequent maintenance.
- Use applicable practices of BMP Road-7 (Stream Crossings) to provide waterbody crossings suitable to the expected trail uses. See nos. 3 and 5 above for additional information about stream crossings.
- All fuel-powered vehicles and tools would be refueled at least 75 feet from any live stream.

Soils

- Use of sediment ponds, trenches, weed free straw bales, geotextile fabric or coconut fiber logs/bales, may be used to prevent or reduce the movement of sediment from the project site to stream channels during construction. These materials will be removed or rehabilitated once the site is stabilized in order to create a natural appearance.
- Trails with grades over 20 percent will be designed to prevent erosion. Where incline or decline exceeds 20 percent trails will be treated to harden the surface or by other techniques which meet the objective of reducing rutting and erosion. Techniques include, but are not limited to tread blocks, rock surfacing, soil amendments, rolling dips and/or reverse grades.
- Where possible, rolling grades and outsloping will be used on trails to reduce concentration of flows and minimize accumulation of water on the trail.
- Woody material will be windrowed at the soil surface on the base of trail fill slopes to catch sediment.
- Maintain large coarse woody material along trail edges, keeping rider safety in mind, to maintain the stability of the trail running surfaces.
- Where trails cross scablands treatments to prevent erosion will be implemented. Techniques may vary by trail type and may include but are not limited to rock surfacing or soil amendments.
- Inventories will occur annually to identify and schedule ongoing trail maintenance needed to ensure resource protection and rider safety.

TES Plants

- A rare plant survey and evaluation will be completed prior to trail construction or other disturbance, such as trail maintenance using mechanized equipment, closing of unauthorized roads or trails, culvert installation or removal, etc.
- Protection measures will be put in place so that impacts to rare or sensitive plants will not occur, or impacts will be mitigated to acceptable levels as determined by the District Botanist. Protection measures may include trail relocation, bridges, boardwalks, or erosion control measures listed in other design criteria.
- To protect TES plant habitat, close the trail system when conditions exist that may result in resource damage (rutting, runoff, etc). Coordinate with the District Botanist when determining conditions for trail closure.

Invasive Plants

- Do not route trails, place staging or camping areas, or other disturbance within areas containing invasive plants.
- To avoid potential spread or introduction of invasive plants, actions conducted or authorized by written permit require cleaning of all equipment (ex. trail dozers, excavators, and other construction or trail maintenance equipment) prior to entering Forest Service lands. This

includes cleaning before moving to another location on FS land if equipment inadvertently enters an invasive plant site.

- Any OHV or other piece of equipment used for trail construction or maintenance (such as OHV-pulled trail groomers) should be free of mud, dirt, and plant parts prior to entering Forest Service lands.
- Use of weed-free gravel, fill, sand, or other quarry or borrow materials is required for construction and maintenance of trails, staging areas, camping areas, trailheads, etc.
- Use of weed-free straw and mulch is required for all project activities.
- Maintenance activities for the trail network that involve blading, brushing, ditch cleaning, etc. in areas with invasive plants will be done in consultation with the District or Forest-level invasive plant specialist.
- Invasive plants introduced on designated OHV routes will be treated using the early detection/rapid response strategy; and given a high priority status for treatment.
- Trails, trailheads, play areas, staging areas, etc, that become infested with invasive plants may be closed by the Responsible Official until the infestation is controlled.
- Native plant materials are the first choice in revegetation and rehabilitation projects.

Special Habitats

- Avoid designating trails within special habitats where possible. Special habitats include aspen and cottonwood groves, wet meadows, springs and seeps, etc (see Table 127 for acres of special habitats within the project area).
- When trail designation within special habitat is necessary, consult with the District Botanist for the best placement, and other mitigating measures. Remove as little vegetation as possible during trail construction and maintenance.

Bald Eagle and Golden Eagle

- Active nest sites will be protected from disturbing activities within timeframes and distances shown in Table 4.

Table 4. Seasonal restrictions on trail construction and maintenance for active raptor nest sites.

Species	Buffer Distance	Restriction Period
Northern Bald Eagle	½ mile line-of-sight or ¼ mile not line-of-sight	January 1 to August 31
Golden Eagle	1/2 mile	March 1 to August 15
Prairie Falcon	¼ mile	March 1 to August 1
Osprey	¼ mile	April 1 to August 1
Goshawk	¼ mile	March 1 to August 31
Other Raptors	660 feet (10 chains)	March 1 to August 1

- If an active eagle nest is discovered during implementation, efforts will be made to avoid any further disturbance. Site-specific measures will be determined by the Wildlife Biologist. These may include:
- As needed, trail alignment will be adjusted to provide appropriate buffer type and width for site specific conditions. New construction activities will not occur within 0.25 mile of bald or golden eagle nests. Exceptions will be evaluated on a case by case basis by a wildlife biologist, and may be adjusted based on current protection or management recommendations provided by USFWS and/or ODFW.
- Restrict activities within 0.5 mile of nest sites from March 1 to August 15 for golden eagles.
- Restrict activities within 0.25 mile of nest sites (0.5 mile line of sight, 1 mile for blasting) from January 1 to August 31 for bald eagles.

Goshawk

- No management activities, including new trail construction, will occur inside the mapped 30 acre nest stand. As needed, trail alignment will be adjusted to provide appropriate buffer type and width for site specific conditions. Decommissioning of existing routes may occur in nest cores outside of the seasonal restriction period.
- Seasonal restriction (March 1-August 31) on construction, reconstruction, maintenance and decommissioning activities will be used within 0.25 mile of active nests. Seasonal restriction may be waived on an annual basis if an appropriately timed nest inventory determines that breeding is not active. Exceptions will be evaluated on a case by case basis by a Wildlife Biologist.

Other Raptors

- Active nest sites will be protected from disturbing activities within timeframes and distances from active nests as shown in Table 4. No new construction activities will occur within 330 feet of a nest site (primary zone). As needed, trail alignment will be adjusted to provide appropriate buffer type and width for site specific conditions.
- Construction and decommissioning operations will be restricted for both primary and secondary zones (0.25 mile for osprey and prairie falcon, 660’ for other species) between March 1 and Aug. 1 at active nests. Exceptions will be evaluated on a case by case basis by a Wildlife Biologist.
- An evaluation of potential disturbance will be done by a wildlife biologist prior to planned construction, reconstruction, maintenance or decommissioning if a new nest is discovered. Such an evaluation will take into consideration the species involved, topography, the type, intensity and duration of the activity, and other criteria (such as proximity to open roads, visual screening, etc.).

Snags/Down Logs

- To the greatest extent possible the trail system will be designed to minimize tree and snag felling during trail construction. Retain large (>20” dbh) snags and snag patches to the extent possible during trail lay-out, construction and maintenance.
- Snags that pose a safety hazard which cannot be mitigated will be topped or felled.
- Safety hazards will be identified by a qualified person, as defined by, and using the procedures provided in the interagency Field Guide for Danger Tree Identification and Response (Toupin et. al., 2008).
- Where it can be done safely, danger trees in excess of 20” dbh should be cut with high stumps within suitable habitat for white-headed woodpeckers.
- Active nest trees (or snags) located during layout or project implementation will be designated with a wildlife tree marker and protected. If the nest tree is determined to be a safety hazard, coordination with the Wildlife Biologist will occur to determine if the hazard can be mitigated. If the hazard cannot be mitigated, felling of the tree will occur outside of the nesting season after the young have fledged. No felling of trees or snags with visible nests or cavities will occur from March 1 to August 15. Exceptions or waivers will be evaluated on a case by case basis by a Wildlife Biologist.
- To the greatest extent possible the trail system will be designed to minimize loss of large (>20” diameter, large end) down wood habitat during trail construction. To achieve this, trail location should be selected to avoid placement through squirrel middens, sites with hollow logs or old log decks to the extent possible. Where possible conceal unauthorized and unwanted user created trails by scattering woody debris in full length or with roots attached, rather than cutting into shorter pieces. The intent is to retain large wood (>20”) in the longest pieces possible along trails.

Big Game

- Timing restrictions will be placed on project construction, re-construction, decommissioning and maintenance activities from May 15 through June 30 within elk calving areas. These areas were established based upon telemetry data from radio collared elk in the Ochoco Mountains (ODFW), district records and other sources.
- Timing restrictions will be placed on project construction, re-construction, decommissioning and maintenance activities from September 1 through October 15 within 0.25 mile of known elk wallows.
- The Rager Cooperative Travel Management Area (green dot road closure agreement) will remain in effect under all alternatives. Only routes designated as open and specified on the TMA map will be available for travel during the period listed on the brochure for each year. The timing of this restriction varies from year to year and is based on the dates of the rifle hunting seasons, which are determined by Oregon Department of Fish and Wildlife (ODFW). Information on the TMA will be provided at Staging areas and trailheads prior to hunting season each year.
- To the greatest extent possible, OHV trails will be routed away from water sources, mineral licks, wallows, wet meadows and aspen stands.

Range

- Use cattle guards at fence crossings to reduce the frequency of gates being left open and allowing livestock to disperse through pastures and other allotments.
- In range allotments, signs will be posted at staging areas and trailheads to inform all user groups that there are livestock in the area and to be aware of their presence.
- Trail distance from water developments should be at least 100 feet to reduce the potential of collisions between livestock and off-road vehicles.
- Trails will not cross an allotment's fenceline more than two times in order to reduce the amount of fence crossings and necessary cattle guards and to reduce the potential for an increase in the need for fence maintenance by permittees. Exceptions would be coordinated with the Range Conservationist.
- Minimize the length of trail running parallel to and within 20' of pasture fences, in order to prevent impacts to fence stability and condition from use of the trail, and to improve safety.

Cultural

- The need for cultural resource survey will be determined along each of the proposed routes, at each proposed staging area and trailhead, and at each proposed restoration site. This need will be determined based on extent of previous survey, location of known sites and high probability areas.
- For known and discovered sites, a list of site-specific design elements will be developed and included in a FOIA-exempt file in the project analysis file, and will be made available to the implementation team for this project.
- Cultural resource surveys will be conducted in advance of all ground disturbing actions. Surveys of potentially impacted areas will be done in accordance with the Ochoco Inventory Strategy.
- To the greatest extent possible the trail system will be designed to minimize potential direct and indirect effects to known cultural sites and historic properties.
- During implementation of proposed activities for this project, if cultural materials are discovered, the activity will stop until the District Archeologist or their representative can review the site. If possible, trail alignment will be re-located in order to avoid newly discovered sites. In the event that a site cannot be avoided, then mitigation will be required

and will be coordinated by the District Archeologist, or the route will be dropped from consideration and not constructed.

- Where a road is converted to a trail through a site, the narrowing of the trail will be accomplished by methods that maintain the integrity of the site below the surface of the road bed. To avoid disturbance to known sites, use methods to narrow routes that do not involve ground disturbance. These include placement of barriers such as down wood or boulders, limiting the clearing of vegetation or overhanging branches, or defining the width of a trail using fallen trees.
- Decommissioning or concealment of existing unauthorized and unwanted user routes may occur on archeological sites, under coordination with the archeologist and using methods that maintain the integrity of the site below the soil surface. Rehabilitation activities on known sites would use appropriate non-ground disturbing methods such as barriers at or above the soil surface and shallow rooted vegetation.
- Trail routes that are proposed on top of, or crossing over, segments of FS road 2630 will include design features in accordance to the Historic Summit Trail Management Plan and relevant Standards and Guidelines (LRMP 4-61, 4-125, 4-180, 4-182, 4-190, 4-192 to 193).
- Unless limited by topography, trail drainage features would be placed outside of site boundaries. If drainage is required within a site boundary, then mitigation would be implemented as described in the Mitigation section of this document.

Mitigation Measures Common to All Action Alternatives

The following mitigation measures are an integral part of each of the action alternatives. These are different from Project Design Features in that they are typically tied to a specific route, trail or location and they are used to avoid, minimize, rectify, reduce, or compensate an impact (40 CFR 1508.20). They are listed here separately to avoid repeating them in each alternative description.

The effectiveness of each measure is rated at high, moderate, or low to provide a qualitative assessment of how effective the practice would be in preventing or reducing resource impacts. These mitigation measures and design elements are considered in the effects discussions of Chapter 3.

Effectiveness ratings of High, Moderate or Low are based on the following criteria: a) Literature and Research, b) Administrative Studies (local or within similar ecosystem), c) Experience (judgment of qualified personnel by education and/or experience, d) Fact (obvious by reasoned, logical, response).

High*:* Practice is highly effective (greater than 90 percent), meets one or more of the rating criteria, and documentation is available.

Moderate*:* Documentation shows that practice is 75 to 90 percent effective; or logic indicates that practice is highly effective, but there is no documentation. Implementation and effectiveness of this practice needs to be monitored and the practice would be modified if necessary to achieve the mitigation objective.

Low*:* Effectiveness is unknown or unverified, and there is little or no documentation; or applied logic is uncertain and practice is estimated to be less than 60 percent effective. This practice is speculative and needs both effectiveness and validation monitoring.

Botanical Resources

- To assure protection of a sensitive plant population adjacent to a class I staging area (Alternatives 2 and 4), a structure such as split rail fencing would be used to define the staging area in proximity to the population. *High*

- To assure protection of active material Sources from invasive plant introduction and to increase rider safety, active portions of active material sources at Scotts Camp and Six Corners will be fenced (Alternatives 2 and 4). *High*

Cultural

- Incorporate data recovery *(high)*, protection *(moderate)*, and/or avoidance *(high)* in eligible and unevaluated cultural resource sites.
- Where site recovery information is required, it would consist of a detailed site record, sketches of the site and any artifacts or features present, gathering GPS data for updates to the spatial record, and entering field data into the corporate tabular database. These data are then forwarded to State Historic Preservation Office (SHPO) to complete the consultation process. *High*

Education, Enforcement, Safety, and Operational Maintenance Plan

The Ochoco Summit Trail Project would place an emphasis on education, enforcement, safety and operational maintenance. The following is a successful model used by the Central Oregon Combined Off-Highway Vehicle Operations (COHVOPS). COHVOPS was first chartered in early 1998, to promote customer service and efficiency in the management of public land with a mission to partner available resources in efficient, cost-effective ways. Their purpose is to provide a high quality OHV program in central Oregon that is centered on consistency, customer service, and resource protection. COHVOPS has the latitude to cross agency boundaries and explore creative new ways of doing business.

Safety, Education and Law Enforcement

The Safety Education strategy and Law Enforcement plan is based on the three "E" concepts: Engineering, Education, and Enforcement. The benefit of a strong safety education program is that it provides *"Education"* as a means to prevent violations through visibility, information, maps, brochures, and signing; the intent is to use education as a means to increase compliance, agency visibility, and visitor safety on public lands. This is achieved through on-the-ground education patrols, staffing education booths at trade shows and other OHV related events and expanding youth education programs. Other methods used to increase OHV education and safety include informational kiosks, quality mapping and signs, and educational materials. Law enforcement actions would likely encourage compliance through education in the first two years of project implementation, although it is unknown what level of non-compliance may occur initially. In a worst-case scenario, if education, monitoring, and enforcement do not succeed in correcting problems, portions of the trail system can be closed using Code of Federal Regulations prohibitions for motor vehicle use (CFR 261.16).

Safety and Education

The safety/education program assists in the implementation of an effective monitoring, maintenance, and enforcement. This program places a strong emphasis on user education and encourages user-ownership of the area, creating an atmosphere of voluntary cooperation and self-policing. Currently, 65 percent of the staff time combined with Trail Rangers, user groups and other volunteers is spent on the ground conducting Education Patrols. The remaining time is used for staffing education booths, teaching the ATV Rider Course, and providing personnel for presentations and special events. Volunteerism has exceeded 360 person days in central Oregon.

The Trail Ranger program has been successfully employed in central Oregon and consists of Forest Service staff and volunteers. The group of volunteers is an important part of the safety/education program and each volunteer is asked to make a commitment of 24 hours per year to the program. Currently, COHVOPS has a bank of volunteer labor commitments from various central Oregon user

groups. Tasks that have been negotiated in the past with these groups and individuals have included trail grooming, maintenance, and annual log out of trails in designated trail systems. They also have a volunteer Sutter (machinery uniquely designed for OHV trail maintenance) operator. Many volunteers donate the use of their personal equipment, including vehicles, motorcycles, ATVs, and chainsaws, while performing services. Initial indications through public outreach on the Ochoco Summit project suggests that there are volunteers willing to help patrol staging areas and trails, provide information and maps, answer questions related to trail conditions, and talk about riding safety.

As part of a larger program, individual volunteers, Trail Rangers, and user groups assist in staffing educational booths at trade shows and other OHV events. This lends the opportunity to reach thousands of potential visitors and provide information about the trail systems, *Right Rider* ethics and education, "Tread Lightly!" principles, OHV Oregon Laws and rules, equipment requirements, and Required to Ride information. The booths at these events are designed to draw in all ages, types and classes of OHV users, individuals that are new to the sport, and the general public that has an interest in OHV use. Whenever possible, the Oregon Parks and Recreation Safety program and trailer is incorporated into the educational booths.

Trail system maps are updated and reprinted as needed for distribution at the various staging areas and trailheads, as well as local vendors and agency offices. Educational materials that are on-hand at display booths come in any number of different forms, including pamphlets, brochures, manuals, and souvenirs. Informational kiosks are located at trailheads and other key locations. These structures offer information on interpretive opportunities, fire restrictions, general area regulations, maps, invasive plant control, wildlife, and other important resource topics.

Mapping and signing are essential for updates on the status of trails/riding areas, how to get there, and how to get back. Mapping and signing makes it easier to disperse riders, increase utilization of the trail systems, increase safety, and provide a way to plan daily trips. Maps also provide another opportunity to inform users on regulations, ethics, user safety, and equipment requirements

Law Enforcement

The Forest Service has the responsibility of enforcing the laws of the United States including Titles 16, 18 and 21 United States Code (USC) as well as the Code of Federal Regulations (CFRs) promulgated under the authority granted in16 USC §551. Those regulations can be found in CFR, Title 36, Part 261, Subpart A, B and C. Subpart A regulations apply to all National Forest System Lands. Subpart B is Special Orders that apply to specific National Forest System lands such as Regions, Forests, Grasslands, or specific Ranger Districts. Subpart C regulations apply to specific Regions and have gone through the rulemaking process. The CFRs are implemented to address violations that affect National Forest System lands. Violations that affect NFS lands include, but are not limited to, interference with Forest Officers, disorderly conduct, fire, timber, forest products, livestock, fish and wildlife, property, occupancy and use, Forest roads and trails, OHV use, wilderness, and primitive areas.

There are several methods to gain compliance of National Forest System rules and regulations. The primary method to gain voluntary visitor compliance is through proper area engineering coupled with an effective education component. Easily understandable signs, substantial public education and well-engineered barriers to prevent trail proliferation are essential components for success. With these components in place it allows law enforcement to focus on a smaller number of "willful violators."

The first line of enforcement is all Forest Service employees. All Forest Service employees are considered Forest Officers and serve as the eyes and ears for the agency. These employees are

required to document and report any incidents they observe involving the violation of the laws of the United States including the CFRs.

The second line of enforcement is Forest Protection Officers (FPOs). FPOs have authority to issue citations for CFR violations committed on National Forest System lands. These violations typically involve littering, resource damage, OHV violations, and area closures. FPOs also gain compliance through public education during field contacts. Most FPOs work seasonally, but there are also many who work under a full-time status for the Forest Service.

The third line of enforcement is Forest Service Law Enforcement Officers (LEOs). LEOs patrol for and respond to calls for service for CFR violations, state law violations, other federal crimes, and investigations that are more serious in nature. LEOs also gain compliance from offenders through warnings and education.

Forest LEOs can also assert their federal and state arrest authority for those violations that warrant it. Along with protecting the National Forest natural resources, LEOs also provide for the safety of forest visitors, Forest Service employees, Forest Service volunteers, and other government agents.

Having an enforcement presence on the ground encourages public awareness of responsible use, increases compliance with OHV rules and regulations[5], and promotes the protection of natural resources within the recreation areas of central Oregon. An increased presence of law enforcement officers at the staging areas, on the trails, in the dispersed riding areas, and with overflights, gains rider buy-in to the rules and regulations, and reduces acts of violence, violations, and other related offenses. Law enforcement officers support trail and riding ethics and promote OHV education, which relates to the safety of the trail users. A law enforcement presence allows for faster response times to accidents, emergencies, search and rescues, and violations.

The goal of a successful enforcement program is demonstrated by a very high rate of user compliance, which is presently the case within the current designated trail systems in central Oregon. To aid in monitoring effectiveness, each patrol officer records hours of patrol time, contacts made, locations of contacts, types of violations, warnings written, and citations issued. These data are entered into a nation-wide database called LEMARS (Law Enforcement Monitoring and Reporting System). The data are then used to determine areas where education patrols or enforcement patrols are most needed and most effective and also help indicate where additional signing, information kiosks, and trail maintenance may be needed or required.

Trail Rangers employed by the Forest Service have the authority to issue citations, although the main emphasis is education. Volunteers that patrol as part of the Trail Ranger program are used to enhance the routine enforcement by Forest Protection Officers, Forest Service law enforcement officers, and the County Sheriff Patrols.

Full time law enforcement officers spend approximately five percent of their time conducting OHV compliance patrols. They have the ability to patrol OHV areas on Class I and III ATVs, all other patrols are by vehicle. This includes the intermittent use of aerial patrols throughout the spring and fall. Prineville BLM makes up the overall staffing of patrol officers in central Oregon with one full time and one three quarter time BLM Law Enforcement Rangers. The Forest Service is staffed with six law enforcement officers: three located in Bend, and one each in Crescent, Sisters, and Prineville. These officers are responsible for law enforcement on the Deschutes and Ochoco National Forests and the Crooked River National Grassland, which encompass just over 2.5 million acres. These lands extend about 100 miles along the east side of the Cascade Mountains crest and eastward into the Ochoco Mountains. The officer that is stationed on the Ochoco National Forest may respond to calls from anywhere in Central Oregon. Also, there are approximately 25 Forest Protection Officers.

[5] Monitoring has shown a high level of compliance on designated trail systems in central Oregon managed by COHVOPS. The referenced monitoring data may be requested from the Ochoco National Forest.

Although the FPO and LEO presence on the Forest is limited at this time, there is a cooperative deputy from Crook County whose primary responsibility is to designated motorized trail systems. There are also funding opportunities for user education and law enforcement through Oregon Parks and Recreation's OHV funds that are not available for enforcement of non-designated areas. This source has helped the COHVOPS organization to fund four to five full-time Deputy Sheriffs with focused responsibility on designated motorized trail systems.

The action alternatives would create a limited area in which motor vehicles can legally operate by designating a trail system within the project area. The remaining area would be closed to motorized travel except on Maintenance Level 2-5 roads. Part of the strategy for Law Enforcement personnel would be to allow the public to gain knowledge of the new rules and system through information provided by law enforcement personnel, OHV volunteers during field contacts, at trailheads and staging areas, and at the Ochoco National Forest office.

Staging areas offer a centralized area for law enforcement personnel to provide compliance emphasis with regard to CFRs and state laws. They also provide a centralized area where equipment checks could be conducted.

Operations and Maintenance

In order to provide a high quality, well maintained trail system, the Ochoco Summit OHV project would endeavor to utilize the assets in the Central Oregon Off-highway Vehicle Operations (COHVOPS) Operations and Maintenance program. Through formation of one OHV team, it provides the most efficient staffing, equipment, and materials necessary to operate and maintain the central Oregon OHV trail systems.

Through consistent operations and maintenance, the trail system in Ochoco Summit OHV trail system would be maintained in a condition where the width, depth, drainage, and control of the OHV riders to keep within the parameter of the designed trail. The maintenance performed is dependent on moisture and weather conditions. The maintenance schedule and priorities may change during the year depending on unusual climatic events, shifts in use patterns, or updated information obtained from condition surveys. Most maintenance would be performed mid-week to avoid conflicts and safety issues with the OHV customers.

COHVOPS currently manages eleven designated trail systems with 657 miles of trails, 305 miles of shared use roads, and ten designated OHV play areas. Timely maintenance keeps the integrity of the trials in check by logging out fallen trees, keeping impinging brush from forming, and maintaining proper drainage to confine potential undesired off-site effects. It also keeps moguls from forming; moguls can potentially be a hazard to trail users. Routine activities include an annual sign maintenance program.

The following are specific details involved in the proposed trail maintenance program:

Condition Surveys – Periodic condition surveys would occur for the trails, play areas, staging areas, and facilities within each of the OHV riding areas to provide an assessment of priority maintenance. The condition of each trail, the number and condition of all trail signs, condition of fencing, road crossings, play areas, staging areas, camping areas, and access roads would be documented.

Trail Logout – Trees that fall across trails create obstacles that must be removed before user-created trails are developed around the blockage. Trail logout takes place as trails open in the spring, after major windstorms, and periodically throughout the year to make certain there are no trees blocking the trails. Much of the logout would be accomplished by volunteers supporting the program.

Trail Grooming – Trail grooming slows the development of trail moguls or whoops, fills holes and ruts, and improves the riding surface of the trails. Regular grooming has many obvious benefits for riders and keeps them confined within the trail system, but it also extends the interval of time before

reconstruction becomes necessary. Trail grooming normally occurs during the spring and the fall when there is enough moisture in the ground to solidify the trail tread. Currently, COHVOPS averages 600 miles of trail grooming during a normal year.

Trail Reconstruction – Grooming is an excellent tool to defer trail reconstruction, but when the moguls become too large, it becomes necessary. Trails are generally reconstructed every three to five years, depending on use. Trails at the core of the system may need to be reconstructed annually due to extremely high use levels. Trail reconstruction may also be used to change the design of a trail and create a higher quality riding experience. A winding trail also slows the riders down making the trail safer and decreases the development of moguls. After reconstruction, the trails remain temporarily closed until the grooming is complete and the tread has solidified. Most traill reconstruction would occur in the same timeframe as grooming. Currently, approximately 150 miles of trails are reconstructed by COHVOPS annually.

Facility Maintenance –This includes cleaning and pumping of toilets; site maintenance of staging areas and camp sites, maintenance of kiosks, map boxes and split rail fencing, garbage removal, litter cleanup; and repairs from vandalism.

Sign Maintenance – Signs and accurate maps are one of the key elements in customer service and keeping riders where they are designated to ride. Currently, COHVOPS and its partners maintain over 6,500 signs within the existing Central Oregon trail systems, staging areas, access roads, and play areas. They are frequently in need of repair or replacement due to damage from the elements, vehicles, or vandalism. Missing, damaged, or vandalized trail signs would be replaced as soon as possible. The priority would be to replace safety signing, such as yield, yield-ahead signs, warning signs on open roads prior to and at OHV trail crossings, and shared use road signs.

Equipment Maintenance –Use of specialized equipment requires a good maintenance program. Equipment expected to be used includes chain saws, Sutters, ATVs, and motorcycles as part of the education and enforcement program.

Operations and Maintenance Guidelines

- An annual trail maintenance plan would be prepared that would outline the trails/areas to be worked on and the recommended treatments. All maintenance performed would be recorded on a maintenance log to facilitate future planning and accounting of work accomplishments.
- Trail condition surveys and monitoring would be performed to identify maintenance needs. Any undue hazards that are identified would be treated as a priority.
- Once heavy maintenance is performed with the Sutter, the trail would be closed until enough moisture is received to firm up the trail tread.
- To improve the flow of the trail and reduce the potential for widening, curves would be super elevated where practical.
- Trail grooming would be performed on high use trails to slow the growth of moguls and maintain a smooth tread. If moguls develop to the point that users ride off to the side of the trail, the trail would be scheduled for reconstruction. Generally, trails that have been reconstructed most recently would receive priority for grooming.
- Any off-trail tracks would be raked out, concealed, rehabilitated or obliterated.
- Dead, inflexible limbs and stubs would be pruned during regular maintenance. To the extent possible, pruned limbs would be cut flush with the trunk. Any live limbs that would require pruning would be cut beyond the collar or branch to facilitate healing over of the cut.
- During logout, an adequate width and turning radius would be maintained; the cut material would be strategically placed to prevent shortcutting the trail, or to deter any off-trail use.

- When a trail follows a closed road, cut material from logout would be staggered randomly from one side to the other so that an "S" alignment is created. The cuts would not exceed the recommended clearing widths so the trails would not be passable by full-sized vehicles.
- Trees that are leaning over the trail or suspended over the trail may be left in place if they are more than six feet above the trail tread and there is adequate sight distance in both directions to see and react to the potential obstacle.
- Any trail signs that are vandalized would be replaced as soon as practical. Replacing safety and regulatory signs would be a priority.
- Generally, no maintenance would occur at play areas unless unsafe holes or ledges develop. Play areas would be checked regularly for signing or fencing damage and other needs.
- All trailheads, staging areas, and facilities would be maintained to clean and safe conditions, having the appearance being sanitary, well-kept and maintained.
- Trailheads, staging areas, and camps would be patrolled 1-2 times per week during the primary season. Litter would be picked up, signs replaced, fences repaired, and bollards installed as needed. Vault toilets would be checked and cleaned at least weekly during the prime season and as needed during the shoulder seasons. Toilets would be checked daily during holidays and other peak days. Vaults would be pumped as required.
- Kiosks would be checked weekly. Faded or damaged posters, signs, and maps would be replaced as needed.
- Map boxes would be stocked weekly, or more often as needed.
- Entry signs would be checked regularly for vandalism and repaired or replaced as needed.
- Gravel roads are maintained by the road crew on an lperiodic basis.
- The trail groomers are utilized to maintain the parking areas and spurs as needed. Spot rocking may be employed to harden soft areas.
- Vandalized facilities would be repaired or replaced as soon as practical.
- Boulder or other barriers would be installed to define campsites as needed.
- The following identifies management practices and operational guidelines for minimizing potential effects to adjacent resources that have been identified for avoidance of motorized use:
- Potential effects to sensitive resources are mitigated by avoidance through trail location, site hardening, use of physical barriers, seasonal closures, and other effective mechanisms.
- Vegetation removal is kept to a minimum. Most maintenance requires only minor trimming of overhead vegetation or removal of fallen trees.
- If monitoring indicates that a decline in user experience or unacceptable numbers of riders are using a trail system, an assessment of the need to implement a method designed to control and/or limit the number of riders would be developed.
- Through consistent operations and maintenance, trails are maintained in a condition where the width, depth, drainage, and control of the riders is adequate to protect adjacent resources; trails are kept within the parameter of the designed trail management objectives; and in a condition that provides for user safety.
- Informational kiosks, located at trailheads and other appropriate locations, are used to provide information on general area regulations, trail etiquette, maps, invasive plant prevention, wildlife and resource protection, fire restrictions, and for interpretive opportunities.
- Trails maps are provided at all trailheads, staging areas, kiosks, and USFS offices and are made available on-line. The maps provide information on regulations, signing, ethics, safety, as well as trail locations.

Monitoring

The Forest Service believes a well-designed and monitored trail system can provide a positive riding experience for a segment of the public that desires a designated trail system while maintaining various other uses and values of the National Forest lands. The following summary of the planned monitoring within the Ochoco Summit OHV project area includes specific monitoring items identified by resource area:

Soil and Water Quality

- Implementation monitoring and Water Quality monitoring to evaluate the effectiveness of BMPs and INFISH standards and guidelines is included for all the action alternatives.
- Drainage would be monitored prior to opening of the trails to ensure that they are functional during operating season, and after the open season to ensure that they are fully functional going into the winter when the trail is not in use.
- Areas with high erosion potential would be monitored to determine whether design treatments intended to reduce erosion potential were implemented according to plans and that they are effective in achieving desired outcomes. Possible methods include establishment of long term photo points or transects in selected sites to monitor changes in soil depth, displacement and compaction.
- The alternatives include several design elements aimed at reducing the potential for sediment delivery from trails in RHCAs and at stream approaches. Selected reaches would be monitored to evaluate changes in sediment. Baseline water quality data for normal conditions would be established at selected sites, and would be used as a basis from which to measure change. Water quality standards and the amount of acceptable change would be identified. Monitoring would occur along stream courses, springs, wet meadows, and RHCAs to determine whether project design elements were implemented as planned and whether they are effective in meeting protection needs.
- Unauthorized or unwanted user created routes that are closed or decommissioned under this project would be monitored to determine if effective ground cover has become established in order to minimize erosion and sedimentation.

Invasive Plant Species

- High priority areas such as sensitive plant populations, rare habitats, staging areas and parking areas would receive regular monitoring and prevention for invasive plant species presence. If noxious weeds are found, an early detection rapid response strategy for treatment of weeds would be implemented.

Wildlife

- Although no trail systems have been designed to overlap existing known bald eagle nest sites or Bald Eagle Management Areas (BEMAs), periodic monitoring of selected bald eagle nest sites would continue to occur within the project area as part of the wildlife monitoring program.
- Although no trail systems have been designed to overlap existing known goshawk core areas or primary zones for other raptors, periodic monitoring of selected raptor nest sites would continue to occur within the project's area of influence as part of the wildlife monitoring program.
- Monitoring and enforcement of system route closures within the Rager Cooperative Travel Management Area would occur. The focus would be during hunting season and would emphasize patrols within the TMA.
- Periodic monitoring of designated routes through special wildlife habitats such as elk calving areas, old growth management areas, pileated woodpecker foraging habitat and goshawk post

fledging areas would be conducted to determine if unauthorized or user created routes are developing in a fashion that connects with the designated route. If such unwanted, unauthorized or user created routes are detected then steps would be taken to close, rehabilitate and/or conceal such routes at their intersection with the designated route and at their point of origin.

Range

- As part of a routine maintenance program, monitoring of all fences that are crossed by a designated route would occur during and after trail construction and route designation and periodically after implementation to determine effectiveness and needs for maintenance or repair.
- Monitoring of all water developments that are within ¼ mile of a designated route, trailhead or staging area would occur during and after trail construction and route designation and periodically after implementation to determine if unauthorized routes have developed which need to be closed.
- Monitoring of range designated monitoring areas (DMAs) that are within ¼ mile of a designated route, trailhead or staging area would occur during and after trail construction and route designation and periodically after implementation to determine if unauthorized routes have developed that need to be closed.

Cultural Resources and Site Monitoring Plan

- Monitoring of all sites that are crossed by, or adjacent to, a designated route would occur during and after trail construction and route designation. Following implementation, site visits would occur periodically to ensure that integrity of these sites is being maintained. This would be coordinated by the District or Forest Archaeologist.

Road Management and Public Safety

- The Road Manager(s) would be responsible for monitoring the condition of designated mixed use routes and crossings of open roads, addressing items that may need corrective action associated with timing of maintenance and public safety. Visibility related to adequate sight distance on curves and at intersections and adequate signing would be the focus.

Recreation

- Monitoring would be conducted by Central Oregon Off-Highway Vehicle Operations (COHVOPS) which incorporates agency personnel and volunteers into an integrated education and enforcement program that monitors elements such as sound testing at staging areas and key locations, and rules related to camping and use of the trail system.
- Trail management would include implementation monitoring of trail construction (including all design elements), type(s) of vehicle accessing each trail area and season of use.
- For conversion of road beds to trails, monitoring would be conducted to determine if widths in excess of trail width specifications were adequately rehabilitated with effective ground cover or width controlling devices such as logs or boulders.
- Trails would be monitored annually to determine if improvements need to be made to support intended use and compliance with trail rules.
- Trail Condition Surveys would be conducted annually to determine if repair or restoration needs have arisen. Monitoring would be done both before the trails open for public use in the spring and throughout the open season. These surveys also include checking to determine if unauthorized or user created trails have developed that need to be addressed.
- Stationary sound testing (Society of Automotive Engineers (SAE Standard J1287) of vehicle dB levels would be conducted periodically at all staging areas.

- Ambient sound testing would be conducted periodically in selected areas (such as Walton Lake Basin) during the operating season to determine the effectiveness of the Sound Model and application of the 45 dB level for establishing sound impacts above ambient level.
- Monitoring of campsites at staging areas and trailheads would be conducted to determine if the camp areas are accommodating user needs, and to determine if camp sites need to be defined (placement of physical limits).
- Trail use would be monitored in selected locations via a combination of visual visitor counts at staging areas, traffic counters and trail counters.
- Implementation monitoring results would be available through the Forest Plan Monitoring Report. At the programmatic level, minimum trail plan monitoring would include an annual report of the following:
    - Miles of new trail constructed by user type
    - Miles of trail reconstruction by user type
    - Miles of trail maintained by user type
    - Miles of total trail that meet meaningful measure standards

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of the purpose and need (to designate a sustainable system of roads, trails and areas open to motor vehicles that will provide legal public access, enhance regulation of unmanaged wheeled motor vehicle travel, protect resources, and decrease conflicts between motorized and non-motorized use on the Ochoco National Forest), duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below.

A concept utilizing 1 long all-user trail system (80” wide) with short side loops for individual user groups (50” and 24”wide) was explored early in this planning effort. When presented to the Provincial Advisory Committee (PAC) the planning team was told that a long all-user trail would not satisfy the needs or desires of the OHV trail using community. It was suggested that the all-user concept be dropped and separate trail systems developed which would emphasize opportunities and quality for individual user groups. Based on that feedback the all-user central network concept was abandoned and the Proposed Action was developed.

Numerous potential routes were provided by COMAC (Central Oregon Motorcycle and ATV Club). To the extent these routes fit within the sideboards established for this project (refer to Purpose and Need, Chapter 1) the COMAC routes were incorporated into project alternatives. However many of the suggested routes were not included in a fully developed alternative due to conflicts with sensitive resources (sensitive plant habitat, weed populations, fish bearing streams, etc), established uses or recreation emphasis (horse camp, semi-primitive recreation, etc), riparian management objectives or other established land management objectives. For example: a motorized route from the staging area at Ahalt Pit into the Walton Lake Basin and connecting with highway legal roads at Ochoco Creek was found to be inconsistent with objectives for recreational uses at Walton Lake and did not connect with any other trail or mixed use road. Establishing a loop trail between mixed use roads at Walton Sno-Park and Round Mountain was found to be inconsistent with objectives for Round Mountain

National Recreational Trail. For these reasons the suggested routes northwest of Walton Lake and south of Walton Sno-Park were not included in a fully developed alternative.

Several options were considered for changing the designation of highway-legal roads under the Forest- level Travel Management Plan, in order to provide mixed use opportunities potentially connecting with trail systems that were being evaluated. The road segments considered included: FS 2630 between the junction with 2200-150 and 2630-400 to connect between the mixed use portions of 2630; FS 2200-150 to connect the staging area at Walton Sno-Park with mixed use portions of the 2630; FS 2200 to connect between trails at Howard Creek and the staging area at Walton Lake; FS 4250 south of the junction with 4256 to a COMAC route coming in from the west; FS 3810 or 4200 to connect between Wolf Creek Campground and the proposed trail network via mixed use roads; a short segment of FS 30 to connect mixed use roads 3000-800 and 4256 and a short segment of FS30 to connect mixed use roads 3000-500 and 4200-450. Due to declining road maintenance budgets and concern for public safety on these high use, high speed roads it was believed that generally the cost of making the changes necessary to make them safe for shared use by traditional and OHV traffic would not be a priority for road and OHV trail maintenance funds. Therefore conversion of highway legal roads to mixed use roads was an alternative that was not fully developed. In some areas parallel trails are included in action alternatives that provide the connections on a constructed trail rather than by putting the OHV onto high traffic roadways. Examples of this are parallel trail on segments along FS 12, 42 and 38 near the Six Corners and Cottonwood Pit Staging Areas, and also along the FS 30 between 3000-500 and 4200-450. In other cases an alternate connection was provided requiring only direct crossing of highway legal roads. Examples of this are connecting loops just east of the FS 30 connection between 4256 and 3000-800 under Alternatives 2 and 4.

Some suggested alternatives were outside of the planning area and were considered to be outside of the scope of this analysis. One of these areas, the McKay Creek watershed could connect to the existing Green Mountain Trail, but it is outside of this project area and therefore outside of the scope of this project. Another area that was suggested was FS 5810, which starts in the project area but travels outside of the project area prior to reaching Spanish Peak. This option was considered by the team, but it is outside of this project area; therefore, converting this highway legal road to a mixed use road in this area would be outside the scope of this project.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative (see Table 5). Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 5. Comparison of alternatives.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Total miles in Designated System Routes (including mixed-use roads)	0	170	101	212
Total miles of OHV trail	0	124	88	158
Miles of Class I Trail	0	55	35	95
Miles of Class II Trail	0	20	0	18
Miles of Class III Trail	0	49	53	45
Miles of trail not on GIS roads (“new construction”)	0	69	50	84
Number of Dispersed Campsites within which OHV noise from the developed trail system might be greater than 45 db	0	35	18	37

Table 5. Comparison of alternatives.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Miles of Dispersed Camping Roads within the >45 db noiseband	0	65	26	73
Miles of Equestrian Endurance Event Route within the >45 db noiseband	0	1.89	1.46	2.12
Miles of Keeton Trail within the >45 db noiseband	0	0.03	0.02	0.02
Number of Developed Recreation Sites within which OHV noise from the developed trail system might be greater than 45 db	0	4	4	5
Acres of Roaded Modified Recreation Opportunity Spectrum within the >45 db noiseband	0	10,837	5,818	12,771
Acres of Roaded Natural Recreation Opportunity Spectrum within the >45 db noiseband	0	1,668	1,059	2,220
Acres of Semiprimitive Non-Motorized Recreation Opportunity Spectrum within the >45 db noiseband	0	276	117	292
Miles of trail system in RHCA	0	18	7	22
Total creek/wetland crossings	0	142	62	170
Class 1 & 2 riparian crossings	0	27	16	27
Class 3 riparian crossings	0	4	5	11
Class 4 riparian crossings	0	76	34	92
Class 9 riparian crossings	0	35	7	40
Increased motorized route density – 6th Field (number of subwatersheds in the project area)	0	11 of 30	9 of 30	13 of 30
Acres USFS more than 1/2 mi from motorized route	50,177 (16%)	44,374 (15%)	45,148 (15%)	43,085 (15%)
Acres USFS less than 200 m from motorized route	115,127 (38%)	125,745 (42%)	123,036 (41%)	129,390 (43%)
Acres of elk security habitat (1/2 mi + 250 ac)	47,969 (16%)	42,460 (14%)	42,514 (14%)	41,132 (14%)
Acres of big game hiding cover (>1/2 mi from motorized route)	11,847	11,558	11,465	11,285
Acres of big game thermal cover (>1/2 mi from motorized route)	9,197	9,089	8,978	8,915
Total big game cover (>1/2 mi from motorized route)	21,044	20,647	20,443	20,200
Miles of system within 660' of hawk/owl nest	0	0.25	0	0
Miles of system within1/4 mi of osprey nest	0	0.6	0.46	0.46
Miles of system within ¼ mi of goshawk nest	0	2.95	1.46	2.78
Miles of system within goshawk post-fledging area	0	5.98	4.13	6.7
Miles of system within Old Growth Management Areas	0	2.59	1.44	2.54
Miles of system within mapped pileated woodpecker feeding habitat	0	2.82	0.68	2.85
Acres and miles of designated trail system in special habitat (Hardwood)	0 acres 0 miles	0.6 acres 0.5 miles	0.6 acres 0.5 miles	0.6 acres 0.5 miles
Acres and miles of designated trail system in special habitat (Meadow)	0 acres 0 miles	2.4 acres 2.02 miles	2.5 acres 2.1miles	4.1 acres 3.35 miles

Table 5. Comparison of alternatives.

	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Acres and miles of designated trail system in special habitat (Rock)	0 acres 0 miles	1.3 acres 1.1 miles	0.7 acres 0.6 miles	1.6 acres 1.3 miles
Acres and miles of designated trail system in special habitat (Shrub-scabland)	0 acres 0 miles	29.1 acres 24.0 miles	10.8 acres 8.9 miles	33.2 acres 27.4 miles
Crossings with highway legal only roads	0	20	16	23
Rehab/Restore sites - user created routes	0	89	54	106
Rehab/Restore sites - decommissioned roads	0	11	7	8
Rehab/Restore sites – closed roads	0	109	84	163
Estimated Construction Cost	0	$978,500	$759,000	$1,071,000

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This Chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in the alternatives chapter.

"Affected Environment" refers to the existing biological, physical and social conditions of an area that are subject to change directly, indirectly, or cumulatively as a result of a proposed human action. Information on the affected environment is found in each resource section under "Existing Condition."

The temporal and spatial scale of the analysis is variable depending upon the resource concern being evaluated. The landscape within the Ochoco Summit OHV Trail System project area boundary is the focus of this EIS, but adjacent lands are considered in this analysis process.

Measures to mitigate or reduce adverse effects caused by the implementation of any of the actions proposed are addressed in Chapter 2, Resource Protection Measures. Effective mitigation avoids, minimizes, rectifies, reduces, or compensates for potential effects of actions. After mitigation is applied, any unavoidable adverse effect to each resource area is addressed in the section titled "Other Disclosures" in this chapter of the EIS.

The following discussion of effects follows CEQ guidance for scope (40 CFR 1508.25(c)) by categorizing them as direct, indirect, and cumulative. The focus is on cause and consequences. Effects exist in a chain of consequences and thus may be labeled "indirect" (occurring later in time or farther in distance, 40 CFR 1508.8(b)), rather than cumulative. For this analysis, in general, direct and indirect effects have been discussed in the context that most readers are accustomed to: those consequences which are caused by the action and either occur at the same time and place, or are later in time or farther removed in distance but are still reasonably foreseeable (40 CFR 1508.8). Cumulative effects are discussed where there is an effect to the environment which results from the incremental effect of the action when added to other past, present, or reasonably foreseeable future actions (40 CFR 1508.7).

Cumulative Effects

There are basically two methodologies the individual resource subjects use in discussing cumulative actions and consequences. The first method would be to describe each individual past, present, and reasonably foreseeable action – including mitigation (cataloging). The second would be to "lump" individual actions if the information regarding those actions would not be useful to illuminate or predict the effects of the proposed action and its alternatives. A mere "cataloging" of effects does not provide the most useful discussion. In some cases, lumping past actions and describing them in terms of "where we are today" can be the most informative. No matter which method is used, it would be formulated to provide the most relevant, useful, helpful, necessary and informative format for the public and deciding official.

The Environmental Consequences disclosures in this EIS include discussion of cumulative effects. Where there is an overlapping zone of influence, or an additive effect, this information is disclosed. In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human

actions and natural events that have affected the environment and might contribute to cumulative effects.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one can't reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, by focusing on the impacts of past human actions, an analysis may risk ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions do. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "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."

The cumulative effects analysis in this EIS is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part:

CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives would add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonable foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision making (40 CFR 1508.7).. is merely a listing of past present and foreseeable actions that have potential to overlap the project area. Because the project appears in this table does not necessarily mean it has an additive effect. Each resource specialist has reviewed this table and if there is a past, present, or foreseeable effect, it is disclosed in the individual resource area in Chapter 3.

Table 6. Past, present and reasonable foreseeable future actions.

Project/Event Name	General Description of Activities	Status
Spears Vegetation and Fuels Management	Commercial and non-commercial vegetation management and fuels reduction; hardwood and upland shrub restoration and road management (4.4 miles construction, 11.0 miles reconstruction, 5.9 miles decommissioning),	Implementation
Zane Vegetation and Fuels Management	Manage stand density and fuels within the Zane Project Area (Allen Creek Watershed).	Implementation
Canyon Fuels and Vegetation Management Project	Commercial and non-commercial vegetation management and fuels reduction; hardwood and upland shrub restoration and road management (0.6 miles construction, 2.0 miles temporary road reconstruction, 4.4 miles reuse of existing temporary roads, 4.9 miles decommissioning, 2.9 miles closure),	Implementation
Ochoco Valley Fuels	Prescribed fire and associated fuels reduction activities in the Ochoco Creek Watershed	Implementation
Gray Prairie Fuels	Prescribed fire and associated fuels reduction activities in the Gray and Lytle Prairie areas of the North Fork Crooked River Watershed	Implementation
Lookout Mountain Prescribed Burn	Prescribed fire and associated fuels reduction activities in the Lookout Mountain Roadless Area	Planning
Deep Watershed Restoration	Proposed stream channel reconstruction, culvert replacements, stream cutbank stabilization, road decommissioning and riparian exclosure fencing along Deep Creek and its tributaries	Implementation
Invasive Plant Treatments (2007)	Deschutes and Ochoco National Forests, Crooked River National Grasslands EIS to reduce the extent of specific invasive plant infestations at identified sites, and to protect areas not yet infested from future introduction and spread of invasive plants species from these sites.	Implementation
Region 6 Invasive Plant EIS (2005)	Implements Standards and Guidelines and prevention strategies to manage invasive plant species	Implementation
Three Trails OHV Project	Proposal to designate approximately 200 miles of trail systems and staging areas near Boundary Springs, Two Rivers, and Crescent Lake Junction. Also would rehabilitate user-created trails. A Deschutes National Forest Plan Amendment would be needed.	Implementation
Umpqua National Forest Travel Management EA (2010)	The proposed action would eliminate cross-country travel, allow motorized use on most of the current open roads, and include approximately 721 miles of OHV trail open to class I and III. Access to dispersed camping would have special provisions to limit access to sensitive areas.	Implementation
Willamette Travel Management Rule Implementation EA (2009)	Motorized travel on the Willamette National Forest would be restricted to designated roads and trails only. Access to dispersed camping would have special provisions to limit access in sensitive areas.	Implementation

Table 6. Past, present and reasonable foreseeable future actions.

Project/Event Name	General Description of Activities	Status
Central Oregon Travel Management Project EIS	The Travel Management EIS implements the travel management rule (prohibiting motorized travel off of existing designated routes where it is not currently prohibited) and continue to provide motorized access for dispersed camping. Motorized travel in Central Oregon would be restricted to designated roads and trails only. Access to dispersed camping would have special provisions to limit access to sensitive areas.	Implementation
Cline Buttes Recreation Area Plan EA	Proposal to create a transportation system and recreation facilities on 32,000 acres of BLM lands approximately five miles west of Redmond.	Implementation
Fremont-Winema Travel Management Plan	The proposed action would eliminate cross-country travel, allow motorized use on most of the current open roads, allow OHV use of all of the current miles of OHV trail (only 8.5 miles), and authorize an 80-acre play-area near Klamath Lake.	Planning
Howard Elliot Johnson Fuels and Vegetation Management Project	Commercial and non-commercial vegetation management and fuels reduction; hardwood and upland shrub restoration, headcut repair and road management (0.4 miles construction, 16.8 miles temporary road reconstruction, 4.4 miles reuse of existing temporary roads, 4.9 miles, and 22.7 miles of closure),	Implementation
Jackson Fuels and Vegetation Management Project	Manage stand density and fuels within the Jackson Project Area (Deep Creek Watershed).	Implementation
Lava Rock OHV System EIS	Proposal to create an OHV trail system on 140,650 acres on the Bend Ft. Rock Ranger District with 154 miles of trails. Proposal includes about 109 miles of Class III, and 45 miles of Class II trails; closure of user created trails in excess of those designated; and closure of level 2 roads in excess of administrative and public access needs.	Planning
Meadow Lake Restoration and Travel Management Project EA (2010)	Sisters Ranger District is proposing a project to focus on restoration of recreation-related impacts to riparian vegetation, fish and wildlife habitat, water quality, and the Santiam Wagon Road. The project would include consideration of providing managed OHV opportunities in the planning area.	Planning
Range Management	The following allotments overlap the project area: Burn, Marks Creek, Crystal Spring, Snowshoe, Canyon Creek, Reservoir, Lookout, Brush Creek, Pringle, Antler, Gray Prairie, Lost Horse, North Fork, Fox Canyon, Big Summit, Deep Creek, Roba, Pisgah, Elkhorn, Badger, Indian Creek, Happy, Derr, Little Summit, Wolf Creek, Rock Creek, Bearskull/Cottonwood and Buck Pasture. Twenty-five of the allotments are active allotments, one of which is a sheep allotment. Remaining active allotments are currently grazed by cattle.	Ongoing
Wolf Vegetation and Fuels Management	Proposal for commercial and non-commercial vegetation management and fuels reduction; hardwood and upland shrub restoration and road management being developed under a collaborative process.	Planning
Ochoco Creek Culvert Replacements	Replacement of two undersized culverts on Ochoco Creek to improve function and to allow passage of aquatic organisms	Planning

Deep Creek is a focus watershed as defined by the Forest Service Region 6 Aquatic Restoration Strategy. Proposed restoration projects were identified in the Deep Creek Restoration Plan, some of which have already been implemented. The purpose of the Deep Creek Restoration Plan was to improve overall stream and riparian health and integrity within the watershed and improve water quality and associated habitat suitable for use by redband trout and other aquatic life. The needs for the proposed action are derived from the differences between current conditions and desired conditions, as described in Forest Plan direction and management objectives. A need was identified to:

- Stabilize stream headcutting and streambanks to improve and maintain channel stability
- Remove and/or replace culverts to allow adequate access for fish
- Allow identified riparian areas to recover natural vegetation
- Provide better distribution of livestock
- Improve in-stream fish habitat
- Decrease stream sedimentation

The decision was made to: 1) Replace 35 culverts and 3 culverts with rock fords to allow passage of flood flows and improve upstream access for redband trout; 2) create 7 water developments, 227 acres of grazing exclosures, 342 acres of riparian pasture, and place large wood along 3.6 miles of stream to better distribute livestock, 3) repair 37 headcut complexes and 18 exposed cutbanks, close, decommission, and reconstruct 47 miles of roads, reconstruct 0.25 miles of channel reaches to reduce in-stream sedimentation, and construct 6 in-stream structures to promote pool habitat for fisheries. Most proposed activities are located within RHCAs and were designed to move the watershed towards meeting interim Riparian Management Objectives (RMOs).

Of these activities, the following restoration projects have been implemented thus far:

- In 2006, 2 gates were installed on FR4272-100 and FR4272-400 in Little Summit Prairie Creek Subwatershed;
- In 2006, 2.8 miles of road were decommissioned in the Lower Deep Creek Subwatershed (FR4200-510, FR4200-600, FR4200-603, FR4200608, FR4200630, FR4260-014).
- In 2011, 1.2 miles of road were decommissioned in Little Summit Prairie Creek Subwatershed (FR4270-503, FR4270-504, FR4270-570, FR4276-030, and FR4276-070);
- In 2011, 0.7 miles of road was closed (FR3000-656), 1.6 miles or road were reconstructed (FR3000-650), and 1.5 miles of road were decommissioned in the Lower Deep Subwatershed (FR3000-610, FR3000-653, FR3000-668, FR3000-669, and FR3000-705).

Transportation

This section contains the entire transportation analysis.

Existing Condition

Location and Distribution

Within the Ochoco Summit OHV Trail System project area there are 1,820 miles of road under various private and public jurisdictions that include federal, state, county, and private entities. The existing road system is, in general, evenly distributed throughout the project area, with a somewhat greater abundance of roads being found in the western portion of the project area, in the vicinity the Marks Creek subdivision and Highway 26.

The majority of roads in the project area are located on moderate to gentle terrain, with ground slopes ranging between 15 and 30%. A few roads can be found in mid-slope positions on slopes ranging

between 30 and 80%; these roads are scattered across the project area from Shadow Creek to Deep Creek.

Within the project area, there are two Cooperative Road Management Areas established by agreement between the Oregon Department of Fish and Wildlife and USDA-Forest Service and adjacent industrial forest land owners. The Rager Green Dot closure, established by the ODFW, identifies a network of open and closed roads during the fall deer rifle-hunting season in the eastern portion of the analysis on the east end of the Ochoco Mountains, from Sept. 30 to November 29. The South Boundary Closure Area, also within the project area, has a year round closure on roads, established by ODFW. The action alternatives were developed outside of the South Boundary Closure Area. There are portions of all three alternatives within the Rager Green Dot Closure area, requiring seasonal restrictions on portions of the routes.

Age and Development History of the Transportation System

The majority of roads within the project area have been in existence for more than 40 years, with few additions having been constructed in the recent past. Some portions of the system date back to the Summit Trail, which evolved from a pack trail developed with the creation of the Blue Mountain Forest Reserves in 1906.

With limited exceptions (and excluding State and County highways), roads in the Ochoco Summit project area have been constructed for access to timber harvest areas. Some roads were constructed specifically in support of mining and access to private land, primarily around Big Summit and Little Summit Prairies.

Road Use Patterns over Time, Now, and in the Future

The majority of roads within the project area, and in particular those roads under Forest Service jurisdiction, have a general pattern of use common to low-standard forest roads in the absence of residential enclaves or developed recreation. Of the arterial roads and major collector through routes such as Forest Roads 22, 30, 42, 2610, 2630, most roads see little use other than administrative traffic and range permittees through the course of the spring and summer. Timber sale activity can contribute substantially to daily traffic numbers, but the pattern of such activity is usually isolated in one particular area at any given time.

Active sheep and cattle grazing allotments are located within the project area, requiring a small usage component provided by permittee vehicles. The Round Mountain electronic site has frequent visits by the special use permittees and USFS radio maintenance crews. The Crystal Springs church camp, located on the west side of the project area, is in use during the summer months. Vehicle traffic may increase associated with the spring firewood season; the bulk of use for the majority of roads comes in the late summer and fall with the commencement of deer and elk hunting seasons.

Related to recreation, road use is steady with visitors to the cabin rentals at Cold Springs and Ochoco Ranger Station, wild horse/spring flowers/wildlife viewing, and trail head use. Traffic is steady to the developed campgrounds at Walton Lake, Deep Creek and Cottonwood. Fishing at Walton Lake and along the North Fork Crooked River is steady. The project area also has a large visitor interest in endurance ride events and horse camping at Allen Creek Horse Camp and Corral Flats.

The anticipated future use patterns will be somewhat reflective of current trends of primarily administrative and timber sale-related use during the summer, firewood permit use in the spring and increased traffic by hunters in the fall. It would also be anticipated, however, that the selection and implementation of an action alternative in this analysis would result in an increase in recreational traffic during the summer months as a result of increased OHV use.

Primary Destinations of Road System Users

The bulk of the roads within the project area do not generally serve any particular destinations, but instead provide access to areas of interest for various users. For land managers and contractors, these roads serve as access to areas where vegetative management or other land management activities are ongoing or planned. These roads also provide access to popular hunting areas such as Pisgah, Barnhouse Springs, and the Deep Creek area.

Existing Maintenance Levels and Road Surface Types

An extensive system of National Forest System Roads exists within the project area. Subsequent to the establishment of the 2005 Travel Management Rule, the Regional Forester of the Pacific Northwest Region issued direction that an Engineering Analysis would be required for any National Forest System Road designated for mixed use (allowing use by both highway-legal and non-highway-legal vehicles). As part of implementation of the Travel Management Rule on the Ochoco National Forest, a mixed use analysis has been performed to establish the suitability of allowing mixed use on roads in the context of their current setting in terms of alignment, width, typical user speed, and presence or absence of traffic control devices. Mixed use roads are available for travel by Off Highway Vehicles (OHV) as displayed on the current Motor Vehicle Use Maps (MVUM). Within the project area the 2012 MVUM allows for mixed use on 659 miles of ML2 roads.

Operational Maintenance Levels define the degree of maintenance required for a specific road and the level of service which that road provides, consistent with road management objectives and maintenance criteria (FSH 7709.58, Transportation System Maintenance Handbook). The five maintenance levels are defined as:

Maintenance Level 1 (M/L 1): Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resource to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate." Roads receiving level 1 maintenance may be of any type, class or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are physically closed to vehicular traffic, but may be open and suitable for non-motorized uses.

Maintenance Level 2 (M/L 2): Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either (1) discourage or prohibit passenger cars or (2) accept or discourage high clearance vehicles.

Maintenance Level 3 (M/L 3): Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either "encourage" or "accept" passenger cars. "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users; unless otherwise specifically authorized, non-street-legal OHV use is prohibited.

Maintenance Level 4 (M/L 4): Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is "encourage" passenger cars. However, the "prohibit" strategy may

apply to specific classes of vehicles or users at certain times; unless otherwise specifically authorized, non-street-legal OHV use is prohibited.

Maintenance Level 5 (M/L 5): Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is "encourage," except that, unless otherwise specifically authorized, non-street-legal OHV use is prohibited.

The majority of open roads (60%) within the project area are native-surface roads (see Table 7). Those under Forest Service jurisdiction are variously managed as either being open for high-clearance vehicle traffic (M /L 2) or as being physically closed so that traffic is eliminated and the roads are in a basic custodial status (M /L 1) but not prohibited (by Forest Order). There are 252 miles of native-surface roads in Maintenance Level 2 status and they are not maintained on a recurring basis but are instead periodically reviewed to determine whether there are maintenance needs necessary to protect adjacent resource values. Some of the native-surface roads in the project area are on private land and are variably open to public access, depending on the wishes of those individual landowners or the existence of public rights of way (as in the case of subdivisions within the project area).

An additional 37% of the roads are either categorized as improved native or aggregate-surfaced. Most of these roads aren't specifically maintained for passenger car use but are generally readily usable by such vehicles under most circumstances.

The remaining 3% of roads are asphalt or bituminous-surfaced facilities, including USFS Roads 22 (Walton Lake) and Road 42 (Big Summit Prairie). These asphalt-surfaced routes are under the jurisdiction of the USDA-Forest Service and are maintained to standards that are represented by M /L 4 and 5. Under these maintenance levels, passenger car use is encouraged and the primary emphasis is on traveler comfort, convenience, and safety.

Table 7. Miles of road by maintenance level.

Operational Maintenance Level	Miles
Unclassified Other Jurisdiction	270
M/L 1 (Closed)	669
M/L 2 (High Clearance Vehicles Allowed)	674
M/L 3 (Passenger Car Allowed; Low Speed)	75
M/L 4 (Passenger Car Accepted; Moderate Speed)	13
M/L 5 (Passenger Car Encouraged; High Speed)	37

Within the project area, operation of non-highway legal vehicles is prohibited on those roads classified as M /L 3, 4, or 5; operation of such vehicles is allowed on those roads not maintained for passenger car use (M/L 1 and 2) in accordance with Oregon Revised Statue 821.055. There are also 15 miles of M/L 2 roads, that for safety reasons, have been identified as prohibiting use of non-highway legal vehicles: Rd 2200-150, Rd 2630 (to Indian Prairie), Rd 2630 (junction with Rd 1200 for 2 miles west), Rd 4250, Rd 4270, Rd 4200-740, Rd 38, Rd 3810 and Rd 4276. A total of 659 miles of M/L 2 roads are open to mixed use by highway legal and non-highway legal vehicles.

Existing Road Management Objectives

The existing management objectives for roads within the project area generally call for roads to be managed primarily for land management and administrative purposes; public access is generally allowed but is a secondary consideration except in areas where subdivisions are located or where there is a specific recreation emphasis. The majority of roads that are managed for land management and/or administrative purposes do see a great deal of public usage during hunting season and the open season for firewood cutting. Arterial and collector routes (two- and four- digit roads) are generally managed to facilitate a mix of commercial, administrative, and public use.

With the exception of those roads providing access to recreational facilities or recreational/permanent residences, the seven-digit local road component is managed, when open, to be primarily used by high-clearance vehicles, including OHVs. Passenger car operation is possible on many of these routes, but no special consideration is given to allowing such use. During timber sale activity, these roads are intended to be single-user facilities, given that their narrow travel ways and lack of frequent, intervisible turnouts preclude opportunities to safely provide for mixed commercial/public traffic.

Route Densities

The Ochoco Summit OHV project area lies within portions of 33 separate sixth-field subwatersheds. The total road density for each subwatershed in Table 8 reflects all the open roads, including all jurisdictions, over 861 miles.

Table 8. Road density for 5th and 6th order watersheds, all open roads, mi/mi^2.

Watershed (5th Order)	Subwatershed Name	Operational Open Road (all jurisdictions) Density mi/mi^2
Bridge Creek		1.31
	Headwaters Bridge Creek	0.62
	Middle Bridge Bear Creek	0.94
	Upper Bridge Creek	1.95
	West Branch Bridge Creek	1.78
Deep Creek		1.90
	Jackson Creek	2.15
	Little Summit Prairie	1.91
	Lower Deep Creek	1.50
Lower Beaver Creek		1.60
	North Wolf Creek	0.84
	Wolf Creek	2.06
Lower North Fork Crooked River		1.27
	Lower North Fork Canyon	0.49
	Upper North Fork Canyon	1.45
Mountain Creek		1.17
	Middle Mountain Creek	1.22
	Upper Mountain Creek	1.14
Paulina Creek		1.89
	Dry Paulina Creek	1.83
	Upper Paulina Creek	1.92
Rock Creek		1.52
	Middle Rock Creek	0.78
	Upper Rock Creek	1.52
Upper North Fork Crooked River		2.34
	Elliot Creek	2.55
	Gray Creek	2.70
	Headwaters North Fork Crooked River	2.07
	Howard Creek	2.28
	Johnson Creek	1.36
	Lower Big Summit Prairie	3.35
	Peterson Creek	2.28
	Porter Creek	2.28
Upper Ochoco Creek		1.66
	Duncan Creek	1.52
	Headwaters Ochoco Creek	1.83

Table 8. Road density for 5th and 6th order watersheds, all open roads, mi/mi^2.

Watershed (5th Order)	Subwatershed Name	Operational Open Road (all jurisdictions) Density mi/mi^2
	Lower Marks Creek	2.51
	Upper Marks Creek	1.57
	Wolf Creek	0

User-Created Trails and All Motorized Routes

Over time, a network of motorized trails has developed within the project area. The bulk of these trails can be found between Hwy 26 and the west side of Big Summit Prairie. There is also a group of user-created trails southwest of the prairie, in addition to a network that crosses from the east side of the prairie to the South Fork John Day River and north of Black Canyon Wilderness, outside of the project boundary. These trails were developed largely as the result of all-terrain vehicle (ATV) activity by the seasonal riders who frequent the Ochoco Mountains and by year-round and recreational residents living along Hwy 26. These trails serve essentially as an extension of the official transportation system, providing shortcuts and connectors between existing roads as well as longer cross-country riding opportunities.

The density of user-created motorized trails within the 33 subwatersheds was not calculated. According to the COMAC (Central Oregon Motorcycle and ATV Club) inventory there are potential routes identified: 188 miles of ATV trail, 87 miles of motorcycle and 159 miles of shared use. Approximately 40% of the routes identified are on existing open roads. The miles are concentrated fairly heavily west of Big Summit Prairie, across the top of the prairie and south of the prairie in Gray Creek, Headwaters of the North Fork Crooked and Lower Big Summit Prairie.

Roads Analysis Results and Opportunities

Under all three action alternatives, the following subwatersheds are above the 3 miles/sq. mile density in the General Forest management area: Lower Big Summit Prairie and Lower Marks Creek. Additionally for Alt. 2 and 4: Jackson Creek and Elliot Creek. For Alternative 4, Upper Marks Creek, Porter Creek and Howard Creek are also above the recommended density.

Through previous road analysis efforts, Jackson Creek, Lower Big Summit, Lower Marks Creek and Upper Marks Creek had been addressed under Deep Roads Analysis (1999) and Spears Roads Analysis (2001). Howard, Elliot and Porter Creek were addressed in the 2010 Howard, Johnson, Elliot and Porter Roads Analysis. There were a number of roads proposed to change from open to decommissioned (Table 9) and from open to closed (Table 10 reflects the Level 2 Open Roads proposed for closure, dropping to Operational Maintenance Level 1). With closing and/or decommissioning these roads, the road density will be decreased, adjusting for the increase in proposed trails.

Table 9. Roads proposed for decommissioning under Howard, Johnson, Elliot and Porter Creek Subwatershed Roads Analysis.

Subwatershed	Road No.	Seg. Length (Miles)	Current Opt. Mtnce	Reason	Recommended Operational Mtnc. Level
Elliot Crk	2200-308	0.25	2	Wildlife	Decommission
Elliot Crk	2200-511	0.14	2	Aquatic/Wildlife	Decommission
Johnson Crk	4200-170	0.29	2	Cercla – Amity Mine	Decommission
Johnson Crk	4200-203	0.24	2	Botany/Wildlife	Decommission
Porter Crk	4200-451	0.10	2	Botany/Wildlife	Decommission
Porter Crk	4200-423	0.27	2	Botany/Wildlife	Decommission
Porter Crk	4200-463	0.66	2	Botany/Wildlife	Decommission
Howard Crk	4210-079	0.10	2	Wildlife	Decommission

	TOTAL	2.05 Miles			
TOTAL Miles Proposed To Decommission For Each Subwatershed: Howard Crk: 0.10 Porter Crk: 1.03 Elliot Crk: 0.39 Johnson Crk: 0.53					

Table 10. Roads proposed to for closure under the Howard, Johnson, Elliot and Porter Subwatersheds Roads Analysis.

Subwatershed	Road No.	Seg. Length (Miles)	Current Opt. Mtnc.	Reason	Recommended Operational Mtnc. Level
Howard Crk	2200-274	.35	1	Aquatic	1
Elliot Crk	2200-306	1.2	2	Aquatic, Wildlife/Botany	1
Elliot Crk	2200-401	0.08	2	Botany	1
Elliot Crk	2200-404	0.5	2	Botany	1
Elliot Crk	2200-405	0.2	2	Botany	1
Elliot Crk	2200-410	0.68	2	Wildlife	1
Elliot Crk	2200-411	0.13	2	Wildlife	1
Elliot Crk	2200-412	0.04	2	Wildlife	1
Elliot Crk	2200-417	0.11	2	Wildlife	1
Elliot Crk	2200-418	0.10	2	Wildlife	1
Elliot Crk	2200-422	0.34	2	Botany	1
Elliot Crk	2200-451	0.22	2	Aquatic	1
Elliot Crk	2200-452	0.24	2	Botany	1
Elliot Crk	2200-455	0.21	2	Aquatic	1 (2 segments)
Elliot Crk	2200-457	0.21	2	Aquatic	1
Elliot Crk	2200-458	0.70	2	Wildlife/Aquatics	1 (2 segments)
Elliot Crk	2200-459	0.10	2	Wildlife/Aquatics	1 (2 segments)
Elliot Crk	2200-460	0.54	2	Wildlife/Aquatics	1
Elliot Crk	2200-461	0.13	2	Aquatic/Botany	1
Elliot Crk	2200-462	0.66	2	Aquatic/Botany	1
Elliot Crk	2200-463	0.36	2	Wildlife/Botany	1
Elliot Crk	2200-464	0.33	2	Aquatic	1
Elliot Crk	2200-500	0.30	2	Wildlife	1
Elliot Crk	2200-501	0.63	2	Wildlife/Botany	1
Elliot Crk	2200-503	0.27	2	Botany	1
Elliot Crk	2200-504	0.42	2	Aquatic	1
Elliot Crk	2200-505	1.04	2	Aquatic	1
Elliot Crk	2200-506	0.70	2	Aquatic	1
Elliot Crk	2200-507	1.18	2	Aquatic/Wildlife	11 (2 segments)
Elliot Crk	2200-508	0.49	2	Aquatic	1
Elliot Crk	2200-509	0.32	2	Aquatic/Wildlife	1
Elliot Crk	2200-510	0.10	2	Wildlife	1
Elliot Crk	2200-512	0.48	2	Wildlife	1
Elliot Crk	2200-521	0.18	2	Wildlife	1
Elliot Crk	2230-058	0.21	2	Wildlife	1
Howard Crk	2630-358	0.52	2	Botany	1
Howard Crk	2630-368	0.25	2	Botany	1
Howard Crk	2630-369	0.56	2	Botany	1
Howard Crk	2630-403	0.24	2	Wildlife	1

Table 10. Roads proposed to for closure under the Howard, Johnson, Elliot and Porter Subwatersheds Roads Analysis.

Subwatershed	Road No.	Seg. Length (Miles)	Current Opt. Mtnc.	Reason	Recommended Operational Mtnc. Level
Howard Crk	2630-408	0.25	2	Wildlife	1
Porter Crk	3000-550	4.78	2	Aquatic	Trail
Porter Crk	3010-095	0.05	2	Wildlife	1
Johnson Crk	4200-153	0.84	2	Aquatic	1
Johnson Crk	4200-175	0.46	2	Aquatic	1
Johnson Crk	4200-227	0.16	2	Wildlife	1
Howard Crk	4200-233	0.56	2	Aquatic	1
	TOTAL	**22.46 Miles**			
TOTAL Miles proposed for closure for each subwatershed: Howard Crk: 2.73 Porter Crk: 4.83 Elliot Crk: 13.44 Johnson Crk: 1.46					

Table 11 lists the roads proposed for closure or decommissioning by the Deep Roads Analysis and Deep Restoration EIS in the Jackson subwatershed. Their current objective maintenance level is Open Level 2. Their recommended Objective Maintenance level is identified as Closed Level 1 or Decommission.

Table 11. Roads proposed for closure or decommissioning under Deep Creek Roads Analysis and Deep Restoration Environmental Analysis.

Subwatershed	Road Number	Length (miles)	Current Oper. Mtnc.	Recommended Operational Mtnc. Level
Jackson Creek	3000-900	0.8	2	1
Jackson Creek	2630-770	0.2	2	1
Jackson Creek	3000-656	0.7	2	1
Jackson Creek	3000-754	0.7	2	Decommission
Jackson Creek	3000-756	0.1	2	Decommission
Jackson Creek	2630-770	0.17	2	1
Jackson Creek	4250-606	0.7	2	Decommission
Jackson Creek	4272-400	2.1	2	Close - gate
Jackson Creek	4250-420	0.8	2	1
Jackson Creek	4250-421	0.9	2	1
Jackson Creek	3000-858	0.3	2	Decommission
Jackson Creek	3000-669	0.2	2	Decommission
Lower Deep Creek	3000-745	0.74	2	Decommission
Little Summit Prairie	4274-065	0.1	2	Decommission
TOTAL		**8.51 Miles**		

Table 12 lists the roads proposed for closure by the Spears/Bandit Roads Analysis in 2000. They were not closed under the Spears EIS, so their closure under this project will further reduce the road density in the subwatersheds.

Table 12. Roads proposed for closure under Spears Roads Analysis.

Subwatershed	Road Number	Length (miles)	Current Op. Mtnc.	Recommended in Spears/Bandit RA - Objective Op. Mtnc.
Upper Marks Creek	2600-452	0.38	2	1
	2630-300	0.5	2	1
	2630-302	0.6	2	1
Lower Marks Creek	2610-151	0.15	2	1
	2610-152	0.1	2	1
	TOTAL	**1.73 Miles**		

Table 13 lists the roads proposed for decommissioning by the Spears/Bandit Roads Analysis in 2000.

Table 13. Roads proposed for decommissioning under Spears Roads Analysis.

Subwatershed	Road Number	Length (miles)	Current Op. Mtnc.	Recommended in Spears/Bandit RA - Objective Op. Mtnc.
Upper Marks Creek	2610-012 (0.2-0.56)	0.36	1	Decommission
	2610-012 (0.56-1.0)	0.44	2	Decommission
	2610-018	0.3	2	Decommission
	TOTAL	**1.10 Miles**		

The miles of road proposed for closure or decommissioning from the three Road Analysis efforts would move to further reduce road densities in the watersheds. The roads identified through Deep and Spears are not reflected in the density tables for the action alternatives, only those roads in Howard, Johnson, Elliot and Porter Creek are reflected in the road and trail density tables. The additional miles proposed for closure from Deep and Spears will further reduce density.

Environmental Effects

Alternative 1 (No Action)

Implementation of Alternative 1 would result in no changes from the current conditions in the project area. The mileage of open and closed roads, and the resultant road densities, would remain as they are. Most Maintenance Level 2 roads would be open for mixed use by both highway-legal and non-highway-legal vehicles, but there would be no roads incorporated as portions of any designated trail system. Non-highway-legal vehicles would be prohibited on all roads maintained for passenger car use (Maintenance Level 3, 4, and 5), plus the Maintenance Level 2 roads added to the list for safety reasons. Use of Maintenance Level 1 roads and user-created roads and trails would be subject to decisions resulting from implementation of the 2005 Travel Management Rule on the Ochoco National Forest.

Effects Common to All Action Alternatives

To varying degrees, each of the three Action Alternatives incorporates the use of National Forest System Roads to provide designated connectivity throughout the project area within and between portions of the designated trail system. Subsequent to the establishment of the 2005 Travel Management Rule, the Regional Forester of the Pacific Northwest Region issued direction that an Engineering Analysis would be required for any National Forest System Road designated for mixed use (allowing use by both highway-legal and non-highway-legal vehicles). As part of implementation

of the Travel Management Rule on the Ochoco National Forest, mixed use analysis has been performed to establish the suitability of allowing mixed use on roads; in the context of their current setting in terms of alignment, width, typical user speed, and presence or absence of traffic control devices. Identification of an OHV route system that features numerous specific mixed use roads as part of that system would result in an increase in OHV use on these roads, especially by users who come to the area specifically to ride the system. Such increase would lead to a commensurate increase in the need for maintenance blading on aggregate surfaced roads (particularly on roads that do not normally receive regular blading maintenance), as well as an increased need to monitor the condition of lower standard native surface roads for issues that may need corrective action to be taken either to protect user safety (for example, to address visibility concerns resulting from extreme dustiness on heavily used native surface roads or adequate sight distance on curves and at intersections due to encroaching vegetation) or protect adjacent resources. There would be little to no maintenance for user convenience on these low standard, high clearance vehicle roads unless impassability was to become an issue.

Supplemental analysis has been performed on certain roads in the project area that have been determined to be unsuitable for a mixture of OHVs and highway-legal vehicles because of either their current setting or their designation as roads maintained for passenger car use (on which non-highway-legal vehicle use is prohibited). In particular, this supplemental Engineering Analysis was performed on portions of Roads 2200-150, 2610, 2630, 2630-450, 38, 3810, 4250, 4254, 4270, 4276 and 5810 to determine what requirements would be necessary to allow for safe use by a mix of highway-legal and non-highway-legal vehicles.

For public safety, the roads have been evaluated for mixed use (R. Collins, 2005). A number of the roads have been designed as highway legal only, such as Rd. 42. Where the proposed alternatives cross the highway legal only routes, driving safety is a concern for both the OHV rider and the driving public. These intersections will require additional signing for both the trail user and the vehicles to encourage safe travel for all users. Table 14 compares the alternatives, with Alternative 4 having the highest number, then Alternative 2, then Alternative 3. Given public safety is a high priority, all the crossings are equally important to protect everyone. The alternatives were designed to cross the highway legal only routes for safety. In Alternative 4, on the Class 3 (motorcycle) route segment on the east side, there is one stretch where the alignment parallels Rd 12 for 1.4 miles. The route is located outside the road prism.

Table 14. Intersections between the alternative routes and highway legal only routes.

Class of Vehicle	Alt 2 Crossings	Alt 3 Crossings	Alt 4 Crossings
Class I and III	19	16	22
Class II	1	0	1
TOTAL	**20**	**16**	**23**

Trail and Stream Intersections

For all alternatives, the intersection of the routes and streams was accomplished with a GIS exercise. The identification of the type of stream crossing was based on the stream class. Bridges were identified for all the Class 2 streams and some of the Class 3. Culverts were identified for a good portion of the Class 3 streams. A combination of culverts and fords were proposed for the Class 4 streams. In a few locations, boardwalks were proposed where wet meadows underlie the proposed routes. There were also several areas where the GIS stream alignment and the proposed trail routes intersected an unusually high number of times. Ground checking will most likely show only 1 or 2 intersections. Based on the rough alignment of the proposed routes, the accuracy of the GIS stream routes and the need to verify stream class, the confidence factor for the intersections is 80%. During actual design, the type of stream crossing, location and trail route may be adjusted, but generally within 100 feet of the proposed location.

Seasonal Closure

The Rager Green Dot closure, established by the ODFW, identifies a network of open and closed roads during the fall deer rifle-hunting season in the eastern portion of the analysis on the east end of the Ochoco Mountains. The dates vary from year to year, but generally the closure starts 3 days prior to the controlled buck rifle season and extends through the November Rocky Mountain standard antlerless elk rifle season. In 2012 the dates of the closure are September 26 through November 25. In each of the action alternatives, the routes entering into the Rager Green Dot closure area will have a seasonal closure from the starting date of the Rager TMA closure through the opening date of the season of operation for the proposed trail system (May 1 for Alternatives 2 and 4, or June 1 for Alternative 3).

Alternative 2 (Proposed Action)

Under Alternative 2, a combination of Class I, Class II and Class III routes total 170 miles of new trail system (Table 15). The distribution of the designated OHV trails for this alternative would begin on Hwy 26, passing from Hwy 26 to Walton Lake, across the slope north of Big Summit Prairie to 6 Corners on Paulina District. The proposed system of routes are a combination of existing roads in mixed use Maintenance Level 2 (open), Maintenance Level 1 (Closed) and decommissioned status and new routes.

The proposed routes cross a number of Class 1, 2, 3 and 4 stream systems. As part of the protection for the streams, a combination of bridges, culverts, boardwalks and hardened fords have been proposed. In Alternative 2, there would be an estimated need for 16 bridges, 88 culverts, 6 boardwalks and 33 fords for a total of 142 structures (Table 16).

Table 15. Alternative 2 trail system, miles of existing road and new route by vehicle class.

Type	Class I (ATV)	Class II (Jeep)	Class III (Motorcycle)	Grand Total
Existing Road	37.79	36.51	26.66	100.95
New Route	31.06	12.39	25.67	69.12
Total	68.85	48.90	52.33	170.07

Table 16. Alternative 2 (Proposed Action) crossing type for stream class and vehicle class.

Stream Class/Crossing Type	Vehicle Class I	Vehicle Class II	Vehicle Class III	Total
1/Bridges	4		1	5
1/Culverts	1	1		2
2/Bridges	7		2	9
2 /Culverts	4	2	2	8
2/Boardwalk	2		1	3
3/Ford				
3 /Bridge	1			1
3 /Culvert	2		1	3
4/Bridge	1			1
4 /Culvert	18	22	12	52
4 /Ford	9	8	5	22
4 /Boardwalk	1			1
9/ Culvert	3	19	1	23
9/Boardwalk	2			2
9/Ford	6	4		10
Totals/vehicle class	**61**	**56**	**25**	**142**

Alternative 2 proposes construction of 3 play areas, 6 trail heads, 1 parking area and a total of 10 staging areas split between the three vehicle classes: 6 Staging areas for the Class I (ATV), 2 Staging areas for the Class II (Jeeps) and 2 Staging areas for the Class III (motorcycles). The OHV areas are spread across the proposed trail route.

Implementation of Alternative 2 would result in designation of 45 miles of opened mixed used roads as connecting routes for the trail system. The proposed route also utilizes closed roads and new routes and crosses highway-legal-only routes. There will be options for users with highway legal vehicles to connect to other portions of the trails via highway legal roads.

There would be a lesser increase in maintenance needs on those native surface Maintenance Level 2 roads built to lower standards and intended for use by high clearance vehicles with no expectation of user comfort; maintenance on these roads would primarily consist of correcting issues, such as drainage patterns off of traveled ways, that from increased use and threaten degradation of adjacent resource values.

Alternative 3

Implementation of Alternative 3 would result in 101 miles of trail system being developed from a combination of new route and existing roads currently in Maintenance Level 1 (closed), Maintenance Level 2 (open) or decommissioned status (Table 17). The distribution of the designated OHV trails for this alternative includes a system of Class I vehicle (ATV) trails on the west end of the project area, and a separate system for Class III vehicles (motorcycles) on the east end of the project area.

Table 17. Alternative 3 Routes for Class I and Class III vehicles, miles.

Type	Class I	Class II	Class III	Grand Total
Existing Road	23.55	0	34.06	50.60
New Route	31.06	0	28.40	50.32
Total	54.61	0	62.46	100.91

This alternative crosses a number of Class 1, 2, 3 and 4 stream systems. As part of the protection for the streams, a combination of bridges, culverts, boardwalks and hardened fords have been proposed. In Alternative 3, there will be an estimated need for 14 bridges, 27 culverts, 4 boardwalks and 17 fords for a total of 62 structures (Table 18).

Table 18. Alternative 3 Crossing Type for Stream Class and Vehicle Class.

Stream Class/Crossing Type	Vehicle Class I	Vehicle Class II	Vehicle Class III	Total
1/Bridges			4	4
1/Culverts				
2/Bridges	4		3	7
2 /Culverts	2		2	4
2/Boardwalk			1	1
3/Ford	1			1
3 /Bridge			1	1
3 /Culvert	3			3
4/Bridge			1	1
4 /Culvert	5		13	18
4 /Ford	5		9	14
4 /Boardwalk	1			1
9/Bridge	1			1
9/ Culvert	1		1	2
9/Boardwalk	2			2
9/Ford	1		1	2
Totals /vehicle class	**26**	**0**	**36**	**62**

Alternative 3 proposes construction of 4 staging areas: 2 Staging areas for the Class I (ATV), 2 Staging areas for the Class III (motorcycles). The OHV areas are spread across the proposed trail route.

Implementation of Alternative 3 would result in the designation of the least amount of trail, composed of closed roads and new routes. The distribution of the designated OHV trails for this alternative splits into a west side, from Hwy 26 to Walton Lake, and an east side, from east of Big Summit Prairie to Six Corners on Paulina District. Alternative 3 would make the least use of mixed use roads as a key component of the overall system. This would create the least risk for mixed use conflicts and the least need (due to mileage alone) for effective traffic control. There would still be a resulting focus of both highway-legal and non-highway-legal traffic onto other permitted mixed use roads.

Alternative 4

Implementation of Alternative 4 would result in 212 miles of trail being developed from a combination of new route and existing roads currently in Maintenance Level 1 (closed), Maintenance Level 2 (open) and decommissioned road status (Table 19). This alternative crosses a number of Class 1, 2, 3 and 4 stream systems. As part of the protection for the streams, a combination of bridges, culverts, boardwalks and hardened fords have been proposed. The distribution of the designated OHV trails for this alternative begins on Hwy 26, passing from Hwy 26 to Walton Lake, across the slope north of Big Summit Prairie to 6 Corners on Paulina District, with additional loop trails for Class I, Class II and Class III vehicles. In Alternative 4, there would be an estimated need for 17 bridges, 111 culverts, 4 boardwalks and 38 fords for a total of 170 structures (Table 20).

Table 19. Alternative 4 Class I, Class II and Class III routes, miles.

Type	Class I (ATV)	Class II (Jeep)	Class III (Motorcycle)	Grand Total
Existing Road	79.37	18.55	29.81	127.74
New Route	51.09	11.24	22.15	84.48
Total	130.46	29.79	51.96	212.22

Table 20. Alternative 4 Crossing Type for Stream Class and Vehicle Class.

Stream Class/ Crossing Type	**Vehicle Class I**	**Vehicle Class II**	**Vehicle Class III**	**Total**
1/Bridges	4		1	5
1/Culverts	1	1		2
2/Bridges	8		1	9
2 /Culverts	6	2	2	10
2/Boardwalk			1	1
3/Ford				
3 /Bridge	1			1
3 /Culvert	9		1	10
4/Bridge	1			1
4 /Culvert	36	17	14	67
4 /Ford	17	4	2	23
4 /Boardwalk	**1**			1
9/Bridge	1			1
9/ Culvert	7	15		22
9/Boardwalk	*2*			2
9/Ford	13	2		15
Total by vehicle class	**107**	**41**	**22**	**170**

Alternative 4 proposes construction of 1 play area and a total of 10 staging areas split between the three vehicle classes: 6 Staging areas for the Class I (ATV), 2 Staging areas for the Class II (Jeeps)

and 2 Staging areas for the Class III (motorcycles). The OHV areas are spread across the proposed trail route.

Alternative 4 would increase density for open roads and trails for 13 of the 30 subwatersheds.

Cumulative Effects

The combination of past access management decisions to close roads and proposed road closures and road/trail conversions in the action alternatives would result in reduction in the number of road miles open to those highway-legal vehicles that are unsuited for operation on designated trails or whose operators are uninterested or unwilling to operate on those trails. During certain time periods, in particular wood cutting or the various hunting seasons, this would result to some degree in an increase in traffic on the remaining tertiary portions of the road system outside of the designated shared use routes, resulting in the potential need for increased maintenance on those roads. With implementation of the Forest-level Travel Management Rule and any particular action alternative, those remaining open roads would be the sole means of vehicular access to the further reaches of the National Forest Land within and adjacent to the project area.

In particular, Ochoco Creek Roads Analysis, Deep Creek Roads Analysis and Marks Creek Roads Analysis proposed altering a number of miles of Maintenance Level 2 roads to Operational Maintenance Level 1 (closed) roads. Also within the planning boundary, the Howard/Johnson/Elliot Roads Analysis identified additional miles of road for closure and for decommissioning. These proposed changes to road maintenance levels combine with increased route density under action alternatives in a compensatory fashion. The resulting combination of effects for each alternative is described below. Comparing the three action alternatives, Alternative 3, after construction of the trail, with road closures from other projects, would decrease road density for general forest more than Alternative 2 and Alternative 4.

At the subwatershed scale for Alternative 2 the distribution of proposed trails and changes in Maintenance Level from other proposed actions within the project areas would result in a general reduction in total of open road densities, although there would be five subwatersheds – Jackson, Elliot, Lower Big Summit Prairie, Porter Creek and Lower Marks Creek – where open-road density would be increased over No Action Alternative (Table 21). Numbers in parenthesis are the existing road densities.

Table 21. Alternative 2 road density open roads and proposed trails - subwatershed basis.

Watershed	Subwatershed Name	Alt. 2 Operational Open Road and Trail Density	Relative Change from No Action
Bridge Creek (1.29)	Headwaters Bridge Creek	0.62	NC
	Middle Bridge Bear Creek	0.94	NC
	Upper Bridge Creek	1.95	NC
	West Branch Bridge Creek	1.73	DOWN (1.78)
Deep Creek (2.19)	Jackson Creek	2.34	UP (2.15)
	Little Summit Prairie Creek	2.27	UP (1.91)
	Lower Deep Creek	1.84	UP (1.50)
Lower Beaver Creek (1.18)	North Wolf Creek	1.16	UP (0.84)
	Wolf Creek	2.20	UP (2.06)

Table 21. Alternative 2 road density open roads and proposed trails - subwatershed basis.

Watershed	Subwatershed Name	Alt. 2 Operational Open Road and Trail Density	Relative Change from No Action
Lower North Fk Crooked River (1.23)	Lower North Fk. Canyon	0.49	NC
	Upper North Fk. Canyon	1.39	DOWN (1.45)
Mountain Creek (1.15	Middle Mountain Creek	1.18	DOWN (1.22)
	Upper Mountain Creek	1.13	UP (1.14)
Paulina Creek (1.85)	Dry Paulina Creek	1.89	DOWN (1.83)
	Upper Paulina Creek	1.82	DOWN (1.92)
Rock Creek (0.97)	Middle Rock Creek	0.78	NC
	Upper Rock Creek	0.97	DOWN (1.52)
Upper North Fk. Crooked River (2.32)	Elliot Creek	2.43	DOWN (2.55)
	Gray Creek	2.40	DOWN (2.70)
	Headwaters North Fk. Crooked River	1.64	DOWN (2.07)
	Howard Creek	2.18	DOWN (2.28)
	Johnson Creek	1.35	DOWN (1.36)
	Lower Big Summit Prairie	3.01	DOWN (3.35)
	Peterson Creek	2.68	UP (2.28)
	Porter Creek	3.06	UP (2.28)
Upper Ochoco Creek (1.62)	Duncan Creek	1.20	DOWN (1.52)
	Headwaters Ochoco Creek	1.73	DOWN (1.83)
	Lower Marks Creek	2.40	DOWN (2.51)
	Upper Marks Creek	1.96	UP (1.57)
	Wolf Creek	0.03	UP (0)

The overall density of total open ‘motorized’ routes (comprised of open roads and designated OHV trails) would be slightly less than in the existing condition. The average road densities over a larger area do not reflect the concern for specific management areas. Table 22 identifies the subwatersheds at or above the recommended 3 miles per sq. mile density for wildlife in General Forest based on the net cumulative result of increased route density under the action alternative combined with road closures identified in the other projects described above.

Table 22. Subwatersheds with Open Road and Trail Density at or above 3 miles/sq. mile in General Forest, Alternative 2 combined with closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Deep Creek	Jackson Creek	2.95 GF
Upper North Fork Crooked River	Elliot Creek	3.06 GF
	Lower Big Summit Prairie	3.31 GF
	Porter Creek	3.26 GF
Upper Ochoco Creek	Lower Marks Creek	3.15 GF

At the subwatershed scale for Alternative 3, the distribution of proposed trails and changes in Maintenance Level from other proposed actions within the project area would result in a general reduction in total and open road densities, although there would be two subwatersheds –Lower Big Summit Prairie and Lower Marks Creek – where open-road density would be still be over 3 miles/sq. mile (Table 23). Numbers in parenthesis are the existing road densities.

Table 23. Alternative 3 Road Density – Subwatershed (Mile/Square Mile).

Watershed	Subwatershed Name	Operational Open Road and Trail Density	Change from Existing Condition
Bridge Creek (1.29)	Headwaters Bridge Creek	0.62	NC
	Middle Bridge Bear Creek	0.94	NC
	Upper Bridge Creek	1.95	NC
	West Branch Bridge Creek	1.73	Down (1.78)
Deep Creek (1.95)	Jackson Creek	1.92	Down (2.15)
	Little Summit Prairie Creek	2.19	Up (1.91)
	Lower Deep Creek	1.72	Up (1.50)
Lower Beaver Creek (1.18)	North Wolf Creek	1.16	Up (0.84)
	Wolf Creek	2.20	Up (2.06)
Lower North Fk Crooked River (1.23)	Lower North Fk. Canyon	0.49	NC
	Upper North Fk. Canyon	1.39	Down (1.45)
Mountain Creek (1.12)	Middle Mountain Creek	1.18	Down (1.22)
	Upper Mountain Creek	1.09	Down (1.14)
Paulina Creek (1.85)	Dry Paulina Creek	1.89	Down (1.45)
	Upper Paulina Creek	1.82	Up (1.83)
Rock Creek (0.97)	Middle Rock Creek	0.78	NC
	Upper Rock Creek	0.97	Down (1.52)
Upper North Fk. Crooked River (2.10)	Elliot Creek	2.12	Down (2.55)
	Gray Creek	2.40	Down (2.70)
	Headwaters North Fk. Crooked River	1.64	Down (2.07)
	Howard Creek	2.01	Down (2.28)
	Johnson Creek	1.35	Down (1.36)
	Lower Big Summit Prairie	3.01	Down (3.35)
	Peterson Creek	2.16	Down (2.28)
	Porter Creek	2.33	Up (2.28)
Upper Ochoco Creek (1.77)	Duncan Creek	1.21	Down (1.52)
	Headwaters Ochoco Creek	1.67	Down (1.83)
	Lower Marks Creek	2.40	Down (2.51)
	Upper Marks Creek	2.64	Up (1.57)
	Wolf Creek	0.03	Up (0)

The overall density of total open ‘motorized’ routes (comprised of open roads and designated OHV trails) would be slightly less than the existing condition. The average road densities over a larger area do not reflect the concern for specific management areas. Table 24 identifies the subwatersheds that are at or above the recommended 3 miles per sq. mile density for wildlife under General Forest based on the net cumulative result of increased route density under the action alternative combined with road closures identified in the other projects described above.

Table 24. Subwatersheds with Open Road and Trail Density at or above 3 mi/sq. mi in General Forest, Alternative 3 combined with closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Upper North Fork Crooked River	Lower Big Summit Prairie	3.01 GF
Upper Ochoco Creek	Lower Marks Creek	2.40 GF

At the subwatershed scale for Alternative 4, the distribution of proposed trails and changes in Maintenance Level proposed by other actions within the project area would result in a general reduction in total of open road densities, although there would be three subwatersheds –Lower Big Summit Prairie, Porter Creek and Lower Marks Creek – where open-road density would be increased over No Action Alternative (Table 25). Numbers in parenthesis are the existing road densities.

Table 25. Alternative 4 Road Density - Subwatershed Basis.

Watershed	Subwatershed Name	Operational Open Road and Trail Density	Relative Change from No Action
Bridge Creek (1.31)	Headwaters Bridge Creek	0.62	NC
	Middle Bridge Bear Creek	0.94	NC
	Upper Bridge Creek	1.95	NC
	West Branch Bridge Creek	1.78	NC
Deep Creek (2.35)	Jackson Creek	2.56	Up (2.15)
	Little Summit Prairie Creek	2.39	Up (1.91)
	Lower Deep Creek	1.97	Up (1.50)
Lower Beaver Creek (1.87)	North Wolf Creek	1.16	Up (0.84)
	Wolf Creek	2.29	Up (2.06)
Lower North Fk Crooked River (1.23)	Lower North Fk. Canyon	0.49	NC
	Upper North Fk. Canyon	1.39	Down (1.45)
Mountain Creek (1.18)	Middle Mountain Creek	1.18	Down (1.22)
Mountain Creek	Upper Mountain Creek	1.23	Up (1.14)
Paulina Creek (1.85)	Dry Paulina Creek	1.89	Up (1.82)
	Upper Paulina Creek	1.82	Down (1.92)
Rock Creek (0.97)	Middle Rock Creek	0.78	NC
	Upper Rock Creek	0.97	Down (1.52)
Upper North Fk. Crooked River (2.35)	Elliot Creek	2.39	Down (2.55)
	Gray Creek	2.40	Down (2.28)
	Headwaters North Fk. Crooked River	1.64	Down (2.07)
	Howard Creek	2.40	Up (2.28)
	Johnson Creek	1.35	Down (1.36)
	Lower Big Summit Prairie	3.01	Down (3.35)
	Peterson Creek	2.70	Up (2.28)
	Porter Creek	3.13	Up (3.35)

Table 25. Alternative 4 Road Density - Subwatershed Basis.

Watershed	Subwatershed Name	Operational Open Road and Trail Density	Relative Change from No Action
Upper Ochoco Creek (1.92)	Duncan Creek	1.21	Down (1.52)
	Headwaters Ochoco Creek	1.72	Down (1.83)
	Lower Marks Creek	2.42	Down (2.51)
	Upper Marks Creek	3.19	Up (1.57)
	Wolf Creek	0.03	Up (0)

The overall density of total open 'motorized' routes (comprised of open roads and designated OHV trails) would be slightly less than in the existing condition. The average road densities over a larger area do not reflect the concern for specific management areas. Table 26 identifies the subwatersheds at or above the recommended 3 miles per sq. mile density for wildlife in General Forest based on the net cumulative result of increased route density under the action alternative combined with road closures identified in the other projects described above.

Table 26. Subwatersheds with Open Road and Trail Density at or above 3 miles/sq. mile in General Forest, Alternative 4 combined with road closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Deep Creek	Jackson Creek	3.0 GF
Upper North Fork Crooked River	Elliot Creek	3.01 GF
	Howard Creek	3.0 GF
	Lower Big Summit Prairie	3.31 GF
	Porter Creek	3.27 GF
Upper Ochoco Creek	Lower Marks Creek	3.22 GF
	Upper Marks Creek	3.27 GF

This document reflects the current route information in the database with limited field visits. The final routes developed, following the alternative selection, may vary slightly from the location identified on the alternative maps. The specific stream crossings may move slightly, depending on reasonable design location.

Recreation

This section includes the entire recreation analysis.

Introduction

The recreation niche is a description, or characterization, of the distinct role each Forest plays in providing outdoor recreation opportunities, experiences, and benefits. The niche is determined by public expectations (demand) and by the ecological capabilities of the land. The niche allows managers to focus management efforts on what is unique and valuable about the Forest. In 2006, the Ochoco National Forest developed a recreation niche statement, mapped where the public recreates, and translated the map into a narrative about the relative importance of the Forest for various recreation opportunities, experiences, and benefits. The wide variety of visitor preferences and uses were grouped into two spatial categories (settings):

- The Backyard – Located closest to the more populated communities, it provides nearby neighbors and families easy access to the Forest and Grassland, giving them the opportunity to spend an hour or spend the day.

- The Back 40 - Adjacent to working ranches and located further from larger population centers, it offers a remote experience and allows for self-discovery and finding one's own special place on a variety of roads and trails from highway to hiking.

The recreation niche indicates that each of these settings could provide opportunities for well-managed designated OHV areas and that this setting is appropriate for OHV use and OHV trailheads. The Ochoco Summit OHV planning area is located primarily in the Back Forty setting.

Off-highway vehicle (OHV) recreation is allowed on National Forest System lands in appropriate places and under proper management (Forest Service Manual 2355.03). The Ochoco National Forest Plan, as amended, permits motorized travel on designated routes.

In 1996, the Ochoco National Forest completed a Trail System & Off-Highway Vehicle Management and Development Environmental Impact Statement in response to issues that included the growing popularity of off-highway vehicles and an increased demand for OHV recreation trail opportunities on the Forest and Crooked River National Grassland. At that time it was estimated that use on the Ochoco's only designated OHV trail (Green Mountain) had increased 5-10% annually during the previous five years. The document indicated that more OHV trail opportunities were needed near Prineville, Madras and Burns to provide high quality OHV experiences and to reduce the amount of off-trail riding that was occurring (USDA Forest Service, 1996).

Use of ATVs for recreation in Oregon is increasing. The Oregon Parks and Recreation Department (OPRD) expected to sell approximately 85,000 OHV stickers valid for two years in 2010 (Oregon Parks and Recreation Department 2009). Cordell et al. (2008) also reports on the remarkable growth of OHV use in the United States. According to the OHV IRIS (Internet Research Report Series)[6] report, regional and national OHV use days have increased 42 percent from 2001-2007 (Cordell, 2008). Parallel trends in local OHV use have been noted locally with the population growth of Central Oregon. Increased OHV use and related impacts have been observed by Forest Service personnel as well as by other agencies, non-governmental organizations (NGOs) and the general public. Similar situations have occurred throughout the nation, leading to the Travel Management Rule that governs OHVs and other motor vehicle use on National Forests and Grasslands. At the time of the first U.S. National Recreation Survey in 1960, OHV recreation was not included as a reportable activity (Cordell et al. 2008a). OHV use today, however, is among the fastest growing outdoor activities. Although the economy over the recent years has likely affected the recent dip in OHV use and sales locally and nationally, it is believed the overall trend for increase in use would continue. Nationally, the number of people (16 years of age and older) who report participating in OHV sports is over 44 million. Annual OHV sales more than tripled between 1995 and 2003 (sales have leveled off since 2003). Total OHV ownership of newly purchased and previously purchased machines increased 174 percent between 1993 and 2003, from fewer than three million to more than eight million vehicles. ATVs (not counting full-size, 4-wheel drive vehicles) account for about 70 percent of all OHVs (Cordell 2008). Based on survey data and sales trends, Cordell projected that there could be as many as 9.8 million ATVs and off-road motorcycles in the US in early 2008 (Cordell et al. 2008a).

After two years of consultation and collaboration, the State of Oregon published The Oregon Trails 2005-2014: A Statewide Action Plan. For the North Central Trails Planning Region, which includes the Ochoco Summit OHV planning area, the report lists that the top regional motorized trails plan issues are:

- Use of snow park areas for OHV recreation during summer months (this currently occurs at Walton Sno-Park on the Ochoco National Forest);

[6] Off-Highway Vehicle Recreation in the United States and its Regions and States: A National Report from the National Survey on Recreation and the Environment (NSRE) February, 2008 by: H. Ken Cordell, Carter J. Betz, Gary T. Green, and Becky Stephens.

- Closure or elimination of OHV trails within the region as a result of resource damage;
- Need for more Class II (4-wheel drive jeeps, SUVs) riding opportunities in the region, including a wide variety of Class II riding opportunities, and particularly technical riding areas.

In addition to the statewide action plan, a study conducted by the State of Oregon (2005) found a trend for closing existing riding opportunities within the region (Bergeson et al. 2005).

General Recreation Use and Trends

The National Visitor Use Monitoring (NVUM) survey, which is conducted every five years, collects information on National Forests and Grasslands about visitor use and satisfaction (USDA Forest Service 2009).

The National Survey on Recreation and the Environment (NSRE) data reflect information gathered in a 1999-2007 survey (Cordell et al. 2008). NSRE data do not reflect local use, but provide national data from a larger and more frequent sample. Table 27 displays NSRE data for selected outdoor activities on a national level.

Table 27. Trends in number of people participating and number of participation days for selected outdoor recreation activities in the United States, 1999-2008.

Activity	Total U.S. Participants (1,000s), 2005-2008	Percent Change in Participants, 1999-2001 to 2005-2008	Total Annual Participant Days (millions), 2005-2008	Percent change in Total Days 1999-2001 to 2005-2008
Developed Camping	52,021	2.7	532.3	9.3
Primitive Camping	33,330.2	-2.0	310.4	12.1
Backpacking	22,077.0	-0.6	277.7	24.0
Picnicking	115,836.2	-1.4	779.7	-17.2
Viewing Natural Scenery	145,489.2	14.1	11,482.3	60.5
Visiting Historic Sites	92,920.8	-4.5	590.8	-15.2
Nature Center Activities	127,406.5	5.0	1,044.0	23.2
Drive Off-road	44,231.3	18.6	1,349.6	56.1
Driving for Pleasure	111,069.0	3.1	2,637.3	-1.1
Snowmobiling	8,328.2	-29.7	92.7	-27.4
Day Hiking	74,032.5	6.8	1,993.4	-20.9
Horseback Riding (trail)	15,262.6	-8.2	278.3	-35.2
Bicycling	91,225.5	7.7	-	-
Kayaking	12,480.5	63.1	76.1	29.4
Downhill Skiing	15,615.4	-14.8	126.4	-15.7
Cross-country Skiing	4,970.7	-39.2	58.8	-7.8
Gathering Forest Products	71,023.3	16.1	869.3	1.9
View or Photograph Birds	81,119.9	19.3	8,039.0	37.6
Viewing Other Wildlife	114,792.0	21.3	5,341.6	46.9
Mountain Climbing	11,811.2	-12.5	104.1	20.5
Visit a Wilderness	70,591.9	3.0	1,108.6	12.8
Excerpted from Cordell et al. 2008b. Source: NSRE 1999-2001 and 2005-2008. Missing data indicate that either participation or annual days were not collected during that time period.				

Population is the major influence in recreation growth in the United States (Cordell 2004). If the population of the market zone increases (where the majority of visitors come from), the recreation use increases. It is highly likely that the population would grow in counties where visitors to Central Oregon live, resulting in increased recreation use of the Ochoco National Forest.

The first round of NVUM surveys for the Forest was conducted between October 1, 2000, and September 30, 2001; the second round was conducted between October 1, 2007, and September 30, 2008. Data collected during this effort can be used to display the percent of use of the National Forest by activity. NVUM data reflect local use, but are a snapshot in time for one calendar year and may not reflect the true visitation to the National Forest because of factors such as weather, time, date, or economic conditions at the time of the sample. NVUM found that for the Ochoco National Forest, fifty-seven percent of the forest visitors come from Deschutes, Crook and Jefferson Counties. In predicting future recreation growth, it is important to look at population predictions in these three counties.

National use may not be a clear indicator of local use; for example, the 2008 NVUM data show that 2.1 percent of visitors to the Ochoco National Forest used an OHV for recreation sometime during their stay, whereas on a national level, 19 percent of visitors used an OHV during the measured timeframe (1999-2007). In 2008, Ochoco visitors that hiked for the day (47.1 percent) more closely matched up with the national average (35.4 percent). Table 28 summarizes findings from the 2008 NVUM and the NSRE surveys.

Table 28. 2008 Ochoco National Forest activity participation and primary activity (NVUM) and national user participation (NSRE) in comparable recreation activities.

Activity	National Visitor Use Monitoring (NVUM) Data (2008)			National User Participation (NSRE) Data	
	% Participating	% As Main Activity	Estimated total # Participating (based on an estimated total visitation of 247,000)	% All Users Participation	% All OHV Users
Backpacking	2.3	1.6	5681	11.4	19.9
Bicycling	1.8	0.6	4446	22	34.4
Cross-country Skiing, snow shoeing	5.2	1.5	12844	4.8	6.7
Day Hiking, walking	47.1	14.5	116337	35.4	47.9
Developed Camping	10.5	7.1	25935	29.1	44.7
Downhill Skiing, snowboarding	5.2	1.5	0	9.2	14.8
Driving for Pleasure	22.1	5.3	54587	59.1	86.3
Family Gathering Outdoors	no data	no data	0	76.2	84.9
Fishing	6.4	6.3	15808	24.5+	44.6+
Gathering Forest Products	5.8	4.5	14326	32.5	52
Horseback Riding	3.6	3.3	8892	8.7	16.8
Hunting	19.1	18.6	47177	10.0+	28.4+
Motorized Water Activities	2	0.2	494	28.5+	46.9+

Table 28. 2008 Ochoco National Forest activity participation and primary activity (NVUM) and national user participation (NSRE) in comparable recreation activities.

Activity	National Visitor Use Monitoring (NVUM) Data (2008)			National User Participation (NSRE) Data	
	% Participating	% As Main Activity	Estimated total # Participating (based on an estimated total visitation of 247,000)	% All Users Participation	% All OHV Users
Nature Center Activities	3.3	0	8151	61.8	69.5
Nature Study	8.4	0.1	20748	no data	no data
Non-motorized Water	0.7	0.1	1729	11.2+	21.4+
OHV Use	0.6	0.2	1482	19	100
Other Motorized Activities	0	0	0	no data	no data
Other non-motorized	5.7	2.6	14079	no data	no data
Picnicking	10.6	3.2	26182	58.9	65.2
Primitive Camping	5.3	3.6	13091	17.8	17.8
Relaxing	29.1	3.3	71877	no data	no data
Resort Use	0.3	0.3	741	no data	no data
Snowmobiling	15.5	14	38285	4.3	4.3
Sightseeing	no data	no data	0	58.5	58.5
Viewing Natural Features	35.9	12	88673	66.5	66.5
Viewing Wildlife	38.8	0.9	95836	51.4	51.4
Visiting Historic Sites	1.3	0	3211	51.5	51.5
Walking for Pleasure	no data	no data	0	86.2	86.2
Motorized Trail Activities	5.2	2.9	12844	no data	no data

NVUM data source is the second round of National Visitor Use Monitoring surveys (Kocis et al. 2003). NSRE data source is 1999-2007 survey information for the National Survey on Recreation and the Environment (Cordell et al. 2008).

"No data" indicates that there was no direct cross-walk between NVUM and NSRE.

"+" indicates that the activity participation rate is higher than indicated because of participation in variations of the activity that were reported separately.

The 2008 NVUM for the Ochoco National Forest estimated that there were approximately 247,000 recreation visits to the forest each year (USDA Forest Service 2009). Table 28 shows the activities in which people participated during their visits to the Ochoco National Forest. By using this survey data, and trends in the number of people participating in recreational activities (NSRE data) from Table 27,

it is predicted that in the next 10 years, the activities with the greatest growth (in terms of total participants multiplied by percent change) would be wildlife/birds, general relaxing, viewing other features, hiking/walking, fishing and driving for pleasure. The activities with the least growth are predicted to be backpacking, cross-country skiing, snowmobiling, horseback riding, and other motorized activity (USDA Forest Service 2005).

As shown in Table 28, the top five recreation activities of visitors to the Ochoco National Forest in 2008 were day hiking/walking, viewing wildlife, viewing natural features, relaxing, and driving for pleasure. Each visitor also indicated his or her primary activity for the current recreation visit to the forest. The top primary activities were, hunting, day hiking/walking, snowmobiling, viewing natural features, and developed camping, viewing wildlife/nature.

Primary OHV users also participate in a variety of other recreation activities during their forest visit (USDA Forest Service 2006b). In Washington and Oregon, the most popular secondary activity for primary OHV users is developed camping (see Table 29). Relaxing and viewing natural features also had high participation rates. From the preceding table, a relationship can be obtained using the last column to compare secondary activities for primary OHV users on a national level. For example, 44.7 percent of primary OHV users camp in developed sites, compared to 49.9 in Oregon and Washington.

Table 29. Secondary Activities Reported by Primary OHV Users in the Pacific Northwest Region of the Forest Service.

Activity	% of Primary OHV Users
Developed Camping	49.9
Relaxing	46.5
Viewing Natural Features	46.2
Viewing Wildlife	24.4
Hiking/Walking	20.4
Driving for Pleasure	16.7
Gathering Forest Products	9.5
Primitive Camping	6.0
Fishing	2.0
Visiting Historic Sites	0.0
Hunting	0.0
Data source is the first round of National Visitor Use Monitoring surveys (USDA Forest Service 2006b).	

Motorized Recreation Use and Trends

Oregon State Law allows OHVs to travel on one-lane gravel and native-surface roads (Oregon Parks and Recreation Department 2009). Over 1,388 miles of road are available for OHV use on the forest to all classes of vehicles. Approximately 659 miles of Maintenance Level II road (252 miles of which are native surface) within the Ochoco Summit planning area are open to OHV use. Native surface, high clearance roads are more likely to be attractive routes for OHVs than roads with aggregate surface. Some of these native surface roads are primitive and rough, while others are relatively smooth and offer little or no technical challenge. Class I and III OHVs are also permitted on roughly 27 miles of designated trails for OHVs on the Ochoco National Forest, including the 8.5 mile Green Mountain OHV trail on the Lookout Mountain Ranger District. None of these designated motorized trail miles occur within the project area. Although the extensive road system and motorized trails provide motorized access for many types of vehicles, roads and designated trails do not always provide the recreational experience that many people seek or the connectivity to desired destinations such as favorite campsites, vistas, people’s homes, or community services.

Several public land management agencies manage more than 40 designated OHV sites and areas in Oregon. Given the willingness of OHV users to drive substantial distances to recreate (Bergerson et al. 2005), many of those who use the existing routes in Central Oregon for OHV recreation probably also use these other areas either instead of or in addition to Forest routes. NVUM reported substitute choices made by OHV users if they were unable to use National Forest System lands. About 64 percent of primary OHV users in the Pacific Northwest responded that they would go somewhere else for the same activity (English et al. 2004).

The 2004 Oregon Statewide Motorized Trail Use Survey revealed that OHV enthusiasts are willing to travel reasonably long distances to pursue their most frequent activity (Bergerson et al. 2005). The median distance traveled to reach an OHV riding opportunity falls in the range of 41 and 50 miles, and nearly one-fifth of OHV users travel more than 100 miles. Considering only OHV opportunities on National Forest system lands, the median distance traveled is over 200 miles (USDA Forest Service 2006).

The Malheur National Forest lies to the east of Paulina Ranger District. The Malheur Forest boundary is not adjacent to the Ochoco National Forest, and there are no Forest roads that are open to mixed use connecting the two Forests. There are some connecting routes open to highway-legal vehicles. As with all national forests, the Malheur National Forest is implementing the Travel Management Rule. There is public land managed by the Prineville BLM adjacent to many areas of the Ochoco National Forest boundary. Some BLM roads are open to OHV use, and some areas have developed trail systems and play areas that are open to cross country travel.

The Oregon Back Country Discovery Route is over 950 miles and is a mostly-graveled route across the eastern part of Oregon, from Cave Lake, California to Walla Walla, Washington. A portion of route 4 traverses the project area making a connection from Seneca to Prineville. Although the State of Oregon no longer can refer to it as a designated route, maps remain available through a private source (www.oohva.org)

In Oregon, ATV riding (three and four wheel vehicles) is by far the most popular type of OHV use, reported by 40 percent of OHV users as their favorite activity (Bergerson et al. 2005). Seventy percent of Oregon households that participate in OHV sports report that they rode an ATV in 2004 (Table 30). Many households participate frequently. The State survey did not ask how many individuals in the household participated in each activity, so no figure for total participation is estimated by this source.

Off-road motorcycling is reported to be the favorite activity by 44 percent of OHV users (Table 30). Forty-four percent and 29 percent of OHV users favor four-wheel driving with stock vehicles and with modified vehicles, respectively. Modified 4-wheel drive vehicles have modified tires and/or suspension upgrades.

Table 30. Frequency of Motorized Trail Participation in Oregon among Households Reporting OHV Participation.

Activity	Participated in the Last Year (percent)	Estimated Oregon Households	Of Participants in Last Year, How Often? (percent)			
			Weekly	2-3/ Month	Once/ Month	Less Often
ATV riding (3 & 4 wheel)	70	68,600	12	34	19	34
Off-road motorcycling	44	43,100	16	29	20	35
4-wheel driving (stock)	44	43,100	21	24	24	31
4-wheel driving (modified)	29	28,400	21	21	33	24
Data are from the 2004 Oregon Statewide Motorized Trail User Survey (Bergeson et al. 2005).						

Residents from the counties that visit the Ochoco Summit project area most often (Deschutes, Crook, Jefferson, Multnomah) state that ATVs (Class I) are also the most popular OHV; Class III OHVs (motorcycle) ownership ranges from 17 to 27 percent for these counties (Table 31). Lane County departs from ownership patterns for Class II OHVs (jeeps, side-by-sides, etc) by having 22 percent of permits for these vehicles, whereas the other counties show 11 percent (Lindberg 2009).

Table 31. OHV Ownership, Permits, In-state, by County, Percent of County Ownership by Class (Lindberg 2009).

	Class I (ATV)	Class II (jeep, side-by-side, etc.)	Class III (motorcycles)	Total
Oregon Total	61%	18%	21%	100%
Crook	72%	11%	17%	100%
Deschutes	61%	11%	27%	100%
Klamath	72%	11%	17%	100%
Lane	59%	22%	19%	100%
Excerpted from : The Economic Impacts of Off-Highway Vehicle (OHV) Recreation in Oregon: Rider Demographics and Preferences Report, Prepared for the Oregon Parks and Recreation Department: July 8, 2009, Kreg Lindberg				

Predicted OHV use in the Ochoco Summit OHV Planning Area

Most OHV use in the project area occurs seasonally as the higher elevations become inaccessible due to snow. Based on observational data from Forest Service staff, the heaviest use within the Ochoco Summit project area occurs on summer weekends and holidays from approximately May 1 – Sept. 30, with less recreational use occurring weekdays and during the shoulder seasons of October and November. An exception to this is during hunting season. Starting with bow hunting in August and continuing through November, there are hunting camps scattered across the area. During this time, there is increased use of OHVs primarily for hunting purposes.

In the short term, fuel prices and the recession are affecting OHV recreation (Albright 2008); however, less than half of OHV survey respondents in 2005 said that “lack of money” was an important reason for not participating in their motorized activities more than they do (Bergeson et al. 2005). Rather than abandon the sport altogether, OHV enthusiasts are predicted to recreate closer to home. For Central Oregon residents, the Ochoco National Forest is substantially closer to home than Portland, the Willamette Valley, or the coastal dunes.

As the recession abates, it is likely that Oregon counties would recover economically and continue growing. This continued population growth would likely result in increased recreation use of National Forests. Overall demand for OHV riding opportunities on the Ochoco National Forest is expected to increase in the long term (Cordell et al. 2008b; Bergeson et al. 2005).

Based on estimates from the NVUM survey on the Ochoco National Forest, more than 14,000 forest visitors participated in OHV or Motorized Trail Activities on the Forest in 2008. For the purpose of this analysis, it is assumed that there are approximately 5,000 visitors participating in OHV use within the project area (slightly more than 1/3 of the estimated total forest OHV participation).

Oregon Statewide Comprehensive Outdoor Recreation Plan (SCORP) data indicated a 38 percent increase for ATVs between 1987-2002 (2.5 percent annual increase) and Cordell’s 2008 data indicated a 56.1 percent increase over the past decade (5.6 percent annual increase); based on these data7, the rate of increase of ATV use on the Ochoco National forest is predicted to be between 2.5

[7] 2003-2007 Oregon Statewide Comprehensive Outdoor Recreation Plan (especially Chapter 4 on Outdoor Recreation); Cordell, 2008 (The Latest on Trends in Nature-based Outdoor Recreation Activity); Cordell et al. 2008 (Outdoor Recreation Activity Trends: What’s Growing, What’s Slowing? [A Recreation Research Report in IRIS Series, September 2008]); Cordell et al. 2008 (Off-Highway Vehicle Recreation in United States and its

and 5.6 percent per year over the next decade. This would translate to about 125-280 new riders within the project area each year.

Central Oregon OHV Operations (COHVOPS)

The Forest Service and the Bureau of Land Management (BLM) have combined forces to manage the Central Oregon off highway vehicle trail systems through a program called Central Oregon Off-Highway Vehicle Operations (COHVOPS).

The mission of COHVOPS is to provide consistent, quality off-highway vehicle recreation opportunities that are focused on customer service and resource protection. COHVOPS manages the Central Oregon OHV trail systems for the Deschutes and Ochoco National Forests and the Prineville BLM. This includes operations, maintenance, monitoring, patrolling, user education, and law enforcement. The team implements existing OHV management plans, identifies future needs, recommends actions to management, and assists in future OHV planning efforts. COHVOPS is funded through a combination of direct support from the Forest Service, the Bureau of Land Management (BLM), and grant funding from the State of Oregon derived from the ATV Allocation Funds derived from the ATV Permit program and a portion of gas tax revenue.

Existing Condition

The Ochoco Summit project area has a variety of recreation opportunities to offer, ranging from developed campgrounds and trails to primitive settings for dispersed recreation. Walton Lake Campground is the largest developed recreation site in the project area. There are several streams that provide fishing opportunities. Hunting is a very popular activity with over 19% visitor participation (NVUM, 2009). Other recreation opportunities include hiking, mountain biking, camping, bird-watching, scenic viewing, snowmobiling and cross-country skiing.

Developed Recreation

Developed recreation sites managed by the Lookout Mountain and Paulina Ranger Districts of the Ochoco National Forest includes 22 campgrounds, 4 picnic (day-use) sites, 23 trailheads, 2 rental cabins, 4 horse camps, 3 snow parks, and other minor sites. Developed recreation sites located within the project area are displayed in Table 32.

Developed sites that are located within ½-mile of the proposed trail systems are Ochoco Divide Campground, Ochoco Divide Sno-park, Wildwood Campground, Walton Lake Campground, Scotts Camp, Allen Creek Horse Camp, Big Springs Campground, Cottonwood Pit, and Keeton Trailhead.

Table 32. Developed recreation sites within the Ochoco Summit OHV Trail System project area.

Site Name	Campground	Trailhead	Sno-park
Walton Lake	**X**		
Ochoco Divide	**X**		
Ochoco Forest Camp	**X**		
Wildwood	**X**		
Scotts	**X**		
Allen Creek Horse Camp	**X**		
Deep Creek	**X**		
Big Springs	**X**		
Biggs Spring	**X**		
Cottonwood	**X**		
Cottonwood Pit	**X**		
Barnhouse	**X**		

Regions and States: An Update National Report from the National Survey on Recreation and the Environment).

Wolf Creek	**X**		
Sugar Creek	**X**		
Walton Lake		**X**	
Lookout Mountain		**X**	
Round Mountain		**X**	
Independent Mine		**X**	
Baneberry		**X**	
Barnhouse		**X**	
Keeton		**X**	
Fry		**X**	
Rock Creek		**X**	
Walton Lake			**X**
Ochoco Divide			**X**
Marks Creek			**X**

Dispersed Recreation

Many Forest visitors prefer a more secluded experience than what developed campgrounds and picnic areas offer. Popular dispersed recreation activities on the Ochoco National Forest include camping, fishing, hiking, viewing wildlife, hunting, picnicking, non-commercial gathering of forest products such as antlers, mushrooms, and cones, and driving Forest roads for recreation or for viewing natural scenery. Across the Ochoco National Forest, there are over 3,036 miles of road, of which 1,388 miles are open to both highway legal and non-highway legal vehicles. In addition, there are 27 miles of trail open to motorized travel for OHVs and motorcycles. As described in the Transportation section of this document, there are 799 miles of open road within this project project area. These vary from paved two lane roads to narrow native surface high clearance roads (refer to the descriptions of Maintenance Levels on pages 45 to 47). Among the open roads, 659 miles are available for mixed use (shared between highway legal vehicles and non-highway legal vehicles) and 252 miles are native surface. This network of roads and trails provides users with a variety of options to access and view the Forest. The network of open roads is part of the existing condition and is displayed in the background of the alternative maps (Maps 3 to 8). This network of roads and trails provides users with a variety of options to access and view the Forest.

Within the Lookout Mountain and Paulina Ranger Districts, there are over 900 identified dispersed sites (GIS data) of which many are accessible by high clearance roads. It is unknown how many of these sites are located within the project area; however the highest concentration of sites is around the Lookout Mountain Recreation Area, and along streams with adjacent designated roads. Big-game hunting is a very popular activity in some parts of the Forest and especially in the Ochoco Wildlife Management Unit. The 2008 NVUM (Table 28) for the Ochoco National Forest showed an estimated 19% percent of forest visitors participated in hunting as either a secondary or a primary activity. There are many dispersed sites on the Paulina Ranger District and around Lookout Mountain Recreation Area that are heavily used during hunting season.

Designated Recreation Areas and Trails

The Lookout Mountain Recreation Area is a roadless area managed to provide big game habitat and semi-primitive recreational opportunities within a natural setting. There are 22.75 miles of standard/terra trails open to non-motorized uses, including mountain bikes. The 14,365-acre area provides a wide range of recreational opportunities, including motorized access on one designated road, which is 1.3 miles long and is open to OHV use (USDA, 1989). Motorized use within this management area is restricted to designated routes.

The Deep Creek Recreation Area encompasses roughly 900 acres and is popular year-round for fishing, dispersed camping, hunting, and sightseeing. The management emphasis for this area is to provide a natural setting for recreation pursuits within the area where management activities are not

visually evident (USDA, 1989). Motorized use within this management area is restricted to designated routes.

The Bandit Springs Recreation Area is adjacent to the planning area along the northeast side near US Highway 26. The management emphasis for this area is to provide dispersed, non-motorized recreational opportunities within a setting where most management activities are generally not evident to the casual observer.

Portions of the ***Summit National Historic Trail*** lie within the project area. The management emphasis for this area is to protect the integrity of the Summit Trail; to enhance and interpret significant segments for public enjoyment and education. Pristine segments will be managed to protect, interpret, and preserve their historic qualities (USDA, 1989). Motorized use within this management area is restricted to designated routes.

The 9.0 mile ***Round Mountain National Recreation Trail*** is located within the planning area. The trail is open to non-motorized uses. The management emphasis for the trail is to protect and manage for scenic qualities which make the trail corridor an attractive recreational setting. Sites along the trail where management activities are in conflict with the National Recreation Trail objectives will be rehabilitated (USDA, 1989). Although the trail is managed for non-motorized use, unauthorized use of the trail by OHVs has been known to occur.

Wilderness

The 5,400-acre Bridge Creek Wilderness is within the Ochoco Summit OHV project area. Motorized and mechanized use is prohibited within designated wilderness areas.

Wild and Scenic Rivers

The North Fork Crooked Wild and Scenic River is within the project area. The 1968 Wild and Scenic Rivers Act calls for maintaining the free-flowing character of designated rivers, protecting the water quality, and protecting and enhancing their "outstandingly remarkable values." Outstandingly remarkable values (ORVs) are values or opportunities in a river corridor that are directly related to the river and that are rare, unique or exemplary from a regional or national perspective. The ORVs for the North Fork Crooked Wild and Scenic River are vegetation and scenic resources.

The North Fork Crooked Wild and Scenic River has segments classified as Recreational and Scenic (these segments are accessible by road and may have some development along their shorelines) and one segment classified as Wild (no development is allowed along the shoreline in this segment). The Ochoco Forest Plan standards and guidelines state that OHV access off of open roads within the Wild and Scenic river corridor is restricted to designated routes only; however, some OHV use is occurring within the corridors outside of designated routes.

Special Uses

All commercial events (where an entry fee is established) on National Forest lands must be authorized by a special-use permit. For the Forest Service to authorize events, organizers must ensure the use is consistent with surrounding land uses. There are several special use events annually within the project area, including the Bandit Springs Horse Endurance Race, the Oregon Star Party, and many less formal events such as poker rides.

Motorized Recreation Opportunities

Many OHV areas and trails exist in Central Oregon; Table 33 lists the areas closest to the project area. There are roughly 700 miles of designated OHV trail opportunities for various vehicle classes, including play areas, that are located less than 50 miles from Prineville. The 8.5 mile Green Mountain OHV trail (approximately 20 miles from the project area) and Henderson Flat (on the Crooked River

National Grassland) are the only designated OHV riding areas on lands managed by the Ochoco National Forest.

Table 33. Selected OHV opportunities close to the Ochoco Summit project area.

Name	Managing Agency	Location	ATV Classes	Season	Description
Green Mountain OHV Trail	Ochoco National Forest	20 miles NE of Prineville	I and III	All year	8.5 miles of easiest to more difficult trails, not open to Class II
Henderson Flat	Crooked River National Grassland	13 Miles S of Madras	I and III	Closed Dec 1 through March 31	18 miles easiest to more difficult trails, not open to Class II
East Fort Rock	Deschutes National Forest	21 miles east of Bend on US 20	I and III, Class II on Shared Use Roads Only, Groundhog Rock Crawl Pit	All year, some trails affected by Green Dot Closure in October	318 miles of easy to most difficult trails
Edison Butte	Deschutes National Forest	24 miles SW of Bend	I, II and III	Closed Dec 1 through March 31 except for Class I vehicles	25 miles of more to most difficult trails. Restricted to vehicles under 80 inches
Cline Buttes	Prineville BLM	9 miles N of Bend on Hwys 20 and 126	I, II, and III	Generally, most trails open dependent upon snow	Up to 90 miles for various class of vehicles with varied terrain
Millican/ ODOT Pit Play area	Prineville BLM	27 Miles E of Bend on Hwy 20	I and III	All Year	Open play area provides challenges for all levels of experience
Rosland Pit Play Area	Prineville BLM	26 miles S of Bend at Wickiup Jct.	I and III	All year	3.5 miles of trails, a learners' loop, a beginner play area and an advanced play area
North Millican	Prineville BLM	24 miles E of Bend off Hwy 20	I, II and III	Closed Dec 1 through April 30	102 miles of easiest to most difficult trails; 24 miles open to Class II
Millican Plateau	Prineville BLM	20 miles NE of Bend on George Millican Road	I, II and III	All Year	111 miles of easiest to more difficult trails; 37 miles open to Class II
South Millican	Prineville BLM	22 miles E of Bend off Hwy 20	I, II and III	Closed Dec 1 through April 30	43 miles of easiest to more difficult trails; 11 miles open to Class II
Santiam Pass	Willamette National Forest	22 miles west of Sisters	I, II, and III	Mid-June-mid-November (snow free)	49 miles of mostly easiest to most difficult trails.
Rim Butte	Deschutes National Forest	40 miles south of Bend, east of La Pine	II	Mid-June-mid-November (snow free)	17.6 miles of trail including 14 miles of technical routes
Three Trails	Deschutes National Forest	60 miles south of Bend off Hwy 97, near Crescent	I, II and III	May 1 to October 31 (condition dependent)	142 miles of trails plus 80 miles connecting roads
Source: Oregon Parks and Recreation Department : http://atv.prd.state.or.us/places.php.					

Approximately 700 miles of user-created OHV routes, including open and closed roads and user created trails, have been identified in the project area. For some, these user trails have provided the experience riders desire. For others, however, these trails are generally of low to moderate value because they lack flow, connectivity, and loops. In general, there is no organization to the trails and they have been developed haphazardly as riders continue to use certain routes. Within the project area the greatest amount of OHV use is currently focused around Big Summit Prairie. During hunting season, there is increased OHV activity throughout the planning area. Although the Forest Service does not have statistically valid use numbers for OHVs on the district, forest personnel have observed an increase in the number of riders and a growing network of user-created trails in this area. However, with implementation of the Deschutes and Ochoco National Forest Travel Management Plan, most user-created routes have become off-limits to motorized vehicles.

In order to put the Ochoco Summit project area in context with other OHV riding areas and opportunities in Central and Eastern Oregon, Travel Management Plans from Ochoco and adjacent Forests were reviewed, as well as riding area descriptions posted on the Oregon State Parks and Recreation and other Forest's web pages.

In Central Oregon four of ten riding areas offered some form of opportunity for operators of class II vehicles: Christmas Valley Sand Dunes (8,000 acres), Klamath Sportsman's Park (20 acres), Edison Butte (25 miles) and Millican Valley (only on open roads). In Eastern Oregon three of eleven riding areas offered some form of opportunity for class II vehicle operators: Morrow County (20 miles), Mt. Emily (30 miles) and Virtue Flat (5,000 acres). All of the remaining riding areas posted on the State Parks web sites were limited to vehicles 50" or less in width, with the exceptions of West End ATV (Sunflower) near Spray, which allows UTVs up to 65" in width, and Upper Walla Walla which is limited to class III (single track motorcycles).

In the Central Oregon Region, the six riding areas offering opportunities for class I and III vehicles (50" and less) total approximately 662 miles of designated routes. In the Eastern Oregon Region, the six riding areas offering opportunities for class I and III vehicles (50" and less) total approximately 338 miles of designated routes. In the Eastern Oregon Region, the riding area offering opportunities for class I, III and IV vehicles (65" and less) includes 3,700 acres, while the area limited to class III (motorcycle) includes 40 miles of designated routes. Additional opportunities will soon be available following construction of trails planned under the Three Trails Off-Highway Vehicle Project on Deschutes National Forest; Cline Buttes on Prineville District BLM; and the Rock Creek and McCubbins Gulch areas under the Mt. Hood National Forest Off-Highway Vehicle (OHV) Management Plan. Fremont-Winema is currently in the process of planning the South Chiloquin Motorized Trail Project.

In addition to designated riding areas and designated trails, OHVs may also travel on open roads that have been approved for mixed use (highway legal as well as non-highway legal vehicles). On the Deschutes and Ochoco National Forests, with implementation of the Travel Management Plan, OHVs would be allowed to utilize approximately 6,700 miles of mixed use road and 1,230 acres of gravel pit areas across the two Forests. Elsewhere in Central Oregon, the Fremont-Winema National Forest offers approximately 5,900 miles of mixed use road and 165 miles of mixed use trail under their Travel Management Plan. Some of these routes are open year-round while others are subject to seasonal restrictions. Though the miles available for mixed use on open roads do not provide the same quality of recreational experience as motorized trails, they do offer opportunities for recreational experiences and motorized access for those who are not looking for technically difficult routes.

Predicted OHV use in the Ochoco Summit OHV Planning Area

Most OHV use in the project area occurs seasonally as the higher elevations become inaccessible due to snow. Based on observational data from Forest Service staff, the heaviest use within the Ochoco Summit project area occurs on summer weekends and holidays from approximately May 1 – Sept. 30,

with less recreational use occurring weekdays and during the shoulder seasons of October and November. An exception to this is during hunting season. Starting with bow hunting in August and continuing through November, there are hunting camps scattered across the area. During this time, there is increased use of OHVs primarily for hunting purposes.

In the short term, fuel prices and the recession are affecting OHV recreation (Albright 2008); however, less than half of OHV survey respondents in 2005 said that "lack of money" was an important reason for not participating in their motorized activities more than they do (Bergeson et al. 2005). Rather than abandon the sport altogether, OHV enthusiasts are predicted to recreate closer to home. For Central Oregon residents, the Ochoco National Forest is substantially closer to home than Portland, the Willamette Valley, or the coastal dunes.

As the recession abates, it is likely that Oregon counties would recover economically and continue growing. This continued population growth would likely result in increased recreation use of National Forests. Overall demand for OHV riding opportunities on the Ochoco National Forest is expected to increase in the long term (Cordell et al. 2008b; Bergeson et al. 2005).

Based on estimates from the NVUM survey on the Ochoco National Forest, more than 14,000 forest visitors participated in OHV or Motorized Trail Activities on the Forest in 2008. For the purpose of this analysis, it is assumed that there are approximately 5,000 visitors participating in OHV use within the project area (slightly more than 1/3 of the estimated total forest OHV participation).

Oregon Statewide Comprehensive Outdoor Recreation Plan (SCORP) data indicated a 38 percent increase for ATVs between 1987-2002 (2.5 percent annual increase) and Cordell's 2008 data indicated a 56.1 percent increase over the past decade (5.6 percent annual increase); based on these data[8], the rate of increase of ATV use on the Ochoco National forest is predicted to be between 2.5 and 5.6 percent per year over the next decade. This would translate to about 125-280 new riders within the project area each year.

Environmental Effects

Assumptions for the Effects Analysis

This recreation analysis is based on the following assumptions:

- OHV users base their destination decisions on a number of variables that include weather-related trail conditions, desire for variety within a given riding season, time and money they can devote to traveling to a riding area, and their choice of riding partners.
- Weather conditions preclude use in the Ochoco Summit OHV area much of the year, which reduces the overall opportunity.
- Once the Travel Management Rule is fully implemented, there would be no other places to ride other than existing designated trail systems or mixed use roads, and those trail systems that are in place would likely increase in visitation over existing levels.
- If a new trail system is created in the project area, the estimated OHV use and annual increase described in the previous section would be focused within that trail system.
- The downward trend seen during the recent recession would not likely continue as the economy becomes stronger.

[8] 2003-2007 Oregon Statewide Comprehensive Outdoor Recreation Plan (especially Chapter 4 on Outdoor Recreation); Cordell, 2008 (The Latest on Trends in Nature-based Outdoor Recreation Activity); Cordell et al. 2008 (Outdoor Recreation Activity Trends: What's Growing, What's Slowing? [A Recreation Research Report in IRIS Series, September 2008]); Cordell et al. 2008 (Off-Highway Vehicle Recreation in United States and its Regions and States: An Update National Report from the National Survey on Recreation and the Environment).

- Research shows that OHV riders are willing to travel more than 100 miles (Bergeson et al. 2005); however, the Ochoco National Forest has received input from local citizens that they would prefer to have OHV opportunities less than 100 miles from home.
- A well-designed designated trail system with adequate facilities would attract riders.
- Word of mouth of a well-designed and managed trail system would contribute to the visitation.
- A trail system that uses Oregon ATV grant monies would be included on the State web site and brochure; when a new trail system is advertised, people from around the state would be likely to visit the area.
- If riders like the trail system, they would return.

Evaluation Criteria

The Experience of the OHV Recreationists

A successful OHV route system provides sufficient traveling distance, play areas, and scenic views, as well as a variety of "difficulty" levels to accommodate all types of users. A successful system also has adequate trailhead and staging area facilities, which include parking, restrooms, drinking water, and picnic or camping opportunities. Many OHV riders want to recreate in a dispersed setting where they feel some level of solitude (Crimmins 2006).

When trail systems are insufficient, there may be an increased tendency for riders to create new trails, which can lead to difficulty in enforcement of rules and regulations.

The effects of the alternatives on the OHV recreation experience have been evaluated using the following criteria:

Travelling Distance

The alternatives were evaluated by measuring and comparing the number of miles of connected OHV trails by each vehicle class. A qualitative descriptor (high, moderate or low value) was assigned to a range of contiguous route miles to describe the adequacy of an experience based solely on the sufficiency of miles, based on Crimmins (2006). Table 34 summarizes this information by vehicle class.

Table 34. Value of OHV experience by vehicle class based on miles of trail.

Miles of Class I ATV Trail (e.g. quad, 4-wheeler)	Value
41 to 80	High Value
16 to 40	Moderate Value
0 to 15	Low Value
Miles of Class II ATV Trail (e.g. Jeep, side-by-side)	**Value**
26 to 50	High Value
11 to 25	Moderate Value
0 to 10	Low Value
Miles of Class III Trail (e.g. Motorcycle)	**Value**
51 to 100	High Value
26 to 50	Moderate Value
0 to 25	Low Value

Play Areas and Scenic Views

Play areas and small, confined, open areas (such as mineral sources or pits) where use is not limited to trails, often provide OHV riders the opportunity to find challenge in an appropriate manner, to warm up their equipment and for new or inexperienced riders to learn and practice skills prior to a trail ride. Although not limited solely to OHV riders, scenic viewpoints such as vistas, historic sites,

and geologic features are desired destinations. The presence or absence of view and play areas affects a rider's experience.

Alternatives were evaluated by comparing the number of play areas and scenic viewpoints in each alternative, and assigning the number a value: low, medium, or high (Crimmins 2006). These values are summarized in Table 35.

Table 35. Value of an OHV Area Based on Play Areas and Scenic View Points.

Play Areas		Scenic Viewpoints	
Number	Value	Number	Value
0-1	Low	0-1	Low
2-3	Moderate	2-3	Moderate
4+	High	4+	High

Staging and Camping Areas

A desirable trail system would have at least one developed staging area (fully-developed or semi-developed staging area or a camping area) in which they could camp. The alternatives were evaluated on whether or not they contain developed staging areas. Refer to Table 36 for a description of amenities that would be provided at staging areas based on level of development.

Table 36. Description of Staging and Camping Areas.

Amenities	Fully developed (3-5 acres)	Semi-developed (2-3 acres)	Semi-primitive (1-2 acres)
Campsites	X		
Parking area	X	X	X
Toilets	X	X	
Tot lot or Learner loop*	X		
Young Teen area/warm-up loop**	X		
Picnic tables	X	X	
Fire rings	X	X	

* Tot lot- small riding area for young children where they are under constant parental supervision, for class I and III vehicle staging areas only
** Area where young teens can learn to ride and for short warm-up rides

Motorized User Conflicts

OHV users are a diverse group with varying desires and expectations. Not all vehicle classes perform the same on any given terrain or trail layout (Crimmins 2006). User separation can enhance specific rider experiences. On the other hand, providing separate trails for different vehicle classes can be expensive, cause resentment, be difficult to enforce, and limit opportunities for communication and cooperation (FHWA 1994).

The separation of classes of vehicles was a particular concern expressed by some ATV and motorcycle riders at meetings with Forest Representatives and during the scoping period. Some motorcycle enthusiasts want only single-track trails (6 - 24 inches wide). Maintaining trails for this experience means excluding ATVs. On the other hand, it is common for a family or group of friends to visit the Forest with more than one vehicle class in tow. Such a group usually would prefer routes open to more than one vehicle class.

Trail Complexity

Comments made during the scoping period and public meetings indicate that OHV riders wish to feel challenged engaged and inspired. However, what presents a challenge to one rider may be too easy for another and too challenging to a third. It's logical to assume that the longer the trail system, the

better it can accommodate a variety of user demands. However, a trail system that's largely made up of user-created trails and National Forest System roads may not provide the range of experiences that OHV riders are looking for.

Forest Service personnel have heard from recreational motorized users through scoping comments and public meetings that the number a trail loop opportunities available within five miles of a staging area and the number of decision points add to the desirability of the trail system.

Analysis of user experience-based experience based on trail complexity will be largely qualitative, but will include the number of miles of Forest road converted to trail as an indicator of improved trail quality.

Rider experience will also be described based on the number of decision points at trail crossings and at junctions with mixed use roads along the trail system, and the number of trail miles and loop opportunities within five miles of a staging area.

The following data compare each alternative's trail system features including new trail construction, conversion of road to trails, and utilizing open roads as connectors, broken out by vehicle class for which the trail systems are proposed.

Alternative 1

Miles of designated motorized trails: 0
Total miles of open mixed use roads (based on draft MVUM): 674 miles

Alternative 2: Proposed Action

Length of class I system : 69 miles
Length of 50" wide trail – new route : 31 miles
Length of 50" wide trail – closed road: 21 miles
Length of 50" wide trail – decom road: 3 mile
Class I system on open road: 14 mile

Length of class II system : 49 miles
Length of 80" wide trail – new route : 12 miles
Length of 80" wide trail – closed road: 7 miles
Length of 80" wide trail – decom road: 1 mile
Class II system on open road: 28 mile

Length of class III system : 52 miles
Length of 24" wide trail – new route : 26 miles
Length of 24" wide trail – closed road: 16 miles
Length of 24" wide trail – decom road: 7 mile
Class III system on open road: 4 mile

Overall Alternative designated route mileage: 170 miles of which 46 miles are on open roads (124 miles of trail on new routes or road-to-trail conversion)

Alternative 3:

Length of class I system : 38 miles
Length of 50" wide trail – new route : 22 miles
Length of 50" wide trail – closed road: 11 miles
Length of 50" wide trail – decom road: 1 mile
Class I system on open road: 4 mile

Length of class II system : 0 miles

Length of class III system : 62 miles
Length of 24" wide trail – new route : 28 miles
Length of 24" wide trail – closed road: 19 miles
Length of 24" wide trail – decom road: 6 mile
Class III system on open road: 9 mile

Overall Alternative mileage: 101 of which 13 miles are on open roads (88 miles of trail on new routes or road-to-trail conversion)

Alternative 4:

Length of class I system : 129 miles
Length of 50" wide trail – new route : 48 miles
Length of 50" wide trail – closed road: 39 miles
Length of 50" wide trail – decom road: 8 mile
Class I system on open road: 34 mile

Class II system on open road: 30 mile
Length of 80" wide trail – new route : 11 miles
Length of 80" wide trail – closed road: 6 miles
Length of 80" wide trail – decom road: 1 mile
Class II system on open road: 11 mile

Length of class III system : 52 miles
Length of 24" wide trail – new route : 22 miles
Length of 24" wide trail – closed road: 17 miles
Length of 24" wide trail – decom road: 5 mile
Class III system on open road: 8 mile

Overall Alternative mileage: 211 of which 53 miles are on open roads (158 miles of trail on new routes or road-to-trail conversion)

The Experience of Non-motorized Recreationists

Non-motorized or quiet recreation is a popular activity within the planning area. "Quiet" recreationists include hikers, bicyclists, equestrians, bird watchers, hunters, anglers and others for whom the quality of their experience depends to a large degree upon their ability to escape the sights and sounds of an increasingly mechanized society. There are roughly 132 miles of forest system trails on the Ochoco National Forest and about 53 miles within the Ochoco Summit OHV Planning area that are managed exclusively for non-motorized uses (excluding winter snowmobile, cross-country ski and snowshoe trails). The 27 miles of forest trails on the Ochoco National Forest that are managed for OHV uses (including 8.5 miles on the Lookout Mountain Ranger District) are also open to non-motorized uses.

A growing body of research demonstrates that traditional and quiet recreationists are adversely affected by OHV use and often seek out landscapes free from OHVs. With respect to shared use of trails, even though trails are designated as multiple use, heavy motorized use tends to cause other trail users to pursue opportunities at other locations in order to realize desired experiences and benefits. This displacement effect has prompted some researchers to claim that, "the displacement of…non-motorized recreation in favor of more intensive OHV use may have significant economic impacts on the local economy," (Swanson and Loomis, 1996).

The sound analysis for this project was performed using geographic information systems (GIS) modeling software developed by Sarah Reed for the Wilderness Society in Berkley, California. The modeling software, called SPreAD-GIS, is a GIS adaptation of a long hand analysis technique developed previously by the Forest Service and the Environmental Protection Agency. It is a series of

commands that are run within Environmental Systems Research Institute (ESRI) ArcMap software. The series of SPreAD-GIS commands or scripts attempt to create concentric zones of diminishing sound around a point or along a trail or road to measure the radiating effects of motor noise in forested and other natural ecosystems. In summary, the model uses elevation, vegetation, sound source, model extent, motor type, weather conditions, predominant vegetation type (coniferous forest) and ambient sound conditions to produce a raster dataset that approximates sound diffusion through the landscape from a linear sound source.

Using the SPreAD-GIS scripts, a motorcycle was selected as the motor type and sound source as it had the potential for producing the highest dB level based on the model. The proposed OHV trail system was buffered with a 45 dB noiseband from each OHV trail and shared-use road for each alternative. This information was then overlaid over the project area to determine how many acres were within the 45 dB noiseband of a proposed OHV trail or shared-use road by alternative. The buffered layer within the 45 dB noiseband is the area determined to be the minimum distance where OHVs would be clearly audible over expected normal ambient noise.

A designated OHV trail system would consist of both concentrations of segments of OHV trails and connecting shared-use roads. It is assumed that OHVs would spend more time on the trails (because trails are a preferable opportunity) and use the shared-used roads only to traverse to another trail area. It is acknowledged that OHVs are not the only audible sounds within the Ochoco Summit OHV project area as there are mixed use roads that produce associated noise that would continue regardless of this decision.

Since there are many destinations where both those enjoying motorized and quiet recreation prefer, the potential OHV trail system was buffered at the 45 dB noiseband from each OHV trail and shared-use road for each alternative and overlaid with a map of developed sites, non-motorized trails, known areas of dispersed campsites, and the Horse Endurance race event routes. Acreage of these sites within the 45 dB noiseband of an OHV trail or shared-use road was then determined. The intersection of these layers should be the area where OHVs can be heard from those specific sites.

User Conflicts

User conflict happens when a person's expectations for his or her recreational experience are not met due to contact with another user or through disturbance from the sound or physical evidence left by another user. The potential for conflict exists among all user groups, and even within a user group, when personal expectations of desired experience are not met. Not all user conflicts on the National Forest are entirely recreation-based; the National Forest System provides a wide array of resource-based opportunities such as timber harvest, livestock grazing and mining.

Non-motorized users who use designated motor vehicle routes should expect to encounter motor vehicle use, so such use would not as likely affect their expectation and experience. When a non-motorized user encounters motor vehicles (or evidence of motor vehicles, such as noise or emissions) in an area where he or she does not expect to, user conflict is more likely to occur. Equestrians may be more sensitive to encounters with other users due to safety.

The Ochoco National Forest (ONF) separates its trails between Winter/Summer and Motorized/Non-motorized. There are a few exceptions where sub categorical separations occur such as "Hikers Only" trails within a Summer/Non-Motorized trail. User group conflicts are most likely to occur when trails share a variety of trail uses. Trails on the Ochoco historically have not been designed to separate user types. Separation of user types requires more management and funding than trails on which uses are not separated.

Motorized OHV trails on the ONF also receive use from non-motorized recreationists such as equestrians, hikers and mountain bikers. Though noise is a factor that can detract from those seeking non-motorized use, people using trails that expect motorized encounters are able to use noise to their

advantage. Non-motorized users are able to hear motorized vehicles and avoid encounters; motorized users often cannot anticipate encounters with other users unless line-of-sight is available. Due to trail use hierarchy and implementation of the Travel Management Visitor Use Map (MVUM) in 2011, a trail encounter of motorized use on non-motorized trails is expected to be less likely. In addition to trail encounters, trail design and tread characteristics play a role in the user experience and concern for these characteristics may affect the perceived conflict between user groups.

Areas within the Ochoco Summit Project Area Not Affected by the Action Alternatives

Developed Recreation and Forest System Trails: There would be no affect from any of the action alternatives to the following developed recreation sites and trails: Walton Lake CG, Biggs Spring CG, Big Spring CG, Deep Creek CG, Cottonwood CG, Wolf Creek CG, Sugar Creek CG, Barnhouse CG, Wildwood CG, Walton Lake Trail, Lookout Mountain Recreation Area Trail Systems, Round Mountain National Recreation Trail, Ochoco Mt.Trail, Barnhouse Trail, Cold Springs Rental Cabin, Marks Creek Sledding Hill.

Congressionally Designated Areas: The 5,400 acre Bridge Creek Wilderness is within the boundary of the Ochoco Summit OHV planning area; however, the closest point to any proposed motorized OHV trail is over one mile. No portion of the wilderness area is within the noiseband >45 db. Motorized and mechanized uses are not allowed within designated wilderness, so most visitors to wildernesses expect quiet, but all wildernesses have transition zones where motorized sounds can be heard. In addition, motorized aircraft routinely fly over wilderness, so visitors most likely hear these sounds.

The North Fork Wild and Scenic River corridor is within the boundary of the Ochoco Summit OHV planning area; however, the closest point to any proposed motorized OHV trail is more than 2.2 miles. No portion of the Wild and Scenic River corridor is within the noiseband >45 db. Motorized travel is allowed only on designated routes within the Wild and Scenic River Corridors, and OHV travel could occur on any designated roads within the corridor that are open to mixed use. There are 659 miles of mixed use road open to OHVs within the corridor.

Lookout Mountain Recreation Area: There would be no affect from any of the action alternatives on any area within the Lookout Mountain Recreation Area. The closest proposed motorized trails are > 4 miles from the boundary of this area. OHV use would be allowed on any road open to non-highway legal vehicles that are within or adjacent to the Recreation area. There are 1.3 miles of road currently open to non-highway legal OHV use adjacent to or within the Lookout Mountain Recreation Area.

Non Motorized Trails: There are 50 miles of trails managed exclusively for non-motorized use within the project area, but none of the trails are within the > 45db noiseband (except for a maximum of 0.03 miles of Keeton Trail).

Non-Motorized Winter Recreation Use: Non-motorized winter recreation is high in the area of Ochoco Divide and Walton Sno-Parks and generally consists of cross-country skiing and snowshoeing. This analysis focuses on summer OHV use and does not analyze effects to winter recreation opportunities.

Motorized Recreation Experience

Table 37 displays the number of miles of OHV trail by alternative. The table distinguishes between new trail construction and/or roads converted to trails (trail miles) from the trail system (including connecting roads) in the action alternatives. Routes were mapped using information obtained by the users themselves, agency personnel who specialize in motorized recreation, and Geographical Information Systems terrain data. Values displayed in Table 37 are based on trail system length only.

Table 37. Miles of OHV trail and assigned value by vehicle class by alternative.

Summary of Alt 2 - Proposed Action motorized trails and areas.				
Trail Type	**Total Trail System miles (including open road connections)**	**Value**	**Trail Miles (new construction or road-to-trail conversion)**	**Value**
Motorcycle (<24”) Trail	52	H	49	M
ATV (vehicles <50”) Trail	69	H	55	H
4x4 (vehicles <80”) Trail	49	H	20	M
Total	**170**		**124**	

Summary of Alt 3 - Proposed Action motorized trails and areas.				
Trail Type	**Total Trail System miles (inc. open road connections)**	**Value**	**Trail Miles (new constr. or Rd to Trail conversion)**	**Value**
Motorcycle (<24”) Trail	62	H	53	H
ATV (vehicles <50”) Trail	38	M	34	M
4x4 (vehicles <80”) Trail	0	N/A	0	N/A
Total	**100**		**87**	

Summary of Alt 4 - Proposed Action motorized trails and areas.				
Trail Type	**Total Trail System miles (inc. open road connections)**	**Value**	**Trail Miles (new constr. or Rd to Trail conversion)**	**Value**
Motorcycle (<24”) Trail	52	H	44	M
ATV (vehicles <50”) Trail	129	H	95	H
4x4 (vehicles <80”) Trail	30	M	18	M
Total	**211**		**157**	

Table 38 summarizes the riding areas by type, and scenic viewpoints that would be accessible to OHVs with connection to proposed trail systems in each alternative.

Table 38. Riding areas and scenic viewpoints by alternative.

	Alt 2	Alt 3	Alt 4
Ochoco Divide Sno-Park	W/L	W/L	W/L
Ahalt Mineral Source	PA		PA
Walton Snopark	TA	TA	TA
Scott's Mineral Source	W/L		W/L
Aspen Mineral Source	PA		W/L*
Road 600	W/L		W/L
Peterson Lava	RC		RC
Ross/Peterson Ridge	TA		TA
Cottonwood Pit	W/L	W/L	W/L
Six Corners Mineral Source	W/L	W/L	W/L
Mt. Pisgah viewpoint	yes	no	yes
Peterson Pt. viewpoint	no	no	yes
Slide Mtn viewpoint	no	no	yes
Value based on play areas alone	mod	low	low
Value base on veiwpoints alone	high	low	high

* Changes location to Happy Camp Crk Ridge
W/L – Warm-up and learner loop
TA – Trail access
RC – Rock crawl
PA – Play area for ATV/MC

Table 39 summarizes the staging areas and mapped trailheads by alternative; Table 40 provides site-specific information about each staging area.

Table 39. Staging areas and trailheads by alternative.

Alternative		Staging Areas	Mapped Trail Heads
2	Class I/III	6	3
	Class III only	2	0
	Class II	2	3
	TOTAL	**10**	**6**
3	Class I/III	2	0
	Class III only	2	0
	Class II	0	0
	TOTAL	**4**	**0**
4	Class I/III	6	0
	Class III only	2	0
	Class II	2	0
	TOTAL	**10**	**0**

Table 40. Site-specific staging area information by alternative.

	Alt 2	Alt 3	Alt 4
Ochoco Divide Sno-Park (SD)	X	X	X
Ahalt Mineral Source (FD)	X		X
Walton Snopark (SD)	X	X	X
Scott's Mineral Source (SD)	X		X
Aspen Mineral Source (FD)	X		X*
Road 600 (SD)	X		X
Peterson Lava (FD)	X		
Ross/Peterson Ridge (SD)	X		
Cottonwood Pit (FD)	X	X	
Six Corners Mineral Source (FD)	X	X	
# Trailheads (SP)	6	0	0
* Changes location to Happy Camp Crk Ridge SD-Semi-developed SP-Semi-primitive FD-Fully developed			

Trail complexity was estimated as contributing to rider experience based on the number of decision points within the trail system and connecting mixed use roads, and the number of trail miles and loop opportunities within 5 miles of a staging area. These comparisons are displayed in Table 41. In this table trail to trail decision points are the number of locations where the trail system connects to more than one segment of the trail system. Trail to road decision points are where the trail system connects to mixed use roads that are not part of the designated trail system.

Table 41. Decision points and opportunities near staging areas by alternative.

	Alt 2	Alt 3	Alt 4
Trail to Trail Decision Points, Class I	27	21	73
Trail to Trail Decision Points, Class II	29	0	11
Trail to Trail Decision Points, Class III to Class III	22	3	15
Trail to Trail Decision Points, Class III to Class I/II/III	78	24	99
Trail to Road Decision Points, Class I	64	34	94
Trail to Road Decision Points, Class II	36	0	33
Trail to Road Decision Points, Class III	28	49	28
System Miles w/in 5 mi. of Staging Area, Class I opportunity	69	38	133
System Miles w/in 5 mi. of Staging Area, Class III opportunity	69	64	85
Number of Loops within 5 miles of Staging Areas, Class I	5	10	27

Alternative 1

Under Alternative 1, motorized use of designated routes in the project area would continue to be allowed in locations described on the MVUM map. Within the acres that are open to cross country travel off designated routes, new user created routes would likely continue to be created, and use of existing user created trails would continue. Motorized use would continue and likely increase on

closed roads as more roads are administratively closed or decommissioned. Use of user created routes would continue to be shared between different classes of vehicles.

Alternative 1 would allow access to all areas open to cross country travel associated with pits for mineral extraction and all viewpoints that can be accessed on roads open to non-highway legal vehicles as per the MVUM. Within the project area these include Crystal, Ahalt, Walton, Scott's Camp, Aspen, Six Corners, Remington, Thornton, Grasshopper, Juniper, and Flow Top.

Although the amount of user created trail miles is not known, it is anticipated that Alternative 1 would retain the current condition of user-created and unauthorized routes as no closures or rehabilitation of such routes are proposed under this alternative. The existing condition lacks cohesion and order. While some users have expressed satisfaction with the existing undesignated trails, other users find it to be disorienting and hazardous. Because the existing trails were created by users, in many cases they were not designed to be safe and sustainable. Recreation management and law enforcement within a user-created trail system are extremely difficult. The potential for user conflicts (among motorized users and between motorized and non-motorized recreationists) could remain high under Alternative 1 in areas with existing unmanaged motorized recreation.

This alternative would not provide any organized facilities designed specifically for parking, camping, and dispersal into a nearby trail system. It is assumed riders would continue to use the areas they have in the past. Areas such as Walton Lake Snow Park would continue to be used for day and overnight use, and riders would continue to utilize material sources and other dispersed areas that provide for parking and access to desired riding areas.

Alternative 2

Alternative 2 would provide a total of 170 miles of designated motorized trail for Class I, II, and III vehicles (including 46 miles of connecting open roads). See Table 42 for trail miles broken out by vehicle class.

Table 42. Summary of trail miles proposed in Alternative 2 of the Ochoco Summit OHV Trail System project.

Vehicle Class	Miles of Open Road within Designated Trail System	Miles of Closed Road used for Trail	Miles of Decommissioned Road Converted to Trail	Trail Constructed on Other Than National Forest System Roads (may include user-created trail)	Total Trail Miles
I	14	21	3	31	69
II	28	7	1	12	48
III	4	16	7	26	53
TOTALS	**46**	**44**	**11**	**69**	**170**

General Effects for All Motorized Users

Because the designated Class I and Class III systems would exclude Class II vehicles, risk of conflicts between Class II vehicles and smaller vehicles would be reduced; however, risk would still be present on mixed-use roads. This separation of use would improve safety over the current condition.

Alternative 2 is rated as "Moderate" for presence of play areas and "High" for access to scenic views (see Table 38). Staging areas would provide opportunities for camping as well as day use (see descriptions in Chapter 2 of this EIS); Alternative 2 would provide ten staging areas as well as six mapped trailheads (see Table 39).

Effects to Class I Users

Alternative 2 would allow for up to 55 miles of 50"-wide trail for Class I vehicles plus 14 miles of open mixed-use road within the designated trail system. These 55 miles would be available for use by

motorcycles but would be closed to Class II vehicles. This alternative would provide six staging areas and three trailheads specifically intended for use by ATVs (but available to any trail users). Staging areas would accommodate day use and overnight camping, and most would include a warm-up or learner's loop.

Effects to Class II Users

Alternative 2 would allow for up to 20 miles of 80"-wide trail for Class II vehicles plus 28 miles of open mixed-use road within the designated trail system. These 20 miles would be available for use by all classes of vehicle. This alternative would provide two staging areas and three mapped trailheads specifically intended for use by Class II vehicles (but available to any trail users). Staging areas would accommodate day use and overnight camping.

Effects to Class III Users

Alternative 2 would allow for up to 49 miles of 24"-wide trail for Class III vehicles plus 4 miles of open mixed use road within the designated trail system. These 49 miles would be available for use by motorcycles only. This alternative would provide two staging areas intended for use by motorcycles.

Alternative 3

Alternative 3 would provide a total of 100 miles of designated motorized trail for Class I and III vehicles (including 13 miles of connecting open roads). See Table 43 for trail miles broken out by vehicle class.

Table 43. Summary of trail miles proposed in Alternative 3 of the Ochoco Summit OHV Trail System project.

Vehicle Class	Miles of Open Road within Designated Trail System	Miles of Closed Road used for Trail	Miles of Decommissioned Road used for Trail	Trail Constructed on Other Than National Forest System Roads (may include user-created trail)	Total Trail Miles
I	4	11	1	22	38
II	0	0	0	0	0
III	9	19	6	28	62
TOTALS	**13**	**30**	**7**	**50**	**100**

General Effects for All Motorized Users

Because the designated Class I and Class III systems would exclude Class II vehicles, risk of conflicts between Class II vehicles and smaller vehicles would be reduced; however, risk would still be present on mixed-use roads. This separation of use would improve safety over the current condition.

Alternative 3 is rated as "Low" for presence of play areas and "Low" for access to scenic views (see Table 38). Staging areas would provide opportunities for camping as well as day use (see descriptions in Chapter 2 of this EIS); Alternative 3 would provide four staging areas and no mapped trailheads (see Table 39).

Effects to Class I Users

Alternative 3 would allow for up to 34 miles of 50"-wide trail for Class I vehicles plus 4 miles of open mixed-use road within the designated trail system. These 34 miles would be available for use by motorcycles but would be closed to Class II vehicles. This alternative would provide two staging areas specifically intended for use by ATVs (but available to any trail users). Staging areas would accommodate day use and overnight camping, and most would include a warm-up or learner's loop.

Effects to Class II Users

Alternative 3 would not provide a designated trail system for Class II vehicles.

Effects to Class III Users

Alternative 3 would allow for up to 53 miles of 24”-wide trail for Class III vehicles plus 9 miles of open mixed use road within the designated trail system. These 53 miles would be available for use by motorcycles only. This alternative would provide two staging areas intended for use by motorcycles.

Alternative 4

Alternative 4 would provide a total of 209 miles of designated motorized trail for Class I, II, and III vehicles (including 53 miles of connecting open roads). See Table 44 for trail miles broken out by vehicle class.

Table 44. Summary of trail miles proposed in Alternative 4 of the Ochoco Summit OHV Trail System project.

Vehicle Class	Miles of Open Road within Designated Trail System	Miles of Closed Road used for Trail	Miles of Decommissioned Road used for Trail	Trail Constructed on Other Than National Forest System Roads (may include user-created trail)	Total Trail Miles
I	34	38	5	51	128
II	11	6	1	11	29
III	8	17	5	22	52
TOTALS	**53**	**61**	**11**	**84**	**209**

General Effects for All Motorized Users

Because the designated Class I and Class III systems would exclude Class II vehicles, risk of conflicts between Class II vehicles and smaller vehicles would be reduced; however, risk would still be present on mixed-use roads. This separation of use would improve safety over the current condition.

Alternative 4 is rated as “Low” for presence of play areas and “High” for access to scenic views (see Table 38). Staging areas would provide opportunities for camping as well as day use (see descriptions in Chapter 2 of this EIS); Alternative 4 would provide ten staging areas and no mapped trailheads (see Table 39).

Effects to Class I Users

Alternative 4 would allow for up to 94 miles of 50”-wide trail for Class I vehicles plus 34 miles of open mixed-use road within the designated trail system. These 94 miles would be available for use by motorcycles but would be closed to Class II vehicles. This alternative would provide two staging areas specifically intended for use by ATVs (but available to any trail users). Staging areas would accommodate day use and overnight camping, and most would include a warm-up or learner’s loop.

Effects to Class II Users

Alternative 4 would allow for up to 18 miles of 80”-wide trail for Class II vehicles plus 11 miles of open mixed-use road within the designated trail system. These 18 miles would be available for use by all classes of vehicle. This alternative would provide two staging areas specifically intended for use by Class II vehicles (but available to any trail users). Staging areas would accommodate day use and overnight camping.

Effects to Class III Users

Alternative 4 would allow for up to 44 miles of 24”-wide trail for Class III vehicles plus 8 miles of open mixed use road within the designated trail system. These 44 miles would be available for use by motorcycles only. This alternative would provide two staging areas intended for use by motorcycles.

Non-Motorized Recreation Experience

Oregon State law and the Forest Service require that OHVs be no louder than 99 dB at 20 inches from the exhaust opening. Some untested individual OHVs currently using the Lookout Mountain Ranger District may be louder than 99 dB. If implemented, an action alternative may provide more active management of OHV use and consequently more effective monitoring and enforcement. If this is achieved, overall sound levels may decrease over the existing condition. Monitoring and testing could be more efficient at identified staging areas and allow law enforcement and volunteers a better opportunity to test for compliance at key locations and times. Vehicles that are tested and found to be over the 99 dB sound threshold would not be able to operate on public land.

A study of the potential impacts of aircraft overflights of wilderness areas found a majority of wilderness visitors were not annoyed by overflight sounds, a minority (16 percent) were somewhat annoyed, and a smaller minority (4 percent) were highly annoyed. This same study reported that the three most often mentioned reasons for visiting wilderness were experiencing peace and quiet (89 percent of respondents); viewing scenic vistas without hearing sounds of civilization (87 percent); and hearing the sounds of nature (81percent). Even though some visitors were annoyed, aircraft sounds did not appreciably impair these wilderness users overall enjoyment of their visits to the wilderness nor reduce their likelihood of repeat visits (Harrison et al. 1992). It is likely, as with wilderness visitors, that some visitors would be annoyed by OHV sound and some would not.

Sound dissipates over distance. If the effects of terrain, vegetation and wind are excluded, sound intensity decreases about 6 decibels (dB) per doubling of distance (Shilling 1993). A decibel level of 30 is characterized as somewhere between “quiet” and “very quiet” and equates to a quiet rural area (OMSI 2005). Assuming an OHV emitting a sound pressure of 99 dB at 20 inches from the exhaust opening (the highest that Oregon State law allows in this area), the sound would dampen to 45 dB at about 4,700 feet or 0.89 miles from the source (Sengpiel audio 2009) and would probably not be heard by the casual observer. Therefore, most people who are likely to be annoyed by the sounds of OHVs would not be annoyed at distances over 0.89 miles because they would probably not hear the sounds. When the effects of terrain, vegetation, wind, and higher background sounds are included, that distance can be shorter.

Even if an OHV cannot register on a sound meter, some people may still hear the sound and could be annoyed by it. A sound source such as an OHV can be clearly audible above the background, in some cases, even if its measured sound level is below that of the background (Harrison et al. 1993). This is especially evident if a person knows or thinks the sound is happening.

Alternative 1

Under this alternative, designated routes for motorized use would not be changed from the current network of opportunity on open mixed use roads and highway legal roads. As describe in detail in the Transportation section of this EIS, within the project area there are 799 miles of road open to motorized use. Of those, 659 miles are open to mixed use, thus allowing for travel by non-highway legal vehicles (OHVs) as well as highway legal vehicles such as passenger cars, trucks and dual sport motorcycles. Under this alternative, recreationists may be able to hear motorized equipment including OHVs operating on these open roads, as well as in rock pits that are open to cross country travel (as displayed on the MVUM maps). Sound analysis was not completed for the existing open road system as they are considered to be part of the existing environment. Therefore sounds greater

than 45db are not displayed for this alternative in Table 45, even though noise at this level or higher is present within the project area.

Alternatives 2-4

Table 45 displays the areas where sounds may be heard at greater than 45db when OHVs are riding on the designated OHV trail system by alternative. Using the threshold for clearly audible sound at 0.45db, it is assumed this would be the boundary for effects associated with noise from motorized vehicles. Other effects disclosed are generally limited to the site-specific discussions.

Table 45. Sites/Areas from which sounds of OHVs might be audible at > 45 db.

Site/Area	Alt 2	Alt 3	Alt 4
Dispersed Camping Sites	35	18	37
Dispersed camping roads within noise band (miles)	65	26	73
Equestrian Endurance Event Route (miles)	1.89	1.46	2.12
Keeton Trail (miles)	0.03	0.02	0.02
Scotts Camp	X		X
Ochoco Divide Sno-Park	X	X	X
Keeton Trailhead	X	X	X
Walton Sno-Park	X	X	X
Cottonwood Pit	X	X	X
Crystal Springs Organizational Camp		X	X
ROS acres within noiseband by ROS Classification			
Roaded Modified	10,837	5,818	12,771
Roaded Natural	1,668	1,059	2,220
Semiprimitive Non-Motorized	276	117	292

Cumulative Effects

Motorized Recreation

In order to put the Ochoco Summit project area in context with other OHV riding areas and opportunities in Central and Eastern Oregon, Travel Management Plans from Ochoco and adjacent Forests were reviewed, as well as riding area descriptions posted on the Oregon State Parks and Recreation and other Forest's web pages (refer to Table 33, Figure 1 and Figure 2).

In Central Oregon six of twelve riding areas offered some form of opportunity for operators of class II vehicles: Christmas Valley Sand Dunes (8,000 acres), Klamath Sportsman's Park (20 acres), Edison Butte (25 miles), Rim Butte (17.6 miles), Three Trails (21 miles) and Millican Valley (only on open roads). In Eastern Oregon three of eleven riding areas offered some form of opportunity for class II vehicle operators: Morrow County (20 miles), Mt. Emily (30 miles) and Virtue Flat (5,000 acres). All of the remaining riding areas posted on the State Parks web sites were limited to vehicles 50" or less in width, with the exceptions of West End ATV (Sunflower) near Spray, which allows UTVs up to 65" in width, and Upper Walla Walla which is limited to class III (single track motorcycles).

In the Central Oregon Region, the six riding areas offering opportunities for class I and III vehicles (50" and less) total approximately 662 miles of designated routes. In the Eastern Oregon Region, the six riding areas offering opportunities for class I and III vehicles (50" and less) total approximately 338 miles of designated routes. In the Eastern Oregon Region, the riding area offering opportunities for class I, III and IV vehicles (65" and less) includes 3,700 acres, while the area limited to class III (motorcycle) includes 40 miles of designated routes. Additional opportunities will soon be available following construction of trails planned under the Three Trails Off-Highway Vehicle Project on

Deschutes National Forest; Cline Buttes on Prineville District BLM; and the Rock Creek and McCubbins Gulch areas under the Mt. Hood National Forest Off-Highway Vehicle (OHV) Management Plan. Fremont-Winema is currently in the process of planning the South Chiloquin Motorized Trail Project.

In addition to designated riding areas and designated trails, OHVs may also travel on open roads that have been approved for mixed use (highway legal as well as non-highway legal vehicles). On the Deschutes and Ochoco National Forests, with implementation of the Travel Management Plan, OHVs would be allowed to utilize approximately 6,700 miles of mixed use road and 1,230 acres of gravel pit areas across the two Forests. Elsewhere in Central Oregon, the Fremont-Winema National Forest offers approximately 5,900 miles of mixed use road and 165 miles of mixed use trail under their Travel Management Plan. Some of these routes are open year-round while others are subject to seasonal restrictions. Though the miles available for mixed use on open roads do not provide the same quality of recreational experience as motorized trails, they do offer opportunities for recreational experiences and motorized access for those who are not looking for technically difficult routes.

The cumulative effect of this project on motorized recreation opportunities would be to provide additional trails for multiple vehicle classes in a location that is between the riding areas to the west on Deschutes, Willamette and Mt. Hood National Forests or Prineville BLM, and the riding areas to the east such as those at Morrow County, Spray and Mt. Emily. Refer to Figure 1 for a visual display of where the Ochoco Summit Project area is positioned relative to the other designated OHV areas in Oregon. This positioning provides increased opportunity for operators of highway legal vehicles (such as dual sport motorcycles or street legal Four-wheelers) to travel between riding areas, utilizing open roads to connect between riding areas. This positioning also provides opportunities for local riders to access a legal system of trails with a shorter travel distance from homes in Prineville, Mitchell, Madras, Redmond or Paulina.

Non-Motorized Recreation

Non-motorized recreation can include a wide array of activities that are not dependent on motorized use. It can be as diverse as kayaking in rivers, surfing ocean waves, paragliding upward air currents, fishing, rock climbing, hunting, skiing, picnicking, group gatherings, photography, yoga and about anything a person aspires to try that does not involve the use of motorized equipment or transport. However for purposes of discussion and analysis non-motorized trail opportunities is the emphasis of non-motorized recreation.

There currently exists a wide range of non-motorized trail opportunities locally on the Ochoco National Forest, Prineville BLM, State, County and City parks. The adjoining National Forests of Malheur to the east, Deschutes to the west and Fremont-Winema to the South also provide a vast array of trail opportunities within a relatively short day-trip drive from the cities in Central Oregon.

These public lands, non-motorized trail systems also are represented in a range of Recreation Opportunity Spectrum (ROS) classes from the “Primitive” of Wilderness Areas to the other end of the spectrum, “Urban” in City and County Parks. The Ochoco National Forest has 132 miles of non-motorized trails represented from Primitive to Roaded Natural spectrum classes.

In addition, trails also range in a “development scale” of class one through five. A class one trail is very primitive with scant use and maintenance such as a string of rock cairns. A class five trail is highly developed such as a wide paved trail with convenient amenities such as benches, hand railings, stairs, lighting and interpretive displays. The Ochoco NF non-motorized trails range from class two which is less developed, native surface with a natural emphasis to a class four which is more highly developed, often paved with convenient amenities.

As previously discussed, the Travel Management Rule has significantly changed the extent of area where OHVs are allowed. Because OHVs are now only legally operated on approved routes and

areas as represented on Motor Vehicle Use Maps, it is assumed that non-motorized activities and opportunities may be enhanced where OHVs are now prohibited from cross country travel. Furthermore, it is widely recognized that although the quality of the experience can be subjective, non-motorized use of motorized trails provides an advantage of access, if desired. Whereas motorized use cannot utilize non-motorized routes. This is represented in the Hierarchy of use. Non-motorized access is allowed on the open motorized routes represented on Table 37 of the Motorized Opportunity section and Table 7 of the Transportation section.

Though the noise band of .89 miles may be heard from some segments of non-motorized trails, and non-motorized trails do have mixed use road crossings, there are no actual proposed OHV trail crossings between the two distinct trail uses. The exception to this is some cross-country ski trails near Walton Lake Snow Park are utilized in the proposed OHV trail system; however, the season of use does not overlap. OHV season of use of these trails is from June 1st thru September 30th. Winter activity is usually available from December through March. Future trail proposals of varied user types may contribute to trail intersections between motorized and non-motorized routes.

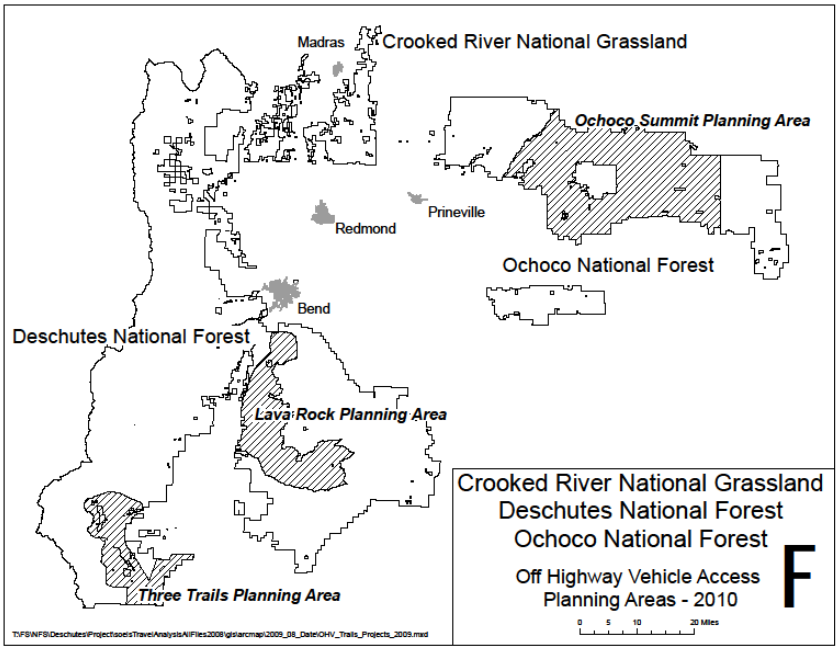

Figure 1. Planning areas (recent and current) for OHV trail projects on the Deschutes and Ochoco National Forest.

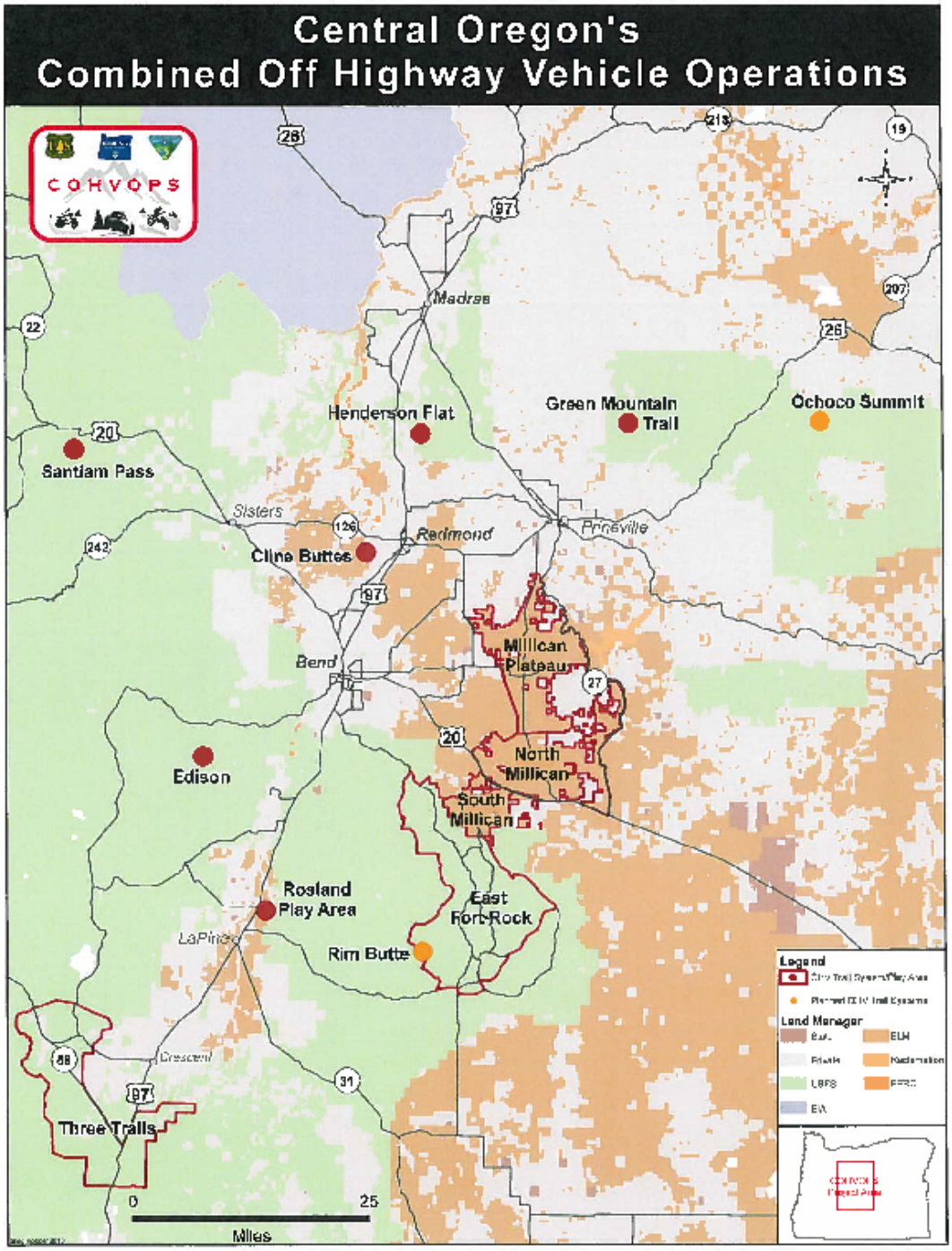

Figure 2. Central Oregon OHV opportunities.

Geology

All the percentages listed in this section are based on the acres of federal and private land contained in the project boundary. This section includes the entire geology analysis.

The project area is underlain mainly by a mixture of rhyolite, basalt, andesite and sedimentary rocks. The climate 60 million years ago to the present has evolved from a warm moist tropical regime to the temperate four distinct seasons of today. The tectonic movement, uplift of the Blue Mountain anticline and mass wasting processes combined to create the moderately dissected and hummocky terrain which is the predominant landform. Landslides played a major role in the shaping of the watersheds creating large areas of hummocky terrain, seeps, ponds and springs. Present day erosion processes are primarily sheet and rill with minor mass wasting in the form of small landslides, rock topple and slope creep. The watersheds are a groundwater recharge collection area for regional and local aquifers. Mt. Mazama erupted approximately 7,000 years ago, depositing a 1.5 feet thick blanket of volcanic ash across the Ochoco Mountains. This volcanic ash has mixed with the evolving soils. Annual precipitation ranges from 15 to 31 inches per year.

The planning area encompasses the Large Meadow Complex, North Slope Ochoco, Scab Stringer and South Slope Ochoco Level 5 Ecoregions, which have a broad range of characteristics.

Existing Condition

Lithology

The Ochoco Summit project area lies within portions of 9 separate fifth-field watersheds. For the purposes of this project, the lithologies with similar erosion characteristics have been lumped together. The Quaternary alluvium, landslide terrain and fanglomerate are moderately to highly erosive and composed of unconsolidated materials; these underlie 7% of the project area. The Quaternary basalt and Quaternary/Tertiary basalt are more resistant lava flows (<0.01%). The Clarno Formation, Tertiary sedimentary and the John Day Formation are moderately erosive, being composed of volcanic sandstones, pyroclastic tuff and mudflows; these comprise 21% of the project area. The Tertiary Picture Gorge Basalt, Tertiary volvanic intrusive, Tertiary, Tertiary rhyolite and Tertiary are primarily resistant to erosion, composed of rhyolite, andesite and basalt flows; these comprise 72% of the project area. The Mesozoic Cretacious Sedimentary units are moderately erosive (<0.05%). Table 46 summarizes the project area lithologies.

Table 46. Lithology across the Ochoco Summit OHV project area by watershed.

Watershed (5th Order)	Quaternary Highly Erosive (acres)	Quaternary Resistant (acres)	Tertiary Moderately Erosive (acres)	Tertiary Resistant (acres)	Mesozoic Moderately Erosive (acres)	Total Acres
Bridge Creek	5750	0	5664	4027	154	15595
Deep Creek	270	0	0	54292	0	54562
Lower Beaver Creek	92	17	696	22805	0	23610
Lower North Fork Crooked River	0	3	0	21455	0	21457
Mountain Creek	7599	0	6279	5366	0	19244
Paulina Creek	0	0	0	16095	0	16095

Table 46. Lithology across the Ochoco Summit OHV project area by watershed.

Watershed (5th Order)	Quaternary Highly Erosive (acres)	Quaternary Resistant (acres)	Tertiary Moderately Erosive (acres)	Tertiary Resistant (acres)	Mesozoic Moderately Erosive (acres)	Total Acres
Rock Creek	1335	0	0	12845	0	14180
Upper North Fork Crooked River	3325	0	9222	76239	0	88786
Upper Ochoco Creek	2200	0	42507	3126	0	47833
TOTAL	**20,571 (7%)**	**20 (0.01%)**	**64,368 (21%)**	**216,250 (72%)**	**154 (0.05%)**	**301,362**

Landslide Terrain

Although the lithology map shows landslide terrain, the scale of mapping doesn't always pick up the rest of the dormant or active landslide terrain. Between field investigations and aerial photo interpretation, additional acres have been identified for the planning area (Table 47).

Table 47. Landslide terrain by subwatershed (acres) in the Ochoco Summit project area.

Watershed (5th Order)	Active Landslide (Acres)	Dormant Landslide Terrain (Acres)	Watershed (5th Order) Total Acres	Percentage (active) Dormant
Bridge Creek	8	9361	15595	(0.05%) 60%
Deep Creek	0	642	54562	1.2%
Lower Beaver Creek	0	158	23610	0.7%
Lower N Fork Crooked River	0	0	21457	0%
Mountain Creek	0	8674	19244	45%
Paulina Creek	0	23	16095	0.1%
Rock Creek	0	1584	14180	11.2%
Upper N Fork Crooked River	0	7446	88786	8.4%
Upper Ochoco Creek	4	11441	47833	(0.01%) 24%
TOTAL	**12**	**39329**	**301,362**	**(0.004%) 13%**

Mineral Sources

A number of mineral sources exist within the project area. These sites have been utilized for extraction of gravel, rip rap, boulders or other rock products. Some mineral sources are available for travel by Off Highway Vehicles (OHV) as displayed on the current Motor Vehicle Use Maps (MVUM). Within the project area the 2012 MVUM allows motorized use on designated portions of the following mineral source areas: Crystal, Ahalt, Walton Lake, Scott's Camp, Aspen, Remington, Thornton, Podo Meadow, Grasshopper, Flow Top, Juniper and Six Corners. Although the actual acres at risk for introduction or expansion of existing populations of noxious weeds within mineral sources are a small percentage of the overall forest acres, an introduction of invasive plants at these sites could mean the closure of the area as an aggregate source for use on the Forest. This could result in increased aggregate haul costs on future projects.

Environmental Effects

Alternative 1 (No Action)

Implementation of Alternative 1 would result in no changes from the current conditions in the project area. Motorized travel would be permitted on designated routes only, as described by the MVUM, on mixed use roads; motorized access to mineral source areas would be as displayed on the MVUM.

Effects Common To All Action Alternatives

To varying degrees, each of the three Action Alternatives incorporates the use of mineral sources as OHV staging or other OHV areas. Specific information is included for each alternative later in this section.

The Mazama Ash component of the soils (see section titled "Soils" in Chapter 3 of this document) provides an erosive potential for the systems, especially when on a grade.

All action alternatives cross a number of Class 1, 2, 3 and 4 stream systems. As part of the protection for the streams, a combination of bridges, culverts, boardwalks and hardened fords have been proposed. Specific information is included for each alternative.

Where new routes cross dormant landslide terrain, the concern is for the protection of any seeps or springs the route might cross. Initiating large scale slope stability isn't a concern with these routes, however, there is the potential to see smaller sloughs created by routes on steeper slopes or coming into drainages. Specific information is included for each alternative.

Recreational use of mineral material sources may result in introduction and/or spread of invasive plant species into the material source. Invasive species can compromise the utility of the sources because materials that are used for Forest Service projects must be weed-free in order to prevent the spread of invasive species to new project areas.

Alternative 2 (Proposed Action)

Under Alternative 2, a combination of Class I, Class II and Class III routes total 170 miles of designated OHV trail system that cross different lithologies with varying resistance to erosion (Table 48). Segments of the proposed routes also cross dormant landslide terrain (Table 49). The distribution of the designated OHV trails for this alternative begins on Hwy 26, passing from Hwy 26 to Walton Lake, across the slope north of Big Summit Prairie to Six Corners on Paulina District. The routes are a combination of existing roads in open, closed and decommissioned status and new routes.

Table 48. Lithology for each proposed trail type in Alternative 2 of the Ochoco Summit project (acres).

Type	Quaternary Landslide Terrain	Clarno Formation	Tertiary Picture Gorge Basalt	John Day Formation	Grand Total
Class I/New Route	1.41	2.58	14.53	0.22	**18.75**
Class II/New Route	0.09	0	11.81	0.05	**11.95**
Class III /New Route	0.37	0	12.05	0	**12.41**
Closed/Decommissioned	0	4.58	74.80	0	**79.39**
Open Roads	2.41	0.08	62.90	2.18	**67.57**
Grand Total (acres)	**4.28**	**7.25**	**176.09**	**2.46**	**190.07**

Table 49. Acres of dormant and active landslide terrain for each trail type in all action alternatives of the Ochoco Summit project.

Trail Type	Active Landslide Terrain			Dormant Landslide Terrain			Grand Total
	Alt. 2	Alt. 3	Alt. 4	Alt. 2	Alt. 3	Alt. 4	
Class I/New Route	0	0	0	1.29	2.34	3.39	**18.75**
Class II/New Route	0	0	0	1.93	0	0.5	**11.95**
Class III /New Route	0	0	0	0.36	0.23	0.14	**12.41**
Closed/Decommissioned	0	0	0.05	3.00	3.68	6.44	**79.39**
Open Roads	0	0	0	1.95	0.67	1.97	**67.57**
Grand Total	**0**	**0**	**0.05**	**9.57**	**6.88**	**12.44**	**190.07**

Alternative 2 proposes construction of three play areas, six trail heads, one parking area and a total of ten staging areas split between the three vehicle classes: six staging areas for the Class I (ATV), two staging areas for the Class II (jeeps) and two staging areas for the Class III (motorcycles). The OHV areas are spread across the proposed trail route. The majority of the trailheads, play areas and staging areas are on Picture Gorge Basalt, which in general is relatively resistant to erosion. The play area, staging area and the parking area at Ahalt are on dormant landslide terrain. The staging area and the parking area at Bandit Springs Snow Park are underlain by the John Day Formation. One trail head is underlain by the John Day Formation. Four of the ten staging areas are located in active mineral material sources (Six Corners, Aspen, Walton Lake and Scott's). Three mineral material sources (Thornton, Scott's Camp and Ahalt) are ready for reclamation; converting them to staging areas, play areas or trail heads is a reasonable next use. Thornton Material Source is also known as Cottonwood Pit. Of the mineral material sources included as staging areas, trail heads or play areas under Alternative 2, the Scott's mineral source is the only one not already open to year-round cross-country travel under the MVUM. There would be increased potential for introduction of invasive plants compared to No Action at this site. There may also be increased potential for introduction or spread of weeds at the other three active mineral material sources due to increased traffic resulting from being included in a designated motorized trail system.

Alternative 3

Under Alternative 3, a combination of Class I and Class III routes that cross different lithologies with varying resistance to erosion are proposed (Table 50). Implementation of Alternative 3 would result in 101 miles of designated trail system being developed from a combination of new routes and existing roads currently in open, closed and decommissioned status (Table 50). Segments of the proposed routes also cross dormant landslide terrain (Table 49). The distribution of the designated OHV trails for this alternative includes a western system between Hwy 26 and Indian Butte and an eastern system between Peterson Creek and Six Corners.

Table 50. Lithology for each proposed trail type in Alternative 3 of the Ochoco Summit project (acres).

Type	Quaternary Landslide Terrain	Clarno Formation	Tertiary Picture Gorge Basalt	Grand Total(acres)
Class I/New Route	1.94	5.45	5.85	**13.24**
Class III /New Route	0	0	13.73	**13.73**
Closed/Decommissioned	0	13.69	39.92	**53.61**
Open Road	1.28	1.16	17.66	**20.10**
Grand Total	**3.22**	**20.3**	**77.16**	**100.68**

Alternative 3 proposes construction of 4 staging areas: two staging areas for the Class I (ATV), two staging areas for the Class III (motorcycles). The OHV areas are spread across the proposed trail route. Two of the four staging areas are located in active mineral material sources: Six Corners and Walton Lake. One staging area is located in a closed material source: Thornton (Cottonwood Pit). The fourth area is the Bandit Springs snow park.

The majority of the staging areas are on Picture Gorge Basalt, which in general is relatively resistant to erosion. The staging area and the parking area at Bandit Springs Snow Park is underlain by the John Day Formation.

Of the mineral material sources included as staging areas under Alternative 3, all are already open to year-round cross-country travel under the MVUM. There may be increased potential for introduction or spread of weeds at the two active mineral material sources proposed as staging areas due to increased traffic resulting from being included in a designated motorized trail system.

Alternative 4

Implementation of Alternative 4 would result in 212 miles of designated trail system being developed from a combination of new route and existing roads currently in open, closed, or decommissioned status (Table 51). These routes cross different lithologies with varying resistance to erosion; segments of the proposed routes also cross dormant landslide terrain (Table 49). The distribution of the designated OHV trails for this alternative begins on Hwy 26, passing from Hwy 26 to Walton Lake, across the slope north of Big Summit Prairie to Six Corners on Paulina District, with additional loop trails for Class I, Class II and Class III vehicles.

Table 51. Lithology for each proposed trail type in Alternative 4 of the Ochoco Summit project (acres).

Type	Quaternary Landslide Terrain	Clarno Formation	Tertiary Picture Gorge Basalt	John Day Formation	Total (acres)
Class I/New Route	2.55	6.94	20.76	0.58	30.82
Class II/New Route	0	0	10.86	0	10.86
Class III/New Route			10.71	0	10.71
Closed/Decommissioned Roads	0	24.87	83.05	0.50	108.42
Open Roads	1.87	2.84	69.74	2.71	77.16
Grand total	**4.42**	**34.65**	**195.13**	**3.78**	**237.97**

Alternative 4 proposes construction of one play area and a total of ten staging areas split between the three vehicle classes: six staging areas for the Class I (ATV), two staging areas for the Class II (Jeeps) and two staging areas for the Class III (motorcycles). The OHV areas are spread across the proposed trail route.

For Alternative 4, the majority of the staging areas are on Picture Gorge Basalt, which in general is relative resistant to erosion. The play area and staging area at Ahalt are on dormant landslide terrain. One staging area is underlain by the John Day Formation. Three of the ten staging areas are located in active mineral material sources (Six Corners, Walton Lake and Scott's). Two mineral material sources (Thornton and Ahalt) are ready for reclamation; using them next as staging areas or play areas is reasonable. Thornton Material Source is also known as Cottonwood Pit.

Of the mineral material sources included as staging areas or play areas under Alternative 4, the Scott's mineral source is the only one not already open to year-round cross-country travel under the MVUM. There would be increased potential for introduction of invasive plants compared to No Action at this site. There may also be increased potential for introduction or spread of weeds at the other three active mineral material sources due to increased traffic resulting from being included in a designated motorized trail system.

Cumulative Effects

The Travel Management decision (2011) prohibited motorized vehicle use except on designated routes and in designated areas. Due to reduced opportunity for OHV recreation, that decision may result in increased use of mineral material sources as OHV play areas; that could combine with the designation of material sources in these action alternatives to increase the risk of introduction of invasive species to mineral material sources in the project area.

Soils

This section is a summary of the Soils specialist's report; the entire report is in the Ochoco Summit Trail System project record, located at the Ochoco National Forest, Prineville, Oregon.

Management Direction

Soil Compaction and Displacement

The Forest Plan (p. 4-196) identifies the following standard and guideline for soil compaction and displacement:

The threshold level of detrimental compaction is defined as any bulk density increase of 15% or more (for residual soils and 20% for ash soils) or more. Or any macro pore space reduction of 40% or below 15%. These values are critical changes over the natural state in the top 12 inches.

In order to maintain site productivity, all project activities will be planned to reduce soil compaction and displacement to the lowest reasonable level. Strive to reduce compaction and displacement to get as close to 90 percent of the total activity area (including permanent, rocked, and non-surface roads) remaining in a non-compacted/non-displaced condition, as realistically possible, one year after any land management activity. The minimum will be 80 percent of the total activity area. Existing areas exceeding these standards will be scheduled for rehabilitation as soon as possible. An activity area is the total area for which a ground disturbing activity is planned, for example, a unit for a timber sale, slash disposal project, or grazing allotment. The area would also include transportation systems within and directly adjacent to the project.

On August 24, 1998, the Pacific Northwest Regional Forester issued a supplement to the 2520 Forest Service Manual (R-6 Supplement No. 2500.98.1). This supplement clarifies direction for planning and implementing activities in areas where soil standards are exceeded from prior activities:

2520.3 – Policy. Design and implement management practices which maintain or improve soil and water quality. Emphasize protection over restoration.

When initiating new activities:

Design new activities that do not exceed detrimental soil conditions on more than 20 percent of an activity area (this includes the permanent transportation system).

In areas where less than 20 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration must not exceed 20 percent.

In areas where more than 20 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effects from project implementation and restoration must at a minimum, not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality.

2521.03.3 - Application of Soil Quality Standards.

Planning. Use soil quality standards to guide the selection and design of management practices and prescriptions on a watershed scale. Evaluate existing soil conditions on all ownerships within the watershed and consider cumulative effects with the addition of proposed actions on ecosystem sustainability and hydrologic function. On a planned activity area, evaluate existing soil conditions and design activities to meet soil quality standards. Document adjustments to management practices, soil conservation practices or restoration techniques necessary to meet threshold values for the affected soil properties and watershed conditions.

Erosion

The Forest Plan (page 4-196) directs that land management activities will be planned to achieve effective ground cover as displayed in Table 52.

Table 52. Effective ground cover objectives from the Ochoco Forest Plan (page 4-196).

Erosion Hazard Class	Minimum % effective ground cover, First Year	Minimum % effective ground cover, second year
Low	20-30	30-40
Moderate	30-40	40-50
Severe	50-60	60-75
Very Severe	60-75	75-90

Effective ground cover is defined as the basal area of perennial vegetation, plus litter and coarse fragments (greater than 2mm sizes), including tree crowns and shrubs that are in direct contact with the ground. Exceptions may occur where specific projects meet erosion control objectives without meeting the ground cover objectives stated above.

Soil Mass Wasting

The Forest Plan (page 4- 196) directs that when a project could result in an increased potential for mass wasting, which could cause significant soil loss or sedimentation, hazards to property, loss of fish habitat, or damage to other resource values, alternative project proposals will be evaluated and documented through the project's environmental analysis.

Fragile Areas

The Forest Plan (page 4-197) directs project planners to recognize the sensitivity and potential of certain areas and/or situations to be adversely affected by management activities and plan accordingly to minimize those effects. Fragile areas include scablands (shallow soil areas), elk wallows, and other isolated soil areas which exhibit sensitivities that require special care.

Scablands are recognized as among the most fragile ecosystems on the Ochoco National Forest. Damage to the soil and vegetation as a result of management activities is nearly impossible to mitigate. This is a result of their having very shallow soils which are subject to severe water saturation and frost heaving during winter, thus making revegetation virtually impossible. For this reason, all management activities will be analyzed as to their effect of scablands prior to implementation.

Existing Condition

Landtypes

The landtype is the basic unit of landscape stratification. It delineates and identifies naturally occurring bodies on the landscape consisting of unique characteristic features, such as soil mantle, bedrock, vegetation, climate, hydrology, and landform, which are significant to management use and interpretations (Paulson et al. 1977). An acreage summary by major landtype within the project area is provided in Table 53.

Table 53. Major landtypes in the Ochoco Summit OHV project area (from Paulson, 1977, ONF SRI).

Landtype Group	Acreage	Percent of Watershed- USFS Lands	Parent Material
P Landtypes	148,980	50	Picture Gorge Basalt
Y Landtypes	54,949	18.3	Basalt
T Landtypes	47,696	15.9	Tuffs- Clarno/John Day
L Landtypes	19,459	6.5	Landslide Debris
B Landtypes	14,584	4.9	John Day- Clarno Basalts and Tuffs
M Landtypes	6,817	2.3	Mixed Alluvium-Meadows
C Landtypes	4,061	1.4	Slope Colluvium
A Landtypes	1,819	0.6	Mixed Alluvium
S Landtypes	1,050	0.4	Basalt Scablands
X Landtypes	1,053	0.4	Tertiary Basalts

Landscape Patterns

Most of the project area is scab stringer terrain; this terrain typically has an average of 30 percent scabland plateaus dissected by timbered stringers. Soils within the stringer sides and bottoms have deeper ash soils. Deeper ash soils are typically classified as L2, L6, P1, P2, P9 and Y2 landtypes. These deep soils are also found on alluvial meadows (M landtypes). Approximately 82,082 acres (27%) within the planning area are deeper ash soils. Approximately 78,230 acres (26 %) of the area is in non-forestlands. These include scablands, meadows and shrub lands. There are 57,354 acres (19%) of scabland in the Ochoco Summit project area. Scabland soils (largely P5, P54, P5Y, P85) range from very shallow to shallow (<20 inches to bedrock). Shrubland soils range from moderately deep to deep (from >20 to 60 inches). Most meadow soils (M landtypes) are deep to very deep (greater than 40 inches). The remaining land area approximately 140,274 acres (47%) are shallower ash soils or residual soils derived from basalt parent material.

Most of the project area is on relatively flat ground. Approximately 90% of the project area is on slopes less than 35%. Topography within this project area, which is in the Eastern Ochoco Mountains, has a lesser proportion in steep ground (over 35% slope) than other areas of Ochoco National Forest such as the Western Ochoco Mountains. This is fairly typical of Picture Gorge Basalt Formation terrain in the southwest Blue Mountain area. The Ochoco Mountains are the southernmost part of the Blue Mountains.

Infiltration and Runoff

Infiltration is very slow on the scablands on old basalt flow surfaces. Scablands function hydrologically as large "tin roofs" which shed runoff from rain and snowmelt very rapidly. Soils on these scablands are largely very shallow and shallow to bedrock. Many scab flats are incised with deep steep-sided drainways. Soils on these steep to very steep plateau drainages and lava flow scarps are moderately deep to deep on the northerly aspects and shallow to moderately deep on the southerly aspects. These drainway soils are derived from ash overlying or mixed with colluvium. The drain areas have served to collect wind and water eroded ash from the scablands which have lithic soils derived from basalt. The interface along the edge between scablands and the forested areas below them are sensitive areas. Infiltration in the deep ash soils is rapid to very rapid. These edge areas provide critical buffers that help slow down and dissipate the rapid runoff from the scabs.

Soil Compaction and Displacement

There are 57,354 acres of scabland in the Ochoco Summit project area. Soils on these areas (P5 landtype, for instance) are usually clayey and very rocky with greater resistance to detrimental compaction. However they are very susceptible to detrimental puddling and postholing by equipment,

vehicles and large herbivores. Subsequently these soils are classified as sensitive soils for use and management. They are relatively resistant to damage when dry, but susceptible when saturated.

In this project area it is estimated that 180,386 acres have been harvested since 1950. It is estimated that 15 to 35% of the tractor harvested acres, approximately 26,625 acres (8.9% of the project area), have been detrimentally compacted and/or displaced. Outside of harvest units another 1 percent is estimated to be disturbed by road construction. The overall compaction level is estimated to be approximately 10% across the project area. Soils within this area of existing disturbance have potential to produce changes in runoff and timing of peak flows compared to undisturbed soils. Some of this detrimental disturbance from past management activities has recovered with natural recovery processes such as frost heaving, rodents, insects and root action. Depending on the severity of the disturbance recovery of soils from compaction or displacement can occur in 7 to 50 years.

Environmental Effects

General Effects of OHVs on Soils

COMPACTION/DISPLACEMENT: Detrimental compaction is defined as a 15% increase in bulk density for residual soils and a 20% increase for ashy soils (Region 6 supplement to the 2520 Forest Service Manual (R-6 Supplement No. 2500.98.1). Three to four passes with large heavy four wheel drives (Class II OHVs) may produce this effect. Lighter OHVs such as motorcycles, ATVs and lighter UTVs do not produce much compaction at depth. The major effect of compaction is reduction in porosity resulting in reduced water and air availability to tree roots. There is also increased mechanical resistance to tree root growth. Mychorrizal symbiosis has also been shown to be decreased when soils are compacted. Clay surface soils with little or no ash capping commonly have clay loam surface A horizons quickly grading to heavier clay. These are generally on south and west facing aspects which are hotter and drier than north or east aspects. These soils are not generally susceptible to detrimental compaction and displacement, depending on the depth to the smectitic clay which shrinks and swells with each wet and dry season. OHV activity, as a contributor to erosion, is most pronounced along streams with ashy banks and steeper sideslopes on north and east aspects. Some Soil Resource Inventory Landtypes in this area which are largely ash soils are L26, P1, P2, T2, T6 and Y2.

DETRIMENTAL COMPACTION- this can have a negative effect on soil productivity**.** The reduction of soil pore space limits air, water and nutrient availability to roots. The reduction in infiltration results in higher peak flows, which means more energy for erosion and transport of sediment.

DETRIMENTAL DISPLACEMENT- this can have a negative effect of soil productivity. Detrimentally displaced soil has an altered hydrographic function and often does not allow normal growth to occur; the A horizon usually has been removed and piled up. Displaced soils are often channelized and loosened so than they are more susceptible to erosion from both water and wind. Wind erosion can be common along OHV tracks and dirt roads.

PUDDLING AND POSTHOLING: Puddling results from the breakdown of soil structure under wet conditions. Recreational vehicles (OHVs) can cause puddles to form in soils, potentially causing channelization and loss of permeability. Clay surface soils are susceptible to detrimental puddling (destruction of soil ped structure) via OHV vehicular traffic and will be susceptible to rutting and subsequent trail erosion during wet conditions such as thunder storms or spring thaw conditions. These are soils with little or no ash capping. They commonly have clay loam surface A horizons quickly grading to heavier clay. These are generally on south and west facing aspects which are hotter and drier than north or east aspects. Some Soil Resource Inventory landtypes in the project area that have shallow ash caps and clay closer to the surface are B4, B5, P5 and P3 landtypes.

WIND EROSION: Wind moves soil associated with vehicular traffic along roads and OHV trails. This contributes some fine sediment (commonly from volcanic ash) to waterways, although usually during the dry season only and at a much reduced rate compared to water transport from sheet, rill and gully erosion. Dust creation and wind erosion are more prevalent with the ash surface soils. The Ochoco Summit OHV project area contains approximately 82,082 acres of ash soils having at least 7 inches of surface ash. The deepest ash soils occur on the north and eastern aspects. The southern and western aspects have the least amount of ash deposits. OHV activity, as a contributor to erosion, is most pronounced along streams with ashy banks and steeper sideslopes on north and east aspects. The streams with S and W aspects often have more rock and clay exposed which gives them somewhat more resistance to vehicular tire impacts. Some Soil Resource Inventory Landtypes in this area which are largely ash soils are L26, P1, P2, T2, T6 and Y2.

OVERLAND FLOW: Overland flow occurs when the infiltration rate or capacity of a soil has been exceeded by the amount of incoming precipitation or by the rate of snowmelt. Independent variables include all the soil and plant factors that influence infiltration rate, intensity and duration of precipitation, steepness of slope and whether or not the soil is frozen. The magnitude of management-induced overland flow increases over background levels is the major concern.

The volcanic ash soils of the Blue Mountains have several properties that can make erosion hazard assessment difficult. In an uncompacted state, these soils have infiltration rates often exceeding 10 inches per hour. Permeability of applied water through the ash layers is also rapid. However, because of their lack of structural development (weak granular to singular grain), they are easily susceptible to erosion in situations where water is channeled on the soil surface such as roads, waterbar outlets, and near drainage structures (Ash Soil Guidelines for OR/WA 1985). Trails also have potential to channel water. Seasonal OHV use restrictions help prevent rutting and subsequent flow concentrations. This reduces potential for sediment delivery to drainways.

MECHANICAL IMPACTS: OHV trail use damages soils when the type and level of use exceed the soil's capacity to resist impact. A soil's capacity to resist impact varies depending on textural class, moisture level, and other environmental and site characteristics, but the processes by which soils are impacted are generally the same. Trail use damages soils directly by mechanical impact from surface traffic and indirectly by hydraulic modifications, soil transport, and deposition. The southern and western aspects have the least amount of ash deposits, often having more rock and clay exposed, which gives them somewhat more resistance to vehicular tire impacts. OHV activity, as a contributor to erosion, is most pronounced along streams with ashy banks and steeper sideslopes on north and east aspects.

Direct mechanical impact has several components: abrasion, compaction, shearing, and displacement.

- Abrasion strips surface vegetation and roots.
- Compaction reduces soil voids and causes surface subsidence.
- Shearing is the destructive transfer of force through the soil.
- Displacement results in the mechanical movement of soil particles.

Indirect impacts include hydraulic modifications, such as the disruption of surface water flow, reductions in infiltration and percolation, surface ponding, and the loss of water-holding capacity. Other indirect impacts include those associated with erosion: the loss of soil particles by wind or water erosion and deposition of transported particles. An associated impact is the hydraulic pumping that occurs when a destructive flow of water is forced through a saturated soil.

Both direct and indirect impacts can degrade soils along trail segments. The impacts generally occur in the following progression:

Abrasive loss of protecting surface vegetation, organic material and root mass (direct impact)

↓

Compaction and surface subsidence (direct impact)

↓

Hydraulic disruption (indirect impact)

↓

Breakdown of soil structure from shearing and pumping (direct impact)

↓

Soil particle erosion and deposition (indirect impact)

While most of the stages in this progression are familiar concepts, the shearing and pumping components may not be as familiar to some readers.

Shearing describes a transfer of force through a soil. When an applied force exceeds the capacity of the soil body to absorb it, a portion of the soil body can be displaced along a shear plane, that place where soil particle cohesion is weakest. The most common example is when the passage of a wheeled vehicle forms ruts. The downward force of the wheel shears--or displaces--the soil beneath it, forcing the soil to bulge upward beside the wheel. The shearing action destroys soil structure by crushing soil peds (natural soil aggregates) and collapsing voids. Shearing is most likely to occur on finely textured soils under moist to saturated conditions. It is uncommon in coarse soils.

Shearing and pumping actions reduce soils to a structureless or "massive" condition. This condition is characterized by the loss of distinguishable soil structure and a reduction in pore space voids, and interped passages (the space between peds). An example of soil in a massive state is a dried mud clod or an adobe brick. In a massive state, soils have significantly reduced infiltration rates, percolation, water storage capacity, and gas exchange. This reduces a soil's ability to support vegetation growth, leads to surface ponding of water, and increases the soil's sensitivity to additional impacts.

Trail use has a predictable path of surface impact. The degree of impact is modified only by the natural resilience of the soil, enhanced resistance through amendments and the intensity of trail use. In an ideal situation, a natural balance is maintained between soil resilience and use, and trail use occurs without significant soil degradation. However, on sites with wet, unstable, and sensitive soils, that equilibrium is easily upset. Even low levels of trail use can have environmental consequences if not carefully designed, constructed and maintained.

Typically, trail degradation follows one of two pathways: surface erosion or surface failure. Surface erosion occurs when wind or water displaces exposed trail surfaces. This usually occurs on steep terrain or on sandy soils that are susceptible to wind erosion. Surface failure occurs when trail surfaces degrade into muddy tracks with deep muck holes. This usually occurs on flat areas with finely textured soils. Either pathway can lead to environmental impacts that are extremely difficult to stabilize or reverse. Without stabilization, expansion of soil degradation can begin that leads to impacts to adjacent surfaces. This cycle begins with the widening of trail surfaces as users avoid degraded surfaces and impacted area expands along with the development of multiple parallel trails.

Soil compaction can lead to surface subsidence (the lowering of the trail relative to the adjacent ground surface). Trails can become entrenched. This lower surface intercepts and drains water from adjacent surfaces and channels that flow along the trail. This dramatically increases the risk of water erosion on sloped areas and the pooling of water in low-lying sections. As with surface erosion, without stabilization or adequate surfacing, expansion of soil degradation can begin that leads to

impact to adjacent surfaces. When trail surfaces degrade due to rutting or the formation of muck holes, users may widen the trail and seek new routes, usually on adjacent soils where environmental conditions are identical to the original impact site. This cycle may repeat itself until the area is scarred with a number of routes in various stages of use and abandonment. This condition is called trail braiding. Trail braiding can significantly expand the environmental impacts of trail use. Trail braiding may occur when trail use levels repeatedly exceed the carrying capacity of soils to support that use (USDA Forest Service Technology and Development Center; 2002, Managing Degraded Off-Highway Vehicle Trails in Wet, Unstable, Sensitive Environments; 0223-2821-MTDC).

Crossings with routes that are not part of the proposed trail system (such as old skid trails, user created routes and closed roads) will be blocked through entrance closures and camouflage such as logs, rocks and slash. Scarification of soil surfaces in preparation for seeding or planting as part of the rehabilitation of these unwanted routes may occur. The main purpose of tillage or scarification is to decompact the soil such that there is an improvement in soil moisture infiltration and aeration. Resistance to root growth is lessened also. There are potential short term and long term effects of tillage or scarification. The long term effects are largely beneficial due to the improved infiltration, percolation, aeration and lessened bulk density. Short term effects may include increases in localized erosion potential before effective vegetative ground cover is established. This short term hazard will be reduced by the use of water bars and slash placement.

Microbiotic crusts are formed by living organisms and their byproducts, creating a crust of soil particles bound together by organic materials. Chemical and physical crusts are inorganic features, such as a salt crust or platy (vesicular) surface crusts. These crusts are more prevalent on the scabland soils and on interspaces between rocks along the edges of timbered stringers. These crusts can be disturbed by vehicle and animal hoof action. There are approximately 57,354 acres of scabland in the project area. Existing trails and roads will be used in these areas to the extent that they are available to avoid creating new disturbance. Some new disturbance will be unavoidable as is described for each alternative below. New routes on scabland increase the potential for disturbance of soil crusts.

Each action alternative may require installation of new cattle guards (see section titled “Range Resources” in Chapter 3 of this document). Effects to soils would be minimal as most of the cattle guard-related activity would be within the existing road prism or other existing disturbance.

Alternative 1

This alternative proposes no management actions that would affect the soil resource in the short term. Existing natural processes would continue. No soil restoration tillage would be performed under this alternative. Recovery of existing soil (compaction) would occur through natural processes. These processes include frost heaving in the top 4 to 6 inches of soil and biopedoturbation (soil disturbance by organisms such as rodents, insects, arthropods and various worms). These natural processes can take 10 to 50 years or more to fully restore damaged ash soils, while clayey residual soils may recover in 1-2 years due to shrinking and swelling actions. OHV travel would proceed as currently allowed, restricted to designated mixed use roads as displayed on the MVUM maps. Alternative 1 would meet Forest and Regional Standards and Guidelines for soils.

Alternative 2

This alternative proposes the second most trail miles (170 miles, 237 acres), 142 stream crossings, 10 staging areas and 6 trailheads. New routes would comprise 69 miles (31.7 acres). See Table 54 for comparison of acreages.

This alternative has the second most potential (of the three action alternatives) to increase the amount of detrimental soil compaction, displacement, and sedimentation. Short term impacts to uplands soils and streambanks would occur with initial trail construction such as contouring (blading, excavation), bridge construction (excavation of abutments) and culvert placement (excavation and filling). Longer

term potential sedimentation would be reduced with these crossing features and the installation of relief culverts, water bars, rolling dips and bed armoring near crossings.

The total distance of OHV trails proposed in Riparian Habitat Conservation Areas is 17.22 miles, most of which would be on existing crossings. Trail design standards such as bridges, culverts and armored fords and trail approaches plus seeding would reduce sediment delivery potential at these points. Effects would be unmeasurable in the long term as seeded and planted vegetation becomes established, providing effective cover for construction disturbance adjacent to the trail beds. Short term construction impacts would occur in the first year or two.

Implementation of this alternative would comply with the regional soil standards.

Alternative 3

This alternative proposes the fewest trail miles (101 miles, 83 acres), 62 stream crossings, 4 staging areas. New routes would comprise 50 miles (17.9 acres). No Class II OHV trails for jeeps and small trucks (80 inch category) would be included in this alternative which contributes to the reduction in impacted acreage. See Table 54 for comparison of acreages.

This alternative would result in the fewest trail impacts of all the action alternatives; this alternative has the least potential to increase the amount of detrimental soil compaction, displacement, and sedimentation. Short term impacts to uplands soils and streambanks would occur with initial trail construction such as contouring (blading, excavation), bridge construction (excavation of abutments) and culvert placement (excavation and filling). Longer term potential sedimentation would be reduced with these crossing features and the installation of relief culverts, rolling dips and bed armoring near crossings. Planting of native or cultivars of native species of grass and/or shrubs will help in providing effective cover for construction disturbance adjacent to the trail beds.

The total distance of OHV trails proposed in Riparian Habitat Conservation Areas is 17.22 miles, most of which would be on existing crossings. Trail design standards such as bridges, culverts and armored fords and trail approaches plus seeding would reduce sediment delivery potential at these points. Effects would be unmeasurable in the long term. Short term construction impacts would occur in the first year or two.

Implementation of this alternative would comply with the regional soil standards.

Alternative 4

This alternative proposes the most trail miles (212 miles 173 acres), 170 stream crossings and 10 staging areas. New routes would comprise 81 miles (38.4 acres). See Table 54 for comparison of acreages.

This alternative proposes the most trail impacts overall. This alternative has the most potential (of the three action alternatives) to increase the amount of detrimental soil compaction, displacement, and sedimentation. Short term impacts to uplands soils and streambanks would occur with initial trail construction such as contouring (blading, excavation), bridge construction (excavation of abutments) and culvert placement (excavation and filling). Longer term potential sedimentation would be reduced with these crossing features and the installation of relief culverts, rolling dips and bed armoring near crossings. Planting of native or cultivars of native species of grass and/or shrubs will help in providing effective cover for construction disturbance adjacent to the trail beds.

The total distance of OHV trails proposed in Riparian Habitat Conservation Areas is 22.04 miles, most of which would be on existing crossings. Trail design standards such as bridges, culverts and armored fords and trail approaches plus seeding would reduce sediment delivery potential at these points. Effects would be unmeasurable in the long term as seeded and planted vegetation becomes

established, providing effective cover for construction disturbance adjacent to the trail beds. Short term construction impacts would occur in the first year or two.

Implementation of this alternative would comply with the regional soil standards.

Table 54. Miles/acres of proposed trails by alternative.

	No Action			Proposed Action			Alternative 3			Alternative 4		
OHV Vehicle Class	I	II	III	I	II	III	I	II	III	I	II	III
Total Route Miles	0	0	0	69	49	52	38.5	0	62.4	129	30	52
Total Route Acres	0	0	0	53.3	39.3	45.7	27.4	0	55.6	104.8	21.1	46.7
New Route Miles Portion of Total	0	0	0	31	12	26	22	0	28	48	11	22
New Route Acres Portion of Total	0	0	0	15.7	9.7	6.3	11.1	0	6.8	24.2	8.9	5.3
Miles of Trail in Riparian Hab. Cons. Areas (RHCAs) by Vehicle Class	0	0	0	7.9	5.1	4.2	2.3	0	5.04	12.8	4.3	4.9
Total RHCA trail miles by Alternative	0	0	0	17.22			7.34			22.04		
Stream Crossings-by OHV class				61	56	25	26	0	36	107	41	22
Stream Crossings-Total	0			142			62			170		
Staging Areas*	0			10			4			10		
Trailheads*	0			6			0			0		
Play Areas*	0			3			0			0		
Parking*	0			1			0			0		

Vehicle Class: Class I- ATV (50” wide trail); Class II-Jeep or Small Truck (80” wide trail); Class III-Motorcycle (24” wide trail).

***Note:** Staging areas (ave 3 acres each); Trail Heads (ave. 2 acres each) and Play Areas (ave 1 acre each along with the parking area (ave 1 acre) are mainly in existing rock pit areas or snow park areas which have rocked, graveled or paved surfaces and are armored against wind and water erosion thereby limiting any potential sediment movement.

Cumulative Effects

Reasonably Foreseeable Activities

Livestock Grazing: The following allotments overlap the project area: Burn, Marks Creek, Crystal Spring, Snowshoe, Canyon Creek, Reservoir, Lookout, Brush Creek, Pringle, Antler, Gray Prairie, Lost Horse, North Fork, Fox Canyon, Big Summit, Deep Creek, Roba, Pisgah, Elkhorn, Badger, Indian Creek, Happy, Derr, Little Summit, Wolf Creek, Rock Creek, Bearskull/Cottonwood and Buck Pasture. Twenty-five of the allotments are active allotments; one allotment is grazed by sheep, and the remaining active allotments are grazed by cattle. Cattle will continue to have an effect on riparian soils in this area. Impacts from sheep on riparian areas are usually limited to crossings and watering sites as the flocks are managed by herding.

With implementation of the selected alternative from the Travel Management Project Final Environmental Impact Statement for the Deschutes and Ochoco National Forests and Crooked River National Grasslands, the national forests and are be closed to motorized travel unless designated

open. Motorized travel is be restricted to designated routes and to within 300 feet of these designated routes. Green dot restrictions would continue to be in effect on the Paulina District and South Boundary portions of this project area. Uncontrolled OHV use may occur from spring through fall, mainly associated with antler hunting, mushroom gathering, spring turkey hunting, general recreation, camping and big game hunting. Localized impacts may continue, mainly associated with dispersed recreation sites.

Timber sales associated with the Howard Elliot Johnson, Jackson and Canyon Projects are currently being implemented in the Ochoco Summit project area. These are largely thin from below silviculture treatments and will meet INFISH guidelines with regard to stream buffers and stream protection measures identified in the Riparian Management Objectives (RMOs).

Completed Activities and Events

The effects of past timber sales are included in the analysis of the existing condition. Past sales within the project area include a variety of harvest prescriptions. Records from the Big Summit and Paulina Ranger Districts indicate the following amount of past harvest treatments within the area since 1980:

- Regeneration Harvest Total – 5108 acres (tractor only)
- Overstory Removal – 5,508 acres.
- Partial Removal Cutting (thinning, selection cutting) – 16,009
    - These sales include: 1960s: Marks Creek, Wolf Creek, Bug Creek, Metal Creek; 1970s: Jackson Creek Salvage, 1980s: Haypress-Buker, Jackson, Lava, Happy Dead, Chuckles Dead, Deadwood Salvage, Dendro Salvage, Crazy, Woodrow, Aspen, Brer Rabbit, Yuma, Alder, Blue Bull, Bull Pine, Sugar, Watson, EP, Connally, Fry, Hewed Log, Indian, Round Meadows; 1990s: Alder, Connally, Indian, Watson, Yuma, Davis Spring, Fry, Indian, Indian Butte, Lutsey, Chamberlin, DCWR, Fry, Koch, Potter, Rainier, Thunder, Beaverfield Claypool, H & G, Rough, Upper Al, Chuckwagon, Hedgepath, 2210 Salvage, Marks, Morgan, Ochococreek, Coyle Salvage, Howie, Morgan, Pisgah Fiber, Deep Salvage, Dippy Beaver, Harpo, Aqua, Summit, Fryton, Gray, Barn, Biscuitroot, Blackbear; 2000s: Barn, Biscuitroot, Blackbear, Gray, Summit, Jungle, Flat Bucket, Fryton, Zane, Halfway.
- Additional harvest prior to 1980s is known to have occurred in the area but is not recorded in the district GIS records. Historical records indicate that harvest was likely occurring within the project area as early as 1950 and covered much of the forested lands within the project area. This older harvest was primarily focused on individual tree harvest, often removing large high value trees that were deemed at risk to insect mortality.
- In 2006 the Maxwell Fire burned approximately 7,145 acres within the planning area. The majority of the area burned at a low intensity with little effect on tree species and structure.
- In 2008 the Bridge Creek Fire burned 4,891 acres largely in the Bridge Creek Wilderness and adjacent private grounds. Effective ground cover was recovered to the 60 to 80 percent level in 2 years after burning (J. David, personal observation and monitoring).

Ongoing Activities

Beaver Management: There is a trapping moratorium on beavers on the Ochoco National Forest which has been in effect since 1993. This has helped populations re-establish in a few areas.

Maintenance of exclosures: No measurable effect to soils for maintenance activities. When maintained these exclosures will help reduce the effect of hooves of large herbivores in the inside of the exclosure areas.

Roading: Currently the net amount of road in this watershed area is approximately 1,820 miles including both system and non-system roads.

Road Maintenance: Ongoing road maintenance activities would continue. This includes activities such as cleaning culverts and ditches, installing drain dips, blading road surfaces, and replacing road signs. Road maintenance has short term effects to soils but helps reduce the magnitude of long term impacts.

Firewood cutting:. The firewood synopsis specifies no cutting within riparian habitat conservation areas. Cutting is currently limited to within 600 feet of designated roads. Localized impacts may continue that are associated with illegal firewood cutting and the proliferation of user created firewood cutting roads.

ATV/OHV use: This is an ongoing use largely during hunting season. Wet season use in the spring for turkey hunting, antler hunting, and mushroom hunting has been shown to contribute to erosion and delivered sediment in localized areas. Off road travel is limited to within 300 feet of open routes to access dispersed camping sites except where otherwise designated open.

Invasive Plant Treatments: Most invasive plant treatments occur along roads and in rock pits. Given the limited extent of treatment this has no measurable effect on soils. Soils along Forest roads and the highway are often mixtures of subsoil, aggregate, cobble, stone and cinders. Such treatments help reduce colonization of undesirable plant species, many of which limit the re-colonization of disturbed sites by desirable natives or native cultivars.

Fences and Water Developments**:** Fences and water developments are maintained via ATV or pickups sometimes with 2 track trails along the fence lines and to springs, troughs and ponds. There are approximately 126 water developments located on ONF managed lands in the Ochoco Summit OHV project area. These comprise springs, troughs and ponds. Each water development includes approximately one acre of land immediately adjacent to the development that has detrimentally impacted soils associated with livestock use of the development. Impacts include compacted, displaced, post holed/plugged and exposed soils. These areas are generally denuded of vegetation. The estimated extent of detrimentally impacted soils associated with the existing developments is approximately 126 acres.

There are about 225 miles of fenceline in the project area**.** Primary impacts are associated with the use of motorized vehicles ranging from OHVs to pickups to transport materials from roads to the site of the construction. Soil compaction and displacement would be limited to areas where vehicles were driven. Assuming a 10-foot wide "road," one mile of fence would result in approximately 1.2 acres of soil experiencing detrimental soil impacts. 225 miles of fence translates into (225 mi x 1.2 ac/mi= 270 acres).

Decommission/Obliterated Roads: Treatment can involve removing culverts, removal of fills from the flood plain, reestablishment of stream channels to their "natural" contour, surface scarification or deep ripping and sub-soiling, water barring and ditch removal. It also may include such thing as removal of unstable fills, insloping or outsloping of the roadbed to improve slope hydrology; and distribution of an erosion seed mix, fertilizer, and weed-free straw to protect soils from surface erosion. A decommissioned road is "storm proofed" or we might say it is "hydrologically obliterated," even though the landscape is not restored or recontoured to near original shape.

Decommissioning or obliteration of roads can affect soils. Short term erosion may increase depending on future storm events, but long term erosion from the road surface and ditches would be reduced. Infiltration would be enhanced through tillage and runoff would be reduced. Trees and other vegetation would recolonize these sites.

Effects of Proposed Activities in Combination with Effects from Past, Present and Reasonably Foreseeable Actions

Refer to Table 54 for miles of proposed trail and estimate of acres impacted under each alternative. The proposed alternatives increase the amount of area exposed to soil disturbance. However, at the landscape scale the increase is relatively small in comparison to the existing level of disturbance across the project area. The magnitude of this increase is described for each alternative below in relationship to the level of disturbance that has resulted from development of the existing network of roads, including both system and non-system road beds.

Alternative 1: OHV travel would proceed as currently allowed, restricted to designated mixed use roads as displayed on the MVUM maps. The miles of route legally open for travel by OHV would not change under this alternative.

Alternative 2: Since the OHVs would largely be restricted to existing disturbance (i.e. existing road prisms), impacts would be limited (170 total miles, ca 237 acres, of which, 69 miles are new trails, ca 32 acres). Initial trail construction disturbance would have a short term effect that would largely be unmeasurable at the landscape scale due to the large project area acreages involved. For example, of the total 170 miles of proposed OHV trails, 101 miles are on existing disturbance. OHV use on existing roads is only 5.5 percent of the total 1,820 miles (3,312 acres = 1.1 percent) of road in the approximately 301,000acre project area. The proposed new trail construction adds 69 miles or 32 acres. These new trails add only 3.8 percent to the total 1,820 miles of roads and trails. Total existing and roads and trail acreage impacts would be increased by only 0.01 percent across this project area (1.10% to 1.11%).

Alternative 3: Since the OHVs would largely be restricted to existing disturbance (i.e. existing road prisms), impacts would be limited (101 total miles, ca 88 acres, of which, 50 miles are new trails, ca 18 acres). Initial trail construction disturbance would have a short term effect that would largely be unmeasurable at the landscape scale due to the large project area acreages involved. For example, of the total 101 miles of proposed OHV trails, 51 miles are on existing disturbance. OHV use on existing roads is only 2.8 percent of the total 1,820 miles (3,312 acres = 1.1 percent) of road in the approximately 301,000 acre project area. The proposed new trail construction adds 50 miles or 18 acres. These new trails add only 2.7 percent to the total 1,820 miles of roads and trails. Total existing and roads and trail acreage impacts would be increased by less than 0.01 percent across this project area (1.10% to 1.108%).

Alternative 4: Since the OHVs would largely be restricted to existing disturbance (i.e. existing road prisms), these impacts would be limited (212 total miles, ca 173 acres, of which, 81 miles are new trails, ca 38 acres). Initial trail construction disturbance would have a short term effect that would largely be unmeasurable at the landscape scale due to the large project area acreages involved. For example, of the total 212 miles of proposed OHV trails, 131 miles are on existing disturbance. OHV use on existing roads is 7.2 percent of the total 1,820 miles (3,312 acres = 1.1 percent) of road in the ca. 300,548 total project acreage. The proposed new trail construction adds 81 miles or 38 acres. These new trails add 4.5 percent to the total 1,820 miles of roads and trails. Total existing and roads and trail acreage impacts would be increased by about 0.01 percent across this project area (1.10% to 1.11%).

Hydrology and Aquatic Species

This section includes a summary of the Hyrology and Aquatic Species specialists' report and Biological Evaluation; the entire report is in the Ochoco Summit Trail System project record, located at the Ochoco National Forest, Prineville, Oregon.

Introduction

This section is a summary of the Hydrology and Aquatic Species Report; the entire report and its appendices may be found in the project file located at the Ochoco National Forest, Prineville, Oregon. This section includes the entire Biological Evaluation (BE) for Threatened, Endangered, and Sensitive aquatic species in the Ochoco Summit Trail System project area. The BE documents the review and findings of the Forest Service planned programs and activities for possible effects on species (1) listed or proposed for listing by the US Fish and Wildlife Service (USFWS) as Threatened or Endangered; or (2) designated by the Pacific Northwest Regional Forester as Sensitive; or (3) required consultation with the National Marine Fisheries Service (NMFS) under the Magnuson-Stevens Fishery Conservation Act (MSA). It is prepared in compliance with the requirements of Forest Service Manual (FSM) 2630.3, FSM 2672.4, and the Endangered Species Act of 1973, as amended (ESA) (Subpart B; 402.12, Section 7 Consultation). Changes to the R6 Regional Forester's Sensitive Species List were instituted on January 2008.

Determination of effects based on the analysis described in this section are listed in Table 55.

Table 55. Determination for threatened, endangered and sensitive aquatic species.

Species	Listing	Alt 1	Alt 2	Alt 3	Alt 4
Bull trout (determined) *Salvelinus confluentus*	threatened	NE	NE	NE	NE
Mid-Columbia River steelhead trout (determined) *Oncorhynchus mykiss ssp*.	threatened	NE	NE	NE	NE
Redband trout *Oncorynchus mykiss* ssp. (determined)	sensitive	NI	MIIH	MIIH	MIIH
Columbia spotted frog *Rana luteiventris* (determined)	sensitive	NI	MIIH	MIIH	MIIH
West Slope cutthroat trout *Oncorhynchus clarki lewisi* (determined)	sensitive	NI	NI	NI	NI
Mid-Columbia River spring chinook EFH *Oncorhynchus tshawytscha*	sensitive	NI	NI	NI	NI
Shortface lanx (Gastropoda) *Fisherola nuttalli* (suspected)	sensitive	NI	NI	NI	NI
Crater Lake tightcoil (mollusk) *Pristiloma arcticum crateris* (determined)	sensitive	NI	NI	NI	NI
Pristine springsnail (mollusk) *Pristinicola hemphilli* (determined)	sensitive	NI	NI	NI	NI

Effects Determinations

Threatened and Endangered Species

NE No Effect
NLAA May Effect, Not Likely to Adversely Affect
LAA May Effect, Likely to Adversely Affect
BE Beneficial Effect

Sensitive Species

NI No Impact
MIIH May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI Beneficial Impact

Pertinent Rules and Regulations

Water Quality

Direction for managing water quality, water quantity, and riparian areas on the Ochoco National Forest are found in the Forest Service Manual, Title 2500 - Watershed and Air Management (FSM 1984), Forest Service Inland Native Fish Strategy Environmental Assessment (INFISH 1995), Environmental Assessment for the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH 1995), Code of Federal Regulations (36 CFR 219), National Best Management Practices for Water Quality Management on National Forest System Lands (USDA 2012), General Water Quality Best Management Practices (BMP 1988), the Clean Water Act (CWA 1972), Executive Orders 11988, 11990 and 12088, the Organic Administration Act of 1897, and the Ochoco National Forest Land Resource and Management Plan (LRMP 1989).

Goals are generalized statements that provide broad direction for future management of the Forest. Objectives represent projected, potential outputs in support of overall goals and are based on available inventory data and assumptions. Desired future conditions summarize the anticipated physical changes that are likely to occur as a result of carrying out planned management practices over time.

Goals of the Ochoco National Forest include:

Maintain or improve water quality, quantity, and timing of run-off.
Comply with the objectives of the "Clean Water Act" and State of Oregon water quality standards.
Provide water of consistently high quality to users and dependent resources.

Objectives of the Ochoco National Forest include:

Maintenance or improvement of water quality through the proper management of entire watersheds at all times, with special attention given to riparian areas.
Maintain or improve all riparian areas to "excellent condition".
Water quantity reflects the surface water leaving the Forest as a result of natural run-off and any increased run-off expected to result from the manipulation of vegetation. Year to year variations in precipitation are likely to obscure any increase or decrease in run-off resulting from management activities.

Desired future condition of the Ochoco National Forest includes:

In ten years, individual watersheds on the Forest that are currently in excellent condition are expected to remain so and those not presently in good condition would be given first priority for improvement. Fifty years and beyond, it is expected that 90 to 95 percent of the riparian areas on the Forest will be in "excellent condition" by the year 2040. No significant increases in run-off for the Forest are expected.

Aquatic Species

Essential Fish Habitat: The Pacific Fishery Management Council designated EFH (Essential Fish Habitat) for chinook salmon on September 27, 2000. The project area does not have (EFH) for Mid-Columbia spring chinook (Magnuson-Stevens Fishery Conservation and Management Act Public Law 94-265). EFH will not be discussed further.

Threatened and Endangered species: Bull trout and Mid-Columbia River steelhead trout are threatened and located on the Ochoco National Forest and Crooked River National Grassland. The proposed project is not within bull trout watersheds and would have no effect (NE) on threatened bull trout (Salvelinus confluentus) or their designated or proposed critical habitats. The threatened Mid-

Columbia River steelhead trout (Oncorhynchus mykiss ssp) are in Rock Creek, Mountain Creek and Bridge Creek watersheds within the project area (see Table BF-2 on p. 18). A portion of the proposed OHV trail crosses into Rock Creek Watershed in the Bear Creek area. Construction of the trail would not impact steelhead trout or its habitat and the trail would not contribute sediment into Bear Creek. There would be no effect (NE) on steelhead trout or their designated or proposed critical habitats. Consultation with NMFS or USFWS is not needed.

Management Indicator Species: Rainbow (Oncorhynchus mykiss) and brook trout (Salvelinus fontinalis) are identified as management indicator species in the FEIS for the Forest Plan. In the past, these fish have been stocked by the Oregon Department of Fish and Wildlife. They are no longer stocked in the streams in the Ochoco Summit Planning Area, but may still naturally reproduce in many Class I and II streams.

R6 Regional Forester sensitive species list: The shortface lanx (Fisherola nuttalli), Crater Lake tightcoil (Pristiloma arcticum crateris), and Pristine springsnail (Pristinicola hemphilli) are on the R6 Regional Foresters Sensitive Species list (January 2008). They are not known to inhabit or have habitat in the project area and will not be discussed further.

Redband trout (Oncorhynchus mykiss ssp) historically were present throughout the planning area and can be found in Class I and Class II streams: Allen, Deep, Jackson, Little Summit, Peterson, Beetle, Big Spring, Crazy, Crystal, Derr, Double Corral, East Porter, Elliot, Fox, Happy Camp, Howard, Indian, Looney, Toggle, and West Fork Fox Creeks.

Westslope cutthroat trout (Oncorhynchus clarki lewisi) are not known to occur in the project planning area and will not be discussed further (Westslope cutthroat Trout 2011).

The Columbia spotted frog (Rana luteiventris) is a candidate species and protected by the USDA programmatic BA Project Design Criteria (USDA 2010-2013). There are currently known populations of Columbia spotted frogs throughout the planning area identified from informal surveys.

For this report, analysis is for redband trout and Columbia spotted frogs, which are the species present within the project area.

Management Area Prescriptions - Riparian

A management area is composed of lands with similar capabilities or characteristics, and is allocated to emphasize a particular resource or mix of resources. In conjunction with Forest-wide standards and guidelines, management areas provide a site-specific management emphasis and desired future condition for that area.

Riparian areas include land adjacent to water, where plants that are dependent on a perpetual source of water occur. They normally have high water tables and soils which exhibit characteristics of wetness. Riparian areas provide food, cover, and a source of large woody material for aquatic insects, fish and land animals. The vegetation of streamside areas filter sediment and shade the water surface to help maintain stable stream temperatures.

Management emphasis for riparian areas includes:

- Manage streamside vegetation and habitat to maintain or improve water quality. Meet temperature and turbidity levels as required by state standards under the Clean Water Act.

Desired future condition for riparian areas includes:

- Exhibiting a low, but apparent level of management. Vegetation may or may not appear manipulated, depending on the condition of the stream. Suitable amounts of large woody material will be apparent within the riparian area to provide streambank stability and habitat.
- For management purposes, a special protection area (100 feet from the edges of perennial

bodies of water) will be apparent.

- Within the limits of ecological potential, a shady, brushy condition with a canopy of alder, willow, aspen, or other deciduous vegetation will exist.
- Where coniferous evergreens are a natural component of the ecosystem, a variety of size classes will exist to perpetuate the supply of shade and woody debris over time. Sites unable to support a canopy of deciduous or evergreen species will be characterized by vigorous stands of forbs, grasses, and grass-like riparian species.
- Bank slopes containing high plant densities, thick root masses, embedded angular boulders, and old logs will also characterize these areas. Extensive scouring of streambanks will be an uncommon occurrence as will soil deposition outside the norm for the individual stream system. Streambeds will be commonly covered by native aquatic growth on assorted sizes of rocks and boulders.
- Where cobble and gravel bars are prominent, they will become covered by sandy loam soils as riparian vegetation filters and traps stream sediments. As stream banks are rebuilt and cutbanks stabilized, a narrower, deeper channel will gradually develop.
- Springs and wet meadows are not specifically included in this management area prescription, but should receive appropriate protection as stated in Forest-Wide Standards and Guidelines for Water.

Forest-Wide Standards and Guidelines – Water

Standards and guidelines state the bounds or constraints within which all practices are to be carried out in achieving the planned goals, objectives and desired future conditions. They are intended to supplement, but do not replace, policy direction found in Forest Service Manuals and Handbooks, and the Regional Guide for the Pacific Northwest Region. They also must comply with applicable State and Federal laws and regulations.

Water Quality

Comply with State requirements in accordance with the Clean Water Act for protection of waters of the State of Oregon (Oregon Administrative Rules, Ch. 340-041-0001), through planning, application, and monitoring of Best Management Practices (BMP 1988, USDA 2012) in conformance with the Clean Water Act, regulations, and federal guidelines issued thereto.

Floodplains and Wetlands (including springs and wet meadows)

Consider the presence of, and potential impacts to, any inventoried floodplain in project area environmental analysis.

Do not locate major structures, roads, or other facilities within floodplains unless no feasible alternative sites exist outside floodplain.

Allow projects causing short-term impacts on floodplain values only if specific mitigation measures designed to minimize the impacts are documented in the project environmental analysis. Restore natural floodplain characteristics after the activity has ceased.

See Management Area F15 Riparian for emphasis and desired future condition of riparian as a management area prescription (not including springs and wet meadows), and management area standards and guidelines for desired resource areas, such as Fire, Recreation, Timber, Transportation System, and Water.

Management Area Standards and Guidelines, Resource – Water

Temperature – Standard and Guideline

The requirements for shade along streams will generally correspond to provisions for more than 80 percent of the surface shaded. Where this can not be attained, 100 percent of the potential for shade is the standard.

Shade requirements may be reduced in cases where management is necessary to sustain a thrifty community of shade providing species over time, but activities may not result in an increase in termperatures above the limits specified (MA-F15 Riparian).

Turbidity – Standard and Guideline

Allow no more than 10 percent cumulative increase in stream turbidity. Short-term (less than five days) deviations from this standard to accommodate emergency or other legitimate activities will comply with state requirements for notification and approval (MA-F15 Riparian).

Project Activities – Standard and Guideline

Special attention shall be given to land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes, and other bodies of water. This area shall correspond to at least the recognizable area dominated by the riparian vegetation. No management practices causing detrimental changes in water temperature or chemical composition, blockages, or deposits of sediment which seriously and adversely affect water conditions or fish habitat shall be permitted within these areas.

Give preferential consideration to riparian-dependent resources over other resources in cases of unresoluble conflicts.

Vegetation and ground cover requirements:

Where site potential and topographic factors permit, manage riparian areas to provide the shade necessary to meet stream temperature goals.
Maintain upper streambanks in a stable condition along at least 80 percent of the length of a stream. Retain at least 80 percent of the potential ground cover in grass-forb riparian communities. Also, retain at least 80 percent of the potential tree or shrub cover in riparian areas dominated by trees or shrubs. In riparian areas with mixed layers, the cover requirement may be met by taking credit for the effective cover provided by all vegetative layers of the riparian community including shrubs, tree understories, and the dominant overstory. Consider the mitigating effect of stream size and orientation as well as surrounding topography when determining the amount of cover that may be removed.

The Clean Water Act (CWA 1972)

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of all waters to protect the Beneficial Uses as documented according to criteria by the Oregon Department of Environmental Quality (ODEQ 2010). A beneficial use is a resource or activity that would be directly affected by a change in water quality or quantity.

To help implement the objectives of the Clean Water Act, Oregon has developed and adopted water quality standards. Water quality standards include beneficial uses, narrative and numeric criteria, and antidegradation policies. Standards are designed to protect the most sensitive beneficial use within a water body. A determination that water quality is impaired can be based on: evidence of a numeric criterion exceedance; evidence of a narrative criterion exceedance; evidence of a beneficial use impairment; or evidence of a declining trend in water quality such that it would exceed a standard prior to the next listing period (ODEQ 2010).

Executive Orders

The following Executive Orders pertain to this project:

Executive Order 12088 requires Federal compliance with pollution control standards (i.e. the Clean Water Act).

Executive Order 11988 requires agencies to avoid adverse impacts associated with the occupancy and modification of floodplains.

Executive Order 11990 requires agencies to avoid adverse impacts associated with the destruction or modification of wetlands.

PACFISH/ INFISH

PACFISH provides interim direction to protect habitat and populations of anadromous fish habitat in eastern Oregon, eastern Washington, Idaho, western Montana, and portions of Nevada. There are no subwatersheds with anadromous fish species or habitat in the Ochoco Summit project area that contain proposed trail locations. No further evaluation will be discussed as PACFISH does not apply to the Ochoco Summit Trail System project.

INFISH (1994) provides direction to protect habitat and populations of resident native fish outside of anadromous fish habitat in eastern Oregon, eastern Washington, Idaho, western Montana, and portions of Nevada. For the Ochoco Summit project area, INFISH provides protection for redband trout.

Riparian Management Objectives (RMOs) describing good quality aquatic habitat were developed to describe desired condition for fish habitat. INFISH RMOs that will be discussed in this section relate to pools, temperature and bank stability. Large wood, lower bank angle, and width to depth will not be discussed further. Pools, sediment and temperature would be indicators of effects to redband trout and Columbia spotted frog habitat.

Recreation Management is addressed in INFISH (1995 p. A-9). It states:

RM-1 Design, construct, and operate recreation facilities, including trails and dispersed sites, in a manner that does not retard or prevent attainment of the Riparian Management Objectives and avoids adverse effects on inland native fish. Complete watershed analysis prior to construction of new recreation facilities in Riparian Habitat conservation Areas within priority watershed. For existing recreation facilities inside Riparian Habitat Conservation Areas, assure that the facilities or use of the facilities would not prevent attainment of Riparian Management Objectives or adversely affect inland native fish. Relocate or close recreation facilities where Riparian Management Objectives cannot be met or adverse effects on inland native fish can not be avoided.

RM-2 Adjust dispersed and developed recreation practices that retard or prevent attainment of Riparian Management Objectives or adversely affect inland native fish. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective in meeting riparian Management Objectives and avoiding adverse effects on inland native fish, eliminate the practice or occupancy.

The intent of INFISH is to achieve a high level of habitat diversity and complexity through a combination of habitat features, to meet the life-history requirements of the fish community inhabiting a watershed. Project proposals are to not retard the attainment of RMOs. To “retard” would mean to slow the rate of recovery below the near natural rate of recovery if no additional human caused disturbance was placed on the system (INFISH 1995 p. A-3).

Riparian Management Objectives for Redband Trout

Table 56 displays RMOs within the Ochoco Summit project area; some information is taken from Table A-1: Interim Riparian Management Objectives (RMOs) from INFISH (1995).

Table 56. Riparian Management Objectives (INFISH 1995).

Habitat Feature	Interim Objective
Water Temperature	No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period). Maximum water temperatures below 59F within adult holding habitat and below 48F within spawning and rearing habitats.
Bank Stability (non-forested systems)	>80 percent stable.

Analysis Design

Watersheds within the Project Boundary that were not Analyzed

Subwatersheds that do not contain streams that are within 300 feet of proposed trails were not analyzed for effects to hydrology. Table 57 lists the subwatersheds that were not analyzed and their Hydrologic Unit Codes (HUC). The current maps of proposed trail locations for Alternatives 3 and 4 indicate that the trail locations extend to within 300 feet of perennial tributary to Duncan Creek; however, based on the location of the proposed trail determined from aerial photography, the trail would not actually extend into the Duncan Creek Subwatershed. The Duncan Creek Subwatershed was, therefore, removed from this hydrology analysis.

Table 57. Name and HUCs for subwatersheds not analyzed within the Ochoco Summit project boundary.

Field	Area	Name	Hydrologic Unit Code
1st	Region	Pacific Northwest	17
2nd	Sub-region	Middle Columbia River	1707
3rd	River Basin	John Day River	170702
4th	Sub-basin	Upper John Day River	17070201
5th	Watershed	Mountain Creek	1707020113
6th	Subwatershed	Upper Mountain Creek	170702011301
		Middle Mountain Creek	170702011302
5th	Watershed	Rock Creek	1707020114
6th	Subwatershed	Upper Rock Creek	170702011401
		Middle Rock Creek	170702011402
4th	Sub-basin	Lower John Day River	17070204
5th	Watershed	Bridge Creek	1707020403
6th	Subwatershed	West Branch Bridge Creek	170702040302
3rd	River Basin	Deschutes River	170703
4th	Sub-basin	Beaver-South Fork	17070303
5th	Watershed	Paulina Creek	1707030309
6th	Subwatershed	Upper Paulina Creek	170703030901
		Dry Paulina Creek	170703030902
5th	Watershed	Lower Beaver Creek	1707030310
6th	Subwatershed	Wolf Creek	170703031002
		Drift Canyon	170703031004
4th	Sub-basin	Upper Crooked River	17070304
5th	Watershed	Upper North Fork Crooked River	1707030403
6th	Subwatershed	Gray Creek	170703040301

Table 57. Name and HUCs for subwatersheds not analyzed within the Ochoco Summit project boundary.

Field	Area	Name	Hydrologic Unit Code
		Headwaters North Fork Crooked River	170703040305
5th	Watershed	Lower North Fork Crooked River	1707030405
6th	Subwatershed	Lower North Fork Canyon	170703040502
4th	Sub-basin	Lower Crooked River	17070305
5th	Watershed	Upper Ochoco Creek	1707030502
6th	Subwatershed	Headwaters Ochoco Creek	170703050201
		Lower Marks Creek	170703050204
		Duncan Creek	170703050205

Potential Issues Acknowledged but not Analyzed

The following potential issues are briefly discussed, but for reasons described were not considered further in this analysis:

Contamination of Surface or Groundwater from chemicals potentially released at staging areas (e.g. petroleum, bacteria, nutrients). Only one staging area is located within 300 feet of a perennial stream channel in the Ochoco Summit Planning Area, Ochoco Divide Snow Park. This existing Snow Park staging area, proposed for Alternatives 2, 3 and 4 as an OHV staging area, is located just under 300 feet from Marks Creek where the creek transitions from intermittent to perennial; the Snow Park is already in use. The staging area is not located within the RHCA, and there is a relatively low risk of contamination from the staging area affecting water quality. No proposed staging areas are within wetland RHCAs, as described by INFISH RHCA requirements and based on Potential Natural Vegetation wetland vegetation type locations. In addition, project design criteria direct that "All fuel-powered vehicles and tools would be refueled at least 75 feet from any live stream." None of the streams within the project area is listed by Oregon Department of Environmental Quality on the 303(d) list for any contaminants other than stream temperature.

Stream Temperature - Within the project area there are several streams with assessed water quality impairments related to summer water temperature. These include Double Corral Creek, Fox Creek, Happy Camp Creek, Howard Creek, Indian Creek, Jackson Creek, Little Summit Creek, Marks Creek, North Wolf Creek, Ochoco Creek, Peterson Creek, Porter Creek, and Toggle Creek. These streams are on Oregon's 2004/2006 Section 303(d) List of "Water Quality Limited Waterbodies." The Oregon State Water Quality Standards states that the seven-day-average maximum temperature of a stream identified as having salmon and trout rearing and migration use, which describes some streams within the project area, may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit). No measurable increase in water temperature from management practices is allowed in these streams. In order to address potential stream temperature effects from trail construction in the Ochoco Summit OHV Project Area, design criteria are included that prevent the removal of shade producing trees on streams on the 303(d) list for water temperatures. Any exceptions would be reviewed on a case-by-case basis by a fisheries biologist or hydrologist. These design criteria would prevent a reduction of shade on streams in the project area, resulting in no increase in stream temperatures.

Tight Curves – Recent studies conducted by the Forest Service and the Department of Transportation found that "compared to tight-radius curves, nearly eight times as many passes were required to produce equal impacts on straight sections, and nearly five times as many passes were required for uphill and downhill sections" of all-terrain vehicle (ATV) trails (Meadows et al. 2008). In order to address potential erosion and subsequent sediment delivery to streams, design criteria were included that require locating curves less than 45 degrees outside of the stream sediment delivery zone.

Large Woody Debris - Overall, action alternatives would have very limited effects on large woody debris, both active and potential. In terms of active large woody debris, there may be pieces of large wood removed where stream crossings are proposed to be installed, but these pieces of active wood should be moved either upstream or downstream of the site to further contribute to large wood numbers in project watersheds. In terms of potential large woody debris, there may be very localized reductions in large wood where trees are removed near stream crossings or where trails closely parallel a stream channel to accommodate trail construction or reconstruction. Removal of potential large wood would be so localized and minimal that there would be no effect on recruitable large wood in project area watersheds as a whole.

Methods

Stream Surveys

Bottom Line Surveys (BLS) were conducted between 1991 and 2001 on the Ochoco National Forest perennial and intermittent streams to determine if a streamside management unit was in compliance with the riparian zone standards and guidelines. These surveys included measurements of shade, large woody debris, cutbanks, and pools.

Level II Stream Surveys were conducted between 1989 and 2011 on the Ochoco National Forest perennial streams to identify existing riparian and aquatic ecosystem conditions on a basin-wide scale.

Sediment/Turbidity

Environmental effects of unstable streambanks include increased turbidity and sediment yield, development of cutbanks, and changes in channel morphology. The result of these changes may result in water quality conditions that are lethal to aquatic organisms. Changes in channel morphology would primarily be seen with changes in entrenchment, width-to-depth ratios, and ultimately channel type (Rosgen 2009). Streams with unstable banks typically erode laterally (i.e. become wider and shallower), which increases the width-to-depth ratio. See sections titled “Geology” and “Soils” in Chapter 3 of this document for additional descriptive information on soil erosion, channel erosion, bank erosion, and overland flow from compaction and/or displacement.

Turbidity is the degree to which suspended material in the water impedes light penetration. Turbidity is expressed in Nephrometric Turbidity Units (NTUs). There can be a close correlation between turbidity and suspended sediment in a given stream, but the correlation can change as organic material increases over the summer or if the percent of sediment from different sources in the drainage changes. The correlation is poor in sediment-limited systems. Turbidity is not a good indicator of the amount of sediment being transported as bedload. At turbidity levels above 25 NTU salmonid sight-feeding may be reduced. Most measurable effects to aquatic life result from sediment instead of turbidity.

State water quality standards direct that turbidity levels should not exceed background levels by more than 10 percent. There is no quantitative standard for sediment in the Oregon DEQ water quality rules. The Narrative Criteria section (340-041-0007-12) states that activities can not result in the formation of appreciable organic or inorganic deposits deleterious to fish or other aquatic life; however, this is more of an objective than a standard. The state appears to be using turbidity as a surrogate for sediment.

There is a body of literature that evaluates sediment loading rates above natural to determine stream transport thresholds with resultant detrimental aquatic effects, but very little quantitative information has been collected locally. Erosion and sediment transport are dynamic in time and space, and are dependent on multiple independent variables (i.e. climate, geology, topography, vegetation, weather, etc.). Additionally, natural episodic events, such as large fires and floods, can elevate sediment

loading rates by orders of magnitude above average observed conditions (Elliot 2002, Elliot 2012, Megahand and King 2004). Two studies located in the Idaho Batholith identified 'thresholds levels' for observable stream aggradation and resultant detrimental aquatic effects in the Northern Rockies. The cited threshold values include 100% over natural (Megahan and Kind 2004), to percentages over natural based on Rosgen stream type: A channels – 100%, B channels – 45%, and C channels – 35% (Stowell et al 1983). Sediment-habitat response curves were developed in Stowell et al 1983 and show that in 'C' channel types, substrate embeddedness is virtually unchanged below 35% increase over natural background sediment and that fine sediment does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. Summer rearing capacity does not decrease significantly until embeddedness reaches at least 25% and winter carrying capacity until embeddedness reaches at least 15% for Age 0 steelhead (Stowell et al 1983).

An inverse relationship between the amount of fine sediments in spawning or rearing areas versus fish survival and abundance has been found in numerous studies (Stowell et al 1983). In general, when sediment yields are increased over natural rates, fish biomass decreases. Embryo survival, winter carrying capacity, and summer rearing capcity are related to in-stream sediment and could limit fish abundance.

The numerous organisms forming the base of the aquatic food chain find shelter and habitat in the open spaces within stream gravel and cobble. Filling these spaces with sediment reduces the habitable volume of the stream. As sediment sources and delivery exceeds 20 percent of the total area on the substrate, deposits within the larger cobble material of the streambed produce an embedded channel, with consequent loss of aquatic habitat. Gravel embeddedness of less than 20 percent is essential to maintain a healthy salmonid population, particularly in those areas identified as potential or existing spawning areas (Bjorn and Reiser 1991). If fine sediment exceeds 20 percent, the spaces between the rocks in the substrate are filled and oxygenation of eggs is reduced. Reduced oxygenation results in reduced success of fish and frog eggs surviving.

Studies have generally concluded that non-channelized sediment flow rarely travels more than 300 feet and that 200-300 foot riparian "filter strips" are generally effective at protecting streams from sediment from non-channelized flow (INFISH 1995, Belt et al. 1992). As a general rule the closer a ground disturbing activity is to a stream, including stream crossings, the higher the potential for sediment delivery.

Soil disturbance on ridges or side slopes may never affect water quality, but disturbance of a channel bed or bank is immediately reflected in downstream sediment levels. Unstable stream banks associated with mechanical disturbance, loss of vegetative root strength, decreases in roughness associated with large woody material (LWM) and vegetation removal, or channelized stream banks are highly susceptible to changes in flow or sediment load. Unstable stream banks can account for most of the sediment load in a drainage system. If the discharge and/or the sediment load are substantially increased, the flow may erode the streambanks or deposit sediment to reach a new equilibrium. A high incidence of raw banks (i.e. cutbanks), headcuts, and/or braided channels (Rosgen channel type D) are indicative of unstable stream banks.

A recent study conducted by the USFS and the US Department of Transportation Federal Highway Administration assessed to what degree natural resources are being effected by all-terrain-vehicle (ATV) use (Meadows et al. 2008). This study found that "following any level of disturbance, runoff and sediment generated on the ATV trails increased by 56 percent and 625 percent, respectively, compared to the undisturbed forest floor." In addition, the study found that tight-radius curves result in the most trail disturbance condition, followed by uphill and downhill sections of trail, with straight sections of trails receiving the least disturbance and susceptibility to rutting (Meadows et al. 2008).

Sediment Loading

Disturbed WEPP and WEPP:Road models were used to assess sediment impacts to streams in the Ochoco Summit project area. Disturbed WEPP was used to model natural background hillslope sediment loading by 6th code HUC. Project-area 6th code HUCs were broken up by soil type (clay loam, silt loam, sandy loam, or loam) and, using Disturbed WEPP, natural background sediment was predicted. Vegetation cover in the project area was estimated at 60% (good grass), and hillslope gradient and horizontal length was estimated using GIS.

WEPP:Road was used to estimated sediment delivery from Ochoco Summit trail segments within 300' of stream and at trail-stream crossings. Soil texture and rock content were estimated by road segment and crossing using the Ochoco National Forest Soil Resource Inventory (SRI). Assumptions of the modeling excersise included: road design of "outsloped, rutted", 8% road gradient, 400 foot road length between drainage features, fill gradient of 67%, fill length of 15 feet, buffer gradient of 15% and buffer length of 150 feet. Road width was based on the proposed width of the trail system. Traffic level was changed depending on the type of use.

For trail-stream crossings, assumptions included: road design of "outsloped, rutted", 8% road gradient and 400 foot road length between drainage features. If the crossing is proposed to be a culvert, than a fill gradient of 67%, fill length of 5 feet, buffer gradient of 5% and a buffer length of 5 feet were used. If the crossing is proposed to be a ford, than a fill gradient of 5%, fill length of 1 foot, buffer gradient of 5% and a buffer length of 1 foot was used. Again, traffic level was changed depending on the type of use.

Bank Stability

Measured cutbank percentages of stream survey reaches were used to assess the existing condition of bank stability for streams in the Ochoco Summit Project Area. Each measurement factor was given a good, fair, or poor rating based on measured values. Percent cutbank was estimated and summarized from the most recent Level II and Bottom Line Survey data for each stream reach. Good ratings indicate that cutbanks are meeting Forest Plan Standards (i.e. <20 percent), fair condition indicate cutbanks between 20 and 29 percent, and a poor rating is associated with cut banks of greater than 30 percent.

Slope Erosion Hazard

The Ochoco National Forest Slope Erosion Hazard Layer was used to assess the susceptibility of the soils to erosion within each Ochoco Summit Project Area subwatershed. Percentages of high, moderate and low slope erosion hazard were determined within 300 feet of perennial and intermittent streams within each subwatershed. Subwatersheds with greater than 30% of the area within 300 feet of perennial and intermittent streams with a high slope erosion hazard were considered high, with more than 25% with a low slope erosion hazard were given a rating of low, and the remaining subwatersheds with a majority of the area within a moderate hazard rating were considered moderate.

Roads/Trails

Existing road densities within 300 feet of perennial and intermittent streams in the Ochoco Summit Project Area were used to assess the existing condition of roads located within the sediment delivery zone. Only non-paved roads with operational maintenance levels designated as Level I through V were considered for this analysis as potential sediment sources for sediment delivery to streams within the Ochoco Summit Project Area. Closed roads (Level I) were included in the analysis, since road closures typically consist of installing a blockage of some sort at the road entrance to prevent use rather than hydrologically stabilizing the road. Closed roads, therefore, can still contribute sediment to stream channels. For purposes of alternative analysis, densities of proposed trails were added to existing roads to determine overall road/trail densities within 300 feet of perennial and intermittent

streams. Each measurement factor was given a low, moderate, or high rating. A road/trail density within the 300 feet of streams with less than six miles per square mile was considered to be low, between six and seven miles per square mile was considered moderate, and greater than seven miles per square mile was considered high. Measurement factor ratings were then summarized into a single roads/trails rating for existing condition.

Channel Sensitivity and Recovery Potential

Varying stream forms and systems react differently to disturbance and recover at differing rates. Depending upon the geomorphic variables, such as entrenchment and bankfull width and depth, one stream may more resilient and may recover more quickly than another when exposed to disturbance. Stream channels with similar geomorphic variables react similarly to disturbances. In order to assess the existing condition and the potential effects on the stream channels in the Ochoco Summit Project Area, the streams were classified and rated accordingly based on their Rosgen Channel Type. This stream classification system, developed by Rosgen, classifies streams into stream types based on entrenchment ratios, width/depth ratios, sinuosity, channel gradient, and channel material (1996).

The width-to-depth ratio is an index of the cross-sectional channel shape, where both width and depth are measured at the bankfull level. Changes in discharge, bank stability, sediment load and/or bedload can rapidly alter the width and/or depth of the channel. Whether a stream erodes downward or outward or both can be influenced by bank shear stress, channel substrate type and the amount of riparian vegetation present on stream banks. Bank vegetation increases the resistance to erosion through its binding effects on banks, with erosion decreasing as the percentage of roots in the soil increases.

The entrenchment ratio is defined by Rosgen (1996) as the flood-prone area width divided by the bankfull width. Flood-prone area width is the width of the stream at twice maximum bankfull depth. Entrenched streams are typically vertically confined (within cutbanks) due to vertical channel erosion and have entrenchment ratios that are less than 1.4 (see Figure 1**Error! Reference source not found.**); higher entrenchment ratios indicate that channels are not confined and have access to floodplain. G and F-type channels are entrenched.

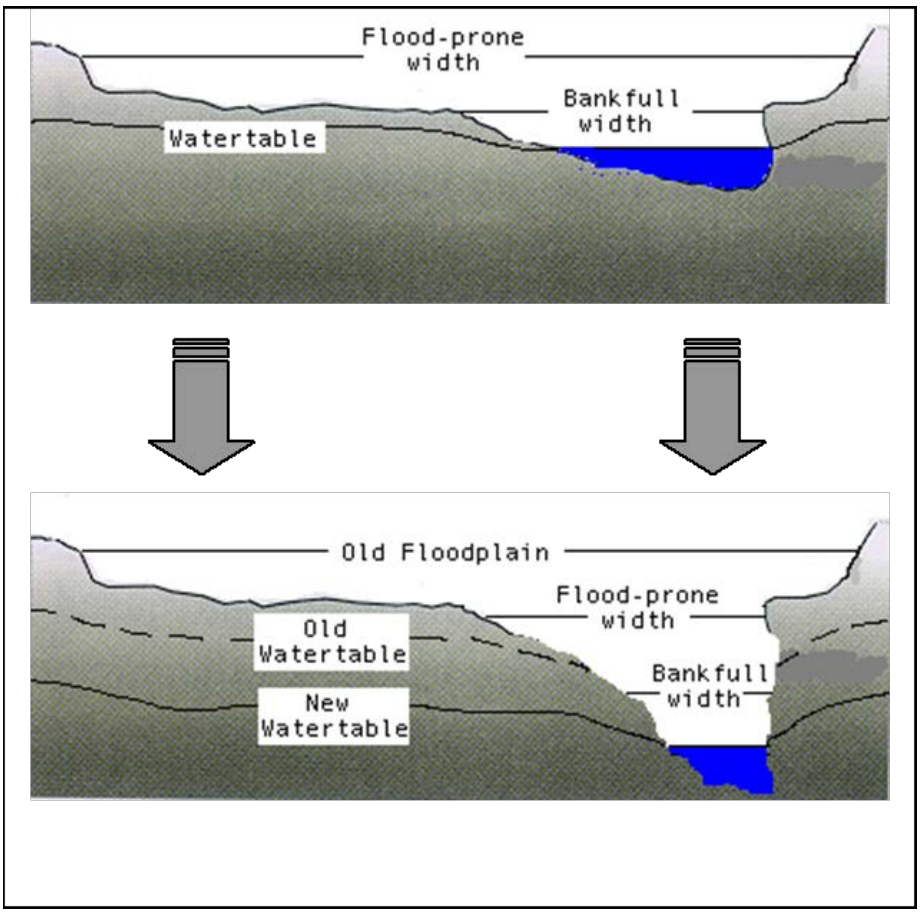

Figure 3. Changes in channel morphology and water table.

Channel disturbances such as increased sediment supply, excessive bank erosion, or increased flows can result in stream channel instability by upsetting the balance between sediment inputs and outputs. Increased sediment supply may result in channel aggradation, whereas excessive bank erosion typically results in channel widening. Both aggradation and channel widening change the ability of a stream channel to transport sediment downstream and may lead to a change in stream channel type.

A stream channel's sensitivity to disturbance is related to the channel type and the dominant channel material (Rosgen 2009). In general, finer-grained channel material results in a more sensitive stream channel, with the exception of clay, which can in some circumstances increase channel stability somewhat (Rosgen 2009). Finer grained (gravels and smaller) A, C, D, E, F, and G channels range from high to extreme sensitivity to disturbance. Finer-grained B and DA channel types, however, are expected to have moderate sensitivity to disturbance. Other channel stability factors based on channel type include recovery potential, sediment supply, streambank erosion potential, and vegetation controlling influence. When these factors depart significantly from their stable state, it can result in degradation, aggradation, accelerated lateral erosion, avulsion or other channel instability. Ultimately, these instability consequences can lead to a change in channel type and a change in channel sensitivity as well as the other channel stability factors (Rosgen 2009).

In order to evaluate the potential impacts to streams in the Ochoco Summit project area, the sensitivity to disturbance, the recovery potential and the streambank erosion potential at stream crossing locations were evaluated by stream type within the analysis subwatersheds (Table 58). Descriptive ratings for sensitivity to disturbance ranging from very low to extreme were quantified from one to six, respectively. Descriptive ratings for recovery potential ranging from excellent to very

poor were quantified from one to six, respectively. Descriptive ratings for streambank erosion potential at new stream crossings (from very low to very high) were based on stream type at the new crossing locations (Rosgen 2009, Table 2-4). These numerical scores were then added together based on the channel type to assess the overall sensitivity and recovery potential for each evaluated stream reach, which were then given a condition rating of poor for scores between 10 to 12, fair for scores between five and nine, and good for scores between two and four. This overall rating was then used to determine the potential of disturbance from the Ochoco Summit Project alternatives to affect the stream channels in the vicinity of proposed trail locations based on stream channel type.

Table 58. Generalized sensitivity to disturbance and recovery potential by stream type (Rosgen 2009).

Stream Type	Sensitivity to Disturbance	Recovery Potential	Overall Score	Overall Rating
A1	Very Low (1)	Excellent (1)	2	Good
A2	Very Low (1)	Excellent (1)	2	Good
A3	Very High (5)	Very Poor (6)	11	Poor
A4	Extreme (6)	Very Poor (6)	12	Poor
A5	Extreme (6)	Very Poor (6)	12	Poor
A6	High (4)	Poor (5)	9	Fair
B1	Very Low (1)	Excellent (1)	2	Good
B2	Very Low (1)	Excellent (1)	2	Good
B3	Low (2)	Excellent (1)	3	Good
B4	Moderate (3)	Excellent (1)	4	Good
B5	Moderate (3)	Excellent (1)	4	Good
B6	Moderate (3)	Excellent (1)	4	Good
C1	Low (2)	Very Good (2)	4	Good
C2	Low (2)	Very Good (2)	4	Good
C3	Moderate (3)	Good (3)	6	Fair
C4	Very High (5)	Good (3)	8	Fair
C5	Very High (5)	Fair (4)	9	Fair
C6	Very High (5)	Good (3)	8	Fair
D3	Very High (5)	Poor (5)	10	Poor
D4	Very High (5)	Poor (5)	10	Poor
D5	Very High (5)	Poor (5)	10	Poor
D6	High (4)	Poor (5)	9	Fair
DA4	Moderate (3)	Good (3)	6	Fair
DA5	Moderate (3)	Good (3)	6	Fair
DA6	Moderate (3)	Good (3)	6	Fair
E3	High (4)	Good (3)	7	Fair
E4	Very High (5)	Good (3)	8	Fair
E5	Very High (5)	Good (3)	8	Fair
E6	Very High (5)	Good (3)	8	Fair
F1	Low (2)	Fair (4)	6	Fair
F2	Low (2)	Fair (4)	6	Fair
F3	Moderate (3)	Poor (5)	8	Fair
F4	Extreme (6)	Poor (5)	11	Poor
F5	Very High (5)	Poor (5)	10	Poor
F6	Very High (5)	Fair (4)	9	Fair
G1	Low (2)	Good (3)	5	Fair
G2	Moderate (3)	Fair (4)	7	Fair
G3	Very High (5)	Poor (5)	10	Poor
G4	Extreme (6)	Very Poor (6)	12	Poor
G5	Extreme (6)	Very Poor (6)	12	Poor
G6	Very High (5)	Poor (5)	10	Poor

Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (GDE) include wet meadows, springs, fens, and other wetlands that are dependent on groundwater. These systems not only provide essential habitat for wildlife, but also are the source of substantial portions of streamflow, particularly during baseflow conditions in the late summer and fall. Protection of GDEs maintains habitat and protects water quality.

INFISH interim guidance designates an RHCA buffer of 150 feet around a wetland greater than one acre and 50 feet around a wetland that is smaller than one acre in non-priority watersheds. No watersheds within the Ochoco National Forest are designated as Priority Watersheds according to the INFISH designation.

In order to analyze the existing condition and the potential effects of the Ochoco Summit Proposed Action and the alternatives on GDEs, the existing road density and the proposed trail density were estimated within wetlands, wet meadows, and springs along with the appropriate RHCAs. A 50 foot RHCA was used for wetlands and wet meadows smaller than one acre and springs. For wetlands or wet meadows greater than one acre in size, a 150 foot RHCA was used. These values were summarized by subwatershed and given a rating of low, moderate, or high. A road/trail density of less than six miles per square mile was considered low, between six and seven miles per square mile was considered moderate, and greater than seven miles per square mile was considered high. Departure from existing condition could then be evaluated.

Flow and Sediment Regimes

Roads have the potential to increase the drainage density of a stream network by intercepting runoff at stream crossings or by channelizing flow that would otherwise be sheet flow or groundwater flow (Wemple at al. 1996; Jones et al. 2000; Takken et al. 2008). By increasing the drainage density and providing a more direct route to stream channels, roads in effect can decrease the time it takes for the precipitation, in the form of runoff, to enter the stream channel and potentially resulting in increased peak flows (La March and Lettenmaier 2001; Storck et al. 1998; Woldie et al. 2009). In addition, since erosion risk from ATV trails has been shown to potentially equal that of a forest road network, it can be expected that trails have the potential to increase drainage densities and peak flows similar to forest roads (Meadows et al., 2008). Areas with high road densities, high drainage densities, and a high density of stream crossings typically result in higher connectivity of the road and stream network. The effects of roads (or trails) on increased peak flows is expected to be greatest downstream of areas with a high density of stream crossings (Jones et al., 2000).

In order to address potential effects of trail construction to the flow and sediment regimes within the Ochoco Summit Project Area, the existing condition of road densities, drainage densities, and intermittent and perennial stream crossing densities were estimated and rated relative to one another for each analysis subwatershed.

Road Density

Road densities were determined for the existing condition by estimating the total miles of Operational Maintenance Level 1-5 Roads within the analysis subwatershed and dividing this length my the total drainage area of the subwatershed in square miles. These values for road densities were then given a rating of low, moderate, or high. “Low” indicates the lowest third of road densities (<3.5 miles per square mile) for the analysis subwatersheds, “moderate” indicates the middle third (3.4-4 miles per square mile), and “high” indicates the highest third (> 4 miles per square mile). Closed roads (Level I) were included in the analysis because road closures are typically implemented by installing a blockage of some sort at the road entrance to prevent use rather than hydrologically stabilizing the road bed. Closed roads, therefore, can still contribute sediment to stream channels. For alternative analysis, trail lengths were added to road miles to determine the overall road/trail densities. These

values were then rated using the same values as for the road density existing condition. Departure from existing condition could then be evaluated.

Drainage Density

Drainage densities were determined for the existing condition by estimating the total miles of intermittent and perennial streams within the analysis subwatershed and dividing this length by the total drainage area of the subwatershed in square miles. These values for drainage densities were then given a rating of low, moderate, or high. Low for the lowest third of road densities (<2.2 miles per square mile) for the analysis subwatersheds, moderate for the middle third (2.2-2.5 miles per square mile), and high for the highest third (> 2.5 miles per square mile).

Stream Crossing Density

The potential effects of roads or trails delivering sediment to streams are most pronounced at stream crossings. In general, lower slope position roads (generally within RHCA) have much greater impact on stream channels and water quality than mid and upper slope position roads. However, where surface flows are continuous between roads and streams, as when ditches convey road runoff to stream channels, regardless of position on the slope, the runoff is considered hydrologically connected to the stream network (Furniss, et al. 2000). Where there is hydraulic connectivity, rapid runoff, sediments, and road-associated channels, the road surface provides an efficient sediment route into the natural channel network. Stream crossings can cause a large amount of sediment to be mobilized when hydraulic capacity is exceeded, or when a culvert becomes plugged and the road fills are overtopped. When road fills are breached, sediment loading can greatly increase. Interception of interflow by cut slopes can generate substantial amounts of runoff converting subsurface flow into surface flows (Furniss, et al. 2000).

The existing condition relative to stream crossing density was determined by dividing the total number of intermittent and perennial stream crossings by the drainage area in square miles. Each of these factors was given a low, moderate, or high rating based on the number of crossings per subwatershed drainage area. Based on the overall ranges, subwatersheds with more than 3.5 crossings per square mile of drainage area were considered high, between 2.5 and 3.5 crossings per square mile were considered moderate, and less than 2.5 crossings per square miles were considered low. To analyze the Ochoco Summit Proposed Action and the alternatives, the number of new trail stream crossings and the number of existing road/stream crossings per subwatershed drainage area were assessed relative to the stream channel's existing condition, channel type, and flow-regime. Ratings for the alternative analysis were based on the same values as for existing condition. Departure from existing condition could then be evaluated.

Existing Condition

Watersheds

The Ochoco Summit project area includes all or portions of nine watersheds and 31 subwatersheds (see Map 9). Watersheds and subwatersheds that do not contain streams that are within 300 feet of proposed trails were not analyzed as part of this analysis. Subwatersheds that were not analyzed are listed in the Analysis Design section. Nine subwatersheds were analyzed, comprising all or portions of four watersheds: Lower Beaver Creek, Upper North Fork Crooked River, Deep Creek, and Upper Ochoco Creek. The ten subwatersheds intersected by the project area include North Fork Wolf Creek, Elliot Creek, Howard Creek, Peterson Creek, Porter Creek, Jackson Creek, Little Summit Prairie Creek, Lower Deep Creek, and Upper Marks Creek. Hydrologic Unit Codes (HUC), which break drainage systems into progressively smaller areas, and drainage names within the project area are listed in Table 59. Map 10 displays the project area RHCAs.

Table 59. Hydrologic Unit Codes for the Ochoco Summit project area.

Field	Area	Name	Hydrologic Unit Code
1st	Region	Pacific Northwest	17
2nd	Sub-region	Middle Columbia River	1707
3rd	River Basin	Deschutes River	170703
4th	Sub-basin	Beaver-South Fork	17070303
5th	Watershed	Lower Beaver Creek	1707030310
6th	Subwatershed	North Wolf Creek	170703031001
4th	Sub-basin	Upper Crooked River	17070304
5th	Watershed	Upper North Fork Crooked River	1707030403
6th	Subwatershed	Elliot Creek	170703040302
		Howard Creek	170703040303
		Peterson Creek	170703040306
		Porter Creek	170703040307
5th	Watershed	Deep Creek	1707030404
6th	Subwatershed	Jackson Creek	170703040401
		Little Summit Prairie Creek	170703040402
		Lower Deep Creek	170703040403
4th	Sub-basin	Lower Crooked River	17070305
5th	Watershed	Upper Ochoco Creek	1707030502
6th	Subwatershed	Upper Marks Creek	170703050203

Watershed and Subwatershed Descriptions

Lower Beaver Creek Watershed

Class III trails are proposed to be located in the headwaters portion of the Lower Beaver Creek Watershed as part of the Ochoco Summit Project. Though the trail does intersect the very upper portions of the Wolf Creek Subwatershed along the ridge, only the North Wolf Creek Subwatershed encompasses streams that are within 300 feet, the sediment delivery zone, of proposed trails. Table 60 summarizes the existing condition within the North Wolf Creek Subwatershed based on identified potential hydrologic effects to the sediment, turbidity and the flow and sediment regimes in and near the streams within the project area.

Based on measured bank stability, slope erosion hazard, road densities near streams, channel sensitivity and recovery potential, and the density of roads in and near wetlands, the streams within the Lower Beaver Creek Watershed are identified as being in relatively fair condition for sediment and turbidity, with poor slope erosion hazard conditions and moderate road densities through the North Wolf Creek Subwatershed. The best conditions are found in the Widow Creek drainage. Based on overall road density, drainage density, and stream crossing density in North Wolf Creek and Widow Creek, the flow and sediment regime conditions are relatively poor to fair.

Table 60. Summary of existing condition in the Lower Beaver Creek Watershed.

Subwatershed	Sediment/Turbidity	Flow/Sediment Regime
North Wolf Creek	Fair	Poor/Fair
* Status/Condition - All variables meeting standards = good; Some variables meeting standards = fair; Most or all variables not meeting standards = poor; No Data Collected (ND)		

North Wolf Creek Subwatershed

Three drainages flow out of the forest and leave the forest boundary within the North Wolf Creek Subwatershed. North Wolf Creek is the western-most drainage and is a perennial, fish-bearing stream with multiple intermittent tributaries. At the forest boundary, the no-name stream east of North Wolf

Creek is an intermittent, fish-bearing stream and Widow Creek, the eastern-most drainage, is a perennial, non-fish-bearing stream.

North Wolf Creek is a perennial spring fed tributary of Wolf Creek. North Wolf Creek is approximately 11.5 miles in length and only the upper 6.3 miles flow within the Forest boundary. North Wolf Creek has been heavily utilized for its resources, i.e. livestock grazing, logging, camping, hunting, and fishing. Redband trout (both adult and fry) and Columbia spotted frogs have been observed.

North Wolf Creek is a Class is II to river mile 4.8 from the US Forest boundary and Class IV for the last 1.5 miles of the headwaters on the mainstem. Total shade and hardwood shade did not reach or exceed 80% of the surface shade in any reach. Reach 1 was the highest with 65.9%; Reach 2 had the only measurable hardwood shade of 0.5. Reaches 1, 2, and 3 were 18 to 23% below potential shade. Large wood was below 1 piece of wood in all log classes and did not meet the Forest standard. Multiple headcuts are found in all reaches with heights from 0.5 ft. to 4 ft. high. Multiple gullies are present in Reaches 2 and 3 with high headcuts (4 ft. high) and with engulfing cutbanks (100 ft.+ long by 4 ft. high).

Table 61 summarizes the existing condition of streams for the two hydrologic issues identified for analysis within the North Wolf Creek Subwatershed. Based on stream surveys and existing Forest Service data layers, the North Wolf Creek Subwatershed was found to have poor slope erosion hazard conditions and moderate road density conditions within 300 feet of perennial and intermittent streams. In addition, this subwatershed was found to have moderate stream crossing densities, moderate road densities within GDEs and the associated RHCA, and moderate overall road densities. The overall drainage density is relatively high, which equates to a poor condition for the purposes of the potential for impact from roads and trails. North Wolf Creek was found to have fair bank stability, very high channel sensitivity, and good recovery potential. Widow Creek was found to have good bank stability, moderate channel sensitivity, and excellent recovery potential.

In the North Wolf Creek Subwatershed, the existing road network contributes approximately 9.4 tons of sediment per year to streams, equating to approximately four percent of the natural background sediment loading from hillslopes. This is well below the 35 percent threshold for affecting fish habitat as described in the Analysis Design section.

Table 61. Summary of stream condition and impairments in North Wolf Creek Subwatershed.

Stream	Sediment/Turbidity					Flow/Sediment Regime		
	Bank Stability	**Slope Erosion Hazard**	**Road Density w/in 300' of Streams**	**Channel Sensitivity/ Recovery Potential**	**GDE**	**Road Density**	**Drainage Density**	**Stream Crossing Density**
North Wolf	Fair	High	Moderate	Fair	Moderate	Moderate	High	Moderate
Widow	Good			Good				
Overall	Fair/Good	Poor	Fair	Fair/Good	Fair	Fair	Poor	Fair

Upper North Fork Crooked River Watershed

Trails are proposed across the northern portion of the Upper North Fork Crooked River Watershed as part of the Ochoco Summit Project. These proposed trail locations intersect portions of the Elliot Creek, Howard Creek, Peterson Creek, and Porter Creek Subwatersheds. Table 62 summarizes the existing condition within the Upper North Fork Crooked River Watershed based on identified potential hydrologic effects to the sediment, turbidity and the flow and sediment regimes in and near the streams within the project area.

Healthy populations of redband trout and Columbia spotted frogs are known to inhabit Allen, East Fork Allen, Peterson and Elliot creeks (ODFW).

Based on measured bank stability, slope erosion hazard, road densities near streams, channel sensitivity and recovery potential, and the density of roads in and near wetlands, the streams within the Upper North Fork Crooked River Watershed are identified as being in relatively fair condition for sediment and turbidity. The best conditions relative to sediment and turbidity issues exist in the Peterson Creek Subwatershed with low road density conditions near streams and wetlands. Based on overall road density, drainage density, and stream crossing density in the Upper North Fork Crooked River Watershed, the flow and sediment regime conditions are relatively poor fair, with Elliot and Peterson Creek Subwatersheds having the best conditions within the watershed.

Table 62. Summary of existing condition in the Upper North Fork Crooked River Watershed.

Subwatershed	Sediment/Turbidity	Flow/Sediment Regime
Elliot Creek	Fair	Fair
Howard Creek	Fair	Poor
Peterson Creek	Good	Fair
Porter Creek	Fair	Poor
Overall	Fair	Poor/Fair
* Status/Condition - All variables meeting standards = good; Some variables meeting standards = fair; Most or all variables not meeting standards = poor; No Data Collected (ND)		

Elliot Creek Subwatershed

Elliot Creek Subwatershed drains into the north end of Big Summit Prairie and includes Crosswhite Creek, Elliot Creek, Fox Creek, Indian Creek, Shady Creek, Stump Creek, West Fork of Fox Creek, and other unnamed stream channels. Perennial fish-bearing streams include Indian Creek, Fox Creek, and Elliot Creek. Crosswhite Creek, Stump Creek, and multiple unnamed streams are intermittent streams where they cross the forest boundary into Big Summit Prairie.

In 1996, Bottom Line Survey was completed on Elliot Creek. Elliot Creek is a perennial stream that originates approximately 3.5 miles upstream from the FS boundary fence on the north end of Big Summit Prairie. For general morphological and vegetative comparisons, Elliot Creek can be divided into two reaches. Based on the 1996 BLS, the top reach, reach 2, starts in a draw and flows through a trough-like valley of mixed conifer: ponderosa pine, Douglas and white fir. There are many undercut banks and debris jams. Sporadic alders give ample hardwood shade where present. There is minimal large woody debris, but where there is, it has been placed by the equipment and hand crews. Cattle damage is extreme on the creek. Banks have sloughed off into the channel. Banks are trampled and lack definition causing heavy sediment to the stream. There is a fence 1/4 mile upstream from FR 22 and a cattle crossing that is also causing heavy sediment into the creek due to the heavy cattle traffic through the stream. This area needs restoration to improve fish habitat.

Based on the 1996 BLS, reach 1 flows from FR 22 south through a very broad, flat-bottomed valley of ponderosa pine. Cattle impact is extreme in this reach. Grass has been grazed to 1-2", banks are sloughed and trampled, and there is very minimal hardwood such as alders. Redband trout, speckled dace, and frogs were observed throughout the entire length of the stream. An elk exclosure 1700' upstream from the boundary fence was not surveyed, but vegetation inside appeared good. Overall, this stream offers fish habitat, yet is in very poor condition due to grazing and past timber harvests.

Pools in reach 1 were 0.9/100 feet and in reach 2 were1.0/100 feet. Pools are below the objective of 1.8 pools per 100 feet (Rosgen 1996).

Field observations by the fisheries biologist and hydrologist (8/10/10) indicate from walking approximately 1 mile of the stream north to south (to FR 22), (equivalent to reach 2 in the 1996 Bottom Line Survey) that the stream is a perennial Class II stream with 1 or less cfs for flow, has fish

presence, and is a spring dominated system. Streambanks are impacted by grazing with postholing, hedged alder, and removal of riparian vegetation. The cut streambanks appear to be sheered by livestock recognized by their hoof prints. The stream is downcut from loss of vegetation. There is evidence of substabtially more flow during spring runoff or high rain events including well developed pools and areas where overflow channels were accessed. Sediment deposition on the substrate indicates continuous sediment inputs from cut streambanks.

Table 63 summarizes the existing condition of streams for the two hydrologic issues identified for analysis within the Elliot Creek Subwatershed. Pertinent stream survey data only exist for Fox Creek within the Elliot Creek Subwatershed, therefore, bank stability and stream channel types were only determined for this stream. The other indicators (i.e. Slope Erosion Hazard, Road Densities, etc.) were estimated for all perennial, intermittent streams, and identified GDEs within the subwatershed. Based on stream surveys and existing Forest Service data layers, the Elliot Creek Subwatershed was found to have poor slope erosion hazard conditions and low road density conditions within 300 feet of perennial and intermittent streams. In addition, this subwatershed was found to have low road densities within GDE RHCAs. Fox Creek was found to have good bank stability through the surveyed stream reaches and extreme channel sensitivity and poor recovery potential based on the channel type at the proposed stream crossing location. Based on the dominant channel type throughout the entire stream network, however, Fox Creek overall has a moderate channel sensitivity and an excellent recovery potential. Overall road density existing conditions are good, drainage densities are relatively high, which equates to a poor condition relative to roads, and the stream crossing density existing conditions is relatively fair.

In the Elliott Creek Subwatershed, the existing road network contributes approximately 10.6 tons per year to streams, equating to approximately three percent of the natural background sediment loading from hillslopes. This is well below the 35 percent threshold for affecting fish habitat as described in the Analysis Design section.

Table 63. Summary of stream condition and impairments in Elliot Creek Subwatershed.

Stream	Sediment/Turbidity					Flow/Sediment Regime		
	Bank Stability	**Slope Erosion Hazard**	**Road Density w/in 300' of Streams**	**Channel Sensitivity/ Recovery Potential**	**GDE**	**Road Density**	**Drainage Density**	**Stream Crossing Density**
Fox	Good	High	Low	Poor	Low	Low	High	Moderate
Overall	Good	Poor	Good	Poor	Good	Good	Poor	Fair

In 2006, a wildfire called the Maxwell Fire affected approximately 2,317 acres in Allen Creek, East Fork Allen Creek, and Elliot Creek drainages. Potential sedimentation in stream reaches within and below moderate to high severity burn areas were identified as values at risk within Allen Creek, East Fork Allen Creek, and Elliot Creek (BAER 2006). Erosion during snow melt runoff during the spring of 2007 added to the loss of filtering vegetation from the wildfire in RHCAs along Allen Creek, East Fork Allen Creek, and Elliot Creek. Roads were closed and culverts were pulled to reduce erosion and sediment delivery to streams. Specifically, culverts were removed and outlsoped drain dips were installed on FR2200-500, FR2200-550, and FR2200-505 (BAER 2006). Referenced in the BAER 2006 report, Forest Road 2200-505, a ford located on a tributary to Elliot Creek was designed to keep storm flow within channel areas (BAER 2006 Engineering Report). Figure 2 below shows that bermed closure has been compromised by OHV use. Fine sediments >20% can be found in the crossing and downstream from OHV fording the closure.

In the areas where riparian vegetation was removed as well as overstory vegetation in the upper portions of the subwatershed, the channel no longer provides protection from temperature increases,

bank failure or sediment additions to the channel (BAER Fishery Report 2006). Filtering vegetation in the watersheds was removed during the Maxwell Fire, especially in the headwaters. The vegetative recovery period was estimated to be 7 years based on WATSED tables (BAER 2006 Hydrology Report) that would be at the end of the 2013 growing season.

Field observations indicate that most of the shade has been lost in moderate to high fire severity polygons, with most of the shade coming from standing dead trees. Approximately 4 miles of perennial streams in the Maxwell Fire burned at moderate to high severity. Fish bearing reaches included, 0.4 miles of Allen Creek, and 1.9 miles of East Fork Allen Creek. Allen Creek burned at moderate to high severity.

Allen Creek and East Fork Allen Creek are the streams that had fire activity that would cause an increase in sedimentation and bank instability as a result of loss in vegetation. Increases in sediment and ash adversely impacts redband and Columbia spotted frog populations until filtering vegetation is reestablished. Downstream effects include increased sedimentation that would reduce available macroinvertebrates, fill pools used for hiding, feeding, and rearing, and reduce success of spawning.

Howard Creek Subwatershed

Howard Creek Subwatershed drains into the northwest corner of Big Summit Prairie and includes East Fork Howard Creek, Howard Creek, Merritt Creek, South Fork Howard Creek, West Fork Howard Creek, and other unnamed stream channels. The contributing area to Howard Creek is juxtaposed between Round Mountain to the southwest, Ochoco Butte to the North and West, and Mount Pisgah to the North and East. The subwatershed drains into Big Summit Prairie from the Northwest. The East and West Forks of Howard Creek join together to form the main stem of Howard Creek, which is a major contributor to flow in the North Fork Crooked River. Greater than 90% of Howard Creeks' drainage area is located above the transient snow zone. Perennial fish-bearing streams include Howard Creek and East Fork Howard Creek. South Fork Howard Creek and West Fork Howard Creek are intermittent fish-bearing streams. Merritt Creek and multiple unnamed tributaries to Howard Creek are intermittent, non-fish-bearing streams.

Table 64 summarizes the existing condition of streams for the two hydrologic issues identified for analysis within the Howard Creek Subwatershed. Based on stream surveys and existing Forest Service data layers, the Howard Creek Subwatershed was found to have fair slope erosion hazard conditions and high road density conditions within 300 feet of perennial and intermittent streams. In addition, this subwatershed was found to have fair road densities within GDEs and the associated RHCAs. East Fork Howard Creek, Howard Creek, South Fork Howard Creek, and West Fork Howard Creek were all found to have good bank stability through the surveyed portion of stream. With the exception of East Fork Howard Creek, the streams within the Howard Creek Subwatershed have good overall channel sensitivity/recovery potential conditions. Based on the channel type derived from stream survey field measurements, East Fork Howard Creek is expected to have very high channel sensitivity to disturbance and a good recovery potential. In addition, this subwatershed was found to have poor stream crossing density, poor road density, and fair drainage density.

In the Howard Creek Subwatershed, the existing road network contributes approximately 16.1 tons per year to streams, equating to approximately four percent of the natural background sediment loading from hillslopes. This is well below the 35 percent threshold for affecting fish habitat as described in the Analysis Design section.

Table 64. Summary of stream condition and impairments in Howard Creek Subwatershed.

Stream	Sediment/Turbidity					Flow/Sediment Regime		
	Bank Stability	**Slope Erosion Hazard**	**Road Density w/in 300' of Streams**	**Channel Sensitivity/ Recovery Potential**	**GDE**	**Road Density**	**Drainage Density**	**Stream Crossing Density**
East Fork Howard	Good	Moderate	High	Fair	Moderate	High	Moderate	High
Howard	Good			Good				
South Fork Howard	Good			Good				
West Fork Howard	Good			Good				
Overall	Good	Fair	Poor	Fair/Good	Fair	Poor	Fair	Poor

Peterson Creek Subwatershed

Peterson Creek Subwatershed drains into the northeast corner of Big Summit Prairie and includes Allen Creek, Beetle Creek, Peterson Creek, East Fork Allen Creek, Ross Creek, Yellow Jacket Cr, and other unnamed stream channels. Peterson Creek is a Class I perennial tributary which originates from Peterson Spring and flows south-westerly approximately 10 miles to the Forest boundary near Peterson Creek Reservoir. The final 3.0 miles flow through private properties on Big Summit Prairie to the confluence with the North Fork of the Crooked River. In addition to Peterson Spring, Peterson Creek gains substantial flow from several spring-fed tributaries: McCarthy Spring which contributes 15% flow, Zane Spring tributary which contributes 60% flow. Water influx from seepage also adds substantial flow to the stream and assists in temperature regulations. Perennial fish-bearing streams include Allen Creek, East Fork Allen Creek, Beetle Creek, and Peterson Creek. Ross Creek is a perennial non-fish-bearing stream. Yellow Jacket Creek and multiple unnamed tributaries to Peterson Creek are intermittent, non-fish-bearing streams.

Stream characteristics in Peterson Creek varies from Rosgen channel type C in reaches 1-5 to G in reach 6 to deep gullies. Reach 6 exhibits substantial bank erosion. Headcuts and fish barriers exist throughout reach 6 (USDA 2007).

In 2007, the number of pools/mile met the minimum desired condition only in reach 1. Medium and large wood per mile was sufficient in all 6 reaches. Percent stable bank was sufficient in all reaches except for reach 6.

Although survey protocols differ, some comparisons can be made between the 2007 survey results and those from the 1994 Bottom Line Survey. In general, shade has increased in all reaches. Most notably, the amount of cutbank per 100 feet has increased in all 6 reaches, dramatically so in reach 6 which displays a downward trend for streambanks.

In general, despite very low shade and heavy cattle impacts, Peterson Creek has high quality fish habitat in the lower eight miles surveyed. Peterson Creek is a stream Class II to the road crossing at the 2630 and a stream Class III thereafter.

Table 65 summarizes the existing condition of streams for the two hydrologic issues identified for analysis within the Peterson Creek Subwatershed. Based on stream surveys and existing Forest Service data layers, the Peterson Creek Subwatershed was found to have fair slope erosion hazard conditions and low road density conditions within 300 feet of perennial and intermittent streams. In

addition, this subwatershed was found to have good road densities within GDEs and associated RHCAs. East Fork Allen Creek was found to have good bank stability through the surveyed portion of stream, however, Allen Creek and Peterson were found to have fair bank stability. Five of the six reaches surveyed in Peterson Creek in 2006 and 2007 were found to have good bank stability, only the upper most reach was found to have poor bank stability with greater than 20 percent cutbanks. Based on the channel type derived from stream survey field measurements, all three streams are expected to have very high channel sensitivity to disturbance and a good recovery potential. In addition, this subwatershed has fair stream crossing density, good road density, and poor drainage density existing conditions.

In 2006, a wildfire called the Maxwell Fire affected approximately 2,317 acres in Allen Creek, East Fork Allen Creek, and Elliot Creek drainages. Potential sedimentation in stream reaches within and below moderate to high severity burn areas were identified as values at risk within Allen Creek, East Fork Allen Creek, and Elliot Creek (BAER 2006). Erosion during snow melt runoff during the spring of 2007 added to the loss of filtering vegetation from the wildfire in RHCAs along Allen Creek, East Fork Allen Creek, and Elliot Creek. Roads were closed and culverts were pulled to reduce erosion and sediment delivery to streams. Specifically, culverts were removed and outlsoped drain dips were installed on FR2200-500, FR2200-550, and FR2200-505 (BAER 2006).

In the Peterson Creek Subwatershed, the existing road network contributes approximately 29.4 tons per year to streams, equating to approximately three percent of the natural background sediment loading from hillslopes. This is well below the 35 percent threshold for affecting fish habitat as described in the Analysis Design section.

Table 65. Summary of stream condition and impairments in Peterson Creek Subwatershed.

Stream	Sediment/Turbidity					Flow/Sediment Regime		
	Bank Stability	Slope Erosion Hazard	Road Density w/in 300' of Streams	Channel Sensitivity/ Recovery Potential	GDE	Road Density	Drainage Density	Stream Crossing Density
East Fork Allen	Good	Moderate	Low	Fair	Low	Low	High	Moderate
Allen	Fair			Fair				
Peterson	Fair			Fair				
Overall	Fair	Fair	Good	Fair	Good	Good	Poor	Fair

Porter Creek Subwatershed

Porter Creek Subwatershed flows into the Lower Big Summit Prairie Subwatershed, which drains into the east side of Big Summit Prairie and includes Dry Porter Creek, East Porter Creek, Looney Creek, Porter Creek, Stupid Creek, and other unnamed stream channels. Porter Creek is a Class II stream and a major tributary of the North Fork Crooked River. The stream originates from Porter Spring and flows approximately 10.3 miles all of which lies on LOM district. Perennial fish-bearing streams include portions of Porter Creek and East Porter Creek. There are no perennial non-fish-bearing streams in the Porter Creek Subwatershed. Looney Creek is an intermittent fish-bearing stream. Stupid Creek, Dry Porter Creek, and multiple unnamed tributaries to Porter Creek are intermittent, non-fish-bearing streams.

Porter Spring begins in a small meadow area for approximately 0.25 miles then enters an area wooded with Douglas-fir, grand fir, and Western larch. The next 3.5 miles vary from small meadows to areas heavily wooded with ponderosa pine, cottonwood, and fir species. The creek flows through an aspen

stand for approximately 0.5 mile near the FR 30 rd. For the next 4.35 miles the creek flows through large diameter ponderosa pine and scattered Douglas-fir. The last mile of the creek has similar vegetation with the addition of hardwood vegetation (mainly red alder) along the banks.

Both redband trout and dace were observed in Porter Creek. Sizes ranged from 1" up to 12" in length. Fish were detected in all three reaches surveyed. Columbia spotted frogs and garter snakes were also observed. Cattle impacts were most notable in reach 2. The exclosure around the cottonwoods in this section was non-functioning and mostly dead. Field observations identified substantial bank damage due to cattle crossing, post-holes, and hoof-shear damage in reaches 2 and 3.

Percent fines are greater than 20%. Bjornn et. al (1977) found that when the percentage of fine sediment exceeds 20% to 30% in spawning riffles, the survival and emergence of salmonid embryos begin to decline.

Table 66 summarizes the existing condition of streams for the two hydrologic issues identified for analysis within the Porter Creek Subwatershed. Based on stream surveys and existing Forest Service data layers, the Porter Creek Subwatershed was found to have good slope erosion hazard conditions and high road density conditions within 300 feet of perennial and intermittent streams. In addition, this subwatershed was found to have poor road densities within identified GDEs and the associated RHCAs. East Porter Creek was found to have good bank stability through the surveyed portion of stream, however, Porter Creek was found to have fair bank stability. Based on the channel type derived from stream survey field measurements, Porter Creek is expected to have moderate channel sensitivity to disturbance and an excellent recovery potential. Based on its dominant channel type, East Porter Creek is expected to have moderate channel sensitivity to disturbance and a good recovery potential; however, based on the channel type at the stream crossing, the stream channel at that location is expected to have a low channel sensitivity and excellent recovery potential. In addition, this subwatershed has poor stream crossing density, fair road density, and poor drainage density existing conditions.

In the Porter Creek Subwatershed, the existing road network contributes approximately 20.9 tons per year to streams, equating to approximately four percent of the natural background sediment loading from hillslopes. This is well below the 35 percent threshold for affecting fish habitat as described in the Analysis Design section.

Table 66. Summary of stream condition and impairments in Porter Creek Subwatershed.

Stream	Sediment/Turbidity					Flow/Sediment Regime		
	Bank Stability	Slope Erosion Hazard	Road Density w/in 300' of Streams	Channel Sensitivity/ Recovery Potential	GDE	Road Density	Drainage Density	Stream Crossing Density
East Porter	Good	Good	High	Fair/Good	High	Moderate	High	High
Porter	Fair			Good				
Overall	Fair/Good	Good	Poor	Fair/Good	Poor	Fair	Poor	Poor

Deep Creek Watershed

Deep Creek includes Lower Deep Creek, Jackson Creek, Little Summit Prairie Creek, Crazy Creek including East and West Forks, Happy Camp Creek, Double Corral Creek, and Toggle Creek in the project area. The Deep Creek Watershed represents one the most interconnected habitats for trout in the Deschutes River Basin. Deep Creek and its tributaries provide some of the premier trout fishing opportunities in the region due to its diverse, relatively intact nature and abundant cold water and

spring creeks entering throughout the watershed. The only resident native salmonid specie is the redband trout. Columbia spotted frogs are present throughout the area.

Deep Creek is a focus watershed as defined by the Forest Service Region 6 Aquatic Restoration Strategy. Proposed restoration projects were identified in the Deep Creek Restoration Plan, some of which have already been implemented (see section titled "Cumulative Effects" in Chapter 3 of this document for more information).

Water quality and fish habitat have declined due to increased sediment yields and stream temperatures, and reductions in pool habitat (USDA 2009). Many stream channels have widened and deepened within the flood plain, effectively lowering the water table and reducing the amount of area available to support riparian vegetation that trap sediment, stabilize stream banks and lower water temperatures. The lowering of the water table allows soils to dry out, leading to a shift in vegetation composition from deeply rooted riparian species to shallow rooted, less desirable ones (Whisenant 1999). Furthermore, fire suppression activities have led to the encroachment of conifers in the riparian areas, replacing desirable riparian plant species (willows, sedges, and rushes) that provide soil/bank protection and shade with less shallow rooted plant species (USDA 2009).

As stated in the Deep Creek Restoration Plan (USDA 2009), Deep Creek includes Lower Deep Creek, Jackson Creek, and Little Summit Prairie Creek. The past century of use of forest lands within the Deep Creek Watershed has contributed to a decline in stream health, as well as trout and frog populations. Past and present activities within this watershed include timber harvest, domestic livestock grazing, big game management, recreation, fire suppression, off road travel and road construction. Water quality and fish habitat have declined due to increased sediment yields and stream temperatures, reductions in pool habitat and in-stream woody debris, and reduced upstream accessibility by aquatic species. OHV trail building is not part of the restoration plan.

Table 67 displays the current physical attributes of streams surveyed within the Deep Creek Watershed.

Table 67. Existing stream conditions in the Deep Creek Watershed.

Streams Surveyed by Reach	Class	Miles surveyed	% Shade	Pools/100ft (1.8)	Fish Present
Deep					
1	I	1.6	*30*	*0.4*	y
2	I	3.9	*40*	*0.5*	y
3	I	2.7	*44*	*0.3*	y
Lt. Summit					
1	I	0.8	82	2.6	y
2	I	1.0	*62*	2.3	y
3	I	2.6	*29*	*1.7*	y
5	II	0.8	*55*	2.8	y
6	II	0.4	*74*	4.0	y
7	III	0.7	*54*	*1.5*	n
8	IV	1.6	*56*	*0.1*	n
Jackson					
1	I	2.5	*28*	*0.9*	y
2	I	2.1	*34*	*0.4*	y
3	I	0.9	*29*	1.9	y
4	II	1.5	*20*	2.6	y
5	III	1.4	*41*	*0.6*	n
6	IV	0.5	*36*	*0*	n
Crazy					
1	II	1.5	*47*	2.1	y
2	II	2.4	*47*	*0.5*	y
E Fk Crazy					
1	II	1.6	*59*	2.0	y

Table 67. Existing stream conditions in the Deep Creek Watershed.

Streams Surveyed by Reach	Class	Miles surveyed	% Shade	Pools/100ft (1.8)	Fish Present
2	IV	0.7	*38*	*0*	n
W Fk Crazy					
1	II	1.7	*46*	1.8	y
2	III	1.1	*36*	*0.1*	n
Happy Camp					
1	II	1.1	*53*	*1.4*	y
2	II	1.6	*39*	*1.3*	y
3	II	0.9	*18*	*1.2*	y
4	II	3.2	*32*	*1.7*	y
5	IV	1.1	*45*	*1.4*	n
Double Corral					
1	II	2.8	*33.4*	3.5	y
2	II	2.5	*17.0*	*1.6*	y
Toggle					
1	II	0.8	*31.1*	*1.1*	y
2	II	1.9	*19.1*	*1.4*	y
3	II	1.3	*22.5*	*1.4*	y
4	IV	1.9	*18.2*	*1.2*	n
Italicized characters indicate condition does not meet INFISH standard.					

Trails are proposed across the landscape of the Deep Creek Watershed, from lower elevation to upper elevations, as part of the Ochoco Summit Project. These proposed trail locations intersect portions of the Jackson Creek, Little Summit Prairie Creek, and Lower Deep Creek Subwatersheds. Table 68 summarizes the existing condition within the Deep Creek Watershed based on identified potential hydrologic effects to the sediment, turbidity and the flow and sediment regimes in and near the streams within the project area.

Based on measured bank stability, slope erosion hazard, road densities near streams, channel sensitivity and recovery potential, and the density of roads in and near wetlands, the streams within the Deep Creek Watershed are identified as being in relatively fair to good condition for sediment and turbidity. These proposed trail locations intersect portions of the Jackson Creek, Little Summit Prairie Creek, and Lower Deep Creek Subwatersheds.

Table 68. Summary of existing condition in the Deep Creek Watershed.

Subwatershed	Sediment/Turbidity	Flow/Sediment Regime
Jackson Creek	Fair/Good	Good
Little Summit Prairie Creek	Fair/Good	Fair/Good
Lower Deep Creek	Fair/Good	Good
Overall	Fair/Good	Good
Status/Condition - All variables meeting standards = good; Some variables meeting standards = fair; Most or all variables not meeting standards = poor; No Data Collected (ND)		

Jackson Creek Subwatershed

Jackson Creek Subwatershed flows into the Lower Deep Creek Subwatershed and includes Cabbage Creek, Derr Creek, Dicer Creek, Double Corral Creek, Happy Camp Creek, Haypress Creek, Hypress Creek, Jackson Creek, Toggle Creek, and other unnamed stream channels. Perennial fish-bearing streams include Jackson Creek, Double Corral Creek, Toggle Creek, Dicer Meadow Creek, Derr Creek, and an unnamed tributary to Jackson Creek. Cabbage Creek is the only perennial non-fish-bearing stream in the Jackson Creek Subwatershed. Hypress Creek, Haypress Creek, and multiple unnamed tributaries to Jackson Creek are intermittent, non-fish-bearing streams.

Table 69 summarizes the existing condition of streams for the two hydrologic issues identified for analysis within the Jackson Creek Subwatershed. Based on stream surveys and existing Forest Service data layers, the Jackson Creek Subwatershed was found to have fair slope erosion hazard conditions and fair road density conditions within 300 feet of perennial and intermittent streams. In addition, this subwatershed was found to have low road densities within identified GDE and the associated RHCAs. Both Happy Camp Creek and Jackson Creek were found to have good overall bank stability for the surveyed reaches of stream. Based on the channel type derived from stream survey field measurements, both streams are expected to have very high channel sensitivity to disturbance and good recovery potential. In addition, this subwatershed has good stream crossing density, fair road density, and good drainage density relative to potential effects to peak flows from connectivity of roads and streams.

In the Jackson Subwatershed, the existing road network contributes approximately 21.1 tons per year to streams, equating to approximately eight percent of the natural background sediment loading from hillslopes. This is well below the 35 percent threshold for affecting fish habitat as described in the Analysis Design section.

Table 69. Summary of stream condition and impairments in Jackson Creek Subwatershed.

Stream	Sediment/Turbidity					Flow/Sediment Regime		
	Bank Stability	Slope Erosion Hazard	Road Density w/in 300' of Streams	Channel Sensitivity/ Recovery Potential	GDE	Road Density	Drainage Density	Stream Crossing Density
Happy Camp	Good	Fair	Moderate	Fair	Low	Moderate	Low	Low
Jackson	Good			Fair				
Overall	Good	Fair	Fair	Fair	Good	Fair	Good	Good

Little Summit Prairie Creek Subwatershed

Little Summit Prairie Creek Subwatershed flows in a westerly direction into the Lower Deep Creek Subwatershed and includes Little Summit Creek, Thornton Creek, West Fork Thornton Creek, and other unnamed stream channels. Little Summit Prairie Creek is the only perennial fish-bearing stream in the Little Summit Prairie Creek Subwatershed. There are no perennial non-fish-bearing streams in the Little Summit Prairie Creek Subwatershed. Thornton Creek, West Fork Thornton Creek, and an unnamed tributary to Little Summit Creek are intermittent, fish-bearing streams in the subwatershed. Multiple unnamed tributaries to Jackson Creek consist of intermittent, non-fish-bearing streams.

Table 70 summarizes the existing condition of streams for the two hydrologic issues identified for analysis within the Little Summit Prairie Creek Subwatershed. Based on stream surveys and existing Forest Service data layers, the Little Summit Prairie Creek Subwatershed was found to have fair slope erosion hazard conditions and high road density conditions within 300 feet of perennial and intermittent streams. In addition, this subwatershed was found to have low road densities within GDEs and the associated RHCAs. Little Summit Creek was found to have good overall bank stability for the surveyed reaches of stream. Based on the channel type derived from stream survey field measurements at the proposed stream crossing location, Little Summit Creek at this location is expected to have low channel sensitivity to disturbance and excellent recovery potential. Based on the dominant stream channel type over the entire surveyed stream reaches, however, the channel sensitivity is expected to be very high with a good recovery potential. In addition, this subwatershed has fair stream crossing density, fair road density, and good drainage density existing conditions relative to potential effects to peak flows from connectivity of roads and streams.

In the Little Summit Prairie Creek Subwatershed, the existing road network contributes approximately 14.4 tons per year to streams, equating to approximately six percent of the natural

background sediment loading from hillslopes. This is well below the 35 percent threshold for affecting fish habitat as described in the Analysis Design section.

Table 70. Summary of stream condition and impairments in Little Summit Prairie Creek Subwatershed.

Stream	Sediment/Turbidity					Flow/Sediment Regime		
	Bank Stability	Slope Erosion Hazard	Road Density w/in 300' of Streams	Channel Sensitivity/ Recovery Potential	GDE	Road Density	Drainage Density	Stream Crossing Density
Little Summit Prairie	Good	Fair	High	Fair/Good	Low	Moderate	Low	Moderate
Overall	Good	Fair	Poor	Fair/Good	Good	Fair	Good	Fair

Lower Deep Creek Subwatershed

Lower Deep Creek is a priority subwatershed as defined by the Forest Service Watershed Condition Framework Process. Lower Deep Creek Subwatershed flows into the Lower North Fork Crooked River Subwatershed just downstream of the confluence of the North Fork Crooked River and Porter Creek. The Lower Deep Creek Subwatershed encompasses Big Spring Creek, Buck Hollow, Crazy Creek, Deep Creek, East Fork Crazy Creek, West Fork Crazy Creek, and other unnamed stream channels. Deep Creek, Crazy Creek, and Big Springs Creek are perennial fish-bearing stream in the Lower Deep Creek Subwatershed. There are two unnamed perennial non-fish-bearing streams that are tributaries to Deep Creek and Big Springs Creek in the Lower Deep Creek Subwatershed. East Fork Crazy Creek is an intermittent, fish-bearing stream and West Fork Crazy Creek, Buck Hollow and multiple unnamed tributaries to Deep Creek are intermittent, non-fish-bearing streams in the Lower Deep Creek Subwatershed.

Table 71 summarizes the existing condition of streams for the two hydrologic issues identified for analysis within the Lower Deep Creek Subwatershed. Based on stream surveys and existing Forest Service data layers, the Lower Deep Creek Subwatershed was found to have fair slope erosion hazard conditions and low road density conditions within 300 feet of perennial and intermittent streams. In addition, this subwatershed was found to have high road densities within identified GDEs and the associated RHCAs. Within the surveyed reaches of both streams, they were found to have good overall bank stability. Based on the channel type derived from stream survey field measurements, Deep Creek is expected to have very high channel sensitivity to disturbance and good recovery potential, while Crazy Creek is expected to have moderate channel sensitivity and excellent recovery potential. In addition, this subwatershed has good stream crossing density, good road density, and good drainage density existing conditions relative to potential effects to peak flows from connectivity of roads and streams.

In the Lower Deep Creek Subwatershed, the existing road network contributes approximately 12.2 tons per year to streams, equating to approximately one percent of the natural background sediment loading from hillslopes. This is well below the 35 percent threshold for affecting fish habitat as described in the Analysis Design section.

Table 71. Summary of stream condition and impairments in Lower Deep Creek Subwatershed.

Stream	Sediment/Turbidity					Flow/Sediment Regime		
	Bank Stability	Slope Erosion Hazard	Road Density w/in 300' of Streams	Channel Sensitivity/ Recovery Potential	GDE	Road Density	Drainage Density	Stream Crossing Density
Crazy	Good	Fair	Low	Good	High	Low	Low	Low
Deep	Good			Fair				
Overall	Good	Fair	Good	Fair/Good	Poor	Good	Good	Good

Upper Ochoco Creek Watershed

Trails are proposed across the northeastern portion of the Upper Ochoco Creek Watershed as part of the Ochoco Summit Project. These proposed trail locations intersect portions of the Upper Marks Creek and Headwaters Ochoco Creek Subwatersheds; however, trails are not proposed within 300 feet of mapped streams within the Headwaters Ochoco Creek Subwatershed. Table 72 summarizes the existing condition within the Upper Ochoco Creek Watershed based on identified potential hydrologic effects to the sediment, turbidity and the flow and sediment regimes in and near the streams within the project area.

Based on measured bank stability, slope erosion hazard, road densities near streams, channel sensitivity and recovery potential, and the density of roads in and near wetlands, the streams within the Upper Ochoco Creek Watershed are identified as being in relatively fair condition for sediment and turbidity. Based on overall road density, drainage density, and stream crossing density in Crystal Creek and Marks Creek, the flow and sediment regime conditions are relatively poor.

Table 72. Summary of existing condition in the Upper Ochoco Creek Watershed.

Subwatershed	Sediment/Turbidity	Flow/Sediment Regime
Upper Marks Creek	Fair	Poor
Overall	Fair	Poor
* Status/Condition - All variables meeting standards = good; Some variables meeting standards = fair; Most or all variables not meeting standards = poor; No Data Collected (ND)		

Upper Marks Creek Subwatershed

The Ochoco Summit Project Boundary follows along Marks Creek and divides the subwatershed into a northwest portion that is outside of the project boundary and a southeast portion that is within the project boundary. Upper Marks Creek Subwatershed flows into the Lower Marks Creek Subwatershed just upstream of the confluence of the Marks Creek and Little Hay Creek. The Upper Marks Creek Subwatershed within the project boundary encompasses Buck Creek, Crystal Creek, Deadman Creek, Marks Creek, Long Hollow Creek, Nature Creek, Rush Creek, and other unnamed stream channels. Marks Creek, Rush Creek, Deadman Creek, Crystal Creek, and unnamed tributaries to both Marks Creek and Crystal Creek are perennial fish-bearing streams in the Upper Marks Creek Subwatershed within the project boundary. There are two unnamed perennial non-fish-bearing streams that are tributaries to Crystal Creek in the Upper Marks Creek Subwatershed. Long Hollow Creek is an intermittent, fish-bearing stream and Buck Creek and multiple unnamed tributaries to Marks Creek are intermittent, non-fish-bearing streams in the Upper Marks Creek Subwatershed. Only approximately 200 feet of stream at the mouth of Buck Creek is included within the Ochoco Summit Project Boundary.

Marks Creek drainage has been subjected to a variety of anthropogenic impacts including: grazing on both private and public lands, culvert placement, reservoir construction on private land, impingement of road fills on active flood plains, water diversion, channel straightening, logging (clear cut or

overstory removal, intermediate cut), precommercial thinning, road construction, housing development, and off road travel. These activities alter sediment and hydrologic inputs and outputs, creating changes in channel dimension, planform, and longitudinal profile. Marks Creek has gone through periods of adjustment to accommodate these changing water and sediment inputs and outputs. Cattle alter this meadow creek as it adjusts to impacts of bank trampling and vegetation removal.

Marks Creek is a high value fishery that requires carefully using level III monitoring surveys to ascertain if and how further entrenchment is advancing. Columbia spotted frogs have been observed in Marks Creek. Changing grazing strategies has helped to recover vegetation, but if channel dynamics are tending toward further entrenchment, loss of the hydraulic capabilities of this channel would tend to dry out riparian margins, and vegetation communities would change to more mesic or xeric species.

Stream shade averaged 24% in the 1996 survey and only 1.8% of the shade was provided by hardwood shrubs. There are signs of hardwoods increasing in the downcut channel with improvements in grazing. Looking at the differences inside and outside of the fenced areas (exclosures) on Little Hay Creek and Marks Creek, potential for riparian vegetation is 80%.

Where livestock breached fences, however, vegetation inside the fenced area outnumbers the vegetation outside the fence. Lack of shrubs decreases cover for fish, habitat for macroinvertebrates and could increase stream temperature if enough cover is removed.

Main channel pools are counted in this survey to assess geomorphic process and to relate this to fisheries habitat quality. The 1999 survey shows 0.38 pools/100 feet and 1992 data shows 0.57 pools/100 feet. Pools should meet 1.25 to 1.2 pools/100 feet (Rosgen 1996). Pool numbers have reduced from 1992 to 1999 survey data. Data for survey in 2010 have not been completed to display current pool trend.

Pebble counts in the 1999 survey data indicate that Reaches 1 and 2 have suitable substrate for fish habitat with 20% or less fines. These reaches start at FR2610 and end upstream to FR2600-105. Reach 3, FR2600-105 upstream to FR2600-201 (just downstream from private land) pebble counts indicate fines exceeding 20% (data indicate 30% and 40%).

Table 73 summarizes the existing condition of streams for the two hydrologic issues identified for analysis within the Upper Marks Creek Subwatershed. Based on stream surveys and existing Forest Service data layers, the Upper Marks Creek Subwatershed was found to have fair slope erosion hazard conditions and moderate road density conditions within 300 feet of perennial and intermittent streams. In addition, this subwatershed was found to have moderate road densities within identified GDEs and the associated RHCAs. Within the surveyed reaches of both Crystal Creek and Marks Creek, they were found to have good overall bank stability. Based on the channel type derived from stream survey field measurements, Marks Creek and Crystal Creek are expected to have very high channel sensitivity to disturbance and good recovery potential. In addition, this subwatershed has poor stream crossing density, poor road density, and fair drainage density existing conditions relative to potential effects to peak flows from connectivity of roads and streams.

In the Upper Marks Creek Subwatershed, the existing road network contributes approximately 40.8 tons per year to streams, equating to approximately 53 percent of the natural background sediment loading from hillslopes. This is above the 35 percent threshold for affecting fish habitat as described in the Analysis Design section.

Table 73. Summary of stream condition and impairments in Upper Marks Creek Subwatershed.

Stream	Sediment/Turbidity					Flow/Sediment Regime		
	Bank Stability	**Slope Erosion Hazard**	**Road Density w/in 300' of Streams**	**Channel Sensitivity/ Recovery Potential**	**GDE**	**Road Density**	**Drainage Density**	**Stream Crossing Density**
Crystal	Good	Fair	Moderate	Fair	Moderate	High	Moderate	High
Marks	Good			Fair				
Overall	Good	Fair	Fair	Fair	Fair	Poor	Fair	Poor

Streams

Table 74 lists the named streams by watershed and subwatershed within the Ochoco Summit project area. The project area includes all streams in the Deep Creek Watershed and only some of the streams in the other three watersheds. However, the Upper North Fork Crooked River Watershed encompasses a majority of the named streams within the project area, followed by the Deep Creek Watershed, the Upper Ochoco Creek Watershed, and finally the Lower Beaver Creek Watershed. Proposed trail stream crossings are only across a select number of the streams within the project area (see Table 74).

Streams within the Ochoco Summit project area have a dendritic drainage pattern with approximately 476 miles of mapped streams with defined channels (Class I – IV) within the analysis subwatersheds (Table 75). There are approximately 138 miles of fish bearing streams (Class I-II) within the analysis subwatersheds. Table 6 lists the lengths of streams by stream class within the project area summarized by watershed and subwatershed. Definitions of stream class are described in the section titled "Aquatic Species" in Chapter 3 of this document.

For the purposes of this analysis, only Class I, II, III, or IV streams are considered functional streams. Class V (or VIIII) streams are ephemeral draws that do not have established beds and banks and often are covered with vegetation. Ephemeral streams do not routinely transport sediment except during larger precipitation events.

Table 74. List of streams in the Ochoco Summit project area by watershed and subwatershed.

Watershed	Subwatershed	Streams			
Lower Beaver Creek	North Wolf Creek	*North Wolf Cr*		Widow Cr	
Upper North Fork Crooked River	Elliot Creek	*Crosswhite Cr*	*Elliot Cr*	*Fox Cr*	*Indian Cr*
		Shady Cr	*Stump Cr*	*West Fork Fox Cr*	
	Howard Creek	East Fork Howard Cr		*Howard Cr*	Merritt Cr
		South Fork Howard Cr		West Fork Howard Cr	
	Peterson Creek	*Allen Cr*	*Beetle Cr*	*Peterson Cr*	Ross Cr
		Yellow Jacket Cr			
	Porter Creek	*Dry Porter Cr*	*East Porter Cr*		*Looney Cr*
		Porter Cr		Stupid Cr	
Deep Creek	Jackson Creek	*Cabbage Cr*	Deep Cr	*Derr Cr*	Dicer Cr
		Double Corral Cr		*Happy Camp Cr*	
		Haypress Cr	Hypress Cr	*Jackson Cr*	*Toggle Cr*
	Little Summit Prairie Creek	*Little Summit Cr*	Thornton Cr	West Fork Thornton Cr	
	Lower Deep Creek	*Big Spring Cr*	*Buck Hollow*	*Crazy Cr*	*Deep Cr*
		East Fork Crazy Cr		*West Fork Crazy Cr*	
Upper Ochoco Creek	Upper Marks Creek	Buck Cr	*Crystal Cr*	Deadman Cr	Marks Cr
		Long Hollow Cr		Nature Cr	*Rush Cr*
Italicized streams have stream crossings proposed for at least one of the alternatives.					

Class I, fish-bearing streams within the Ochoco Summit Analysis Subwatersheds include Allen Creek, Deep Creek, Elliot Creek, Fox Creek, Jackson Creek, Little Summit Creek, Marks Creek, the East Fork of Allen Creek, the North Fork Crooked River, Ochoco Creek, Peterson Creek and Toggle Creek. Approximately three quarters of fish-bearing streams in the analysis subwatersheds are located in Upper North Fork Crooked River and Deep Creek Watersheds.

Table 75. Stream class miles by watershed and subwatershed.

Watershed	Subwatershed	Class I	Class II	Class III	Class IV	Total
Lower Beaver Creek	North Wolf Creek	-	6.9	5.9	27.2	40.0
Upper North Fork Crooked River	Elliot Creek	1.6	10.5	5.8	28.5	46.5
	Howard Creek	-	10.7	11.3	11.2	33.3
	Peterson Creek	11.2	5.9	6.2	36.4	59.7
	Porter Creek	0.01	11.0	2.7	29.3	43.0
Deep Creek	Jackson Creek	6.4	17.9	4.7	39.3	68.3
	Little Summit Prairie Creek	4.3	8.1	3.3	37.8	53.5
	Lower Deep Creek	7.9	6.1	11.7	20.5	46.3
Upper Ochoco Creek	Upper Marks Creek	6.1	10.8	11.4	15.5	43.9
Total Stream Miles		37.6	88.0	63.0	245.8	434.4

The perennial streams equate to Forest Service Class I through Class III streams. Class I and II streams may, however, be intermittent if they are used by fish part of the year. Flow regime (i.e. perennial, intermittent, and ephemeral) characteristics for the subwatersheds in the project area are summarized in Table 76. Overall, streams in the Ochoco Summit project area are dominated by intermittent streams. A majority of the perennial streams are located within the Upper North Fork Crooked River and the Deep Creek Watersheds, with approximately 46 miles and 47 miles of perennial streams within the analysis subwatersheds, respectively.

Table 76. Miles of perennial, intermittent, and ephemeral streams.

Watershed	Subwatershed	Perennial	Intermittent	Ephemeral	Total
Lower Beaver Creek	North Wolf Creek	3.2	36.8	-	40.0
Upper North Fork Crooked River	Elliot Creek	12.6	33.9	6.8	53.2
	Howard Creek	7.7	24.6	5.1	37.5
	Peterson Creek	19.5	39.4	20.6	79.5
	Porter Creek	6.4	36.6	14.8	57.7
Deep Creek	Jackson Creek	28.6	39.7		68.3
	Little Summit Prairie Creek	5.3	48.1	-	53.5
	Lower Deep Creek	13.3	32.9	-	46.3
Upper Ochoco Creek	Upper Marks Creek	20.3	23.6	5.2	49.1
Total Stream Miles		117.0	315.7	52.5	485.1

Stream Condition (Sediment/Turbidity)

Bank Stability

Accelerated erosion that has caused sediment inputs into streams within the Ochoco National Forest has also negatively affected the success of redband populations. Spawning habitats are negatively affected by the introduction of fine sediments from erosion. Sedimentation degrades spawning gravels and spawning success. Channel stability and the ability of the channel to transport the flows and sediment of its watershed effectively is another important component of quality salmonid habitat.

Of the total length of stream surveyed in the Ochoco Summit project area subwatersheds, approximately four percent of the streams have no identified cutbanks. Approximately 83 percent of the surveyed stream reach lengths are in good condition (<20 percent cutbank), 14 percent are in fair condition (20-30 percent cutbank), and three percent are in poor condition (>30 percent cutbank). Poor bank stability is found in the upper reaches of North Wolf Creek and the upper reaches of Peterson Creek. Overall fair bank stability conditions are found in the middle reach of North Wolf Creek, the middle reaches of Allen Creek, and the middle reach of Porter Creek.

Slope Erosion Hazard

A combination of slope and soil characteristics within 300 feet of perennial and intermittent streams in the Ochoco Summit project area, as reflected in the Slope Erosion Hazard Rating, indicate an overall moderate erosion hazard. The area within 300 feet of perennial and intermittent streams in the Ochoco Summit project area subwatersheds is dominated by moderate slope erosion hazard conditions, ranging from 54% to 87%. North Wolf Creek and Elliot Creek Subwatersheds have the highest percentage of high slope erosion hazard conditions with 40% and 33% of the area within 300 feet of perennial and intermittent streams, respectively. Porter Creek Subwatershed has the highest percentage of area, namely 26%, in the vicinity of streams dominated by low slope erosion hazard conditions.

Roads/Trails

Road densities in much of the forest are higher in the vicinity of streams than averaged over the entire subwatershed due to the topographic characteristics of the stream drainages. Existing road densities within 300 feet of perennial and intermittent streams within the Ochoco Summit project area subwatersheds range from 4.3 to 8.2 miles per square mile. The highest road densities in the vicinity of the streams within the project area are found in the Howard Creek, Porter Creek, Little Summit Prairie Creek, and Upper Marks Creek Subwatersheds. North Wolf Creek and Jackson Creek Subwatersheds have moderate road densities near streams, ranging from 6.1 to 6.3 miles per square

mile. The lowest road densities within 300 feet of streams can be found in the Lower Deep Creek, Elliot Creek, and Peterson Creek Subwatersheds.

Channel Sensitivity and Recovery Potential

Streams with sufficient survey data within the analysis subwatersheds are dominated by C channel types and the dominant channel material is gravel. Based on Table 58, C4 channel types have a very high sensitivity to disturbance and a good recovery potential. Second to C channel types within the analysis subwatersheds are B channel types also dominated by gravel. Based on Table 58, B4 channel types have a moderate sensitivity to disturbance and an excellent recovery potential.

Groundwater-Dependent Ecosystems

Existing road densities within springs and wetlands and their associated RHCAs are between 2.8 and 9.9 miles per square mile. Porter Creek and Lower Deep Creek Subwatersheds have relatively high road densities in the vicinity of GDEs with road densities of 9.9 and 7.6 miles per square mile, respectively. Howard Creek, North Wolf Creek, and Upper Marks Creek Subwatersheds have more moderate existing road densities ranging from 6.6 to 6.9 miles per square mile. Subwatersheds with relatively low road densities in the vicinity of GDEs within the Ochoco Summit project area include Jackson Creek, Peterson Creek, Little Summit Prairie Creek, and Elliot Creek.

Flow and Sediment Regimes

Road Density

Existing watershed wide Operational Maintenance Level 1-5 road densities range from 3.0 miles per square mile in Lower Deep Creek Subwatershed to 4.6 in Howard Creek Subwatershed. Howard Creek and Upper Marks Creek have relatively high road densities, ranging from 4.1 to 4.6. Road densities in Jackson Creek, Little Summit Prairie Creek, North Wolf Creek, and Porter Creek Subwatersheds are relatively moderate. Elliot Creek, Lower Deep Creek, and Peterson Creek Subwatersheds have relatively low road densities, ranging from 3.0 to 3.3 miles per square mile.

Drainage Density

Drainage densities based on the existing intermittent and perennial Forest Service GIS data layer range from 1.8 to 2.9. Elliot Creek, North Wolf Creek, Peterson Creek, and Porter Creek Subwatersheds all have relatively high drainage densities, ranging from 2.7 to 2.9. Howard Creek and Upper Marks Creek Subwatersheds have relatively moderate drainage densities of 2.2 and 2.4, respectively. Jackson Creek, Little Summit Prairie Creek, and Lower Deep Creek have the lowest drainage densities in the Ochoco Summit project area, ranging from 1.8 to 2.1.

Stream Crossings

The number of existing road/stream crossings per subwatershed drainage area within forest boundaries ranges from 1.8 to 5.0 number of crossings per square mile. The highest number of stream crossings per square mile is located in the Upper Marks Creek, Howard Creek, and Porter Creek Subwatersheds and range from 4.0 to 5.0. Elliot Creek, North Wolf Creek, Peterson Creek, and Little Summit Prairie Creek Subwatersheds have a moderate number of existing stream crossings per square mile, ranging from 2.5 to 3.4. The least number of existing stream crossings per square mile are found in Lower Deep Creek and Jackson Creek Subwatersheds.

Aquatic Species

Redband trout

Historically, redband trout may have occupied more aquatic habitat within the watershed analysis area than presently. Road densities, livestock grazing, timber harvest, and mining have contributed to a reduction in suitable habitat and increased fish passage barriers. Ochoco Dam and other non-

passable irrigation diversions contribute to fragmentation of native redband trout populations. This further increases risk for localized extinctions and can limit the long-term sustainability of these native trout populations.

Redband trout typically inhabit cooler, well-oxygenated water that is less than 70°F, although they tolerate a wider range of water temperatures (from 32°F up to 80°F) better than many other salmonid species (Wydoski and Whitney 1979). Current research indicates that redband trout have developed phenotypic traits that allow them to tolerate marginal trout habitats in the high desert areas of Oregon (Rodnick et. al. 2004, Gamperl et. al. 2002). Despite various phenotypic traits, the preferred temperature for optimum metabolic performance in redband is 55.4°F (Gamperl et. Al. 2002) and the upper lethal temperature limits are 84.7-85.1°F, very similar to temperature profiles observed in most other Oncorhynchus species (Rodnick et. al., 2004).

Redband trout typically spawn between March and the end of June depending on water temperatures and timing of spring runoff. Egg deposition occurs in stream areas that have adequate water depth and velocity and appropriate sized gravels for redd construction. Water temperatures influence the number of days eggs incubate in the gravel before fry emergence. During the fry and parr life stages, redband trout are often observed along stream margins in slower waters. Adults are most often observed in pools near large wood or available cover. Food sources for young and adults include aquatic insects, amphipods, fish and eggs and adults may also eat crustaceans when they are available (Wydoski and Whitney, 1979).

Columbia spotted frog

Historically the Columbia spotted frog was found at elevations ranging from near sea level to 7,370 feet. Their range extended from southeast Alaska through British Columbia, eastern Washington and Oregon to northeast California and eastward to western Montana and Wyoming, and northern Utah. Columbia spotted frogs have been found throughout the Ochoco National and are present within the project area.

Columbia spotted frogs are highly aquatic, thus they are generally found in close proximity to water in riparian habitat. In winter months, the frogs burrow into mud in wet meadows or in streams. They breed in shallow water areas such as stream margins or pond edges, flooded meadows, or in pools of water formed by snow melt from early March through the end of May. Timing of breeding is dependent on snowmelt and rising water temperatures. After hatching, the larval stage (tadpole) remains in the water until metamorphosis into the adult form. Adults utilize both water habitat and nearby riparian areas for foraging and refuge needs.

Environmental Effects

Effects Common to All Alternatives

Henderson Flat on the Crooked River National Grassland and the Green Mountain Trail on Lookout Mountain Ranger District are currently the only two designated OHV trails on NFS lands managed by the Ochoco National Forest. The Forest was generally open to motor vehicle use unless designated closed until the Record of Decision for the Travel Management Project was signed in 2011. Cross-country vehicle travel is now restricted to designated routes; however, unauthorized use on user-created routes may occur. Many user-created routes would not be rehabilitated under any alternative. Unauthorized OHV use on user-created routes may continue to contribute sediment by erosion from trails that are in close proximity to or that cross streams, springs, and ponds.

Alternative 1

Since the Record of Decision for the Travel Management Project was signed in September 2011, and began to be implemented starting in January 2012. The decision does the following:

Limits motor vehicle use to designated roads, trails, and areas shown on the Motor Vehicle Use Maps
Designates some gravel pits open to motorized access
Creates new conditions for motor vehicle access off of designated roads for dispersed camping
Changes some system roads to highway legal vehicle use only

No existing open designated roads or motorized trails were closed as a result of the decision; however, changes to cross-country travel, motorized access for dispersed camping, and motorized mixed use (highway legal and non-highway legal vehicles) of some system roads were made. Cross-country travel is no longer allowed on the Ochoco National Forest. Motorized access for dispersed camping is only allowed to existing sites within 300 feet of roads shown on the Motor Vehicle Use Map and motor vehicles cannot drive closer than 30 feet to any wetland, stream, or water body at dispersed campsites. The decision makes no changes to developed campgrounds and does not apply to over-snow motorized travel or permitted activities such as firewood cutting.

Under Alternative 1, no trails would be added for use specifically by any type vehicle; travel would only be allowed as designated by the Motor Vehicle Use Map (MVUM). In general, this alternative represents the continuation of the existing condition; however, since the Travel Management Decision was not implemented until starting in January 2012, the effects of this decision have not been realized in the Ochoco Summit project area. It would be expected that with the cessation of cross-country motorized travel across the Ochoco National Forest that watershed health indicators would improve somewhat, though the user-created trails would remain on the landscape for a period of time until they naturally revegetated or future projects are proposed and implemented to decommission user-created, non-system roads.

Effects Common to All Watersheds

Flow and Sediment Regimes

Implementation of Alternative 1 would allow for existing user-created roads to heal, reducing the connectivity slightly between streams and roads (including user-created). System roads designated as Level 2, 3, 4 or 5, however, would remain open to use by the public and therefore the system road density and stream crossing density would remain the same as the existing condition and peak flows would not have the potential to increase as a result. The flow and sediment regime existing conditions would continue to exist in the Ochoco Summit project area watersheds with slight improvements over time as the effects of implementation of the Travel Management project are realized.

Sediment/Turbidity

Implementation of Alternative 1 would provide for the greatest improvements to streambank alteration and vegetative conditions within the shortest time frame. There would be no vehicles crossing streams, directly impacting streambanks at crossing locations. There would be no further effects to width-to-depth ratio, entrenchment, or sediment yield than what currently exists. In addition, by reducing the density of user created roads and stream crossings, peak flows would not be affected or would slightly decrease as a result, in turn maintaining or slightly decreasing bank erosion downstream of stream crossings. Cessation of cross-country travel across the Ochoco National Forest would facilitate a more rapid increase than is presently occurring in bank stability and prevent vehicle-related loss of bank stabilizing riparian vegetation.

In addition to improved bank stability, Alternative 1 would maintain or slightly reduce the density of roads, in the form of user-created roads, within the vicinity of streams and wetlands. By reducing the overall road densities, less sediment would be delivered to streams and wetlands, resulting in improved water quality.

Rates of recovery would be expected to vary across this project area. Most streambanks would be expected to stabilize with vegetation over the next 10-15 years, if some extent of riparian vegetation is already present. Previously altered sites presently lacking a riparian vegetation component would

take longer to recover vegetation and stabilize streambanks. Recovery of riparian vegetation may take 15+ years in these sites; due to soil type and other factores, some sites may not be capable of producing riparian vegetation without some sort of active management. Streambanks with vertical streambanks (cutbanks) would take several decades or more to adjust bank slopes and stabilize with vegetation, even without cross-country travel.

The channel sensitivity and recovery potential of streams in the Ochoco Summit project area vary from stream to stream by channel type (Rosgen 2009). Most of the surveyed stream channels within the project area are gravel-dominated and consist mostly of moderately steep, moderately sinuous, moderately entrenched stream channels (B type-channels) and slightly entrenched, moderately to high sinuosity, and less step stream channels (C type-channels). Gravel-dominated B channel types have a moderate sensitivity to disturbance and an excellent recovery potential while gravel-dominated C channel types have a very high sensitivity to disturbance and a good recovery potential (Rosgen 2009). Short portions of streams in the project area are characterized as G-type channels, one such reached was identified by a stream survey in Peterson Creek. The B and C channel type streams would recover more rapidly than the G-type segments of stream. Areas that are currently entrenched (G and F-type channels) would remain as such until vertical side slopes naturally adjust and become vegetated. The return to original conditions (pre-European) on some sites would be very slow or non-existent (Laycock 1989; Winward 1991). Sediment yield from these entrenched systems would continue to exist, but would decline as streambanks adjust slope and become vegetated.

Overall, Alternative 1 would have the least impacts to streambanks across all Ochoco Summit project area subwatersheds. Cessation of cross-country travel across the Ochoco National Forest would facilitate a more rapid increase than is presently occurring in bank stability and prevent loss of bank stabilizing riparian vegetation. Areas that are currently entrenched (G and F-type channels) would continue to adjust and may take several decades to become stable with vegetation. Sediment yield from these entrenched systems would continue to exist, but would decline as streambanks adjust slope and become vegetated.

Determination of Effects for Aquatic Species

There would be **no impact** to redband trout or Columbia spotted frogs as there are no trails proposed in Alternative 1. Although the Travel Management Project decision restricted motorized travel to designated routes as shown on the Motor Vehicle Use Maps (MVUM), user created routes and closed roads used by off-road travel would still exist. They would not be closed or maintained. Unauthorized OHV use on user-created routes may occur, resulting in reduced streamside vegetation where frogs could be breeding and redband trout could be spawning. Driving through fords changes substrate to fines and increases sediment in the stream. Increased sediment fills downstream pools that fish use for hiding cover and feeding. Bjornn et. al. (1977) found that when the percentage of fine sediment exceeds 20% to 30% in spawning riffles, the survival and emergence of salmonid embryos begins to decline. Within the 300-feet sediment delivery zone, erosion from fording streams, springs, and ponds and using closed roads not properly maintained within RHCAs may continue to contribute sediment to streams. In particular, rutted user-created trails would also continue to contribute fine sediment to streams. Severely rutted trails through wet meadows can dewater portions of the meadow, loss of meadow vegetation, and potentially weed infestations. Other sites could revegetate over time but would likely take a minimum of 15 years to establish. Success would depend on browse by ungulates in the woody vegetation areas and the ability of uplands to restore where there are ruts used by OHVs.

Alternative 2

Alternative 2, the Proposed Action, focuses on designating motorized trails and supporting areas, in conjunction with opportunities that would remain on mixed use roads identified on the MVUM. Alternative 2 proposes a total of 69 miles of Class I vehicle (ATV) trails or roads, 48 miles of Class II

vehicle (jeep, small truck and buggy) trail/roads, and 52 miles of Class III vehicle (motorcycle) trail/roads. These projects would result in more effects to the streams and watersheds within the Ochoco Summit project area as compared to Alternative 1, the no action alternative. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 2, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document).

Project design criteria were developed for stream crossings and stream approaches to reduce trail surface erosion during high precipitation months of May and October (USDA 2006). The season of use for the trail system (proposed to open on May 1 in Alternative 2) would partially overlap the spawning season for fish (March to the end of June) and the breeding season for frogs (variable from early March through the end of May) (Wydoski and Whitney 1979).

Effects Common to All Watersheds

Flow and Sediment Regimes

Overall, this alternative would have a beneficial impact on flow and sediment regimes in the Ochoco Summit project area subwatersheds relative to the historic allowance of OHV cross-country travel. In the long-term (15+ years), once vegetation has reestablished, connectivity of roads and trails with streams would be reduced, resulting in decreased peak flow magnitudes. However, relative to the no action alternative, proposed trails in Alternative 2 would increase the overall road/trail density and stream crossing density. Increased road/trail densities have the potential to increase drainage density, resulting in increased connectivity and peak flow magnitudes.

Sediment/Turbidity

Overall, this alternative would reduce impacts relative to water quality, in particular sediment and turbidity. Relative to OHV cross-country travel, sediment and turbidity related water quality would be maintained or slightly improved through an overall reduction in the number of stream and wetland crossing locations, improved stream crossing types, improved trail drainage, reduction in the miles of trail in the vicinity of perennial and intermittent streams, and anticipated decreased peak flow magnitudes.

As compared to historic OHV cross-country travel impacts, streambank conditions are expected to maintain or slightly improve over time with the implementation of Alternative 2. Relative to OHV cross-country travel, fewer stream crossings would occur within all subwatersheds and culverts or bridges would be installed at all new perennial and intermittent stream crossings. By reducing the number of crossings locations relative to cross-country travel and by not allowing fords, direct streambank impacts would be reduced. Alternative 2 would have more impact on streambanks as compared to the no action alternative with increased stream crossings and potential disturbance during culvert or bridge installation. Areas that are currently entrenched (G and F-type channels) would continue to adjust and may take several decades to become stable with vegetation. Sediment yield from these entrenched systems would continue to exist, but would decline as streambanks adjust slope and become vegetated.

As the effects of the implementation of the Travel Management Decision that omits cross-country travel across the Ochoco National Forest are realized, impacts to Groundwater-Dependant Ecosystems (GDEs) in the form of wetlands, wet meadows, and springs would be reduced even with the designation of the trail network in Alternative 2. User created trails across GDEs would naturally revegetate over time and trails that cross GDEs would have minimal effect through the implementation of the design criteria. Design criteria state that trails would either be rerouted to

"avoid meadows, seeps, and springs" or "puncheon stringers" would need to be installed that would elevate the trail above the GDE. Overall, however, Alternative 2 would have slightly more effect on GDEs through increased road/trail densities in and within GDE RHCAs through increased disturbance levels compared to the no action alternative.

In the long-term, Alternative 2 would result in reduced sediment delivery to streams overall through improved trail drainage, periodic trail maintenance, reduced trail densities near streams, and reduced peak flows as compared to historic OHV cross-country uses in the Ochoco Summit project area. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 2, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document). User-created trails that have been created over time do not have proper drainage, are not maintained, and cross over a larger portion of the landscape including across streams. Alternative 2 includes design criteria that require outsloping and hardening approaches to stream crossings and installing rolling dips to disperse water from the trail, reduces the number of locations where OHVs can cross intermittent and perennial streams, and reduces the density of trails within the sediment delivery zone (300 feet), which should reduce erosion and sediment delivery to streams. Reduced peak flows also dissipate the effects of sediment delivery to streams by reducing the potential for rilling to occur along the trails or where flow is diverted off the trail onto the hillslope above the stream channel.

Overall, this alternative would be consistent with the water goals and maintaining cutbank levels to below 20 percent as outlined in the LRMP. This alternative would be consistent with the Riparian Management Goal of maintaining bank stability greater than 80 percent outlined in INFISH and with the RMO. This alternative would protect designated beneficial uses and would be consistent with the Clean Water Act and Executive Orders 11988, 11990, and 12088. Proposed trail in some site-specific locations in the Deep Creek Watershed, however, would not be consistent with the purpose and need of the Deep Creek Restoration EA, specifically the goal of reducing stream sedimentation as a result of site specific sediment delivery and bank stability concerns (see section titled "Cumulative Effects" in Chapter 3 of this document for more information). In addition, due to channel instability resulting from the Maxwell Fire, reopening a road that has been effectively decommissioned that crosses Allen Creek, has the potential to affect channel recovery and increase turbidity in Allen Creek.

Table 77 displays estimated sediment contribution from road/trail crossings and road/trail segments within 300 feet of streams in project area subwatersheds, and compares these contributions to estimated natural background hillslope sediment production. Table 77 also displays estimates of existing road sediment contributions and compares these contributions, along with those estimated for actions in Alternative 2, to natural background hillslope sediment production. See Table 88 for specific locations with hydrologic concerns.

Table 77. Sediment contribution from road/trail crossing and adjacent road/trail segments (tons/year) compared to estimated natural background hillslope sediment (tons/year) by subwatershed for Alternative 2.

Subwatershed	Total Natural Background Sediment (tons/year)	Estimated Contribution from Existing Roads (tons/year)	Total Contribution from Alt 2 Road/Trail Crossings (tons/year)	Total Contribution from Alt 2 Adjacent Road/Trail Segments (tons/year)	Alternative 2 – Percent of Natural Background	Alternative 2 + Existing Roads – Percent of Natural Background
Elliott Creek	421	10.6	15.5	0.7	4%	6%
Howard Creek	404	16.1	1.7	0.1	0.4%	4%
Jackson Creek	252	21.1	11.3	0.6	5%	13%
Little Summit Prairie Creek	255	14.4	1.6	0.1	0.7%	6%
Lower Deep Creek	952	12.2	2.0	0.3	0.2%	2%
North Wolf Creek	215	9.4	0.1	0.01	0%	4%
Peterson Creek – North Fork Crooked River	1051	29.4	13.2	0.5	1%	4%
Porter Creek	265	20.9	14.6	1.8	3%	7%
Upper Marks Creek	77	40.8	0.6	0.05	0.8%	54%

Lower Beaver Creek Watershed

Alternative 2 proposes 9.1 miles of Class III trail within the Lower Beaver Creek Watershed. Approximately, 4.1 miles of the total are proposed on existing National Forest System Roads and approximately 5.0 miles would be new trail construction. Approximately 0.2 miles of new trail and 1.0 miles of trail on existing roads in the Lower Beaver Creek Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of three existing stream crossings are proposed for use, all of which would cross intermittent streams.

North Wolf Creek Subwatershed

Within the North Wolf Creek Subwatershed, approximately 3.2 miles of existing Forest Service System Road, mostly closed roads, and approximately 1.2 miles of new trail are proposed to be constructed as part of Alternative 2. The 1.2 miles of new trail are predominately along ridges and in areas not adjacent to stream channels. Approximately 0.2 mile of the proposed of trail in the North Wolf Creek Subwatershed is located within the sediment delivery zone of 300 feet from perennial or intermittent streams and, therefore, analyzed relative to hydrology and water quality. A total of three existing stream crossings are proposed for use, all of which cross intermittent streams.

Flow and Sediment Regimes

Designating Class III trails in the Alternative 2 proposed locations in the North Wolf Creek Subwatershed would have the effect of improving flow and sediment regime conditions in the long-term relative to past cross-country travel and would essentially maintain flow and sediment conditions relative to the no action alternative. By adding approximately 1.2 miles of trail to the overall subwatershed road/trail network, Alternative 2 would increase the road/trail densities from 3.0 to 3.3

miles per square mile; however, relative to the overall range in existing road densities across the Ochoco Summit project area, the rating for road/trail densities would remain moderate. Drainage densities are relatively high (2.9 miles per square mile); however, by not adding any new intermittent or perennial stream crossings in the North Wolf Creek Subwatershed, Alternative 2 would not change the overall stream crossing density (3.3 crossings per square mile with a moderate rating). In addition, all of the trails proposed within this subwatershed as part of Alternative 2 are Class III trails, designed for 24-inch wide motorcycle clearance, which would have much less disturbance and potential for capture of drainage compared to the wider Class I and Class II trails. Since the majority of the trails proposed in the North Wolf Subwatershed would be located on existing roads and the new trails would not cross intermittent or perennial stream channels, this minor increase in road/trail densities across the subwatershed would not be likely to increase the flow and sediment regime relative to the existing condition.

Sediment/Turbidity

Designating Class III trails in the Alternative 2 proposed locations in the North Wolf Creek Subwatershed would have the effect of improving water quality conditions in the long-term relative to past cross-country travel and would essentially maintain water quality conditions relative to the no action alternative. Approximately 0.2 miles of trail would be added within 300 feet of an intermittent stream, no new stream crossings would be added, and no new trail is proposed that crosses known GDEs within the forest boundary portion of the subwatershed.

By adding approximately 0.2 miles of trail to the road/trail network within the sediment delivery zone of streams in the North Wolf Creek Subwatersheds, the road/trail densities increase slightly from 6.3 to 6.4 miles per square mile, however, relative to the overall range in existing road densities across the Ochoco Summit Planning Area, the rating for road/trail densities within 300 feet of streams remains as moderate. Slope Erosion Hazard Ratings are relatively high; however, by not adding any new intermittent or perennial stream crossings and only minimal trail length near streams in the North Wolf Creek Subwatershed, the additional erosion potential from the 0.2 additional miles of trail is not expected to measurably increase sediment delivery to the streams or stream turbidity in the North Wolf Creek subwatershed.

In the North Wolf Creek subwatershed, natural background sedimentation is estimated at 215 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 0.1 tons/year. This equates to a 0% increase over natural background sediment in the North Wolf Creek subwatershed. The existing road system along with actions proposed under Alternative 2 is estimated to produce approximately 4% of natural background sediment (see Table 77).

Effects to Aquatic Species

Based on the 0% increase in sediment over natural background levels (see Table 77), there would be no effect on stream aggradation in the North Wolf Creek subwatershed from project activities (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the North Wolf Creek subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (0% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted from 2009 to 2013 in the North Wolf Creek watershed indicate that average percent surface fines are around 39%, which is greater than the 20% threshold for negative effects to steelhead fry emergence. This shows that there are factors in the watershed that are leading to higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would result in an adverse effect to fry emergence (based on 0% increase is sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 2 would not lead to overall stream aggradation or large increases in surface fines. However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, are causing stream and streambank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the North Wolf Creek subwatershed under actions proposed in Alternative 2. There would also be no effect on aquatic habitat, especially since the majority of the trails proposed are located on existing roads and the new trails do not cross intermittent or perennial streams channels.

Upper North Fork Crooked River Watershed

Alternative 2 proposes approximately 44 miles on closed roads, decommissioned roads, and new routes. Approximately 34 miles of trail are proposed on existing open roads. A total of 24 new and 40 existing intermittent and perennial stream crossings are proposed for use. Alternative 2 proposes approximately 25 miles of Class I trail, approximately 45 miles of Class II trail, and approximately 8.6 miles of Class III trail within the Upper North Fork Crooked River Watershed. Approximately 12 miles of Class I trail, 33 miles of Class II trail, and 4.2 miles of Class III trail are proposed on existing Forest Service System Roads.

Approximately 13 miles of Class I trail, 12 miles of Class II trail, and 4.4 miles of Class III trail would be trails not already part of the existing Forest Service System road network. Approximately 6.8 miles of new trail and 16.8 miles of trail on existing roads in the Upper North Fork Crooked River Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. There are 3 stream crossings on Class I streams, 9 crossings on Class II streams, 2 stream crossings on Class III streams, and 50 stream crossings on Class IV streams.

Elliot Creek Subwatershed

Within the Elliott Creek Subwatershed, approximately eight miles of trail are proposed on closed roads, decommissioned roads and new routes. Approximately six miles of trail are proposed on existing open roads. Approximately 7.7 miles of Class I trail and 2.5 Class III trail are proposed on existing National Forest System Road and approximately 2.5 miles of Class I trail and 2.2 miles of Class III new trail are proposed to be constructed as part of Alternative 2. Alternative 2 proposes for Class I trails to cross perennial and intermittent streams at 12 locations at existing stream crossings on existing roads and to cross perennial and intermittent streams with new trails at five locations. In addition, Class III trails are proposed to cross perennial and intermittent streams at one location at an existing stream crossing on an existing road and to cross perennial and intermittent streams with new trails at four locations.

The Maxwell Fire BAER rehabilitation road treatments, included rehabilitation work on segments of two roads within the Elliot Creek Subwatershed, FS 2200-505 and FS 2200-500 for purposes of reducing sedimentation into streams due to the effects of vegetation removed in the Maxwell Fire in the Allen Creek watershed. These roads were closed, currently this closure has been breached and Allen Creek has been forded by unauthorized OHV use.

Approximately 0.04 miles of Class I trail overlap FS 2200-500 where water bars were recommended for installation to enable roads to better handle expected surface runoff increases. Approximately

0.24 miles of Class I trail overlap FS 2200-505, which crosses one intermittent and one perennial tributary to Elliott Creek and parallels the stream within the RHCA for almost the entire segment length. The crossing over the perennial tributary to Elliott Creek was undersized and was removed and replaced with rock ford as part of the Maxwell Fire BAER rehabilitation. Based on design criteria, implementation of the Alternative 2 trail system would require installation of a culvert or bridge at this stream crossing location. Based on the BAER report for the Maxwell Fire, the vegetative recovery period was seven years, which would indicate hydrologic recovery should occur by the end of the summer of 2013.

Sedimentation from reopening roads and reinstalling culverts on Class I and II streams and the existence of the new trail would not allow restoration of aquatic habitat or improve species success in Allen, East Fork Allen, and Elliot creeks and does not meet the intent of the Maxwell BAER. Along with sediment, there is potential that contaminants from vehicles entering streams from runoff on roads from approaches and at crossing areas and the roads located within RHCAs. The roads analysis (BAER) determined that these roads, which are proposed for the OHV trail locations, should be decommissioned.

Flow and Sediment Regimes

Constructing new Class I and III trails and stream crossings at the locations proposed in Alternative 2 in the Elliot Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term (i.e. approximately 10-15 years post-construction) relative to past cross-country travel; however, compared to the no action alternative, it could increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and stream crossing densities overall. By adding approximately 4.7 miles of trail to the overall subwatershed road/trail network, Alternative 2 would increase the road/trail densities from 3.3 to 3.6 miles per square mile, increasing trail/road density conditions from low to moderate relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively high (2.8 miles per square mile) and by adding nine new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Elliot Creek Subwatershed, Alternative 2 would increase the overall stream crossing density from 3.4 to 4.0 crossings per square mile, bringing the overall rating up from moderate to high relative to the other Ochoco Summit project area subwatersheds. Overall, slope erosion hazard conditions are high in the vicinity of streams in the Elliot Creek Subwatershed, which can make interconnectivity of roads and streams more likely, potentially resulting in increased peak flows in streams. Increases in the road/trail and stream crossing densities across the Elliot Creek Subwatershed, in combination with poor slope erosion hazard conditions, potentially increases the flow and sediment regime relative to the existing condition.

Sediment/Turbidity

Designating Class I and III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Elliot Creek Subwatershed may improve somewhat the bank stability and sediment delivery conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams and exacerbate bank stability conditions at some site-specific locations in the subwatershed (see Table 88). During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 2, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document).

Approximately 2.0 miles of trail would be added within 300 feet of an intermittent stream, nine new stream crossings would be added, and 0.2 miles of trail are proposed that intersect GDEs or their

RHCAs within the forest boundary portion of the subwatershed. By adding approximately 2.0 miles of trail to the road/trail network within the sediment delivery zone of streams in the Elliot Creek Subwatershed, Alternative 2 would increase the road/trail densities from 4.3 to 4.6 miles per square mile; however, relative to the overall range in existing road densities across the Ochoco Summit project area, the rating for road/trail densities within 300 feet of streams would remain low. The addition of 0.2 miles of trail within GDEs and associated RHCAs would raise road densities in GDEs from approximately 2.8 to 3.0 miles per square mile, maintaining a low rating relative to other project subwatersheds. Slope Erosion Hazard Ratings are relatively high, making erosion and potentially sediment delivery more likely in the subwatershed.

Existing bank stability in Fox Creek, the only stream in the Elliot Creek Subwatershed with a Level II stream survey conducted, is relatively good and met LRMP standards as of 2002. In addition, the dominant channel type of Fox Creek has moderate channel sensitivity and recovery potential. Other reaches of Fox Creek are classified as A4 and C4 channel types. A4 channel types generally have extreme channel sensitivity and very poor recovery potential, while C4 channel types generally have very high channel sensitivity and good recovery potential. No new trails are proposed to cross or parallel Fox Creek. Assuming that other streams in the Elliot Creek Subwatershed exhibit similar dominant channel type conditions and the implementation of design criteria that require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, bank stability is likely to be maintained, unless increased peak flows result from increases in road/trails and stream networks.

Based on high Slope Erosion Hazard conditions, increases in both road/trail densities within the sediment delivery zone, and increases in stream crossing densities, new trails proposed under Alternative 2 have the potential to increase sediment delivery to streams; however, bank stability is likely to be maintained.

In the Elliott Creek subwatershed, natural background sedimentation is estimated at 421 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 16.2 tons/year. This equates to a 4% increase over natural background sediment in the Elliott Creek subwatershed (see Table 77).

Effects to Aquatic Species

Based on the 4% increase in sediment over natural background levels (see Table 77), there would be no effect on stream aggradation in the Elliott Creek Subwatershed from project activities (C channels would experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Elliott Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (4% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2002 in the Elliott Creek Watershed indicate that average percent surface fines are around 28%, over the 20% threshold for negative effects to fry emergence for steelhead. This shows that cumulatively in the watershed, there are negative impacts in the watershed that are leading to higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on 4% increase is sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 2 would not lead to overall stream

aggradation or large increases in surface fines (6% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Elliott Creek subwatershed under actions in Alternative 2. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

Filtering vegetation that was removed during the Maxwell Fire in 2006, especially in headwaters, was estimated to be recovered in approximately 7 years post-fire based on WATSED tables (BAER 2006 Hydrology Report). Based on that information, it is anticipated that filtering vegetation in the Elliott Creek Subwatershed would be recovered at the end of the 2013 growing period. Alternative 2 would not be implemented until at least the spring/summer of 2014; therefore, post-fire recovery in terms of filtering vegetation would have already been met.

Howard Creek Subwatershed

Within the Howard Creek Subwatershed, approximately 10 miles of trail are located on closed and new routes. Approximately 1 mile of trail is proposed on existing open roads. Approximately 1.5 miles of Class I trail and 1.8 Class III trail are located on existing Forest Service System Road and approximately 5.5 miles of Class I trail and 2.1 miles of Class III new trail are proposed to be constructed as part of Alternative 2. Alternative 2 proposes for Class I trails to cross perennial and intermittent streams with new trails at four locations. In addition, Class III trails are proposed to cross perennial and intermittent streams at one location at an existing stream crossing on an existing road.

Flow and Sediment Regimes

Designating Class I and III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Howard Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and stream crossing densities overall. By adding approximately 7.6 miles of trail to the overall subwatershed road/trail network, Alternative 2 would increase road/trail densities from 4.6 to 5.1 miles per square mile, both of which are high relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively moderate (2.2 miles per square mile) and by adding four new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Howard Creek Subwatershed, Alternative 2 would increase overall stream crossing density from 4.1 to 4.4 crossings per square mile, both of these densities are high relative to the other Ochoco Summit project area subwatersheds. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Howard Creek Subwatershed. Increases to the already high road/trail and stream crossing densities across the Howard Creek Subwatershed have the potential to increase peak flows and shorten response times relative to the existing condition.

Sediment/Turbidity

Designating Class I and III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Howard Creek Subwatershed may improve somewhat the bank stability and sediment delivery conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 2, sediment delivery would increase; however, once user-created

trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document).

Approximately 1.4 miles of trail would be added within 300 feet of an intermittent stream, four new stream crossings would be added, and 1.1 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 1.4 miles of trail to the road/trail network within the sediment delivery zone of streams in the Howard Creek Subwatershed, Alternative 2 would increase the road/trail densities from 8.2 to 8.6 miles per square mile; both of these densities are high relative to the other Ochoco Summit project area subwatersheds. The addition of 1.1 miles of trail within GDEs and associated RHCAs would raise road densities in GDEs from approximately 6.9 to 7.4 miles per square mile, bringing the overall rating up from moderate to high relative to the other subwatersheds.

Existing bank stability in surveyed streams in the Howard Creek Subwatershed is relatively good and met LRMP standards between 1994 and 2001. In addition, the dominant channel types of streams in the subwatershed are B4 channel types, which have moderate channel sensitivity and excellent recovery potential. At the proposed location of the new Class I trail stream crossing on Howard Creek, the channel type indicates that the channel should have low streambank erosion potential. No channel type information was gathered for the remaining three new stream crossings in the Howard Creek Subwatershed. Dominant channel types in Howard Creek, South Fork Howard Creek, and West Fork Howard Creek indicate moderate channel sensitivity and excellent recovery potential, whereas dominant channel type in East Fork Howard Creek indicates very high channel sensitivity and good recovery potential of the stream. Assuming that other streams in the Howard Creek Subwatershed exhibit similar dominant conditions to Howard Creek and the implementation of design criteria that require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, bank stability is likely to be maintained, unless increased peak flows result from increases in road/trails and stream networks.

Based on increases in both road/trail densities within the sediment delivery zone and within and near GDEs, new trails proposed under Alternative 2 would have the potential to increase sediment delivery to streams; however, bank stability is likely to be maintained.

In the Howard Creek Subwatershed, natural background sedimentation is estimated at 404 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 1.8 tons/year. This equates to a 0.4% increase over natural background hillslope sediment delivered to streams in the Howard Creek Subwatershed (see Table 77).

Effects to Aquatic Species

Based on the less than 1% increase in sediment over natural background levels (see Table 77), there would be no effect on stream aggradation in the Howard Creek Subwatershed from project activities (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Howard Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (<1% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

There is no instream fine sediment data available for the Howard Creek Subwatershed, so it is unclear whether there are cumulative impacts from management activities (roads, grazing, etc.) that are impacting instream fine sediment. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to affect fry emergence (based on <1% increase is sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 2 would not lead to overall stream aggradation or large increases in surface fines (4% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected **long-term** in the Howard Creek Subwatershed under actions in Alternative 2. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

Peterson Creek Subwatershed

Within the Peterson Creek subwatershed, approximately 11 miles of trail are located on closed roads and new routes and 14 miles of trail proposed on open existing roads. Approximately 2.4 miles of Class I trail and 15.2 Class II trail are located on existing Forest Service System Road and approximately 2.9 miles of Class I trail and 4.4 miles of Class II new trail are proposed to be constructed as part of Alternative 2. Alternative 2 proposes for Class I trails to cross perennial and intermittent streams with new trails at three locations and to cross perennial and intermittent streams on existing roads at two locations. Class II trails are proposed to cross perennial and intermittent streams at one new location and to cross perennial and intermittent streams at eight locations at existing stream crossings on existing roads. In addition, a two mile switch-back section of new Class II trail ("jeep crawl") is located approximately 100 feet upslope and East of Peterson Creek, a fish-bearing perennial stream, on a slope with a High Slope Erosion Hazard and crosses five ephemeral streams.

The Maxwell Fire BAER rehabilitation road treatments, included rehabilitation work on segments of one road within the Peterson Creek Subwatershed, FS 2200-550. Approximately 0.18 miles of Class I trail overlap FS 2200-550, which crosses Allen Creek, a fish-bearing perennial stream. The crossing structure was removed and banks were laid back as part of the Maxwell Fire BAER rehabilitation. Based on design criteria, implementation of the Alternative 2 trail system would require installation of a culvert or bridge at this stream crossing location. The operational maintenance level of this road is Level I (Closed); however, the objective maintenance of this road is decommissioned, likely attributed to the potential for sedimentation into a high quality, fish-bearing perennial stream. Based on the BAER report for the Maxwell Fire, the vegetative recovery period was seven years, which would indicate hydrologic recovery should occur by the end of the summer of 2013. Field trips to the site during the summer of 2011 indicated that Allen Creek, in the vicinity of this stream crossing, was still in an unstable state and was still in the process of recovering from impacts from the Maxwell Fire.

The jeep boulder crawl area is located on two tributaries to Peterson Creek and traverses down steep terrain. There are two Class IV streams with five fords (three fords on one tributary and two on the other tributary). A boulder crawl creates loosened soil that would flow downstream to Peterson Creek (Class I stream) during rain and snow melt events. During the wet season from mid-October to mid-June and during storm events through the summer, existence of the jeep trail and use of the jeep crawl is likely to deliver sediment to the two tributaries, which would then convey additional sediment into Peterson Creek.

Flow and Sediment Regimes

Designating Class I and II trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Peterson Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and reopening roads slated for decommissioning. By adding approximately 7.3 miles of trail to the overall subwatershed road/trail network, Alternative 2 would increase the road/trail densities from 3.2 to 3.6 miles per square mile, increasing the rating from low to moderate relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively high (2.7 miles per square mile) and by adding four new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Peterson Creek Subwatershed, Alternative 2 would increase the overall stream crossing density from 2.7 to 2.9 crossings per square mile, both of these densities are moderate relative to the other Ochoco Summit project area subwatersheds. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Peterson Creek Subwatershed. Increases to the already high road/trail across the Peterson Creek Subwatershed have the potential to slightly increase peak flows and shorten response times relative to the no action alternative.

By constructing two miles of new trail East of Peterson Creek on a slope with High Slope Erosion Hazard, Alternative 2 has the potential to create connectivity between the intermittent streams and the trail surface. Since the drainage area of the streams is small, they are not likely to substantially increase peakflows; however, erosion and sediment delivery to Peterson Creek has a much higher potential.

Sediment/Turbidity

Designating Class I and II trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Peterson Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams at site specific locations.

Approximately 1.3 miles of trail would be added within 300 feet of an intermittent or perennial stream, four new stream crossings would be added, and virtually no miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 1.3 miles of trail to the road/trail network within the sediment delivery zone of streams in the Peterson Creek Subwatershed, Alternative 2 would increase road/trail densities from 4.3 to 4.5 miles per square mile; both of these densities are low relative to the other Ochoco Summit project area subwatersheds. The addition of virtually no new miles of trail within GDEs and associated RHCAs would maintain road densities in GDEs at approximately 5.5 miles per square mile, which is low relative to the other subwatersheds.

Existing bank stability in surveyed streams in the Peterson Creek Subwatershed is relatively good and met LRMP standards in 2001 in the East Fork of Allen Creek; however, bank stability is predominately relatively fair and not meeting LRMP standards in Allen Creek and Peterson Creek, based on stream surveys in 2002 and 2006-2007, respectively. The 2007 Level II stream survey in Peterson Creek found unstable bank conditions with cutbanks of approximately 36 percent of the length of Reach 6 where a Class II trail overlaps the FS 2630 road and crosses the stream. In addition, the dominant channel types of streams in the subwatershed are C4 channel types, which have very high channel sensitivity and good recovery potential. At the location of the new Class I trail stream crossing on the East Fork of Allen Creek as well as through the stream reaches that were surveyed, the channel type indicates that the channel should have very high streambank erosion potential. Since peakflow increases are expected to be minor and design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, overall bank

stability is likely to be maintained. At site specific locations; however, by converting a closed road, with an objective maintenance of decommissioned, to Class I trail that crosses Allen Creek in an unstable portion of the stream and by adding two miles of Class II trail on a High Slope Erosion Hazard slope near Peterson Creek, site specific locations may experience higher incidents of unstable banks and sediment delivery.

Based on site specific sediment delivery and bank stability concerns, Alternative 2 proposed trails have the potential to increase sediment delivery to streams and unstable banks at site specific locations, which would delay recovery to LRMP standards of bank stability in Allen Creek and potentially add to sediment and turbidity increases in Peterson Creek.

In the Peterson Creek Subwatershed, natural background sedimentation is estimated at 1051 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 13.7 tons/year. This equates to a 1% increase over natural background hillslope sediment in the Peterson Creek Subwatershed (see Table 77).

Effects to Aquatic Species

Based on the 1% increase in sediment over natural background levels (see Table 77), there would be no effect on stream aggradation in the Peterson Creek Subwatershed from project activities (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Peterson Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (1% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2007 in the Peterson Creek watershed indicate that average percent surface fines are around 45%, which is greater than the 20% threshold for negative effects to steelhead fry emergence. This shows that there are factors in the watershed that are leading to higher than normal instream fine sediment levels. The elevated instream fine sediment numbers may be partially due to responses after the Maxwell Fire in 2006. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on 1% increase is sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 2 would not lead to overall stream aggradation or large increases in surface fines (4% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and streambank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Peterson Creek Subwatershed under actions in Alternative 2. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

Filtering vegetation that was removed during the Maxwell Fire in 2006, especially in headwaters, was estimated to be recovered in approximately 7 years post-fire based on WATSED tables (BAER 2006 Hydrology Report). Based on that information, it is anticipated that filtering vegetation in the Peterson Creek Subwatershed would be recovered at the end of the 2013 growing period. Alternative

2 would not be implemented until at least the spring/summer of 2014; therefore, post-fire recovery in terms of filtering vegetation would have already been met.

Porter Creek Subwatershed

Within the Porter Creek subwatershed, approximately 15 miles of trail is proposed on closed roads, decommissioned roads, and new routes. Approximately 12 miles of trail is proposed on existing open roads. Within the Porter Creek subwatershed, approximately 0.26 miles of Class I trail and 17.7 miles of Class II trail located on existing Forest Service System Road. Approximately 2.1 miles of Class I trail, 7.3 miles of Class II trail, and 0.04 miles of Class III new trail are proposed to be constructed as part of Alternative 2. No Class I trails are proposed to cross intermittent or perennial stream channels in Alternative 2. Class II trails are proposed to cross perennial and intermittent streams at 16 locations at an existing stream crossing on an existing road and at 7 new locations. No new trails are proposed that intersect GDEs or associated RHCAs.

A proposed jeep trail lies along East Porter Creek along FR3000-550 in the RHCA. East Porter Creek is a Class II stream. The roads analysis for Howard Elliot Johnson EIS (2010) indicates FR3000-550 be changed to a trail for protection of aquatic species. Mile 0 to 2.3 of the FR3000-550 road crosses a Class II stream and is proposed to convert to trail above FR3300-553. Mile 2.3 to 4.8 of FR3300-550 crosses Class III and IV streams. Part of the road is proposed to convert to a trail in the southern half. The rating was High for aquatic species, indicating a high impact on aquatic species. The proposal to make FR 3000-500 a jeep trail does not meet the intent of protecting aquatic species as identified in the roads analysis.

Flow and Sediment Regimes

Designating Class I and II trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Porter Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and stream crossing densities overall. By adding approximately 9.4 miles of trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.7 to 4.4 miles per square mile, raising the rating from moderate to high relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively high (2.8 miles per square mile) and by adding seven new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Porter Creek Subwatershed, the overall stream crossing density increases from 4.0 to 4.4 crossings per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are low in the vicinity of streams in the Porter Creek Subwatershed. Increases to the road/trail and already high stream crossing densities across the Porter Creek Subwatershed have the potential to increase peak flows and shorten response times relative to the existing condition.

Sediment/Turbidity

Designating Class I and II trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Porter Creek Subwatershed may improve somewhat the bank stability and sediment delivery conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams. In the short-term with the implementation of Alternative 2 in this subwatershed, sediment delivery would increase; however, in the long-term, once most user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition.

Approximately 2.1 miles of trail would be added within 300 feet of an intermittent stream, seven new stream crossings would be added, and essentially no miles of trail are proposed that intersect GDEs or

their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 2.1 miles of trail to the road/trail network within the sediment delivery zone of streams in the Porter Creek Subwatershed, the road/trail densities increase from 7.4 to 7.8 miles per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. Slope Erosion Hazard conditions for the Porter Creek Subwatershed are low overall, somewhat reducing the risk and magnitude of potential sediment delivery increases for the proposed trail network in Alternative 2.

Existing bank stability in surveyed streams in the Porter Creek Subwatershed was relatively good and met LRMP standards in Easter Porter Creek in 1995 and in the top and bottom reaches of Porter Creek in 2006-2007. Bank stability in the middle reach of Porter Creek in 2007 slightly exceeded LRMP standards with approximately 23 percent of the stream length unstable. No trails are proposed to cross Porter Creek on the reach of stream that is not meeting LRMP standards of no more than 20 percent unstable banks. Dominant channel types in Porter Creek indicate moderate channel sensitivity and excellent recovery potential. Assuming that other streams in the Porter Creek Subwatershed exhibit similar dominant conditions to Porter Creek and implementation of design criteria that require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, bank stability is likely to be maintained, unless increased peak flows result from increases in road/trails and stream networks.

Based on increases in both stream crossing and road/trail densities within the sediment delivery zone, Alternative 2 proposed new trails have the potential to increase sediment delivery to streams as described in the Aquatic Species section; however, banks stability is likely to be maintained.

In the Porter Creek Subwatershed, natural background sedimentation is estimated at 562 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 15.4 tons/year. This equates to a 3% increase over natural background hillslope sediment in the Porter Creek Subwatershed (see Table 77).

Effects to Aquatic Species

Based on the 3% increase in sediment over natural background levels (see Table 77), there would be no effect on stream aggradation in the Porter Creek Subwatershed from project activities (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Porter Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (3% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2006 and 2007 in the Porter Creek Subwatershed indicate that average percent surface fines are around 22%, which is slightly greater than the 20% threshold for negative effects to steelhead fry emergence. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to independently adversely affect fry emergence (based on 3% increase is sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 2 would not lead to overall stream aggradation or large increases in surface fines (7% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or

current land uses, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Porter Creek Subwatershed under actions in Alternative 2. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

Deep Creek Watershed

Alternative 2 proposes approximately 58 miles of trail on closed roads, decommissioned roads, and new routes. Approximately eight miles of trail is proposed for existing open roads. Alternative 2 proposes approximately 31 miles of Class I trail, approximately 2.7 miles of Class II trail, and approximately 32 miles of Class III trail within the Deep Creek Watershed. Approximately 20 miles of Class I trail, 2.4 miles of Class II trail, and 18 miles of Class III trail are proposed on existing Forest Service System Roads. Approximately 11 miles of Class I trail, 0.32 miles of Class II trail, and 14 miles of Class III trail would be new trails. Approximately 3.7 miles of new trail and 12.7 miles of trail on existing roads in the Deep Creek Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of 14 new and 22 existing intermittent and perennial stream crossings are proposed for use.

Some of the perennial streams that have been identified by Forest fish biologists and the Oregon Department of Fish and Wildlife to be critical refuges for redband trout in the Deep Creek Watershed are Deep Creek, Little Summit Creek, Happy Camp Creek and Double Corral Creek. However, many of these systems have been impacted by past management and are not as effective as they once were in sustaining redband trout. In addition to redband trout, Columbia spotted frogs are present throughout the area.

Jackson Creek Subwatershed

Within the Jackson Creek Subwatershed, approximately 30 miles of trail is proposed for closed roads, decommissioned roads, and new routes. Approximately seven miles of trail is proposed for open roads. Within the Jackson Creek Subwatershed, approximately 9.3 miles of Class I trail, 2.4 miles of Class II trail, and 14.3 miles of Class III trail are located on existing Forest Service System Road. Approximately 5.4 miles of Class I trail, 0.32 miles of Class II trail, and 5.6 miles of Class III new trail are proposed to be constructed as part of Alternative 2. Alternative 2 proposes for Class I trails to cross perennial and intermittent streams with new trails at seven locations and to cross perennial and intermittent streams on existing roads at three locations. Class II trails are proposed to cross perennial and intermittent streams at no new locations and to cross perennial and intermittent streams at one location at an existing stream crossing on an existing Level II, high clearance road. Class III trails are proposed to cross perennial and intermittent streams at two new locations and to cross perennial and intermittent streams at ten locations at existing stream crossings on existing roads.

Flow and Sediment Regimes

Designating Class I, II, and III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Jackson Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing overall road/trail and stream crossing densities. By adding approximately 11 miles of new trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.7 to 4.0 miles per square mile, both ratings are moderate relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively low (1.8 miles per square mile) and by adding nine new intermittent or perennial stream crossings to the

existing number of stream crossings by roads in the Jackson Creek Subwatershed, the overall stream crossing density increases from 1.8 to 2.1 crossings per square mile, both of these densities are low relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Jackson Creek Subwatershed. Based on relatively low drainage and stream crossing densities, increases to the road/trail density and stream crossings density across the Jackson Creek Subwatershed are likely to have little effect on peak flows, with the potential for an immeasurable increase relative to the no action alternative.

Sediment/Turbidity

Designating Class I, II, and III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Jackson Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 2, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document).

Approximately 1.6 miles of trail would be added within 300 feet of an intermittent or perennial stream, nine new stream crossings would be added, and 0.7 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 1.6 miles of trail to the road/trail network within the sediment delivery zone of streams in the Jackson Creek Subwatershed, the road/trail densities increase from 6.1 to 6.3 miles per square mile, both of these densities are moderate relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of 0.7 miles of trail within GDEs and associated RHCAs increases the road densities in GDEs from 5.6 to 5.8 miles per square mile, which are low relative to the other subwatersheds. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Jackson Creek Subwatershed.

Existing bank stability in surveyed streams in the Jackson Creek Subwatershed is relatively good and met LRMP standards in Happy Camp Creek and Jackson Creek from 1998 and 2010. Based on Level II stream surveys, the dominant channel types of streams in Happy Camp Creek are E4 channel types and in Jackson Creek are C4 channel types, which have very high channel sensitivity and good recovery potential. At the location of the two new Class I trail stream crossings on Happy Camp Creek, the channel types indicate that the channel should have moderate and high streambank erosion potential. At the new Class I stream crossing location on Jackson Creek, the channel type indicates a moderate streambank erosion potential. Since peakflow increases are expected to be minor and design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, overall bank stability is likely to be maintained.

Based on slight increases in both road/trail densities within the sediment delivery zone and in GDEs, as well as overall moderate Slope Erosion Hazard Conditions, Alternative 2 proposed new trails have the potential to slightly increase sediment delivery to streams and GDEs; however, banks stability is likely to be maintained.

In the Jackson Creek Subwatershed, natural background sedimentation is estimated at 252 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 11.9 tons/year. This equates to a 5% increase over natural background sediment in the Jackson Creek Subwatershed (see Table 77).

Effects to Aquatic Species

Based on the 5% increase in sediment over natural background levels (see Table 77), there would be no effect on stream aggradation in the Jackson Creek Subwatershed from project activities (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Jackson Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (5% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2010 in Jackson Creek indicate that average percent surface fines are around 21%, which is slightly greater than the 20% threshold for negative effects to steelhead fry emergence. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on 5% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 2 would not lead to overall stream aggradation or large increases in surface fines (13% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Jackson Creek Subwatershed under actions in Alternative 2. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

Little Summit Prairie Creek Subwatershed

Within the Little Summit Prairie Creek Subwatershed, approximately 14 miles of trail proposed on closed roads, decommissioned roads, and new routes. Approximately 1 mile of trail is proposed on existing open roads. Within the Little Summit Prairie Creek Subwatershed, approximately 4.1 miles of Class I trail and 3.6 miles of Class III trail are located on existing Forest Service System Road. Approximately 1.2 miles of Class I trail and 5.8 miles of Class III new trail are proposed to be constructed as part of Alternative 2. Alternative 2 proposes for Class I trails to cross perennial and intermittent streams with new trail at one location and to cross a perennial or intermittent stream on an existing road at one location. Class III trails are proposed to cross perennial and intermittent streams at no new locations and to cross perennial and intermittent streams at two locations at existing stream crossings on existing roads.

Flow and Sediment Regimes

Designating Class I and Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Little Summit Prairie Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing overall road/trail and stream crossing densities. By adding approximately seven miles of new trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.8 to 4.1 miles per square mile, bringing the rating from moderate to high relative to the overall range in existing road densities across the Ochoco

Summit project area. Drainage densities are relatively low (2.2 miles per square mile) and by adding one new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Little Summit Prairie Creek Subwatershed, the overall stream crossing density increases from 2.5 to 2.6 crossings per square mile, both of these densities are moderate relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Little Summit Prairie Creek Subwatershed. Based on relatively low drainage densities, increases to the road/trail density and stream crossings density across the Little Summit Prairie Creek Subwatershed are likely to have little effect on peak flows, with the potential for an immeasurable increase relative to the no action alternative.

Sediment/Turbidity

Designating Class I and III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Little Summit Prairie Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the sediment delivery to streams. In the short-term with the implementation of Alternative 2 in this subwatershed, sediment delivery would increase; however, in the long-term, once most user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition.

Approximately 0.6 miles of trail would be added within 300 feet of an intermittent or perennial stream, one new stream crossings would be added, and 0.4 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 0.6 miles of trail to the road/trail network within the sediment delivery zone of streams in the Little Summit Prairie Creek Subwatershed, the road/trail densities increase from 7.4 to 7.5 miles per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of 0.4 miles of trail within GDEs and associated RHCAs increases the road densities in GDEs from 5.1 to 5.4 miles per square mile, which are low relative to the other subwatersheds. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Little Summit Prairie Creek Subwatershed.

Existing bank stability in surveyed streams in the Little Summit Prairie Creek Subwatershed is relatively good and met LRMP standards in surveyed reaches of Little Summit Creek and an unnamed tributary in 1998 and 2010. Based on Level II stream surveys, the dominant channel types of streams in the Little Summit Prairie Creek Subwatershed are C4 channel types, which have very high channel sensitivity and good recovery potential. At the location of the new Class I trail stream crossings on Little Summit Creek, the channel type is a B3 channel type, which indicates that the channel should have low streambank erosion potential. Since peakflow increases are expected to be minor, streambank erosion based on channel type at the stream crossing is low, and design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, overall bank stability is likely to be maintained.

Based on slight increases in both road/trail densities within the sediment delivery zone and in GDEs, as well as overall moderate Slope Erosion Hazard Conditions, Alternative 2 proposed new trails have the potential to slightly increase sediment delivery to streams and GDEs; however, banks stability is likely to be maintained.

In the Little Summit Prairie Creek Subwatershed, natural background sedimentation is estimated at 255 tons/year. The total estimated contribution from Alternative 2 road/trail crossings and adjacent road/trail segments is approximately 1.7 tons/year. This equates to a 0.7% increase over natural background sediment in the Little Summit Prairie Creek Subwatershed (see Table 77).

Effects to Aquatic Species

Based on the less than 1% increase in sediment over natural background levels (see Table 77), there would be no effect on stream aggradation in the Little Summit Prairie Creek Subwatershed from project activities (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Little Summit Prairie Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (<1% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2010 in Little Summit Prairie Creek indicate that average percent surface fines are around 29%, which is greater than the 20% threshold for negative effects to steelhead fry emergence. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on the less than 1% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 2 would not lead to overall stream aggradation or large increases in surface fines (6% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Little Summit Prairie Creek Subwatershed under actions in Alternative 2. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

Lower Deep Creek Subwatershed

Within the Lower Deep Creek Subwatershed, approximately 14 miles of trail is proposed on closed roads, decommissioned roads, and new routes. Approximately 7.0 miles of Class I trail are located on existing Forest Service System Road and approximately 4.1 miles of Class I trail and 2.9 miles of Class III new trail are proposed to be constructed as part of Alternative 2. Alternative 2 proposes for Class I trails to cross perennial and intermittent streams with new trails at three locations and to cross perennial and intermittent streams on existing roads at five locations. Class III trails are proposed to cross perennial and intermittent streams at one new location.

Proposed restoration projects were identified in the Deep Creek Restoration Plan, some of which have already been implemented. Of the 2.8 miles of road within the sediment delivery zone of streams that were decommissioned in the Lower Deep Creek Subwatershed as part of the Deep Creek Restoration Plan, 0.7 miles of the FS 4200-600 and 0.4 miles of the FS 4200-603 decommissioned roads are planned to be reopened as Class I trails in Alternative 2. The FS 4200-600 road parallels Big Spring Creek, a fish-bearing perennial stream, for approximately 0.3 miles and parallels and intermittent tributary to Big Spring Creek for approximately 0.4 miles. The FS 4200-603 road parallels Buck Hollow, a perennial stream, for approximately 0.4 miles. The reopened portion of the FS 4200-603 road is located on high slope erosion hazard. Approximately a third of the reopened portion of the FS 4200-600 road is located on high slope erosion hazard, a third is located on moderate slope erosion hazard, and a third is located on low slope erosion hazard. Stream crossings would be installed with both of these road segments. Based on design criteria, implementation of the Alternative 2 trail

system would require installation of a culvert or bridge at these stream crossing locations. Other roads that are proposed to be decommissioned are FR1200-504, FR3000-802, FR3000-930, FR4250-608 (Jackson), FR4270-508 (Little Summit Prairie). These roads are proposed to build the OHV trail and are discussed in more detail in the Cumulative Effects Section of this report.

Flow and Sediment Regimes

Designating Class I and III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Lower Deep Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and reopening decommissioned roads. By adding approximately 7.0 miles of trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.0 to 3.3 miles per square mile, both densities are low relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively low (2.0 miles per square mile) and by adding four new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Lower Deep Creek Subwatershed, the overall stream crossing density increases from 1.8 to 2.0 crossings per square mile, both of these densities are low relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Lower Deep Creek Subwatershed. Based on relatively low drainage densities, slight increases to the road/trail density and stream crossings density across the Lower Deep Creek Subwatershed are likely to have little effect on peak flows, with the potential for an immeasurable increase relative to the no action alternative.

Sediment/Turbidity

Designating Class I and III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Lower Deep Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams at site specific locations.

Approximately 1.5 miles of trail would be added within 300 feet of an intermittent or perennial stream, four new stream crossings would be added, and 0.5 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. In addition, approximately 1.1 miles of decommissioned roads within 300 feet of streams are proposed to be reopened as Class I trails as part of Alternative 2. By adding approximately 1.5 miles of trail to the road/trail network within the sediment delivery zone of streams in the Lower Deep Creek Subwatershed, the road/trail densities increase from 5.5 to 5.8 miles per square mile, both of these densities are low relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of virtually 0.5 new miles of trail within GDEs and associated RHCAs increases road densities in GDEs from 7.6 to 8.1 miles per square mile, both of which are high relative to the other subwatersheds.

Existing bank stability in surveyed streams in the Lower Deep Creek Subwatershed is relatively good and met LRMP standards in the Crazy Creek in 2010 and in Deep Creek in 1999. The dominant channel types of streams in Crazy Creek are B4 channel types, which have moderate channel sensitivity and excellent recovery potential. The dominant channel types of streams in Deep Creek are C4 channel types, which have very high channel sensitivity and good recovery potential. At the location of the new Class I trail stream crossing on Deep Creek, the channel type indicates that the channel should have very high streambank erosion potential. Since peakflow increases are expected to be minor and design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, overall bank stability is likely to be maintained. At site specific locations bank stability and increased sediment delivery may be of concern by

reopening decommissioned roads that cross and parallel Big Springs Creek and Buck Hollow, a portion of which are on a High Slope Erosion Hazard slope.

Based on site specific sediment delivery and bank stability concerns, Alternative 2 proposed trails have the potential to increases sediment delivery to streams and unstable banks at site specific locations, which would potentially add to sediment and turbidity increases in Deep Creek.

With the sensitive nature of fish habitat in Deep Creek Watershed, sedimentation from converting decommissioned roads to trails and construction of new trail that crosses or parallels streams within the sediment delivery zone conflicts with the intention of the Deep Creek Restoration Plan (USDA 2009).

In the Lower Deep Creek subwatershed, natural background sedimentation is estimated at 952 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 2.3 tons/year. This equates to a 0.2% increase over natural background sediment in the Lower Deep Creek Subwatershed (see Table 77).

Effects to Aquatic Species

Based on the less than 1% increase in sediment over natural background levels (see Table 77), there would be no effect on stream aggradation in the Lower Deep Creek Subwatershed from project activities (C channels would experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Lower Deep Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (less than 1% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2010 in Crazy Creek (tributary to Deep Creek) indicate that percent surface fines are around 21%, which is slightly greater than the 20% threshold for negative effects to fry emergence for steelhead. This shows there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on the less than 1% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 2 would not lead to overall stream aggradation or large increases in surface fines (2% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Lower Deep Creek Subwatershed under actions in Alternative 2. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

Upper Ochoco Creek Watershed

Alternative 2 proposes approximately 12 miles of Class I trail and approximately 1.0 miles of Class III trail within the Upper Ochoco Creek Watershed. Approximately 5.0 miles of Class I trail are proposed on existing National Forest System Roads. Approximately 6.9 miles of Class I trail and 1.0 mile of Class III trail would be new trails and not already part of the existing National Forest System

road network. Approximately 0.1 miles of new trail and 0.9 miles of trail on existing roads in the Upper Ochoco Creek Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of four existing intermittent and perennial stream crossings are proposed for use.

Upper Marks Creek Subwatershed

Alternative 2 proposes approximately 3 miles of trail on closed roads, 0.1 mile on decommissioned road, and 8 miles on new routes. Approximately 1 mile of trail is proposed on existing open roads. Alternative 2 proposes approximately 12 miles of Class I trail and approximately 1.0 miles of Class III trail within the Upper Ochoco Creek Watershed. Approximately 5.0 miles of Class I trail are proposed on existing Forest Service System Roads. Approximately 6.9 miles of Class I trail and 1.0 mile of Class III trail would be new trails and not already part of the existing Forest Service System road network. Approximately 0.1 miles of new trail and 0.9 miles of trail on existing roads in the Upper Ochoco Creek Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of four existing intermittent and perennial stream crossings are proposed for use.

Flow and Sediment Regimes

Designating Class I and Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Upper Marks Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing overall road/trail densities. By adding approximately 5.3 miles of new trail to the overall subwatershed road/trail network, the road/trail densities increase from 4.1 to 4.4 miles per square mile, both of which are high relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively moderate (2.4 miles per square mile); however, no new stream crossings are proposed in the Upper Marks Creek Subwatershed, effectively maintaining the relatively high stream crossing density of 5.0 crossings per square mile. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Upper Marks Creek Subwatershed. Moderate drainage densities, the addition of no new stream crossings, and increases to the road/trail densities across the Upper Marks Creek Subwatershed are likely to have little effect on peak flows, with the potential for an immeasurable increase relative to the no action alternative.

Sediment/Turbidity

Designating Class I and III trails and constructing new trails and stream crossings at the locations proposed in Alternative 2 in the Upper Marks Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the sediment delivery to streams. In the short-term with the implementation of Alternative 2 in this subwatershed, sediment delivery would increase; however, in the long-term, once most user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition.

Approximately 0.1 miles of trail would be added within 300 feet of an intermittent or perennial stream, no new stream crossings would be added, and 0.4 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 0.1 miles of trail to the road/trail network within the sediment delivery zone of streams in the Upper Marks Creek Subwatershed, the road/trail densities are maintained at 6.2 miles per square mile, which are moderate relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of 0.4 miles of trail within GDEs and associated RHCAs increases the road densities slightly in GDEs from 6.6 to 6.7 miles per square mile, which are moderate relative to the other subwatersheds. Overall, slope erosion hazard conditions are moderate in the vicinity of streams

in the Upper Marks Creek Subwatershed. Based on only slight increases in road densities in GDEs and near streams and no new stream crossings, sediment delivery effects are expected to be negligible based on Alternative 2.

Existing bank stability in surveyed stream reaches in the Upper Marks Creek Subwatershed within the project boundary is relatively good and met LRMP standards in surveyed reaches of Crystal Creek in 2003 and in the only stream reach of Marks Creek within the project boundary with bank stability data from 2010. Based on Level II stream surveys, the dominant channel type of streams in the Crystal Creek is an E4 channel type and in Marks Creek in the 2010 surveyed reach is a C4 channel type, both of which have very high channel sensitivity and good recovery potential. Since peakflow increases are expected to be minor and no new stream crossings are proposed, overall bank stability is likely to be maintained.

Based on a negligible increase in the road/trail density within the sediment delivery zone, a slight increase in the road density in GDEs, no new stream crossings, as well as overall moderate Slope Erosion Hazard Conditions, Alternative 2 proposed new trails are not likely to measurably increase sediment delivery to streams and GDEs nor decrease bank stability.

In the Upper Marks Creek Subwatershed, natural background sedimentation is estimated at 77 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 0.7 tons/year. This equates to a 0.8% increase over natural background sediment in the Upper Marks Creek Subwatershed (see Table 77).

Effects to Aquatic Species

Based on the less than 1% increase in sediment over natural background levels (see Table 77), there would be no effect on stream aggradation in the Upper Marks Creek Subwatershed from project activities (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Upper Marks Creek subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (<1% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 1999-2010 in Marks Creek and Crystal Creek (tributary to Marks Creek) indicates average percent surface fines are around 29%, greater than the 20% threshold for negative effects to steelhead fry emergence. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute to the extent of preventing fry emergence (based on the less than 1% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system may be having adverse effects on aquatic species and their habitat (existing roads are producing approximately 54% of natural background). Stream aggradation and fine sediment depths are likely elevated in Upper Marks Creek, which in turn may be having a negative effect on aquatic species.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Upper Marks Creek subwatershed under actions in Alternative 2. Estimates indicate that sediment production from all existing roads in the subwatershed is likely having adverse effects on instream aquatic habitat and species. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative

effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

Alternative 2 Summary

Alternative 2, the Proposed Action, focuses on designating motorized trails and supporting areas, in conjunction with opportunities that would remain on mixed use roads identified on the MVUM. Alternative 2 proposes a total of 69 miles of Class I vehicle (ATV) trails or roads, 48 miles of Class II vehicle (jeep, small truck and buggy) trail/roads, and 52 miles of Class III vehicle (motorcycle) trail/roads. These projects would result in more effects to the streams and watersheds within the Ochoco Summit project area as compared to Alternative 1, the no action alternative. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 2, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document) .

Alternative 3

Alternative 3 was developed in response to potential issues related to how the trail system could impact water quality, big game habitat, and fish habitat, as well as potential conflict between motorized and non-motorized recreation. This alternative is intended to provide motorized trails and areas at a lesser scale to reduce potential for impacts to water quality, fish and wildlife, and to reduce conflict between motorized and non-motorized recreational use. Alternative 3 proposes a total of 38 miles of Class I vehicle (ATV) trails or roads and 62 miles of Class III vehicle (motorcycle) trail/roads. These projects would result in more effects to the streams and watersheds within the Ochoco Summit project area as compared to Alternative 1, the no action alternative. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 3, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document). Overall, alternative 3 would result in less effect to stream and GDE water quality across the Ochoco Summit project area than any of the other alternatives.

In Alternative 3, the OHV trail is proposed in Deep Creek, Lower Beaver Creek, Upper North Fork Crooked River, and Upper Ochoco Creek watersheds. The two watersheds with the majority of the trail (approximately 65%) include the area within the Deep Creek Watershed and the Upper North Fork Crooked River. Approximately 101 miles of trail is proposed that includes approximately 6 miles of trail in Class I, II, and III RHCAs and 1 mile of trail in Class IV RHCAs. Of the 101 miles of trail, approximately 88 miles of trail are on closed roads, those that have been decommissioned, or new routes. Approximately 13 miles of trail would be on existing open roads. There are 21 crossings on Class I, II and III streams, and 34 crossings on Class IV streams. For trail miles and crossings in RHCAs by watershed and by stream class. Alternative 3 has fewer crossings than Alternatives 2 and 4.

Effects Common to All Watersheds

Flow and Sediment Regimes

In the long-term, this alternative would have an overall beneficial impact on flow and sediment regimes in the Ochoco Summit project area Subwatersheds relative to the historic allowance of OHV cross-country travel. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 3, sediment delivery would increase; however,

once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document). Relative to OHV cross-country travel, connectivity of roads and trails with streams would ultimately be lessened resulting in decreased peak flow magnitudes. However, relative to the no action alternative, proposed trails in Alternative 3 would increase the overall road/trail density and stream crossing density. Increased road/trail densities have the potential to in effect increase drainage density, resulting in increased connectivity and peak flow magnitudes.

Sediment/Turbidity

Overall, this alternative would reduce impacts relative to water quality, in particular sediment and turbidity. In the long-term, relative to OHV cross-country travel, sediment and turbidity related water quality would be maintained or slightly improved through an overall reduction in the number of stream and wetland crossing locations, improved stream crossing types, improved trail drainage, reduction in the miles of trail in the vicinity of perennial and intermittent streams, and anticipated decreased peak flow magnitudes.

As compared to historic OHV cross-country travel impacts, streambank conditions are expected to maintain or slightly improve over time with the implementation of Alternative 3. Relative to OHV cross-country travel, fewer stream crossings would occur within all subwatersheds and culverts or bridges would be installed at all new perennial and intermittent stream crossings. By reducing the number of crossing locations relative to cross-country travel and by not allowing fords, direct streambank impacts would be reduced. Alternative 3 would have more impact on streambanks as compared to the no action alternative with increased stream crossings and potential disturbance during culvert or bridge installation. Alternative 3 would have less of an impact to streambanks as compared to Alternative 2 with fewer stream crossings, less changes to the sediment and flow regimes, and with the absence of Class II trails. Areas that are currently entrenched (G and F-type channels) would continue to adjust and may take several decades to become stable with vegetation. Sediment yield from these entrenched systems would continue to exist, but would decline as streambanks adjust slope and become vegetated.

As the effects of the implementation of the Travel Management Decision that omits cross-country travel across the Ochoco National Forest are realized, impacts to Groundwater-Dependant Ecosystems (GDEs) in the form of wetlands, wet meadows, and springs would be reduced even with the designation of the trail network in Alternative 3. User created trails across GDEs would naturally revegetate over time and trails that cross GDEs would have minimal effect through the implementation of the design criteria. Design criteria state that trails would either be rereouted to “avoid meadows, seeps, and springs” or “puncheon stringers” would need to be installed that would elevate the trail above the GDE. Overall, however, Alternative 3 would have slightly more effect on GDEs through increased road/trail densities in and within GDE RHCAs through increased disturbance levels compared to the no action alternative.

Overall, Alternative 3 would result in reduced sediment delivery to streams through improved trail drainage, periodic trail maintenance, reduced trail densities near streams, and reduced peak flows as compared to historic OHV cross-country uses in the Ochoco Summit project area. User-created trails that have been created over time do not have proper drainage, are not maintained, and cross over a larger portion of the landscape including across streams. By designating the trail system in Alternative 3, erosion and sediment delivery to the stream channel is mitigated by the design criteria that require outlsloping and hardening approaches to stream crossing, installing rolling dips to disperse water from the trail, by reducing the number of locations where OHVs can cross intermittent and perennial streams, and by reducing the density of trails within the sediment delivery zone (300

feet). Reduced peak flows also dissipate the effects of sediment delivery to streams by reducing the potential for rilling to occur along the trails or where flow is diverted off the trail onto the hillslope above the stream channel.

Overall, this alternative would be consistent with the water goals and maintaining cutbank levels to below 20 percent as outlined in the LRMP. This alternative would be consistent with the Riparian Management Goal of maintaining bank stability greater than 80 percent outlined in INFISH and with the RMO. This alternative would protect designated beneficial uses and would be consistent with the Clean Water Act and Executive Orders 11988, 11990, and 12088. Site specific locations in the Deep Creek Watershed, however, would not be consistent with the purpose and need of the Deep Creek Restoration and potentially resulting in turbidity increases in Deep Creek. Cumulative turbidity increases of ten percent or more do not meet LRMP water quality standards and guidelines.

Table 78 displays estimated sediment contribution from road/trail crossings and road/trail segments within 300 feet of streams in project area subwatersheds, and compares these contributions to estimated natural background hillslope sediment production. Table 78 also displays estimates of existing road sediment contributions and compared these contributions, along with those estimated for actions in Alternative 3, to natural background hillslope sediment production.

Table 78. Sediment contribution from road/trail crossing and adjacent road/trail segments (tons/year) compared to estimated natural background sediment (tons/year) by subwatershed for Alternative 3.

Subwatershed	Total Natural Background Sediment (tons/year)	Estimated Contribution from Existing Roads (tons/year)	Total Contribution from Road/Trail Crossings (tons/year)	Total Contribution from Adjacent Road/Trail Segments (tons/year)	Alternative 3 – Percent of Natural Background	Alternative 3 + Existing Roads – Percent of Natural Background
Elliott Creek	421	10.6	4.1	0.2	1%	4%
Howard Creek	404	16.1	1.7	0.1	0.4%	4%
Jackson Creek	252	21.1	7.5	0.3	3%	11%
Little Summit Prairie Creek	255	14.4	0.7	0.05	0.3%	6%
Lower Deep Creek	952	12.2	2.0	0.3	0.2%	2%
North Wolf Creek	215	9.4	0.1	0.01	0%	4%
Peterson Creek – North Fork Crooked River	1051	29.4	0	0	0%	3%
Porter Creek	562	20.9	2.5	0.4	0.5%	4%
Upper Marks Creek	77	40.8	4.1	0.2	6%	59%

Lower Beaver Creek Watershed

Alternative 3 proposes 9.1 miles of Class III trail within the Lower Beaver Creek Watershed. Approximately, 4.1 miles of the total are proposed on existing National Forest System Roads and approximately 5.0 miles would be new trail construction. Approximately 0.2 miles of new trail and 1.0 miles of trail on existing roads in the Lower Beaver Creek Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of three existing stream crossings are proposed for use, all of which cross intermittent streams.

North Wolf Creek Subwatershed

There is no difference between Alternative 2 and 3 in the North Wolf Creek Subwatershed in terms of the proposed trail system. Therefore, the effects would be the same as those addressed under Alternative 2 for the North Wolf Creek Subwatershed.

Upper North Fork Crooked River Watershed

Upper North Fork Crooked River Watershed includes Elliot Creek, Howard Creek, Peterson Creek, and Porter Creek Subwatersheds. Approximately 17 miles of Class I and Class II trail are on closed roads, decommissioned roads and new routes. Approximately 5 miles of trail are on existing open roads. Alternative 3 proposes approximately 15 miles of Class I trail and approximately 8.0 miles of Class III trail within the Upper North Fork Crooked River Watershed. Approximately 5.3 miles of Class I trail and 4.9 miles of Class III trail are proposed on existing Forest Service System Roads. Approximately 9.5 miles of Class I trail and 3.1 miles of Class III trail would be new trails not already part of the existing Forest Service System road network. Approximately 2.8 miles of new trail and 2.1 miles of trail on existing roads in the Upper North Fork Crooked River Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of 13 new and 3 existing intermittent and perennial stream crossings are proposed for use.

Elliot Creek Subwatershed

Alternative 3 proposes six miles of trail on closed roads, decommissioned roads, and new routes, and two miles of trail on existing open roads. Within the Elliott Creek Subwatershed, approximately 3.7 miles of Class I trail are located on existing Forest Service System Road and approximately 3.3 miles of Class I new trail are proposed to be constructed as part of Alternative 3. Alternative 3 proposes Class I trails to cross perennial and intermittent streams at one location at an existing stream crossing on existing roads and to cross perennial and intermittent streams with new trails at four locations.

The Maxwell Fire BAER rehabilitation road treatments, included rehabilitation work on segments of two roads within the Elliot Creek Subwatershed, FS 2200-505 and FS 2200-500. In Alternative 3, proposed trail locations do no overlap either FS 2200-500 or FS 2200-505.

Flow and Sediment Regimes

Designating Class I trails and constructing new trails and stream crossings at the locations proposed in Alternative 3 in the Elliot Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and stream crossing densities overall. By adding approximately 3.3 miles of trail to the overall subwatershed road/trail network, the road/trail densities increase somewhat from 3.3 to 3.5 miles per square mile. Relative to the overall range in existing road densities across the Ochoco Summit project area, the rating for road/trail densities increases from low to moderate. Drainage densities are relatively high (2.8 miles per square mile) and by adding four new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Elliot Creek Subwatershed, the overall stream crossing density increases from 3.4 to 3.7 crossings per square mile, bringing the overall rating up from moderate to high relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are high in the vicinity of streams in the Elliot Creek Subwatershed, which can make interconnectivity of roads and streams more likely, potentially resulting in increased peak flows in streams. Increases in the road/trail and stream crossing densities across the Elliot Creek Subwatershed, in combination with poor slope erosion hazard conditions, potentially increases the flow and sediment regime relative to the existing condition.

Sediment/Turbidity

Constructing new Class I and III trails and stream crossings at the locations proposed in Alternative 3 in the Elliot Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and stream crossing densities overall. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 3, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document).

Approximately 0.8 miles of trail would be added within 300 feet of an intermittent stream, four new stream crossings would be added, and 0.2 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 0.8 miles of trail to the road/trail network within the sediment delivery zone of streams in the Elliot Creek Subwatershed, the road/trail densities increase from 4.3 to 4.5 miles per square mile, both ratings are low relative to the overall range in existing road densities across the Ochoco Summit project area. The addition of 0.2 miles of trail within GDEs and associated RHCAs raises road densities in GDEs from approximately 2.8 to 3.0 miles per square mile, maintaining a low rating relative to other project subwatersheds. Slope Erosion Hazard Ratings are relatively high, making erosion and potentially sediment delivery more likely in the subwatershed. Sediment delivery estimates indicate an addition of a relatively moderate amount of sediment delivery to the no action alternative (see Aquatic Species section).

Existing bank stability in Fox Creek, the only stream in the Elliot Creek Subwatershed with a Level II stream survey conducted, is relatively good and met LRMP standards as of 2002. In addition, the dominant channel type of Fox Creek has moderate channel sensitivity and recovery potential. Other reaches of Fox Creek are classified as A4 and C4 channel types. A4 channel types generally have extreme channel sensitivity and very poor recovery potential, while C4 channel types generally have very high channel sensitivity and good recovery potential. No new trails are proposed to cross or parallel Fox Creek. Assuming that other streams in the Elliot Creek Subwatershed exhibit similar dominant channel type conditions and the implementation of design criteria that require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, bank stability is likely to be maintained, unless increased peak flows result from increases in road/trails and stream networks.

Based on high Slope Erosion Hazard conditions, increases in both road/trail densities within the sediment delivery zone, and increases in stream crossing densities, Alternative 3 proposed new trails have the potential to increases sediment delivery to streams; however, banks stability is likely to be maintained.

In the Elliott Creek Subwatershed, natural background sedimentation is estimated at 421 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 4.3 tons/year. This equates to a 1% increase over natural background sediment in the Elliott Creek Subwatershed (see Table 78).

Effects to Aquatic Species

Based on the 1% increase in sediment over natural background levels (see Table 78), there would be no effect on stream aggradation in the Elliott Creek Subwatershed from project activities proposed under Alternative 3 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves

in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Elliott Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (less than 1% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2002 in the Elliott Creek watershed indicate that average percent surface fines are around 28%, which is greater than the 20% threshold for negative effects to fry emergence for steelhead. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on the less than 1% increase in sediment over estimated natural background levels).Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 2 would not lead to overall stream aggradation or large increases in surface fines (4% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Elliott Creek Subwatershed under actions in Alternative 3. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Elliott Creek Subwatershed, Alternative 3 would have less effect in terms of fine sediment delivery when compared to Alternative 2. There would be fewer trails within 300’ of streams and fewer trail/stream crossings. Alternative 3 is estimated to produce 12 fewer tons of sediment per year when compared to Alternative 2 in the Elliott Creek Subwatershed.

Howard Creek Subwatershed

Alternative 3 proposes seven miles of trail on closed roads, decommissioned, and new routes, and one mile on open roads. Within the Howard Creek Subwatershed, approximately 1.6 miles of Class I trail are located on existing Forest Service System Road and approximately 6.2 miles of new Class I trail are proposed to be constructed as part of Alternative 3. Alternative 3 proposes for Class I trails to cross perennial and intermittent streams with new trails at four locations.

In terms of effects to flow and sediment regimes, sediment/turbidity, and aquatic species and their habitat, there difference between Alternative 2 and 3 is very small. Therefore, the effects addressed for Howard Creek under Alternative 2 would be the same for Alternative 3.

In the Howard Creek Subwatershed, Alternative 3 would have the same effect in terms of fine sediment delivery when compared to Alternative 2. However, there would be fewer trails within 300’ of streams and fewer trail/stream crossings in the Howard Creek Subwatershed. Alternative 3 is expected to have less effect on aquatic species, even though the fine sediment produced is the same between Alternative 2 and 3, because there would be fewer trail/stream crossings and adjacent trails that may still have impacts on bank stability and other channel alterations.

Peterson Creek Subwatershed

No trails are proposed within the Peterson Creek Subwatershed for Alternative 3.

Flow and Sediment Regimes

By proposing no OHV trails in Alternative 3 in the Peterson Creek Subwatershed, flow and sediment regimes would improve more quickly with the exclusion of cross-country OHV travel. All road/trail densities and stream crossing densities would remain the same in the Peterson Creek Subwatershed with the implementation of Alternative 3. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Peterson Creek Subwatershed. In the long-term, flow and sediment regime conditions in the Peterson Creek Subwatershed are expected to improve more quickly than in Alternatives 2 and 4, similar to the no action alternative.

Sediment/Turbidity

By proposing no OHV trails in Alternative 3 in the Peterson Creek Subwatershed, sediment/turbidity conditions would improve more quickly with the exclusion of cross-country OHV travel. All road/trail densities within the sediment delivery zone of streams and GDEs and associated RHCAs, as well as stream crossing densities would remain the same in the Peterson Creek Subwatershed with the implementation of Alternative 3. In the long-term, sediment delivery and banks stability conditions in the Peterson Creek Subwatershed are expected to improve more quickly than in Alternatives 2 and 4, similar to the no action alternative.

Effects to Aquatic Species

In the Peterson Creek Subwatershed, Alternative 3 would have no effect on aquatic species in the Peterson Creek Subwatershed. Alternative 3 would have less effect in terms of fine sediment delivery when compared to Alternative 2. There would be no trails within 300' of streams and no trail/stream crossings in the Peterson Creek Subwatershed.

Porter Creek Subwatershed

Alternative 3 proposes four miles of trail on closed roads, decommissioned and new routes and 3.5 miles of trail on open roads. Within the Porter Creek Subwatershed, approximately 4.9 miles of Class III trail located on existing Forest Service System Road. Approximately 3.1 miles of Class III new trail are proposed to be constructed as part of Alternative 3. No Class I or II trails are proposed to cross intermittent or perennial stream channels in Alternative 3. Class III trails are proposed to cross perennial and intermittent streams at five new locations.

Flow and Sediment Regimes

Designating Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 3 in the Porter Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and stream crossing densities overall. By adding approximately 3.1 miles of trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.7 to 3.9 miles per square mile, maintaining a rating of moderate relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively high (2.8 miles per square mile) and by adding five new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Porter Creek Subwatershed, the overall stream crossing density increases from 4.0 to 4.3 crossings per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are low in the vicinity of streams in the Porter Creek Subwatershed. Slight increases to the road/trail density and already high stream crossing density across the Porter Creek Subwatershed in combination with all trails being Class III (motorcycle) have the potential to slightly increase impacts to flow and sediment regimes in the short-term (i.e. approximately 10-15 years) relative to the existing condition.

Sediment/Turbidity

Designating Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 3 in the Porter Creek Subwatershed may improve somewhat the bank stability and sediment delivery conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 3, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document).

Approximately 0.6 miles of trail would be added within 300 feet of an intermittent stream, five new stream crossings would be added, and essentially no miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 0.6 miles of trail to the road/trail network within the sediment delivery zone of streams in the Porter Creek Subwatershed, the road/trail densities increase from 7.4 to 7.5 miles per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. Slope Erosion Hazard conditions for the Porter Creek Subwatershed are low overall, somewhat reducing the risk and magnitude of potential sediment delivery increases for the proposed trail network in Alternative 3. Sediment delivery estimates indicate an addition of a relatively moderate amount of sediment delivery to the no action alternative (see Aquatic Species section).

Existing bank stability in surveyed streams in the Porter Creek Subwatershed was relatively good and met LRMP standards in East Porter Creek in 1995 and in the top and bottom reaches of Porter Creek in 2006-2007. Bank stability in the middle reach of Porter Creek in 2007 slightly exceeded LRMP standards with approximately 23 percent of the stream length unstable. No trails are proposed to cross Porter Creek on the reach of stream that is not meeting LRMP standards of no more than 20 percent unstable banks. Dominant channel types in Porter Creek indicate moderate channel sensitivity and excellent recovery potential. Assuming that other streams in the Porter Creek Subwatershed exhibit similar dominant conditions to Porter Creek and implementation of design criteria that require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, bank stability is likely to be maintained.

Based on increases stream crossing density and slight increases in in road/trail densities within the sediment delivery zone, Alternative 3 proposed new trails have the potential to increase sediment delivery to streams as described in the Aquatic Species section; however, bank stability is likely to be maintained.

In the Porter Creek Subwatershed, natural background sedimentation is estimated at 562 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 2.9 tons/year. This equates to a 0.5% increase over natural background sediment in the Porter Creek Subwatershed (see Table 78).

Effects to Aquatic Species

Based on the less than 1% increase in sediment over natural background levels (see Table 78), there would be no effect on stream aggradation in the Porter Creek Subwatershed from project activities proposed under Alternative 3 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent

fine sediment is under 20%. The proposed activities in the Porter Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (0% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2006 and 2007 in the Porter Creek watershed indicate that average percent surface fines are around 22%, which is slightly greater than the 20% threshold for negative effects to fry emergence for steelhead. This indicates that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on the less than 2% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 3 would not lead to overall stream aggradation or large increases in surface fines (4% of natural background). However it is presumable that there are localized areas where the existing road system, as well as other historic or current land us practices, are causing stream and streambank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Porter Creek Subwatershed under actions in Alternative 3. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Porter Creek Subwatershed, Alternative 3 would have less effect in terms of fine sediment delivery when compared to Alternative 2. There would be fewer trails within 300' of streams and fewer trail/stream crossings. Alternative 3 is estimated to produce 13 fewer tons of sediment per year when compared to Alternative 2 in the Porter Creek Subwatershed.

Deep Creek Watershed

Alternative 3 proposes approximately 37 miles of trail on closed roads, decommissioned roads and new routes. Approximately 5 miles of trail are proposed on existing open roads. Alternative 3 proposes approximately 43 miles of Class III trail within the Deep Creek Watershed. Approximately 24 miles of Class III trail are proposed on existing Forest Service System Roads. Approximately 19 miles of Class III trail would be new trails and not already part of the existing Forest Service System road network. Approximately 2.6 miles of new trail and 7.0 miles of trail on existing roads in the Deep Creek Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of 11 new and 13 existing intermittent and perennial stream crossings are proposed for use.

Jackson Creek Subwatershed

Within the Jackson Creek Subwatershed, approximately 15 miles of trail are proposed on closed roads, decommissioned roads and new routes. Approximately four miles of trail are proposed for existing open roads. Within the Jackson Creek Subwatershed, approximately 13 miles of Class III trail are located on existing Forest Service System Road. Approximately 6.2 miles of new Class III trail are proposed to be constructed as part of Alternative 3. Alternative 3 proposes for Class III trails to cross perennial and intermittent streams with new trails at six locations and to cross perennial and intermittent streams on existing roads at six locations.

Flow and Sediment Regimes

Designating Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 3 in the Jackson Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term (i.e. 10-15 years post-construction) relative to past cross-country

travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing overall road/trail and stream crossing densities. By adding approximately 6.2 miles of new trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.7 to 3.8 miles per square mile, both ratings are moderate relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively low (1.8 miles per square mile) and by adding six new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Jackson Creek Subwatershed, the overall stream crossing density increases from 1.8 to 2.0 crossings per square mile, both of these densities are low relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Jackson Creek Subwatershed. Based on relatively low drainage and stream crossing densities, slight increases to the road/trail density and stream crossings density across the Jackson Creek Subwatershed are likely to have a negligible effect on peak flows, with the potential for an immeasurable increase relative to the no action alternative.

Sediment/Turbidity

Designating Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 3 in the Jackson Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams. In the short-term (i.e. approximately 10-15 years post-construction) with the implementation of Alternative 3 in this subwatershed, sediment delivery would increase; however, in the long-term, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition assuming extensive historic cross-country OHV trail systems exist.

Approximately 0.9 miles of trail would be added within 300 feet of an intermittent or perennial stream, six new stream crossings would be added, and 0.4 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 0.9 miles of trail to the road/trail network within the sediment delivery zone of streams in the Jackson Creek Subwatershed, the road/trail densities increase from 6.1 to 6.2 miles per square mile, both of these densities are moderate relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of 0.4 miles of trail within GDEs and associated RHCAs increases the road densities in GDEs from 5.6 to 5.7 miles per square mile, which are low relative to the other subwatersheds. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Jackson Creek Subwatershed. Estimates of sediment delivery in the Aquatic Species section indicate that Alternative 3 has the potential to add a moderate amount of sediment delivery relative to the no action alternative (Alternative 1), but less than Alternatives 2 and 4.

Existing bank stability in surveyed streams in the Jackson Creek Subwatershed is relatively good and met LRMP standards in Happy Camp Creek and Jackson Creek from 1998 and 2010. Based on Level II stream surveys, the dominant channel types of streams in Happy Camp Creek are E4 channel types and in Jackson Creek are C4 channel types, which have very high channel sensitivity and good recovery potential. At the location of the new Class III stream crossing location on Jackson Creek, the channel type indicates moderate streambank erosion potential. Since peakflow increases are expected to be negligible, design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, and based on channel type conditions, overall bank stability is likely to be maintained.

Based on slight increases in both stream crossing and road/trail densities within the sediment delivery zone and in GDEs, as well as overall moderate Slope Erosion Hazard Conditions, Alternative 3 proposed new trails have the potential to moderately increase sediment delivery to streams and GDEs; however, banks stability is likely to be maintained.

In the Jackson Creek Subwatershed, natural background sedimentation is estimated at 252 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 8.0 tons/year. This equates to a 3% increase over natural background sediment in the Jackson Creek Subwatershed (see Table 78).

Effects to Aquatic Species

Based on the 3% increase in sediment over natural background levels (see Table 78), there would be no effect on stream aggradation in the Jackson Creek Subwatershed from project activities proposed under Alternative 3 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Jackson Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (3% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2010 in Jackson Creek indicate that average percent surface fines are around 21%, which is slightly greater than the 20% threshold for negative effects to fry emergence for steelhead. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on the 3% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 3 would not lead to overall stream aggradation or large increases in surface fines (11% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, are causing stream and streambank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Jackson Creek Subwatershed under actions in Alternative 3. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Jackson Creek Subwatershed, Alternative 3 would have less effect in terms of fine sediment delivery when compared to Alternative 2. There would be fewer trails within 300’ of streams and fewer trail/stream crossings. Alternative 3 is estimated to produce 4 fewer tons of sediment per year when compared to Alternative 2 in the Jackson Creek Subwatershed.

Little Summit Prairie Creek Subwatershed

Within the Little Summit Prairie Creek Subwatershed, approximately 13 miles of trail are located on closed roads, decommissioned roads and new routes. Approximately one mile of trail is proposed to be on open roads. Within the Little Summit Prairie Creek Subwatershed, approximately 5.6 miles of Class III trail are located on existing Forest Service System Road. Approximately 7.0 miles of Class III new trail are proposed to be constructed as part of Alternative 3. Class III trails are proposed to cross perennial and intermittent streams at one new location and to cross perennial and intermittent streams at two locations at existing stream crossings on existing roads.

Flow and Sediment Regimes

Designating Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 3 in the Little Summit Prairie Creek Subwatershed may improve somewhat the flow

and sediment regime conditions in the long-term (i.e. approximately 10-15 years post-construction relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing overall road/trail and stream crossing densities. By adding approximately seven miles of new trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.8 to 4.1 miles per square mile, bringing the rating from moderate to high relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively low (2.2 miles per square mile) and by adding one new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Little Summit Prairie Creek Subwatershed, the overall stream crossing density increases from 2.5 to 2.6 crossings per square mile, both of these densities are moderate relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Little Summit Prairie Creek Subwatershed. Based on relatively low drainage densities, increases to the road/trail density and stream crossings density across the Little Summit Prairie Creek Subwatershed are likely to have little effect on peak flows, with the potential for an immeasurable increase relative to the no action alternative.

Sediment/Turbidity

Designating Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 3 in the Little Summit Prairie Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the sediment delivery to streams. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 3, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document).

Approximately 0.6 miles of trail would be added within 300 feet of an intermittent or perennial stream, one new stream crossings would be added, and 0.4 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 0.6 miles of trail to the road/trail network within the sediment delivery zone of streams in the Little Summit Prairie Creek Subwatershed, the road/trail densities increase from 7.4 to 7.5 miles per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of 0.4 miles of trail within GDEs and associated RHCAs increases the road densities in GDEs from 5.1 to 5.4 miles per square mile, which are low relative to the other subwatersheds. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Little Summit Prairie Creek Subwatershed. Estimates of sediment delivery in the Aquatic Species section indicate that Alternative 3 has the potential to add a low amount of sediment delivery relative to the no action alternative (Alternative 1), the same as Alternatives 2 and 4.

Existing bank stability in surveyed streams in the Little Summit Prairie Creek Subwatershed is relatively good and met LRMP standards in surveyed reaches of Little Summit Creek and an unnamed tributary in 1998 and 2010. Based on Level II stream surveys, the dominant channel types of streams in the Little Summit Prairie Creek Subwatershed are C4 channel types, which have very high channel sensitivity and good recovery potential. At the location of the new Class I trail stream crossings on Little Summit Creek, the channel type is a B3 channel type, which indicates that the channel should have low streambank erosion potential. Since peakflow increases are expected to be minor, streambank erosion based on channel type at the stream crossing is low, and design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, overall bank stability is likely to be maintained.

Based on slight increases in both road/trail densities within the sediment delivery zone and in GDEs, as well as overall moderate Slope Erosion Hazard Conditions, Alternative 3 proposed new trails have the potential to slightly increase sediment delivery to streams and GDEs; however, banks stability is likely to be maintained.

In the Little Summit Prairie Creek Subwatershed, natural background sedimentation is estimated at 255 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 0.75 tons/year. This equates to a 0.3% increase over natural background sediment in the Little Summit Creek Subwatershed (see Table 78).

Effects to Aquatic Species

Based on the less than 1% increase in sediment over natural background levels (see Table 78), there would be no effect on stream aggradation in the Little Summit Prairie Creek Subwatershed from project activities proposed under Alternative 3 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Little Summit Prairie Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (0% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2010 in Little Summit Prairie Creek indicate that average percent surface fines are around 29%, which is greater than the 20% threshold for negative effects to steelhead fry emergence. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on 0% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 3 would not lead to overall stream aggradation or large increases in surface fines (6% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Little Summit Prairie Subwatershed under actions in Alternative 3. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Little Summit Prairie Subwatershed, Alternative 3 would have less effect in terms of fine sediment delivery when compared to Alternative 2. There would be fewer trails within 300’ of streams and fewer trail/stream crossings. Alternative 3 is estimated to produce 1.0 fewer tons of sediment per year when compared to Alternative 2 in the Little Summit Prairie Subwatershed.

Lower Deep Creek Subwatershed

Within the Lower Deep Creek Subwatershed, approximately 5.4 miles of Class III trail are located on existing National Forest System Road and approximately 5.9 miles of new Class III trail are proposed to be constructed as part of Alternative 3. Alternative 3 proposes for Class III trails to cross perennial and intermittent streams with new trails at four locations and to cross perennial and intermittent streams on existing roads at five locations. Relative to Alternative 2, Alternative 3 eliminates all Class I trails and converts most of them to Class III trails.

Proposed restoration projects were identified in the Deep Creek Restoration Plan, some of which have already been implemented. Of the 2.8 miles of road within the sediment delivery zone of streams that were decommissioned in the Lower Deep Creek Subwatershed as part of the Deep Creek Restoration Plan, 0.7 miles of the FS 4200-600 and 0.4 miles of the FS 4200-603 decommissioned roads are planned to be converted to Class III trails in Alternative 3. The FS 4200-600 road parallels Big Spring Creek, a fish-bearing perennial stream, for approximately 0.3 miles and parallels and intermittent tributary to Big Spring Creek for approximately 0.4 miles. The FS 4200-603 road parallels Buck Hollow, a perennial stream, for approximately 0.4 miles. The reopened portion of the FS 4200-603 road is located on high slope erosion hazard. Approximately a third of the converted portion of the FS 4200-600 road is located on high slope erosion hazard, a third is located on moderate slope erosion hazard, and a third is located on low slope erosion hazard. Stream crossings would be installed with both of these road segments. Based on design criteria, implementation of the Alternative 3 trail system would require installation of a culvert or bridge at these stream crossing locations.

In terms of effects to flow and sediment regimes, sediment/turbidity, and aquatic species and their habitat, there difference between Alternative 2 and 3 is very small. Therefore, the effects addressed for Lower Deep Creek Subwatershed under Alternative 2 would be the same for Alternative 3.

In the Lower Deep Creek Subwatershed, Alternative 3 would have the same effect in terms of fine sediment delivery when compared to Alternative 2. However, there would be fewer trails within 300' of streams and fewer trail/stream crossings. In addition, fewer roads proposed for decommissioning by the Deep Creek EA are proposed for conversion to trail in Alternative 3 (see Conclusion). Alternative 3 is expected to have less effect on aquatic species, even though the fine sediment produced is the same between Alternative 2 and 3, because there would be fewer trail/stream crossings and adjacent trails that may still have impacts on bank stability and other channel alterations in the Lower Deep Creek Subwatershed.

Upper Ochoco Creek Watershed

Alternative 3 proposes approximately 24 miles of trail with two miles on open roads and 22 miles on closed, decommissioned and new routes. There are about two times as many miles of trail in Alternative 3 (24 mi.) than in Alternative 2 (13 mi.), but less than Alternative 4 (37 mi.). Upper Ochoco Creek is east of Round Mountain and is fed by a number of streams: Canyon, Coyle, McAllister, Ahalt, Judy, Scissors, and Fisher Creeks.

Alternative 3 proposes approximately 24 miles of Class I trail within the Upper Ochoco Creek Watershed. Approximately 11 miles of Class I trail are proposed on existing National Forest System Roads. Approximately 12 miles of Class I trail would be new trails and not already part of the existing National Forest System road network. Approximately 1.1 miles of new trail and 1.7 miles of trail on existing roads in the Upper Ochoco Creek Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of six existing intermittent and perennial stream crossings and six new stream crossings are proposed for use.

Upper Marks Creek Subwatershed

Alternative 3 proposes for Class I trail to cross three Class II streams and three Class IV streams on 20 miles of closed roads, decommissioned roads and new routes with two miles on open roads. Within the Upper Marks Creek Subwatershed, approximately 11 miles of Class I trail are located on existing Forest Service System Road. Approximately 11 miles of new Class I trail are proposed to be constructed as part of Alternative 3. Alternative 3 proposes for Class I trails to cross perennial and intermittent streams on existing roads at six locations and at new stream crossings at six locations.

Flow and Sediment Regimes

Designating Class I trails and constructing new trails and stream crossings at the locations proposed in Alternative 3 in the Upper Marks Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing overall road/trail densities. By adding approximately 11 miles of new trail to the overall subwatershed road/trail network, the road/trail densities increase from 4.1 to 4.7 miles per square mile, both of which are high relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively moderate (2.4 miles per square mile) and by adding six new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Upper Marks Creek Subwatershed, the overall stream crossing density increases from 5.0 to 5.3 crossings per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Upper Marks Creek Subwatershed. Moderate drainage densities, the addition of six new stream crossings, and increases to the road/trail and stream crossing densities across the Upper Marks Creek Subwatershed have the potential to increase peak flows and shorten response times relative to the existing condition.

Sediment/Turbidity

Designating Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 3 in the Upper Marks Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 3, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document).

Approximately 1.1 miles of trail would be added within 300 feet of an intermittent or perennial stream, six new stream crossings would be added, and 1.4 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 1.1 miles of trail to the road/trail network within the sediment delivery zone of streams in the Upper Marks Creek Subwatershed, the road/trail densities are increased from 6.2 to 6.4 miles per square mile, which are moderate relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of 1.4 miles of trail within GDEs and associated RHCAs increases the road densities slightly in GDEs from 6.6 to 7.2 miles per square mile, increasing from moderate to high relative to the other subwatersheds. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Upper Marks Creek Subwatershed. Estimates of sediment delivery in the Aquatic Species section indicate that Alternative 3 has the potential to add a relatively moderate amount of sediment delivery relative to the no action alternative (Alternative 1) and Alternative 2, but less than Alternative 4. Based on increases in stream crossing densities and road densities in GDEs and near streams, as well as sediment delivery estimates, sediment delivery effects are expected to be be moderate in Alternative 3 for the Upper Marks Creek Subwatershed.

Existing bank stability in surveyed stream reaches in the Upper Marks Creek Subwatershed within the project boundary is relatively good and met LRMP standards in surveyed reaches of Crystal Creek in 2003 and in the only stream reach of Marks Creek within the project boundary with bank stability data from 2010. Based on Level II stream surveys, the dominant channel type of streams in the Crystal Creek is an E4 channel type and in Marks Creek in the 2010 surveyed reach is a C4 channel type, both of which have very high channel sensitivity and good recovery potential. The channel type

at the proposed new stream crossing on Crystal Creek is an E4, which has high streambank erosion potential. Based on potential increases to peakflow, high streambank erosion potential conditions, and increases stream crossing densities, a potential exists that bank stability could decreases relative to the existing condition. Since the design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches; however, bank stability is likely to be maintained, unless increased peak flows result from the increases in road/trails and stream networks.

Based on increased road/trail densities, stream crossing densities, road/trail densities in the vicinity of streams and GDEs, and channel type conditions in the Upper Marks Creek Subwatershed; Alternative 3 proposed trails have the potential to increase sediment delivery to streams and unstable banks, which would potentially add to sediment and turbidity increases in Marks Creek.

In the Upper Marks Creek Subwatershed, natural background sedimentation is estimated at 77 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 4.3 tons/year. This equates to a 6% increase over natural background hillslope sediment in the Upper Marks Creek Subwatershed (see Table 78).

Effects to Aquatic Species

Based on the 6% increase in sediment over natural background levels (see Table 78), there would be no effect on stream aggradation in the Upper Marks Creek Subwatershed from project activities proposed under Alternative 3 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Upper Marks Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (less than 2% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983.

Instream substrate surveys conducted in 1999-2010 in Marks Creek and Crystal Creek (tributary to Marks Creek) indicates average percent surface fines are around 29%, greater than the 20% threshold for negative effects to steelhead fry emergence. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on the 6% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system may be having adverse effects on aquatic species and their habitat (existing roads are producing approximately 59% of natural background). Stream aggradation and fine sediment depths are likely elevated in Upper Marks Creek, which in turn may be having a negative effect on aquatic species.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Upper Marks Creek Subwatershed under actions in Alternative 3. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Upper Marks Creek Subwatershed, Alternative 3 would have more effect in terms of fine sediment delivery when compared to Alternative 2. There would be fewer trails within 300’ of streams and fewer trail/stream crossings. Alternative 3 is estimated to produce 3.6 more tons of sediment per year when compared to Alternative 2 in the Upper Marks Creek Subwatershed.

Alternative 3 Summary

Alternative 3 proposes a total of 38 miles of Class I vehicle (ATV) trails or roads and 62 miles of Class III vehicle (motorcycle) trail/roads. These projects would result in more effects to the streams and watersheds within the Ochoco Summit project area as compared to Alternative 1, the no action alternative. During trail construction and prior to vegetation re-establishment (approximately 10-15 years), with the implementation of Alternative 3, sediment delivery would increase; however, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organisms and Soils section under Resource Protection Measures in Chapter 2 of this document). Overall, alternative 3 would result in less effect to stream and GDE water quality across the Ochoco Summit project area than any of the other alternatives.

Alternative 4

Alternative 4 was developed in response to an issue identified during scoping that the proposed action trail system is too small and lacks quality. Alternative 4 includes trails for class I, II and III vehicles over more area and with more miles than the Proposed Action. Alternative 4 proposes a total of 95 miles of Class I vehicle (ATV) trails or roads, 19 miles of Class II vehicle (4x4), and 45 miles of Class III vehicle (motorcycle) trail/roads. In the short-term (i.e. approximately 2-3 years) with the implementation of Alternative 4, sediment delivery would increase; however, in the long-term (i.e. approximately 10-15 years post-construction), even though some user-created trails have revegetated, due to the extensive network of OHV trails added in this alternative, impacts to the flow and sediment regime and sediment/turbidity levels in the streams would likely remain at or in excess of the existing condition. Alternative 4 would result in the largest impact to streams and watersheds within the Ochoco Summit project area as compared to all of the other three alternatives.

Alternative 4 addresses the Purpose and Need as outlined in Chapter 1 by proposing to develop a trail network that includes approximately 158 miles of proposed OHV trail and 53 miles of open National Forest System roads that connect trail segments or contribute to the network by connecting trail segments or by enhancing loop opportunities/options for trail users. The motorized trails would be open for use by specified vehicle type, seasonally between May 1 and November 1 of each year, except on Paulina Ranger District, where trails would close at the beginning of the restriction period specified for the Rager Cooperative Travel Management Area, and would remain closed until May 1 of each year. This alternative features several interconnected trails systems.

Effects Common to All Watersheds

Flow and Sediment Regimes

Since the exact magnitude of the existing user-created trail system is unknown and due to the extensive trail system proposed in Alternative 4, it is difficult to say whether this alternative would have an overall beneficial impact on flow and sediment regimes in the Ochoco Summit project area Subwatersheds in the long-term. In the short-term (i.e. approximately 10-15 years) with the implementation of Alternative 4, impacts of the addition of trails on the flow and sediment regimes would increase; however, in the long-term (i.e. approximately 10-15 years post-construction), once most user-created trails have revegetated, impacts to watersheds flow and sediment regimes should decrease to some extent. Relative to all three other alternatives, proposed trails in Alternative 4 would have result in the highest increase of the overall road/trail density and stream crossing density. Increased road/trail densities have the potential to in effect increase drainage density, resulting in increased connectivity and peak flow magnitudes.

Sediment/Turbidity

Overall, this alternative would likely not reduce impacts relative to water quality, in particular sediment and turbidity. Depending upon the magnitude of the existing user-created OHV trail system,

sediment and turbidity related water quality could either be maintained or further impaired by increased sediment delivery to streams. Since the design criteria require that all perennial and intermittent stream crossings would have culverts or bridges installed with improved drainage on the approaches, stream crossing impacts to streams should be less in Alternative 4 as compared to the existing condition in the long-term, once disturbance from structure installation has subsided and most user-created trails have revegetated.

As compared to historic OHV cross-country travel impacts, streambank conditions are expected to maintain overall over time with the implementation of Alternative 4. Relative to OHV cross-country travel, all intermittent and perennial stream crossings would have culverts or bridges installed with improved drainage on the approaches. By not allowing fords and providing proper drainage structures, direct streambank impacts would be reduced. Alternative 4 would have more impact on streambanks as compared to all other alternatives with increased stream crossings and potential disturbance during culvert or bridge installation. Areas that are currently entrenched (G and F-type channels) would continue to adjust and may take several decades to become stable with vegetation. Sediment yield from these entrenched systems would continue to exist, but would decline as streambanks adjust slope and become vegetated.

As the effects of the implementation of the Travel Management Decision that omits cross-country travel across the Ochoco National Forest are realized, impacts to Groundwater-Dependant Ecosystems (GDEs) in the form of wetlands, wet meadows, and springs would be reduced even with the designation of the trail network in Alternative 4. User created trails across GDEs would naturally revegetate over time and trails that cross GDEs would have minimal effect through the implementation of the design criteria. Design criteria state that trails would either be rereouted to “avoid meadows, seeps, and springs” or “puncheon stringers” would need to be installed that would elevate the trail above the GDE. Overall, however, Alternative 4 would have slightly more effect on GDEs through increased road/trail densities in and within GDE RHCAs through increased disturbance levels compared to the no action alternative.

In the long-term, Alternative 4 would result in maintaining sediment delivery to streams at current levels overall as some user-created trails are revegetated over time. Existing user-created trails with drainage issues, may remain a source of sediment into the future, until actively restored. Even with the implementation of improved trail drainage and periodic trail maintenance, trail densities would likely not decrease relative to existing user-created trail system and some decommissioned roads near streams would be reopened as trails. In the short-term (i.e. approximately 10-15 years) with the implementation of Alternative 4, sediment delivery would increase; however, in the long-term (i.e. approximately 10-15 years post-construction), once most user-created trails have revegetated, sediment delivery to streams should decrease to some extent. User-created trails that have been created over time do not have proper drainage, are not maintained, and cross over a larger portion of the landscape including across streams.

Alternative 4 would have more impact on streambanks as compared to all other alternatives with increased stream crossings and potential disturbance during culvert or bridge installation. Areas that are currently entrenched (G and F-type channels) would continue to adjust and may take several decades to become stable with vegetation. Sediment yield from these entrenched systems would continue to exist, but would decline as streambanks adjust slope and become vegetated.

Overall, this alternative would be consistent with the water goals and maintaining cutbank levels to below 20 percent as outlined in the LRMP. This alternative would be consistent with the Riparian Management Goal of maintaining bank stability greater than 80 percent outlined in INFISH and with the RMO. This alternative would protect designated beneficial uses and would be consistent with the Clean Water Act and Executive Orders 11988, 11990, and 12088. Site specific locations in the Deep Creek Watershed, however, would not be consistent with the purpose and need of the Deep Creek

Restoration. In addition, due to channel instability resulting from the Maxwell Fire, reopening a road that has been effectively decommissioned that cross Allen Creek, has the potential to affect channel recovery and increase turbidity in Allen Creek. Cumulative turbidity increases of ten percent or more do not meet LRMP water quality standards and guidelines.

Table 79 displays estimated sediment contribution from road/trail crossings and road/trail segments within 300 feet of streams in project area subwatersheds, and compares these contributions to estimated natural background hillslope sediment production. Table 79 also displays estimates of existing road sediment contributions and compared these contributions, along with those estimated for actions in Alternative 4, to natural background hillslope sediment production.

Table 79. Sediment contribution from road/trail crossing and adjacent road/trail segments (tons/year) compared to estimated natural background hillslope sediment (tons/year) by subwatershed for Alternative 4.

Subwatershed	Total Natural Background Sediment (tons/year)	Estimated Contribution from Existing Roads (tons/year)	Total Contribution from Road/Trail Crossings (tons/year)	Total Contribution from Adjacent Road/Trail Segments (tons/year)	Alternative 4 – Percent of Natural Background	Alternative 4 + Existing Roads – Percent of Natural Background
Elliott Creek	421	10.6	11.4	0.7	3%	7%
Howard Creek	404	16.1	2.4	0.2	0.6%	5%
Jackson Creek	252	21.1	11.4	0.8	5%	13%
Little Summit Prairie Creek	255	14.4	1.7	0.1	0.7%	6%
Lower Deep Creek	952	12.2	2.7	0.7	0.3%	2%
North Wolf Creek	215	9.4	0.1	0.01	0%	4%
Peterson Creek – North Fork Crooked River	1051	29.4	8.3	0.6	0.8%	4%
Porter Creek	562	20.9	12.8	1.7	3%	6%
Upper Marks Creek	77	40.8	5.1	0.4	7%	60%

Lower Beaver Creek Watershed

Alternative 4 proposes 11.7 miles of Class III trail within the Lower Beaver Creek Watershed. Approximately, 5.9 miles of the total are proposed on existing Forest Service System Roads and approximately 5.8 miles would be new trail construction. Approximately 0.2 miles of new trail and 1.0 miles of trail on existing roads in the Lower Beaver Creek Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of three existing stream crossings are proposed for use, all of which cross intermittent streams.

North Wolf Creek Subwatershed

There is no difference between Alternatives 2 and 4 in the North Wolf Creek Subwatershed in terms of the proposed trail system. Therefore, the effects would be the same as those addressed under Alternative 2 for the North Wolf Creek Subwatershed.

Upper North Fork Crooked River Watershed

Alternative 4 proposes approximately 47 miles of Class I trail and approximately 30 miles of Class II trail within the Upper North Fork Crooked River Watershed. Approximately 28 miles of Class I trail

and 19 miles of Class II trail are proposed on existing National Forest System Roads. Approximately 18 miles of Class I trail and 11 miles of Class II trail would be new trails not already part of the existing National Forest System road network. Approximately 6.5 miles of new trail and 17 miles of trail on existing roads in the Upper North Fork Crooked River Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of 22 new and 37 existing intermittent and perennial stream crossings are proposed for use.

Elliot Creek Subwatershed

Within the Elliott Creek Subwatershed, approximately eight miles of trail is located on closed roads, decommissioned roads, and new routes. Approximately six miles of trail are proposed to be on existing open roads. Within the Elliott Creek Subwatershed, approximately 9.0 miles of Class I trail are located on existing Forest Service System Road and approximately 4.3 miles of Class I new trail are proposed to be constructed as part of Alternative 4. Alternative 4 proposes for Class I trails to cross perennial and intermittent streams at 13 locations at existing stream crossings on existing roads and to cross perennial and intermittent streams with new trails at eight locations. In comparison to Alteranative 2, Alternative 4 has one less stream crossing and approximately 0.4 less miles less of trail within 300' of streams in the Elliott Creek Subwatershed.

The Maxwell Fire BAER rehabilitation road treatments, included rehabilitation work on segments of two roads within the Elliot Creek Subwatershed, FS 2200-505 and FS 2200-500. Approximately 0.04 miles of Class I trail overlap FS 2200-500 where water bars were recommended for installation to enable roads to better handle expected surface runoff increases. Approximately 0.24 miles of Class I trail overlap FS 2200-505, which crosses one intermittent and one perennial tributary to Elliot Creek and parallels the stream within the RHCA for almost the entire segment length. The crossing over the perennial tributary to Elliot Creek was undersized and was removed and replaced with rock ford as part of the Maxwell Fire BAER rehabilitation. Based on design criteria, implementation of the Alternative 4 trail system would require installation of a culvert or bridge at this stream crossing location. Based on the BAER report for the Maxwell Fire, the vegetative recovery period was seven years, which would indicate hydrologic recovery should occur by the end of the summer of 2013.

Flow and Sediment Regimes

Constructing new Class I trails and stream crossings at the locations proposed in Alternative 4 in the Elliott Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term (i.e. approximately 10-15 years post-construction) relative to past cross-country travel; however, compared to the no action alternative, it could increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and stream crossing densities overall. By adding approximately 4.3 miles of trail to the overall subwatershed road/trail network, the road/trail densities increase somewhat from 3.3 to 3.6 miles per square mile, increasing trail/road density conditions from low to moderate relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively high (2.8 miles per square mile) and by adding eight new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Elliott Creek Subwatershed, the overall stream crossing density increases from 3.4 to 3.9 crossings per square mile, bringing the overall rating up from moderate to high relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are high in the vicinity of streams in the Elliott Creek Subwatershed, which can make interconnectivity of roads and streams more likely potentially resulting in increased peak flows in streams. Increases in the road/trail and stream crossing densities across the Elliott Creek Subwatershed, in combination with poor slope erosion hazard conditions, potentially increases the flow and sediment regime relative to the existing condition.

Sediment/Turbidity

Designating Class I trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Elliott Creek Subwatershed may improve somewhat the bank stability and sediment delivery conditions in the long-term (i.e. approximately 10-15 years post-construction) relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams and exacerbate bank stability conditions at some site specific locations in the subwatershed. In the short-term (i.e. approximately 10-15 years) with the implementation of Alternative 4 in this subwatershed, sediment delivery would increase; however, in the long-term (i.e. approximately 10-15 years post-construction), once most user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition assuming extensive historic cross-country OHV trail systems currently exist.

Approximately 1.7 miles of trail would be added within 300 feet of an intermittent stream, eight new stream crossings would be added, and 0.3 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 1.7 miles of trail to the road/trail network within the sediment delivery zone of streams in the Elliot Creek Subwatershed, the road/trail densities increase from 4.3 to 4.6 miles per square mile, however, relative to the overall range in existing road densities across the Ochoco Summit project area, the rating for road/trail densities within 300 feet of streams remains as low. The addition of 0.3 miles of trail within GDEs and associated RHCAs raises road densities in GDEs from approximately 2.8 to 3.0 miles per square mile, maintaining a low rating relative to other project subwatersheds. Slope Erosion Hazard Ratings are relatively high, making erosion and potentially sediment delivery more likely in the subwatershed. Sediment delivery estimates from the Aquatic Species section for this project indicate an addition of a relatively high amount of sediment delivery to the no action alternative.

Existing bank stability in Fox Creek, the only stream in the Elliot Creek Subwatershed with a Level II stream survey conducted, is relatively good and met LRMP standards as of 2002. In addition, the dominant channel type of Fox Creek has moderate channel sensitivity and recovery potential. Other reaches of Fox Creek are classified as A4 and C4 channel types. A4 channel types generally have extreme channel sensitivity and very poor recovery potential, while C4 channel types generally have very high channel sensitivity and good recovery potential. No new trails are proposed to cross or parallel Fox Creek. Assuming that other streams in the Elliot Creek Subwatershed exhibit similar dominant channel type conditions and the implementation of design criteria that require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, bank stability is likely to be maintained, unless increased peak flows result from increases in road/trails and stream networks.

Based on high Slope Erosion Hazard conditions, increases in both road/trail densities within the sediment delivery zone, and increases in stream crossing densities, Alternative 4 proposed new trails have the potential to increase sediment delivery to streams; however, bank stability is likely to be maintained.

In the Elliott Creek Subwatershed, natural background sedimentation is estimated at 421 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 12.1 tons/year. This equates to a 3% increase over natural background sediment in the Elliott Creek Subwatershed (see Table 79).

Effects to Aquatic Species

Based on the 3% increase in sediment over natural background levels (see Table 79), there would be no effect on stream aggradation in the Elliott Creek Subwatershed from project activities proposed under Alternative 4 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves

in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Elliott Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (3% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983).

Instream substrate surveys conducted in 2002 in the Elliott Creek watershed indicate that average percent surface fines are around 28%, which is greater than the 20% threshold for negative effects to fry emergence for steelhead. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on the 3% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 4 would not lead to overall stream aggradation or large increases in surface fines (3% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Elliott Creek Subwatershed under actions in Alternative 4. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Elliott Creek Subwatershed, Alternative 4 would have less effect in terms of fine sediment delivery when compared to Alternative 2. There would be fewer trails within 300’ of streams and fewer trail/stream crossings. Alternative 4 is estimated to produce 4 fewer tons of sediment per year when compared to Alternative 2 in the Elliott Creek Subwatershed.

Howard Creek Subwatershed

Within the Howard Creek Subwatershed, approximately 11 miles of trail are located on closed roads, decommissioned roads, and new routes. Approximately three miles of trail are proposed on existing open roads. Within the Howard Creek Subwatershed, approximately 5.9 miles of Class I trail are located on existing Forest Service System Road and approximately 7.9 miles of new Class I trail are proposed to be constructed as part of Alternative 4. Alternative 4 proposes for Class I trails to cross perennial and intermittent streams at existing stream crossing locations at two locations and with new trails at four locations. In comparison to Alternative 2, Alternative 4 would add three more stream crossings and approximately 2.5 miles of trail within 300’ of streams in the Howard Creek Subwatershed.

Flow and Sediment Regimes

Designating Class I trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Howard Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and stream crossing densities overall. By adding approximately 7.9 miles of trail to the overall subwatershed road/trail network, the road/trail densities increase from 4.6 to 5.1 miles per square mile, both of which are high relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively moderate (2.2 miles per square mile) and by adding four new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Howard Creek Subwatershed, the overall stream

crossing density increases from 4.1 to 4.4 crossings per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Howard Creek Subwatershed. Increases to the already high road/trail and stream crossing densities across the Howard Creek Subwatershed have the potential to increase peak flows and shorten response times relative to the existing condition.

Sediment/Turbidity

Designating Class I trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Howard Creek Subwatershed may improve somewhat the bank stability and sediment delivery conditions in the long-term (i.e. approximately 10-15 years post-construction) relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams. In the short-term (i.e. approximately 10-15 years) with the implementation of Alternative 4 in this subwatershed, sediment delivery would increase; however, in the long-term, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition assuming extensive historic cross-country OHV trail systems currently exist.

Approximately 1.5 miles of trail would be added within 300 feet of an intermittent stream, four new stream crossings would be added, and 1.2 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 1.5 miles of trail to the road/trail network within the sediment delivery zone of streams in the Howard Creek Subwatershed, the road/trail densities increase from 8.2 to 8.6 miles per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of 1.2 miles of trail within GDEs and associated RHCAs raises road densities in GDEs from approximately 6.9 to 7.4 miles per square mile, bringing the overall rating up from moderate to high relative to the other subwatersheds. Sediment delivery estimates from the Aquatic Species section for this project indicate an addition of a relatively low amount of sediment delivery to the no action alternative.

Existing bank stability in surveyed streams in the Howard Creek Subwatershed is relatively good and met LRMP standards between 1994 and 2001. In addition, the dominant channel types of streams in the subwatershed are B4 channel types, which have moderate channel sensitivity and excellent recovery potential. At the location of the new Class I trail stream crossing on Howard Creek, the channel type indicates that the channel should have low streambank erosion potential. No channel type information was gathered for the remaining three new stream crossings in the Howared Creek Subwatershed. Dominant channel types in Howard Creek, South Fork Howard Creek, and West Fork Howard Creek indicate moderate channel sensitivity and excellent recovery potential, whereas, dominant channel type in East Fork Howard Creek indicate very high channel sensitivity and good recovery potential of the stream. Assuming that other streams in the Howard Creek Subwatershed exhibit similar dominant conditions to Howard Creek and the implementation of design criteria that require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, bank stability is likely to be maintained, unless increased peak flows result from increases in road/trails and stream networks.

Based on increases in both road/trail densities within the sediment delivery zone and within and near GDEs, Alternative 4 proposed new trails have the potential to increase sediment delivery to streams; however, banks stability is likely to be maintained.

In the Howard Creek Subwatershed, natural background sedimentation is estimated at 404 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 2.6 tons/year. This equates to a 0.6% increase over natural background sediment in the Howard Creek Subwatershed (see Table 79).

Effects to Aquatic Species

Based on the less than 1% increase in sediment over natural background levels (see Table 79), there would be no effect on stream aggradation in the Howard Creek Subwatershed from project activities proposed under Alternative 4 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Howard Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (less than 1% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983.

There is no instream fine sediment data available for the Howard Creek Subwatershed, so it is unclear whether there are cumulative impacts from management activities (roads, grazing, etc.) that are impacting instream fine sediment. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on less than 1% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 4 would not lead to overall stream aggradation or large increases in surface fines (5% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, are causing stream and streambank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in Howard Creek Subwatershed under actions in Alternative 4. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Howard Creek Subwatershed, Alternative 4 would have more effect in terms of fine sediment delivery when compared to Alternative 2 and 3. There would be more trails within 300’ of streams and more trail/stream crossings. Alternative 3 is estimated to produce 0.8 more tons of sediment per year when compared to Alternative 2 and 3 in the Howard Creek Subwatershed.

Peterson Creek Subwatershed

Within the Peterson Creek Subwatershed, approximately 11 miles of trail is proposed on closed roads, decommissioned roads, and new routes. Approximately 14 miles of trail is proposed on existing open roads. Within the Peterson Creek Subwatershed, approximately 13 miles of Class I trail and 4.8 miles of Class II trail are located on existing Forest Service System Road and approximately 5.4 miles of Class I trail and 2.5 miles of Class II new trail are proposed to be constructed as part of Alternative 4. Alternative 4 proposes for Class I trails to cross perennial and intermittent streams with new trails at four locations and to cross perennial and intermittent streams on existing roads at four locations. Class II trails are proposed to cross perennial and intermittent streams at no new locations and to cross perennial and intermittent streams at five locations at existing stream crossings on existing roads. In comparison to Alteranative 2, Alternative 4 would reduce three stream crossings and approximately 0.2 miles of trail within 300’ of streams in the Peterson Creek Subwatershed.

The Maxwell Fire BAER rehabilitation road treatments, included rehabilitation work on segments of one road within the Peterson Creek Subwatershed, FS 2200-550. Approximately 0.18 miles of Class I trail overlap FS 2200-550, which crosses Allen Creek, a fish-bearing perennial stream. The crossing structure was removed and banks were laid back as part of the Maxwell Fire BAER rehabilitation. Based on design criteria, implementation of the Alternative 4 trail system would require installation

of a culvert or bridge at this stream crossing location. The operational maintenance level of this road is Level I (Closed); however, the objective maintenance of this road is decommissioned, likely attributed to the potential for sedimentation into a high quality, fish-bearing perennial stream. Based on the BAER report for the Maxwell Fire, the vegetative recovery period was seven years, which would indicate hydrologic recovery should occur by the end of the summer of 2013. Field trips to the site during the summer of 2011 indicated that Allen Creek, in the vicinity of this stream crossing, was still in an unstable state and was still in the process of recovering from impacts from the Maxwell Fire. Monitoring of vegetative is to be done prior to trail construction (Project Design Criteria).

Flow and Sediment Regimes

Designating Class I and II trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Peterson Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and reopening roads slated for decommissioning. By adding approximately 7.8 miles of trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.2 to 3.6 miles per square mile, increasing the rating from low to moderate relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively high (2.7 miles per square mile) and by adding four new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Peterson Creek Subwatershed, the overall stream crossing density increases from 2.7 to 2.9 crossings per square mile, both of these densities are moderate relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Peterson Creek Subwatershed. Increases to the already high road/trail across the Peterson Creek Subwatershed have the potential to slightly increase peak flows and shorten response times relative to the no action alternative.

Sediment/Turbidity

Designating Class I and II trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Peterson Creek Subwatershed may improve somewhat the bank stability conditions in the long-term (i.e. approximately 10-15 years post-construction) relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams at site specific locations.

Approximately 1.5 miles of trail would be added within 300 feet of an intermittent or perennial stream, four new stream crossings would be added, and approximately 0.1 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 1.5 miles of trail to the road/trail network within the sediment delivery zone of streams in the Peterson Creek Subwatershed, the road/trail densities increase from 4.3 to 4.5 miles per square mile, both of these densities are low relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of approximately 0.1 miles of trail within GDEs and associated RHCAs slightly increases the road densities in GDEs from 5.5 to 5.6 miles per square mile, which are both low relative to the other subwatersheds.

Existing bank stability in surveyed streams in the Peterson Creek Subwatershed is relatively good and met LRMP standards in 2001 in the East Fork of Allen Creek; however, bank stability is predominately relatively fair and not meeting LRMP standards in Allen Creek and Peterson Creek, based on stream surveys in 2002 and 2006-2007, respectively. The 2007 Level II stream survey in Peterson Creek; however, found unstable bank conditions with cutbanks of approximately 36 percent of the length of Reach 6 where a Class I trail overlaps the FS 2630 road and crosses the stream. In addition, the dominant channel types of streams in the subwatershed are C4 channel types, which have very high channel sensitivity and good recovery potential. At the location of the new Class I trail

stream crossing on the East Fork of Allen Creek as well as through the stream reaches that were surveyed, the channel type indicates that the channel should have very high streambank erosion potential. Since peakflow increases are expected to be minor and design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, overall bank stability is likely to be maintained. At site specific locations; however, by converting a closed road, with an objective maintenance of decommissioned, to Class I trail that crosses Allen Creek in an unstable portion of the stream and by adding two miles of Class II trail on a High Slope Erosion Hazard slope near Peterson Creek, site specific locations may experience higher incidents of unstable banks and sediment delivery.

Based on site specific sediment delivery and bank stability concerns, Alternative 4 proposed trails have the potential to increase sediment delivery to streams and unstable banks at site specific locations, which would delay recovery to LRMP standards of bank stability in Allen Creek and potentially add to sediment and turbidity increases in Peterson Creek.

In the Peterson Creek Subwatershed, natural background sedimentation is estimated at 1051 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 8.9 tons/year. This equates to a 0.8% increase over natural background sediment in the Peterson Creek Subwatershed (see Table 79).

Effects to Aquatic Species

Based on the less than 1% increase in sediment over natural background levels (see Table 79), there would be no effect on stream aggradation in the Peterson Creek Subwatershed from project activities proposed under Alternative 4 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Peterson Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (less than 1% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983.

Instream substrate surveys conducted in 2007 in the Peterson Creek Subwatershed indicate that average percent surface fines are around 45%, which is greater than the 20% threshold for negative effects to steelhead fry emergence. This shows that there are factors in the watershed that are leading to higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on less than 1% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 4 would not lead to overall stream aggradation or large increases in surface fines (4% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in Peterson Creek Subwatershed under actions in Alternative 4. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Peterson Creek Subwatershed, Alternative 4 would have less effect in terms of fine sediment delivery when compared to Alternative 2 and more effect when compared to Alternative 3. There

would be less trails within 300' of streams and fewer trail/stream crossings that Alternative 2. Alternative 4 is estimated to produce 4.8 fewer tons of sediment per year when compared to Alternative 2 in the Peterson Creek Subwatershed.

Porter Creek Subwatershed

Within the Porter Creek Subwatershed, approximately 15 miles of trail is proposed on closed roads, decommissioned roads, and new routes. Approximately 9 miles of trail is proposed on existing open roads. Within the Porter Creek Subwatershed, approximately 0.7 miles of Class I trail and 14 miles of Class II trail located on existing Forest Service System Road are proposed in Alternative 4. Approximately 0.8 miles of Class I and 8.8 miles of Class II new trail are proposed to be constructed as part of Alternative 4. No Class I trails are proposed to cross intermittent or perennial stream channels in Alternative 4. Class II trails are proposed to cross perennial and intermittent streams at 13 existing stream crossings and at six new locations. In comparison to Alternative 2, Alternative 4 would reduce three stream crossings and approximately 1.9 miles of trail within 300' of streams in the Peterson Creek Subwatershed.

Flow and Sediment Regimes

Designating Class I and Class II trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Porter Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and stream crossing densities overall. By adding approximately 9.6 miles of trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.7 to 4.4 miles per square mile, increasing the rating from moderate to high relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively high (2.8 miles per square mile) and by adding six new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Porter Creek Subwatershed, the overall stream crossing density increases from 4.0 to 4.4 crossings per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are low in the vicinity of streams in the Porter Creek Subwatershed. Slight increases to the road/trail density and already high stream crossing density across the Porter Creek Subwatershed in combination with most of the trails being Class III (motorcycle) have the potential to increase impacts to flow and sediment regimes relative to the existing condition.

Sediment/Turbidity

Designating Class I and Class II trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Porter Creek Subwatershed may improve somewhat the bank stability and sediment delivery conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams. In the short-term with the implementation of Alternative 4 in this subwatershed, sediment delivery would increase; however, in the long-term, once most user-created trails have revegetated, sediment delivery to streams have the potential to decrease to levels below the existing condition assuming extensive historic cross-country OHV trail systems currently exist.

Approximately 1.8 miles of trail would be added within 300 feet of an intermittent stream, six new stream crossings would be added, and essentially no miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 1.8 miles of trail to the road/trail network within the sediment delivery zone of streams in the Porter Creek Subwatershed, the road/trail densities increase from 7.4 to 7.8 miles per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. Slope Erosion Hazard conditions for the Porter Creek Subwatershed are low overall, somewhat reducing the risk and magnitude of potential sediment delivery increases for the proposed trail

network in Alternative 4. Sediment delivery estimates from the Aquatic Specie section indicate an addition of a relatively moderate amount of sediment delivery to the no action alternative.

Existing bank stability in surveyed streams in the Porter Creek Subwatershed was relatively good and met LRMP standards in Easter Porter Creek in 1995 and in the top and bottom reaches of Porter Creek in 2006-2007. Bank stability in the middle reach of Porter Creek in 2007 slightly exceeded LRMP standards with approximately 23 percent of the stream length unstable. No trails are proposed to cross Porter Creek on the reach of stream that is not meeting LRMP standards of no more than 20 percent unstable banks. Dominant channel types in Porter Creek indicate moderate channel sensitivity and excellent recovery potential. Assuming that other streams in the Porter Creek Subwatershed exhibit similar dominant conditions to Porter Creek and implementation of design criteria that require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, bank stability is likely to be maintained.

A proposed jeep trail lies along East Porter Creek along FR3000-550 in the RHCA. East Porter Creek is a Class II stream. The roads analysis for Howard Elliot Johnson EIS (2010) indicates FR3000-550 be changed to operational maintenance Level 1 (i.e. decommissioned) for protection of aquatic species. The jeep trail proposed on FR3000-550 does not meet the intent of protecting aquatic species as identified in the roads analysis.

Based on increases in the stream crossing density and the road/trail densities within the sediment delivery zone, Alternative 4 proposed new trails have the potential to increase sediment delivery to streams as described in the Aquatic Species section; however, bank stability is likely to be maintained.

In the Porter Creek Subwatershed, natural background sedimentation is estimated at 562 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 14.5 tons/year. This equates to a 3% increase over natural background sediment in the Porter Creek Subwatershed (see Table 79).

Effects to Aquatic Species

Based on the 3% increase in sediment over natural background levels (see Table 79), there would be no effect on stream aggradation in the Porter Creek Subwatershed from project activities proposed under Alternative 4 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Porter Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (less than 2% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983.

Instream substrate surveys conducted in 2006 and 2007 in the Porter Creek watershed, average percent surface fines are around 22%, which is slightly greater than the 20% threshold for negative effects to fry emergence for steelhead. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on 3% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 4 would not lead to overall stream aggradation or large increases in surface fines (6% of natural background). However, it is presumable that there are

localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in Porter Creek Subwatershed under actions in Alternative 4. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Porter Creek Subwatershed, Alternative 4 would have less effect in terms of fine sediment delivery when compared to Alternative 2 and more effect when compared to Alternative 3. There would be less trails within 300' of streams and fewer trail/stream crossings than Alternative 2. Alternative 4 is estimated to produce 1.9 fewer tons of sediment per year when compared to Alternative 2 in the Porter Creek Subwatershed.

Deep Creek Watershed

Alternative 4 proposes approximately 77 miles of trail on closed roads, decommissioned roads, and new routes in the Deep Creek Watershed. Approximately 16 miles of trail are proposed for existing open roads. Alternative 4 proposes approximately 44 miles of Class I trail and 29 miles of Class III trail within the Deep Creek Watershed. Approximately 29 miles of Class I trail and 23 miles of Class III trail are proposed on existing Forest Service System Roads. Approximately 15 miles of Class I trail and 15 miles of Class III trail would be new trails and not already part of the existing Forest Service System road network. Approximately 3.2 miles of new trail and 20 miles of trail on existing roads in the Deep Creek Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of 14 new and 29 existing intermittent and perennial stream crossings are proposed for use.

Jackson Creek Subwatershed

In the Jackson Creek Subwatershed, approximately 36 miles miles of Class I and Class III trails are proposed on closed roads, decommissioned roads and new routes. Approximately 11 miles of trail are proposed on existing open roads. Within the Jackson Creek Subwatershed, approximately 13 miles of Class I trail and 20 miles of Class III trail are located on existing Forest Service System Road. Approximately 7.0 miles of new Class trail and 7.4 miles of new Class III trail are proposed to be constructed as part of Alternative 4. Class I trails are proposed to cross intermittent or perennial streams at four existing locations and six new locations in Alternative 4. Class III trails are proposed to cross perennial and intermittent streams at at 14 existing stream crossings and at two new locations. In comparison to Alternative 2, Alternative 4 would add an additional 2.7 miles of trail within 300' of streams and two additional stream crossings.

Flow and Sediment Regimes

Designating Class I and Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Jackson Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing overall road/trail and stream crossing densities. By adding approximately 14.5 miles of new trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.7 to 4.1 miles per square mile, raising the rating from moderate to high relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively low (1.8 miles per square mile) and by adding eight new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Jackson Creek Subwatershed, the overall stream crossing density increases from 1.8 to 2.0 crossings per square mile, both of these densities are low relative to the other Ochoco Summit project area

Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Jackson Creek Subwatershed. Increases to the road/trail densities in combination with slight increases to the stream crossing density have the potential to increase effects to the flow and sediment regime as a result of Alternative 4; however, with low drainage density, these increases may be relatively minor.

Sediment/Turbidity

Designating Class I and Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Jackson Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams. In the short-term with the implementation of Alternative 4 in this subwatershed, sediment delivery would increase; however, in the long-term, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition assuming extensive historic cross-country OHV trail systems currently exist.

Approximately 1.5 miles of trail would be added within 300 feet of an intermittent or perennial stream, eight new stream crossings would be added, and 0.5 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 1.5 miles of trail to the road/trail network within the sediment delivery zone of streams in the Jackson Creek Subwatershed, the road/trail densities increase from 6.1 to 6.3 miles per square mile, both of these densities are moderate relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of 0.5 miles of trail within GDEs and associated RHCAs increases the road densities in GDEs from 5.6 to 5.7 miles per square mile, which are low relative to the other subwatersheds. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Jackson Creek Subwatershed. Estimates of sediment delivery in the Aquatic Species section indicate that Alternative 4 has the potential to add a high amount of sediment delivery relative to the no action alternative (Alternative 1), similar to Alternative 2, but more than Alternative 3.

Existing bank stability in surveyed streams in the Jackson Creek Subwatershed is relatively good and met LRMP standards in Happy Camp Creek and Jackson Creek from 1998 and 2010. Based on Level II stream surveys, the dominant channel types of streams in Happy Camp Creek are E4 channel types and in Jackson Creek are C4 channel types, which have very high channel sensitivity and good recovery potential. At the location of the new Class I stream crossing location on Jackson Creek, the channel type indicates moderate streambank erosion potential; however, slope erosion hazard conditions are high. Since peakflow increases are expected to be negligible, design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, and based on channel type conditions, overall bank stability is likely to be maintained.

Based on slight increases in both stream crossing and road/trail densities within the sediment delivery zone and in GDEs, as well as overall moderate Slope Erosion Hazard Conditions, and localized high Slope Erosion Hazard Conditions, Alternative 4 proposed new trails have the potential to have a moderate to high sediment delivery increase to streams and GDEs; however, banks stability is likely to be maintained.

In the Jackson Creek Subwatershed, natural background sedimentation is estimated at 252 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 12.2 tons/year. This equates to a 5% increase over natural background hillslope sediment in the Jackson Creek Subwatershed (see Table 79).

Effects to Aquatic Species

Based on the 5% increase in sediment over natural background levels (see Table 79), there would be no effect on stream aggradation in the Jackson Creek Subwatershed from project activities proposed

under Alternative 4 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Jackson Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (5% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983.

Instream substrate surveys conducted in 2010 in Jackson Creek indicate that average percent surface fines are around 21%, which is slightly greater than the 20% threshold for negative effects to fry emergence for steelhead. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on the 3% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 4 would not lead to overall stream aggradation or large increases in surface fines (11% of natural background). However, it is presumable that there are localized areas where the existing road system, as well as other historic or current land use practices, are causing stream and streambank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in Jackson Creek Subwatershed under actions in Alternative 4. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Jackson Creek Subwatershed, Alternative 4 would have less effect in terms of fine sediment delivery when compared to Alternative 2 and more effect when compared to Alternative 3. There would be less trails within 300’ of streams and fewer trail/stream crossings than Alternative 2. Alternative 4 is estimated to produce 1.9 fewer tons of sediment per year when compared to Alternative 2 in the Jackson Creek Subwatershed.

Little Summit Prairie Creek Subwatershed

Alternative 4 proposed approximately 0.2 miles more trail within 300 feet of streams and one additional stream crossing that is proposed to be a ford. However, in terms of the flow and sediment regimes, as well as sediment and turbidity, there is very little difference between Alternative 2 and 4 in the Little Summit Prairie Creek Subwatershed. Therefore, the effects would be the same as those addressed under Alternative 2 for the Little Summit Prairie Creek Subwatershed. Alternative 4 is expected to have more effect on aquatic species, even though the fine sediment produced is the same between Alternative 2 because there would be more trail/stream crossings and adjacent trails that may still have impacts on bank stability and other channel alterations.

Lower Deep Creek Subwatershed

Within the Lower Deep Creek Subwatershed, approximately 11 miles of Class I trail are located on existing Forest Service System Road. Approximately 5.2 miles of new Class I trail and 2.4 miles of new Class III trail are proposed to be constructed as part of Alternative 4. Alternative 4 proposes for Class I trails to cross perennial and intermittent streams with new trails at four locations and to cross perennial and intermittent streams on existing roads at seven locations. Class III trails are proposed to cross perennial and intermittent streams at one new location. In comparison to Alternative 2, Alternative 4 proposes approximately 2.8 more miles of trail within 300 feet of streams and three additional stream crossings on existing culverts.

Proposed restoration projects were identified in the Deep Creek Restoration Plan, some of which have already been implemented. Of the 2.8 miles of road within the sediment delivery zone of streams that were decommissioned in the Lower Deep Creek Subwatershed as part of the Deep Creek Restoration Plan, 0.7 miles of the FS 4200-600 and 0.4 miles of the FS 4200-603 decommissioned roads are planned to be reopened as Class I trails in Alternative 4. The FS 4200-600 road parallels Big Spring Creek, a fish-bearing perennial stream, for approximately 0.3 miles and parallels and intermittent tributary to Big Spring Creek for approximately 0.4 miles. The FS 4200-603 road parallels Buck Hollow, a perennial stream, for approximately 0.4 miles. The reopened portion of the FS 4200-603 road is located on high slope erosion hazard. Approximately a third of the reopened portion of the FS 4200-600 road is located on high slope erosion hazard, a third is located on moderate slope erosion hazard, and a third is located on low slope erosion hazard. Stream crossings would be installed with both of these road segments. Based on design criteria, implementation of the Alternative 4 trail system would require installation of a culvert or bridge at these stream crossing locations.

Flow and Sediment Regimes

Designating Class I and III trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Lower Deep Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing road/trail densities and reopening decommissioned roads. By adding approximately 7.5 miles of trail to the overall subwatershed road/trail network, the road/trail densities increase from 3.0 to 3.4 miles per square mile, both densities are low relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively low (2.0 miles per square mile) and by adding four new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Lower Deep Creek Subwatershed, the overall stream crossing density increases from 1.8 to 2.0 crossings per square mile, both of these densities are low relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Lower Deep Creek Subwatershed. Based on relatively low drainage densities, slight increases to the road/trail density and stream crossings density across the Lower Deep Creek Subwatershed are likely to have little effect on peak flows, with the potential for an immeasurable increase relative to the no action alternative.

Sediment/Turbidity

Designating Class I and Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Lower Deep Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams at site specific locations.

Approximately 1.1 miles of trail would be added within 300 feet of an intermittent or perennial stream, four new stream crossings would be added, and 0.5 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. In addition, approximately 1.1 miles of decommissioned roads within 300 feet of streams are proposed to be reopened as Class I trails as part of Alternative 4. By adding approximately 1.1 miles of trail to the road/trail network within the sediment delivery zone of streams in the Lower Deep Creek Subwatershed, the road/trail densities increase from 5.5 to 5.7 miles per square mile, both of these densities are low relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of virtually 0.5 new miles of trail within GDEs and associated RHCAs increases road densities in GDEs from 7.6 to 8.1 miles per square mile, both of which are high relative to the other subwatersheds. Estimates of sediment delivery in the Aquatic Species section indicate that Alternative

4 has the potential to add a relatively low amount of sediment delivery relative to the no action alternative (Alternative 1), roughly the same as Alternatives 2 and 3.

In addition, approximately 2.4 miles of road with an objective maintenance of closed, would be used as Class I trail (FS 3000-365 and FS 3000-750). These segments parallel the West Fork of Crazy Creek and are located within the sediment delivery zone for their entire length. Slope Erosion Hazard conditions along the entire length are moderate.

Existing bank stability in surveyed streams in the Lower Deep Creek Subwatershed is relatively good and met LRMP standards in the Crazy Creek in 2010 and in Deep Creek in 1999. The dominant channel types of streams in Crazy Creek are B4 channel types, which have moderate channel sensitivity and excellent recovery potential. The dominant channel types of streams in Deep Creek are C4 channel types, which have very high channel sensitivity and good recovery potential. At the location of the new Class I trail stream crossing on Deep Creek, the channel type indicates that the channel should have very high streambank erosion potential. Since peakflow increases are expected to be minor and design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, overall bank stability is likely to be maintained. At site specific locations, bank stability and increased sediment delivery may be of concern by reopening decommissioned roads that cross and parallel Big Springs Creek and Buck Hollow, a portion of which are on a High Slope Erosion Hazard slope.

Based on site specific sediment delivery and bank stability concerns, Alternative 4 proposed trails have the potential to increase sediment delivery to streams overall and unstable banks at site specific locations, which would potentially add to sediment and turbidity increases in Deep Creek.

In the Lower Deep Creek Subwatershed, natural background sedimentation is estimated at 952 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 3.4 tons/year. This equates to a 0.3% increase over natural background hillslope sediment in the Lower Deep Creek Subwatershed (see Table 79).

Effects to Aquatic Species

Based on the less than 1% increase in sediment over natural background levels (see Table 79), there would be no effect on stream aggradation in the Lower Deep Creek Subwatershed from project activities proposed under Alternative 4 (C channels experience an increase in stream channel aggradation when sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Lower Deep Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (less than 1% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983.

Instream substrate surveys conducted in 2010 in Crazy Creek (tributary to Deep Creek) indicate that percent surface fines are around 21%, which is slightly greater than the 20% threshold for negative effects to fry emergence for steelhead. This shows there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on the less than 1% increase in sediment over estimated natural background levels). Cumulatively, it appears that the entire road system combined with actions proposed under Alternative 4 would not lead to overall stream aggradation or large increases in surface fines (2% of natural background). However, it is presumable that there are

localized areas where the existing road system, as well as other historic or current land use practices, is causing stream and stream bank instability, leading to areas of increased surface fines.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in Lower Deep Creek Subwatershed under actions in Alternative 4. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Lower Deep Creek Subwatershed, Alternative 4 would have more effect in terms of fine sediment delivery when compared to Alternative 2 and 3. There would be more trails within 300' of streams and more trail/stream crossings than Alternative 2 and 3. Alternative 4 is estimated to produce 1 more ton of sediment per year when compared to Alternative 2 and 3 in the Lower Deep Creek Subwatershed.

Upper Ochoco Creek Watershed

Alternative 4 proposes approximately 37 miles of Class I trail within the Upper Ochoco Creek Watershed. Approximately 21 miles of Class I trail are proposed on existing National Forest System Roads. Approximately 16 miles of Class I trail would be new trails and not already part of the existing National Forest System road network. Approximately 1.3 miles of new trail and 4.4 miles of trail on existing roads in the Upper Ochoco Creek Watershed are located within the sediment delivery zone of 300 feet from perennial or intermittent streams. A total of 17 existing intermittent and perennial stream crossings and seven new stream crossings are proposed for use.

Upper Marks Creek Subwatershed

Within the Upper Marks Creek Subwatershed, approximately 20 miles of Class I trail are located on existing Forest Service System Road. Approximately 14 miles of new Class I trail are proposed to be constructed as part of Alternative 4. Alternative 4 proposes for Class I trails to cross perennial and intermittent streams on existing roads at 17 locations and at new stream crossings at seven locations. Comparatively, Alternative 4 proposes the most trail and trail/stream crossings. Alternative 4 proposes an additional 2.7 miles of trail within 300 feet of streams and 14 more trail/stream crossings when compared to Alternative 3.

Flow and Sediment Regimes

Designating Class I trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Upper Marks Creek Subwatershed may improve somewhat the flow and sediment regime conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could slightly increase the effects of flow and sediment regime on the subwatershed by increasing overall road/trail densities. By adding approximately 14 miles of new trail to the overall subwatershed road/trail network, the road/trail densities increase from 4.1 to 4.9 miles per square mile, both of which are high relative to the overall range in existing road densities across the Ochoco Summit project area. Drainage densities are relatively moderate (2.4 miles per square mile) and by adding seven new intermittent or perennial stream crossings to the existing number of stream crossings by roads in the Upper Marks Creek Subwatershed, the overall stream crossing density increases from 5.0 to 5.4 crossings per square mile, both of these densities are high relative to the other Ochoco Summit project area Subwatersheds analyzed. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Upper Marks Creek Subwatershed. Moderate drainage densities, the addition of seven new stream crossings, and increases to the road/trail and stream crossing densities across the Upper Marks Creek Subwatershed have the potential to increase peak flows and shorten response times relative to the existing condition.

Sediment/Turbidity

Designating Class III trails and constructing new trails and stream crossings at the locations proposed in Alternative 4 in the Upper Marks Creek Subwatershed may improve somewhat the bank stability conditions in the long-term relative to past cross-country travel; however, compared to the no action alternative, it could increase the sediment delivery to streams. In the short-term with the implementation of Alternative 4 in this subwatershed, sediment delivery would increase; however, in the long-term, once user-created trails have revegetated, sediment delivery to streams should decrease to levels below the existing condition, assuming an extensive cross-country OHV trail network currently exists.

Approximately 1.3 miles of trail would be added within 300 feet of an intermittent or perennial stream, seven new stream crossings would be added, and 1.5 miles of trail are proposed that intersect GDEs or their RHCAs within the forest boundary portion of the subwatershed. By adding approximately 1.3 miles of trail to the road/trail network within the sediment delivery zone of streams in the Upper Marks Creek Subwatershed, the road/trail densities are increased from 6.2 to 6.5 miles per square mile, which are moderate relative to the other Ochoco Summit project area Subwatersheds analyzed. The addition of 1.5 miles of trail within GDEs and associated RHCAs increases the road densities slightly in GDEs from 6.6 to 7.3 miles per square mile, increasing from moderate to high relative to the other subwatersheds. Overall, slope erosion hazard conditions are moderate in the vicinity of streams in the Upper Marks Creek Subwatershed. Estimates of sediment delivery in the Aquatic Species section indicate that Alternative 4 has the potential to add a relatively high amount of sediment delivery relative to all other alternatives. Based on increases in stream crossing densities and road densities in GDEs and near streams, as well as sediment delivery estimates, sediment delivery effects are expected to be moderate to high in Alternative 4 for the Upper Marks Creek Subwatershed.

Existing bank stability in surveyed stream reaches in the Upper Marks Creek Subwatershed within the project boundary is relatively good and met LRMP standards in surveyed reaches of Crystal Creek in 2003 and in the only stream reach of Marks Creek within the project boundary with bank stability data from 2010. Based on Level II stream surveys, the dominant channel type of streams in the Crystal Creek is an E4 channel type and in Marks Creek in the 2010 surveyed reach is a C4 channel type, both of which have very high channel sensitivity and good recovery potential. The channel type at the proposed new stream crossing on Crystal Creek is an E4, which has high streambank erosion potential. A potential exists that bank stability could decrease relative to the existing condition based on potential increases to peakflow, high streambank erosion potential conditions, and increased stream crossing densities. Design criteria require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches; however, bank stability is likely to be maintained, unless increased peak flows result from the increases in road/trails and stream networks.

Based on increased road/trail densities, stream crossing densities, road/trail densities in the vicinity of streams and GDEs, and channel type conditions in the Upper Marks Creek Subwatershed; Alternative 4 proposed trails have the potential to increase sediment delivery to streams and unstable banks, which would potentially add to sediment and turbidity increases in Marks Creek.

In the Upper Marks Creek Subwatershed, natural background sedimentation is estimated at 77 tons/year. The total estimated contribution from road/trail crossings and adjacent road/trail segments is approximately 5.5 tons/year. This equates to a 7% increase over natural background hillslope sediment in the Upper Marks Creek Subwatershed (see Table 79).

Effects to Aquatic Species

Based on the 7% increase in sediment over natural background levels (see Table 79), there would be no effect on stream aggradation in the Upper Marks Creek Subwatershed from project activities proposed under Alternative 4 (C channels experience an increase in stream channel aggradation when

sediment increases are over 35% of natural background; Stowell et al 1983). Sediment-habitat response curves in Stowell et al. (1983) also indicate that fine sediment depth does not increase appreciably when sediment yield increases 50% over natural background. In terms of habitat-fish response, percent fine sediment by depth is estimated to have no impact on fry emergence if percent fine sediment is under 20%. The proposed activities in the Upper Marks Creek Subwatershed would not increase instream fine sediment to the point of adversely affecting fry emergence over existing condition levels (7% increase in sediment over natural background conditions compared to 50% increase in natural background referenced in Stowell et al 1983.

Instream substrate surveys conducted in 1999-2010 in Marks Creek and Crystal Creek (tributary to Marks Creek) indicates average percent surface fines are around 29%, greater than the 20% threshold for negative effects to steelhead fry emergence. This shows that there are factors in the watershed that are leading to slightly higher than normal instream fine sediment levels. However, when addressing the impacts of the Ochoco Summit Project, the estimated sediment produced from the new trail system would not contribute enough to adversely affect fry emergence (based on the 7% increase in sediment over estimated natural background levels). Cumuatively, it appears that the entire road system may be having adverse effects on aquatic species and their habitat (existing roads are producing approximately 60% of natural background). Stream aggradation and fine sediment depths are likely elevated in Upper Marks Creek, which in turn may be having a negative effect on aquatic species.

Based on this information, redband trout and Columbia spotted frog would be unaffected long-term in the Upper Marks Creek Subwatershed under actions in Alternative 4. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality.

In the Upper Marks Creek Subwatershed, Alternative 4 would have more effect in terms of fine sediment delivery when compared to Alternative 2 and 3. There would be more trails within 300’ of streams and more trail/stream crossings. Alternative 4 is estimated to produce 1.2 more tons of sediment per year when compared to Alternative 3 in the Upper Marks Creek Subwatershed.

Alternative 4 Summary

Alternative 4 was developed in response to an issue identified during scoping that the proposed action trail system is too small and lacks quality. Alternative 4 includes trails for class I, II and III vehicles over more area and with more miles than the Proposed Action. Alternative 4 proposes a total of 95 miles of Class I vehicle (ATV) trails or roads, 19 miles of Class II vehicle (4x4), and 45 miles of Class III vehicle (motorcycle) trail/roads. In the short-term (i.e. approximately 10-15 years) with the implementation of Alternative 4, sediment delivery would increase; however, in the long-term (i.e. approximately 10-15 years post-construction), even though some user-created trails have revegetated, due to the extensive network of OHV trails added in this alternative, impacts to the flow and sediment regime and sediment/turbidity levels in the streams would likely remain at or in excess of the existing condition. Alternative 4 would result in the largest impact to streams and watersheds within the Ochoco Summit project area as compared to all of the other three alternatives.

Cumulative Effects

Future and Ongoing Projects

Hash Rock Wildfire (2000): The Hash Rock Wildfire started on August 23, 2000 and encompassed about 18,275 acres. The fire burned primarily within two 5th order Hydrologic Units, Upper Ochoco Creek Watershed (HUC 1707030502) and Mill Creek Watershed (HUC 1707030503). Within the Upper Ochoco Creek Watershed, the fire effects were confined primarily to the Upper Marks Creek Subwatershed. Within the Upper Marks Creek Subwatershed, the fire covered much of the McGinnis

Creek, Reilly Creek, Cornez Creek, Hamilton Creek drainages, as well as the headwaters of the Buck Creek drainage. Within the Upper Marks Creek Subwatershed, the highest burn intensities occurred in Hamilton relative to the McGinnis, Reilly, and Cornez Creek areas. The effects of the fire may last up to 40 years or more in these areas until forest vegetation becomes reestablished. Effective ground cover (grass, shrubs) reestablished within 2-5 years with favorable growth conditions.

Deep Creek Watershed Restoration (2004): The purpose of the Deep Creek Restoration Plan was to improve overall stream and riparian health and integrity within the watershed and improve water quality and associated habitat suitable for use by redband trout and other aquatic life. The needs for the proposed action are derived from the differences between current conditions and desired conditions, as described in Forest Plan direction and management objectives. The decision was made to: 1) Replace 35 culverts and 3 culverts with rock fords to allow passage of flood flows and improve upstream access for redband trout; 2) create 7 water developments, 227 acres of grazing exclosures, 342 acres of riparian pasture, and place large wood along 3.6 miles of stream to better distribute livestock, 3) repair 37 headcut complexes and 18 exposed cutbanks, close, decommission, and reconstruct 47 miles of roads, reconstruct 0.25 miles of channel reaches to reduce instream sedimentation, and construct 6 in-stream structures to promote pool habitat for fisheries. Most proposed activities are located within RHCA's and were designed to move the watershed towards meeting interim Riparian Management Objectives (RMOs).

Maxwell Fire (2006): In 2006, a wildfire called the Maxwell Fire affected approximately 2,317 acres in Allen Creek, East Fork Allen Creek, and Elliot Creek drainages. Potential sedimentation in stream reaches within and below moderate to high severity burn areas were identified as values at risk within Allen Creek, East Fork Allen Creek, and Elliot Creek (BAER 2006). Erosion during snow melt runoff during the spring of 2007 added to the loss of filtering vegetation from the wildfire in RHCAs along Allen Creek, East Fork Allen Creek, and Elliot Creek. Maxwell Fire BAER stream improvements were implemented in 2006 and 2007 to reduce sediment from upland and riparian burned areas. Roads were closed and culverts were pulled to reduce erosion and sediment delivery to streams. Specifically, culverts were removed and outlsoped drain dips were installed on FR2200-500, FR2200-550, and FR2200-505 (BAER 2006). These projects reduce sediment for a high value fishery.

Canyon Fuels and Vegetation Management (2010): The Canyon project area is approximately 31,500 acres and falls within the Upper Ochoco Creek Watershed. As described in the Record of Decision, there are 13,632 acres planned for treatment, 4099 acres of which would be treated through commercial harvest, 5862 acres to be treated through pre-commercial harvest, 1395 acres of juniper removal, 236 acres of hardwood treatments, and 2038 acres of underburning. Road management estimates include approximately 0.6 miles of new specific road construction, 2.0 miles of temporary road construction, 4.4 miles of reuse of temporary roads, 4.9 miles of decommissioning of existing roads, and 2.9 miles of closure of existing roads. Implementation of all activities associated with the Canyon decision could take up to 10 years to complete.

Howard Elliot Johnson Fuels and Vegetation Management (2011): The Howard Elliot Johnson project area is approximately 44,858 acres and falls within three subwatersheds within the Upper North Fork Crooked River Watershed; the Howard Creek, Elliot Creek, and Johnson Creek Subwatersheds. As described in the Record of Decision, there are 4,370 acres of which would be treated through commercial harvest (including fuel treatments), 3,007 acres to be treated through pre-commercial harvest (including fuel treatments), 608 acres of juniper removal, 611 acres of hardwood treatments, 6,247 acres of prescribed burning only, and 1,573 acres of conditional prescribed fire. Road management estimates include approximately 0.4 miles of new specific road construction, 5.1 miles of temporary road construction, 11.7 miles of use of temporary roads on existing disturbance, 1.7 miles of road reconstruction, 2.3 miles of decommissioning of existing roads, and 2.9 miles of

closure of existing roads. Implementation of all activities associated with the Howard Elliot Johnson decision could take up to 10 years to complete.

Jackson Fuels and Vegetation Management (2012): The Jackson project area is approximately 54,609 acres and falls within three subwatersheds within the Upper North Fork Crooked River Watershed; Howard Creek, Elliot Creek, and Johnson Creek Subwatersheds. About 5,744 acres would be treated through commercial harvest, 14,703 acres would be treated through pre-commercial harvest, 893 acres would receive juniper cutting and associated fuel treatments, 295 acres would receive hardwood treatments, and 1,934 acres will be underburned without other associated treatments. Road management estimates include approximately 0.4 miles of new specific road construction, 10 miles of temporary road construction, 15 miles of use of temporary roads on existing disturbance, 0.3 miles of road reconstruction, and between 11 and 43 skid trail stream crossings. Implementation of all activities associated with the Jackson decision could take up to 10 years to complete.

Spears Vegetation Management (2007): The Spears project area is approximately 39,200 acres and falls within the Upper Ochoco Creek Watershed. As described in the Record of Decision, there are 4,935 acres that would be treated through commercial harvest, 10,935 acres to be treated through pre-commercial harvest, and 196 acres of hardwood treatments. Fuel reduction activities include approximately 15,162 acres of prescribed fire, 2,490 acres of grapple piling, and 793 acres of hand piling. Road management estimates include approximately 4.4 miles of new road construction, and 11 miles of road reconstruction.

Travel Management Project (2011): The Record of Decision for the Travel Management Project was signed in September 2011 and the Travel Management Decision implementation started as of January 2012. The decision does the following: 1) limits motor vehicle use to designated roads, trails, and areas shown on the Motor Vehicle Use Maps; 2)designates some gravel pits open to motorized access; 3) creates new conditions for motor vehicle access off of designated roads for dispersed camping; 4) changes some system roads to highway legal vehicle use only. No existing open designated roads or motorized trails were closed as a result of the decision; however, changes to cross-country travel, motorized access for dispersed camping, and motorized mixed use (highway legal and non-highway legal vehicles) of some system roads were made. Cross-country travel is no longer allowed on the Ochoco National Forest. Motorized access for dispersed camping is only allowed to existing sites within 300 feet of roads shown on the Motor Vehicle Use Map and motor vehicles cannot drive closer than 30 feet to any wetland, stream, or water body at dispersed campsites. The decision makes no changes to developed campgrounds and does not apply to over-snow motorized travel or permitted activities such as firewood cutting.

Marks Creek Allotment Management Plan (2011): The Marks Creek Allotment Management Plan reauthorizes grazing in the Marks Creek, Ortman, and Wildcat Allotments; authorizes a variety of rangeland improvements; and implements riparian restoration activities. Almost the entire Marks Creek AMP Project Area is encompassed within the Upper Ochoco Creek Watershed; however, small portions of the project area also intersect the Bridge Creek and Lower Ochoco Creek Watersheds. Five subwatersheds are intersected by the project area: Lower Marks Creek, Upper Marks Creek, Duncan Creek-Ochoco Creek, Ochoco Reservoir-Ochoco Creek, and Middle Bear Creek. Livestock may be displaced by high use on the trail system and distribution throughout the project area could also be negatively affected with the increase of off-road use in localized areas. If livestock distribution is decreased, localized areas in uplands and riparian areas may receive greater utilization.

Wolf Fuels and Vegetation Management Project (2014): The Wolf Fuels and Vegetation Management Project is still in the planning phase, so no decision has been made to date. A Draft Environmental Impact Statement was released to the public for comment in January of 2014. The preferred alternative proposed to meet the purpose and need is to implement commercial thinning on

4706 acres, noncommercial thinning on 988 acres, juniper cutting on 481 acres, underburning on 5,000 acres, and hardwood enhancement on 90.2 acres. The total area on which activities would be implemented would be about 11,252 acres. The proposed action also includes closing 7.8 miles of roads, and decommissioning 2.7 miles of roads, as recommended though the Wolf Roads Analysis process. Actions connected to the proposed action would include stream restoration on North Fork Wolf and Wolf Creek, headcut repair at six locations, 1.8 miles of temporary road, 18 miles of temporary roads on existing disturbance, and the expansion of Six Corners Material Source by up to 3 acres. Temporary roads would be closed and hydrologically stabilized following treatment.

Alternative 1

Flow and Sediment Regime

The no action alternative proposes adding no new trail system on the Ochoco National Forest and since the Travel Management Rule no longer allows cross-country OHV travel, there should be no cumulative effects occurring with the implementation of Alternative 1. The existing condition of the watersheds would be maintained with the addition of the future and ongoing vegetation management project effects, which were analyzed in their associated EIS documents.

Existing trails across the landscape from past OHV cross-country travel use would no longer be used and some trails would revegetate over time. Some trails, likely those trails that have connectivity with the drainage network, would continue affecting the flow and sediment regimes until active rehabilitation is implemented.

Sediment/Turbidity

The no action alternative proposes adding no new trail system on the Ochoco National Forest and since the Travel Management Rule no longer allows cross-country OHV travel, there should be no cumulative effects occurring with the implementation of Alternative 1. The existing condition of the watersheds would be maintained with the addition of the future and ongoing vegetation management project effects, which were analyzed in their associated EIS documents. Effects to streams from wildfire would continue to recover.

Existing trails across the landscape from past OHV cross-country travel use would no longer be used and some trails would revegetate over time. Some trails, likely those trails that have connectivity with the drainage network, would continue delivering sediment to stream channels until active rehabilitation is implemented.

Following the Hash Rock and Maxwell Wildfires, there was likely an increased sediment load in streams due to increased surface and bank erosion. As vegetation reestablished, surface erosion has decreased and regrowth of riparian vegetation stabilized banks at some locations. Sediment supply in affected streams would continue to adjust until sediment loads stabilize to pre-wildfire levels, once vegetation has completely reestablished.

Action Alternatives

Flow and Sediment Regime

The effects of past and present actions are described in detail under the “Direct and Indirect Effects” section. Future and ongoing portions of the preceding list of projects that overlap the Ochoco Summit project area have the potential to result in cumulative effects to streams relative to the flow and sediment regime. According to the LRMP, harvest activities on the Ochoco National Forest should not increase the Equivalent Harvest Acres (EHA) above the thresholds listed for forest watersheds by sensitivity class (Table 80). Changes to the timing and increases in peak flows resulting from increased connectivity of streams and proposed trails in addition to potential timing and increases in peak flows from harvest activity and associated road construction may have the potential to increase peak flows above the threshold described in the LRMP.

Future and ongoing projects that have the potential to cumulatively impact the flow and sediment regimes in the Ochoco Summit Planning Area include the Howard Elliot Johnson Vegetation Management Project, the Canyon Vegetation Management Project, the Spears Vegetation Management Project, the Jackson Vegetation Management Project, the Wolf Fuels and Vegetation Management Project, and the Deep Creek Restoration Project. These projects overlap portions of the Upper North Fork Crooked River, Deep Creek, Upper Ochoco Creek, and Lower Beaver Creek Watersheds. The Howard Elliot Johnson Vegetation Management Hydrology Report estimated a peak EHA of 7.5 percent in 2013 for the selected alternative, Alternative 2 (Table 80). The Canyon Vegetation Management Hydrology Report estimated a peak EHA of 13.38 percent in 2012 for the Alternative 3, a modification of which was selected in the Record of Decision (Table 80). The peak EHA for the Deep Watershed was reported as 15.34 percent in 2014 for the proposed action as described in the Draft Hydrology Report for the Deep Project (Table 80). The peak EHA for the Wolf Fuels and Vegetation Management Project was reported as 12.6 percent in 2014 for the preferred alternative as described in the Draft Hydrology Report. Peak EHA values from vegetation management analyses are all below the LRMP EHA thresholds by approximately 10 to 22 percent.

Table 80. Alternative 2 flow and sediment regime cumulative effects summary by watershed.

Watershed	Peak Vegetation Management Project EHA (%)	EHA Threshold (%)
Upper North Fork Crooked River	13.4	30
Deep Creek	15.3	25
Upper Ochoco Creek	7.5	30
Lower Beaver Creek	12.6	25

Table 81 and Table 82 show the changes to road/trail densities and stream crossing densities with the implementation of all of the anticipated future and ongoing projects listed in this section. Road miles and stream crossings include all of the estimated temporary road miles that are planned for the future, even though these miles of road may not exist on the ground all at the same time. In addition, the miles of road planned for decommissioning by watershed were subtracted from the total miles of road, though the timing of the implementation may or may not overlap in time with other planned road construction.

Overall new temporary and specified roads planned as part of vegetation management projects range for the Upper North Fork Crooked River Watershed, Deep Creek Watershed, Upper Ochoco Watershed, and Lower Beaver Creek Watershed are 5.1 miles, 10.5 miles, 1.0 mile, and 0.6 miles, respectively. These new roads in addition to proposed trail miles minus planned decommissioned roads result in slightly reduced road densities in the Deep Creek and Upper Ochoco Creek Watersheds since more miles of road are planned to be decommissioned than are planned for construction. A net increase of 2.8 miles of road will be constructed as part of planned projects other than the Ochoco Summit Project in the Upper North Fork Crooked River Watershed, essentially maintaing the road density for the no action alternative, increasing it by a negligible amount from 2.69 to 2.71 miles per square mile. The same is true for Lower Beaver Creek, where there will be a net increase of 0.5 miles of road constructed as part of planned projects other than the Ochoco Summit Project in Lower Beaver Creek, essentially maintain the road density, increasing it by a negligible amount from 3.95 to 4.07 miles per square mile.

Vegetation management projects that are planned in the Ochoco Summit project area Watersheds include construction of new temporary and specified road stream crossings over perennial or intermittent streams. Approximately eight new stream crossings are anticipated in the Upper North Fork Crooked River Watershed, approximately six are planned in the Deep Creek Watershed, and approximately two are planned in the Lower Beaver Creek watershed (Table 82). Slight increases

result as a cumulative effect of adding stream crossings as part of vegetation management project to existing road stream crossings in the Upper North Fork Crooked River, Deep Creek Watersheds and Lower Beaver Creek, increasing the stream crossing density for the no action alternative from 2.46 to 2.52, from 2.05 to 2.12 crossings per square mile, and 3.26 to 3.40 crossings per square mile, respectively.

Table 81. Cumulative road/trail densities with implementation of future and ongoing projects.

Watershed	Existing Condition Road Density (Miles/Miles^2)	Veg Project New Temp and Spec Roads (Miles)	Future Decom Roads (Miles)	Cumulative Road/Trail Density (Miles/Miles^2)			
				Alt 1	Alt 2	Alt 3	Alt 4
Upper North Fork Crooked River	2.69	5.1	2.3	3.48	3.77	3.70	3.84
Deep Creek	3.56	10.5	17.6	2.71	2.93	2.81	2.93
Upper Ochoco Creek	2.55	1.0	2.4	2.89	2.93	2.93	2.93
Lower Beaver Creek	3.95	0.6	0.09	3.98	4.07	4.07	4.07

Table 82. Cumulative stream crossing density with implementation of future and ongoing projects.

Watershed	Existing Stream Crossing Density (Miles/Miles^2)	Veg Project New Temp and Spec Stream Crossings	Max Cumulative Stream Crosing Density			
			Alt 1	Alt 2	Alt 3	Alt 4
Upper North Fork Crooked River	2.46	8	2.52	2.99	2.63	2.95
Deep Creek	2.05	6	2.12	2.53	2.39	2.61
Upper Ochoco Creek	3.24	0	3.24	3.27	3.34	3.44
Lower Beaver Creek	3.26	2	3.40	3.40	3.40	3.40

Livestock grazing occurs across the Ochoco Summit project area within the Ochoco National Forest. Recently, improvements to grazing management were made, as described in the Marks Creek Allotment Management Plan. Implementation of this plan should improve grazing impacts to streams; however, cattle would likely use some of the user-created trails across the Ochoco National Forest. Cattle use of these user-created trails would reduce the number and miles of trail that would revegetate over time without active decommissioning; potentially maintaining existing connectivity of streams and user-created trails.

Based on estimated EHA values from vegetation management projects and almost negligible increases in the overall road/trail and stream crossing densities in the watersheds with future and ongoing projects, cumulative effects from future and ongoing projects to the sediment and flow regimes are anticipated to be negligible. In addition, due to the large departure between EHA values and LRMP thresholds, it is unlikely that the implementation of the Ochoco Summit trail systems would increase EHA values above LRMP thresholds. Essentially, there are no measurable increased cumulative effects beyond those effects described in the “Direct and Indirect Effects” section relative to the flow and sediment regimes within the watersheds that overlap the Ochoco Summit project area.

Sediment/Turbidity

The effects of past and present actions are described in detail under the “Direct and Indirect Effects” section. Future and ongoing portions of the preceding list of projects that overlap the Ochoco Summit project area have the potential to result in cumulative effects to streams relative to sediment delivery to and turbidity increases in streams and GDEs. Cumulative increases in miles of road and trail nears streams and GDEs have the potential to further increase impacts to stream and GDE habitat quality.

In order to assess whether there is a cumulative impact to streams from vegetation management road construction and to account for the mitigating effect of planned road decommissioning, miles of planned road construction and road decommissioning within the sediment delivery zone of perennial and intermittent streams and within GDEs and their associated RHCAs were estimated and an overall density was calculated (Table 83 and Table 84). Since increased peak flows are not anticipated to be cumulatively increased by planned future and ongoing projects, cumulative increases in bank erosion are also not anticipated.

Table 83 and Table 84 display the miles of new road, decommissioned roads and cumulative road/trail densities within 300 feet of streams and within wetland and spring RHCAs, respectively. Total road/trail densities in the Upper Ochoco Creek Watershed are particularly low based on the road layer used, which did not include miles of road outside the forest boundary as well as due to portions of the Mill Creek Wilderness roadless area overlapping this watershed. Upper North Fork Crooked River Watershed road/trail densities are also affected by the watershed encompassing the Big Summit Prairie, which is on private land and has very few roads.

Table 83. Cumulative road/trail densities within 300 feet of streams with the implementation of future and ongoing projects.

Watershed	Existing Condition Road Density in Sediment Delivery Zone (Miles/Miles^2)	Veg Project New Temp and Spec Roads in Sediment Delivery Zone (Miles)	Future Decom Roads in Sediment Delivery Zone (Miles)	Cumulative Road/Trail Density in Sediment Delivery Zone (Miles/Miles^2)			
				Alt 1	Alt 2	Alt 3	Alt 4
Upper North Fork Crooked River	3.44	0.81	0.43	3.45	3.65	3.53	3.64
Deep Creek	6.25	1.1	13.4	5.61	5.80	5.75	5.78
Upper Ochoco Creek	1.08	0.06	2.1	1.00	1.01	1.04	1.05
Lower Beaver Creek	6.34	0.15	0.09	6.36	6.36	6.36	6.36

Table 84. Cumulative road/trail densities within GDE RHCAs with the implementation of future and ongoing projects.

Watershed	Existing Condition Road Density in GDE RHCA (Miles/Miles^2)	Veg Project New Temp and Spec Roads in GDE RHCA (Miles)	Future Decom Roads in GDE RHCA (Miles)	Cumulative Road/Trail Density in GDE RHCA (Miles/Miles^2)			
				Alt 1	Alt 2	Alt 3	Alt 4
Upper North Fork Crooked River	1.42	1.8	0.08	1.48	1.53	1.52	1.54
Deep Creek	4.98	0.52	2.14	4.70	4.98	4.93	4.95
Upper Ochoco Creek	7.20	1.3	1.0	7.25	7.31	7.46	7.48
Lower Beaver Creek	6.8	0.0	0.0	6.8	6.8	6.8	6.8

Three roads in the Deep Creek Watershed planned for decommissioning by the Deep Creek Restoration Plan are planned for use as trails for Alternatives 2 and 4 and two of these roads are planned for use as trails in Alternative 3 (Table 85). Alternative 3 would not convert FS 1200-504 to trail. Approximately 1.41 miles of these roads are within the sediment delivery zone along

intermittent or perennial streams and approximately 0.86 miles are within wetland and spring RHCAs (Table 85). These miles of road planned for decommissioning proposed for trail conversion were not included in miles of road proposed for decommissioning within the sediment delivery zone of streams or within the GDE RHCAs or the associated road densities reported in Table 83 and Table 84.

Table 85. Deep Creek Restoration Plan planned decommisioned roads converted to trail.

Road	Subwatershed	Trail Class		Miles of Road Converted	
		Alt 2 & 4	Alt 3	Alt 2 & 4	Alt 3
FS 1200-504	Jackson	III	-	0.43	0
FS 3000-802	Jackson	I	III	0.92	0.92
FS 3000-930	Jackson	III	III	1.5	1.5
FS 4270-508	Little Summit Prairie	III	III	0.53	0.53

Overall, cumulative effects to road/trail densities within the sediment delivery zone of intermittent and perennial streams in the Ochoco Summit project area do not increase appreciably from the direct/indirect effect road/trail densities. The Deep Creek Restoration Plan planned road decommissioning has the cumulative effect of reducing road densities within the sediment delivery zone of streams from an existing condition road density of 6.25 miles per square mile to 5.61 miles per square mile for the no action alternative, Alternative 1. Alternatives 2, 3 and 4 all increase road/trail densities in the sediment delivery zone to streams relative to the no action alternative. Alternatives 2 and 4 have higher road/trail densities in the Upper North Fork Crooked River Watershed and the Deep Creek Watershed relative to Alternative 3 and the no action alternative. In the Upper Ochoco Creek Watershed; however, Alternatives 3 and 4 have higher road/trail densities within the sediment delivery zone as compared to Alternatives 1 and 2.

Overall, cumulative effects to road/trail densities within the wetland and spring RHCAs in the Ochoco Summit project area do not increase appreciably from the direct/indirect effect road/trail densities. The Deep Creek Restoration Plan planned road decommissioning has the cumulative effect of reducing road densities within wetland and spring RHCAs from an existing condition road density of 4.98 miles per square mile to 4.70 miles per square mile for the no action alternative, Alternative 1. Alternatives 2, 3 and 4 all increase road/trail densities in the wetland and spring RHCAs and have almost equivalent densities relative to the no action alternative. In the Upper Ochoco Creek Watershed; however, Alternatives 3 and 4 have higher road/trail densities within the GDE RHCAs as compared to Alternatives 1 and 2.

Livestock grazing occurs across the Ochoco Summit project area within the Ochoco National Forest. Recently, improvements to grazing management were made, as described in the Marks Creek Allotment Management Plan. Implementation of this plan should improve grazing impacts to streams; however, cattle would likely use some of the user-created trails across the Ochoco National Forest. Cattle use of these user-created trails would reduce the number and miles of trail that would revegetate over time without active decommissioning; potentially maintaining existing levels of sediment delivery from user created trails.

Based on estimated negligible increases in the overall road/trail densities in the sediment delivery zone of streams and in GDE RHCAs in the watersheds with future and ongoing projects, cumulative effects from future and ongoing projects to the sediment delivery and turbidity increases are anticipated to be negligible. In addition, since increased peak flows are not anticipated to be cumulatively increased by planned future and ongoing projects, cumulative increases in bank erosion are also not anticipated. In the Deep Creek Watershed, planned road decommissioning would decrease road/trail densities in sediment delivery zones and GDE RHCAs; however, approximately 3.4 to 4.7 miles of road planned for decommissioning in the Deep Creek Watershed is proposed to be converted to trail by the Ochoco Summit Project. Essentially, there are no measurable increased cumulative effects beyond those effects described in the “Direct and Indirect Effects” section relative

to the flow and sediment regimes within the watersheds that overlap the Ochoco Summit project area, in part as a result to planned road decommissioning.

Cumulative Effects to Aquatic Species

The determination of "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" (MIIH) to redband trout and Columbia spotted frogs is made for all action alternatives for the Ochoco Summit Project. Although the trail proposal would not likely contribute to a trend towards federal listing, the proposed trail would have effects to fish and frogs and their habitat.

Since erosion risk from ATV/OHV trails has been shown to potentially equal that of a forest road network, it can be expected that trails have the potential to increase drainage densities and peak flows similar to forest roads (Meadows et al., 2008). Areas with high road densities, high drainage densities, and a high density of stream crossings typically result in higher connectivity of the road and stream network.

Using the Project Design Criteria and Resource Protection Measures would help reduce sediment that could enter streams as a result of establishing an OHV trail as well as having culverts or bridges for crossings instead of fords through Class I, II, III and IV streams. Approaches to stream crossings would be hardened to reduce the sediment entering streams.

When comparing estimated sediment production from the new trail system under all proposed alternatives in the Ochoco Summit Project, it is apparent that estimated sediment production is a very small percentage of estimated natural background sediment produced in these subwatersheds. Stowell et al. (1983) look at changes in stream aggradation, fish habitat response, and fish response to surface fines with increases from the the forest road network. All alternatives in the Ochoco Summit project are estimated to produce a small percentage of fine sediment when compared to natural background, and therefore all alternatives are not expected to have an effect on stream aggradation, habitat changes, or physical changes in redband egg emergence.

With the exception of the Upper Marks Subwatershed, the forest road network combined with changes in all alternatives of the Ochoco Summit Project subwatersheds would not reach thresholds that are documented in Stowell et al. (1983). Based on the large percentage increase over natural background from the existing forest road network (>50%), it appears that there are likely negative impacts in the Upper Marks Creek Subwatershed from the forest road system. However, the estimated addition of fine sediment in all alternatives is so small compared to natural background that there wouldn't be any cumulative impacts beyond what is already occurring on-the-ground. Proposed restoration work in the Upper Marks Creek Subwatershed would help further improve conditions in the subwatershed over time. It is recommended that to promote healthy fish populations in Upper Marks Creek, a thorough look at the existing road system is warranted in order to reduce high estimated fine sediment numbers in the watershed.

Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality. Turbidity reduces the penetration of sunlight into the water that may affect the primary producers such as algae, phytoplankton, and other aquatic plants; thus potentially limiting photosynthetic activity, which many organisms depend on for survival (Kolbe and Luedke, 1993). Suspended solids can settle over eggs and redds (fish nests) resulting in lower reproductive rates, and disrupt the food base filling the interstitial spaces between larger substrates such as gravel and cobble rendering this habitat as marginal at best for those macroinvertebrates (food for fish) which typically reside in these spaces. The changes in the physical characteristics of streams and rivers can critically affect aquatic insects, fish, frogs and other animals that depend upon clear cold waters for habitat, spawning, or food (Havlick, 2002).

Redband trout: Additional sediment from the construction of the trail and installation of new crossings (culverts or bridges) and use of the trail within the 300-foot sediment delivery zone would contribute additional sediment to the streams. Fish habitat would be affected by potentially filling in pools and gravels used for spawning fish. Constructing trails in RHCAs and installing culverts increases sedimentation into stream during the life of construction until high flows can flush the sediment. Until that time, spaces in stream substrate fill, displacing macroinvertebrates and decreasing spawning habitat. Pools located downstream may fill during periods of excessive sedimentation.

Columbia spotted frogs: If the Columbia spotted frog becomes proposed for listing or listed after the decision for this project is signed, conferencing or formal consultation with the U.S. Fish and Wildlife Service would be initiated (Appendix B).

There are new trails in ground dependent ecosystems and ground dependent ecosystem buffers in Deep Creek Watershed for 1.6 miles; Upper North Fork Crooked River Watershed for 1.3 mile; Upper Ochoco Creek Watershed for 0.4 miles and 0 miles in Lower Beaver Creek Watershed. Project Design Criteria for building trail would prevent intersecting Columbia spotted frog habitat. However, short-term sediment increases in streams where it affects redband trout would also affect breeding success for Columbia spotted frogs.

Conclusion

Flow and Sediment Regime

Increases in overall subwatershed road/trail densities and stream crossing densities have the potential to increase connectivity between roads, trails and streams resulting in higher peak flows and changes to peak flow timing. Ochoco Summit Project proposed trail systems would have the effect of increasing road/trail and stream crossing densities in most of the subwatersheds analyzed in the project area for at least one of the alternatives, with the exception of the North Wolf Creek Subwatershed. Since miles of existing user created trails by subwatershed are unknown, these are not accounted for in road/trail density estimates and likely would affect these results. Overall, it is anticipated that by designating OHV trails, the total miles of trail across the Ochoco National Forest would decrease over time as user created trails revegetate in the long-term (15+ years). Some of these trails; however, would continue to effect flow and sediment regimes in subwatersheds across the Forest until active decommissioning is implemented.

Table 86 illustrates the magnitude of density increases or maintenance of current road/trail or stream crossing densities resulting from Alternatives 2, 3 and 4 relative to the no action alternative. The largest increases in both road/trail and stream crossing densities across analyzed subwatersheds exist as a result of Alternative 4, followed by Alternative 2, then Alternative 3. Alternative 1, the no action alternative, would not increase road/trail densities or stream crossing densities; however the user-created trails would continue to exist and potentially expand. Similar increases in the magnitude of both road/trail densities and stream crossing densities result from both Alternatives 2 and 4 in all of the Upper North Fork Crooked River Watershed subwatersheds. The Howard Creek Subwatershed has similar increases in densities for all three alternatives. The largest increases in both road/trail densities and stream crossing densities occur as a result of Alternatives 2 and 4 in the Porter Creek Subwatershed and as a result of Alternative 4 in the Upper Marks Creek Subwatershed. Both of these subwatersheds have poor existing conditions relative to flow/sediment regimes.

Cumulative effects from future and ongoing projects to the sediment and flow regimes are anticipated to be negligible based on estimated EHA values from vegetation management projects and almost negligible increases in the overall road/trail and stream crossing densities in the watersheds with future and ongoing projects. In addition, due to the large departure between EHA values and LRMP thresholds, it is unlikely that the implementation of the Ochoco Summit trail systems would increase EHA values above LRMP thresholds. Essentially, there are no measurable increased cumulative

effects beyond those effects described in the "Direct and Indirect Effects" section relative to the flow and sediment regimes within the watersheds that overlap the Ochoco Summit project area.

Sediment/Turbidity

Increases in road/trail densities within the sediment delivery zone of perennial and intermittent streams and within RHCAs of wetlands and springs have the potential to increase sediment delivery and turbidity increases in streams and habitat quality in both streams and wetlands in the Ochoco Summit project area. Ochoco Summit Project proposed trail systems would have the effect of increasing road/trail densities in stream sediment delivery zones and GDE RHCAs in most of the subwatersheds analyzed in the project area for at least one of the alternatives, with the exception of the North Wolf Creek Subwatershed. Since miles of existing user created trails by subwatershed are unknown, these are not accounted for in road/trail density estimates and likely would have effect on these results. Overall, it is anticipated that by designating OHV trails, the total miles of trail near streams and wetlands would decrease over time as user created trails revegetate over time. Some of these trails; however, would continue to effect sediment delivery and turbidity levels in streams and wetlands across the Forest until active decommissioning is implemented.

Table 87 illustrates the magnitude of density increases or maintenance of current road/trail densities resulting from Alternatives 2, 3 and 4 relative to the no action alternative. The largest increases in road/trail densities within stream sediment delivery zones and GDE RHCAs exist as a result of both Alternatives 2 and 4, followed by Alternative 3. Alternative 1, the no action alternative, would not increase road/trail densities. Similar increases in the magnitude of both road/trail densities result from both Alternatives 2 and 4 in the Howard Creek, Porter Creek, Little Summit Prairie, and Lower Deep Subwatersheds. Alternative 3 has similar increases to both Alternatives 2 and 4 in the Little Summit Prairie and Lower Deep Subwatersheds. In the Upper Marks Creek Subwatershed, increases in road/trail densities in stream sediment delivery zones and GDE RHCAs are similar for Alternatives 3 and 4, which is more than the proposed action, Alternative 2. The largest increases in both road/trail densities and stream crossing densities occur as a result of Alternatives 2 and 4 in the Howard Creek Subwatershed, which has a fair overall sediment/turbidity existing condition.

Some specific locations where decommissioned roads are proposed to be converted to trail may result in site specific sediment delivery concerns to streams in the Ochoco Summit project area. Alternatives 2, 3 and 4 propose to convert roads decommissioned in Deep Creek Watershed as part of the Deep Creek Restoration Plan to trails. In addition, roads decommissioned in the Peterson Creek Subwatershed as a result of risks related to the Maxwell Fire, are planned to be converted to trail in Alternatives 2 and 4. In addition, Alternative 2 proposes a 2 mile jeep crawl up a steep slope with High Slope Erosion Hazard that crosses two ephemeral streams multiple times. These site specific concerns are listed in Table 88 and the associated subwatersheds, road numbers, miles within Sediment Delivery Zones, Slope Erosion Hazard, proposed trail class by alternative, proximity to the stream, and flow regime. Alternative 3 has the least number of site specific concerns and all trails proposed within areas of concern are Class III trail motorcycle trails, which are expected to have the least impact of all three trail classes. Project Design Criteria should mitigate to some extent erosion and sediment delivery to the stream channel by requiring outsloping and hardening approaches to stream crossing, installing rolling dips to disperse water from the trail, by reducing the number of locations where OHVs can cross intermittent and perennial streams, and by reducing the density of trails within the sediment delivery zone (300 feet); however, in particularly sensitive areas where trails are located in close proximity to the stream channel (i.e. <200-300 feet) sediment delivery to the stream remains a potential concern.

For Table 86 and Table 87, the following applies: Arrow direction indicates magnitude of increase in density values: → indicates less than 0.2 mile per square mile increase in density; ↗ indicates an increase of 0.2 to 0.3; and ↑indicates an increase of greater than 0.3; SDZ = Sediment Delivery Zone.

Table 86. Flow and sediment regime summary of direct/indirect effects by alternatives.

Watershed	Existing Condition Flow/ Sediment Regime Rating	Sub-Watershed	Ochoco Summit Direct/Indirect Effects					
			Alternative 2		Alternative 3		Alternative 4	
			Road/ Trail Density	Stream Crossing Density	Road/ Trail Density	Stream Crossing Density	Road/ Trail Density	Stream Crossing Density
Lower Beaver Creek	Fair	North Wolf	→	→	→	→	→	→
Upper North Fork Crooked River	Poor/Fair	Elliot	↗	↑	↗	↗	↗	↑
		Howard	↑	↗	↑	↗	↑	↗
		Peterson	↑	→	→	→	↑	↗
		Porter	↑	↑	↗	↗	↑	↑
Deep Creek	Good	Jackson	↗	↗	→	↗	↑	↗
		Little Summit Prairie	↗	→	↗	→	↑	→
		Lower Deep	↗	↗	↗	↗	↑	↗
Upper Ochoco Creek	Poor	Upper Marks	↗	→	↑	↗	↑	↑

Table 87. Sediment and turbidity summary of direct/indirect effects by alternative.

Watershed	Existing Condition Sediment/ Turbidity Rating	Sub-Watershed	Ochoco Summit Direct/Indirect Effects					
			Alternative 2		Alternative 3		Alternative 4	
			SDZ Road/ Trail Density	GDE Road/ Trail Density	SDZ Road/ Trail Density	GDE Road/ Trail Density	SDZ Road/ Trail Density	GDE Road/ Trail Density
Lower Beaver Creek	Fair	North Wolf	→	→	→	→	→	→
Upper North Fork Crooked River	Fair	Elliot	↑	↗	↗	↗	↗	↗
		Howard	↑	↑	↑	↗	↑	↑
		Peterson	↗	→	→	→	↗	↗
		Porter	↑	→	→	→	↑	→
Deep Creek	Fair/Good	Jackson	↗	↗	→	→	↗	→
		Little Summit Prairie	→	↗	→	↗	→	↗
		Lower Deep	↗	↑	↗	↑	↗	↑
Upper Ochoco Creek	Fair	Upper Marks	→	→	↗	↑	↗	↑

Table 88. Specific locations with hydrologic concerns.

Subwatershed	Road/Trail Identifier	Miles in SDZ	Slope Erosion Hazard	Trail Class			Proximity to Stream	Flow Regime
				Alt 2	Alt 3	Alt 4		
Petersen Creek	New Trail (2 Mile Jeep Crawl)	0	High	II	-	-	5 Crossings	Ephemeral
	FS 2200-550	0.2	Moderate	I	-	I	1 Crossing	Fish-Bearing, Perennial
Jackson Creek	FS 1200-504	0.4	Moderate	III	-	III	5 – 200 ft (parallels)	Fish-Bearing, Perennial
	FS 3000-802	0.1	Moderate	I	III	I	1 Crossing	Perennial
		0.1					30 – 300 ft (parallels)	Fish-Bearing, Intermittent
	FS 3000-930	0.8	Moderate/ High	III	III	III	25 – 300 ft (parallels)	Fish-Bearing, Perennial
	FS 4250-608	0.1	Low/ Moderate	III	-	III	1 Crossing	Fish-Bearing, Perennial
Little Summit Prairie Creek	FS 4270-600	0.1	Moderate/ High	I	III	I	1 Crossing	Intermittent
Lower Deep Creek	FS 4200-600	0.3	Low	I	III	I	1 Crossing/ 15 – 100 ft (parallels)	Intermittent
	FS 4200-603	0.5	High	I	III	I	1 Crossing/ 30 – 120 ft (parallels)	Perennial

Viability Analysis for Aquatic Species

Fish species identified as management indicator species are listed in the FEIS for the Forest Plan. These species are rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*). In the past, these fish have been stocked by the Oregon Department of Fish and Wildlife. They are no longer stocked in the streams in the Ochoco Summit Trail System project area but may naturally reproduce in many streams (Classes I and II). For purposes of this analysis, effects to redband trout will act as a surrogate for MIS fish species. No further evaluation for brook trout will be discussed in this section (Rife 2011).

Riparian ecosystems occur at the margins of standing and flowing water, including intermittent stream channels, ephemeral ponds, and wetlands. The aquatic MIS were selected to indicate healthy stream and riparian ecosystems across the landscape. Attributes of a healthy aquatic ecosystem includes: cold and clean water; clean channel substrates; stable streambanks; healthy streamside vegetation; complex channel habitat created by large wood, cobbles, boulders, streamside vegetation, and undercut banks; deep pools; and waterways free of barriers. Healthy riparian areas maintain adequate temperature regulation, nutrient cycles, natural erosion rates, and provide for instream wood recruitment.

The existing condition of redband trout habitat and extent of redband trout populations in the project area is displayed in the "Hydrology and Aquatic Species" section of this FEIS in subsections titled "Watershed and Subwatershed Descriptions" and "Existing Condition." Refer to these discussions for more information on conditions for redband trout in the project area.

Redband trout populations in the Ochoco Summit OHV project area are considered depressed to less than 10% of historical numbers, but are believed to be self-sustaining and not considered to be in immediate threat of declining precipitously according to Oregon Department of Fish & Wildlife personnel (personal communication with Brett Hodgson, ODFW District Biologist, March 2006).

Limiting factors and threats for redband trout are similar throughout their range on the Ochoco National Forest and Crooked River National Grassland (Rife 2011). The predominant threats are increases in stream temperature due to channel degradation that is related to riparian area

management issues and population fragmentation from upstream passage issues mostly related to culverts at stream crossings.

Causal factors include legacy impacts from grazing, logging and road building in the 20th century. In most cases, channels are recovering from these impacts, especially from impacts associated with historic levels of grazing and logging; however, road building issues that constricted floodplains continue to cause impacts to fish habitat. Road crossings on the Ochoco are being replaced on a yearly basis with over 60 culverts either removed or replaced in the last 16 years. This has increased the ability of redband trout to move freely within and between watersheds.

There are no models developed to determine viability of the redband trout based on habitat. However, based on the local science from Stuart et al. (2007) and the estimated habitats from the Interior Columbia Basin Management Plan there appears to be appropriate habitat that is well distributed and available for redband trout across the Ochoco National Forest (Rife 2011). In conclusion, the viability assessment indicates that habitat of the redband trout is still available in adequate amounts, distribution, and quality to maintain redband trout viability on the Ochoco National Forest and Crooked River National Grassland.

Given the project design and mitigations and the small scale of change in site-specific locations, from the existing condition (especially relative to the scale of the Forest or overall subwatersheds included in this project), the viability of redband trout is expected to continue on the Ochoco National Forest under any alternative. See discussion above in “Direct and Indirect Effects” section of this report. The predominant threats to redband trout on the Ochoco National Forest are increases in stream temperature and fragmentation of habitats from road culverts. All alternatives analyzed in the Ochoco Summit Trail System project were determined to have “no effect” on stream temperature or upstream passage and therefore the viability of redband trout would not be affected. Furthermore, sediment levels would not be increased above the thresholds described in the “Direct and Indirect Effects” section of this analysis, further verifying that the viability of redband trout in the project area would not be affected.

Wildlife

This section includes a summary of the Wildlife specialist's report and Biological Evaluation; the entire report is in the Ochoco Summit Trail System project record, located at the Ochoco National Forest, Prineville, Oregon.

General Effects to Wildlife

With all management activities, there are negative effects to some species and benefits to others that must be considered and balanced along with the need for those human activities. Negative effects of recreational OHV use on wildlife may include wildlife mortality, direct and indirect loss of habitat, displacement, and reduced connectivity. Factors that influence the vulnerability of different wildlife species include behavior and ecology. For example, animals that tend to stay closer to shelter, such as gray squirrel and woodchuck, can tolerate closer encounters with humans because they can quickly escape (Frid and Dill 2002; Gill et al. 1996). Other species tend to forage less and spend less time in quality habitat near human activity (Gill et al. 1996). Still other species may respond positively to human development and use of OHV trails and roads; potential benefits are related to habitat, mobility, and food resources. Openings, shrubs and grasses may develop alongside roads, providing additional foraging habitats. Cleared roads and trails are utilized as travel corridors for some species.

No road construction is proposed for the Ochoco Summit project; however, there are ongoing effects of existing roads, and the effects of existing roads and proposed OHV trails are similar.

Road widths vary from 14 to 35 feet depending on single or double lane and maintenance of right of way. For trails, effects are less than roads regarding direct alteration of habitat as the width of the footprint for motorcycle trails would be 24 inches wide; ATV trails would be 50 inches wide; and jeep trails would be 80 inches wide.

General effects to wildlife include altered reproductive success, mortality, loss of habitat or habitat quality due to:

- Access for predators and people
- Fragmentation of habitat patches
- Behavioral changes in response to human use
- Impacts due to noise
- Physical alteration of habitat

Access for predators and people

Roads may act as barriers for some species but may aid in the dispersal of other native and non-native species. Pocket gophers have extended their ranges by traveling on roads and canals (Hey 1941 in Ouren et al. 2007). Brown-headed cowbirds are attracted to trails giving them easier access to parasitize nests near the trail or roads (Hickman 1990). Studies have found predation rates increase with decreasing distance to trails by raven, domestic dogs, mice, squirrels, skunks, and coyotes (Miller and Hubbs 2000; Miller et al. 1998).

Roads and trails provide greater human access to habitats previously not accessed (Forman et al. 2003). There is increased human access to and contact with animals resulting in intentional or accidental harm or mortality. Roads and trails also increase access for falconers to remove young raptors from nests (Erdman et al. 1998 in Gaines et al. 2003). Increased contact can result in increased intentional or accidental killing of wildlife, resulting in increased vulnerability of species like mink, marten, deer and elk (Cole et al. 1997; pers. comm. ODFW; Gaines et al. 2003).

Edge effect from roads and trails may also increase predation access to songbird nests. Studies found an increase in predators attracted to the corridors and the adjacent forest interior on trails and roads 7

to 26 feet (Rich et al. 1994 in Ouren et al. 2007; Hickman 1990). In addition, open areas such as junctions, play areas, campgrounds, and staging areas have perches and a clear view of surrounding areas can be a factor in higher nest predation (Ratti & Reese 1988 in Paton 1994).

Adjacent roads and trails provide travel corridors into forested habitat from nearby areas (Small and Hunter 1988; Askins 1994 in Montana TWS 1999). Predators such as great gray owls and red-tail hawks take advantage of forest edge. Roads and 4 wheel drive trails provide additional nesting habitat for these species. Indirect effects would include competition with other predators, such as Goshawk and Coopers hawk.

In recent years there have been few restrictions to cross country travel across the Forest except in designated areas (e.g. wilderness, research natural areas, Travel Management Areas, Roadless Areas). Closed roads have administrative use allowed. This use is highly variable in any given year from short-term daily use for a vegetation management project to years of inactivity. Because of the variability and high degree of inactivity these roads are not included in the disturbed habitat analysis. Outside of closed areas cross country travel has been permitted on Ochoco National Forest, and many miles of user-created trails, closed roads, non-motorized trails and other unauthorized routes are receiving motorized use. Within the project area there are 659 miles of roads that are legal for mixed use by OHVs. In addition there are 140 miles of open road that are not legal for OHV use, and 669 miles of closed roads, many of which are receiving OHV use. Given the traditional pattern of “open unless designated closed” on this forest, there are currently large areas with high levels of human disturbance and predator access.

The Ochoco Summit project does not propose to construct any new roads. Proposed trail construction would utilize roads, user-created trails, fire lines, snowmobile trails, and other areas disturbed from management activities wherever possible. Through the action alternatives, OHV use would only be allowed on designated trails, routes, shared use roads and/ or play areas, and would no longer be permitted on user-created trails. Within each action alternative, there is a proposal to decrease habitat disturbance by closing and rehabilitating user-created trails, physically closing roads that are not managed as open roads, and converting roads into trails. Table 89 displays the length of trail by existing disturbance type. “Miles of trail not on roads” includes new routes, as well as routes on existing disturbance that are not recognized in GIS as Forest System Roads (ie. temporary roads, skid roads, user created trails, or old roads that have been removed from the transportation database). A combination of rehabilitation of unwanted user created or unauthorized routes and reinforcement of existing road closures would be implemented, which should ameliorate effects of human access across the project area. However, closed roads, converted trails and rehabilitated routes may still provide access for predators. Given the relatively open travel conditions present across much of the project area for hunters and predators alike, it is assumed that animal mortality rates would be similar to what currently exists.

Table 89. Comparison of Alternative Actions.

Alternative	Miles of mixed use (OHV legal) road	Miles of trail route on open roads	Miles of trails on closed roads	Miles of trails on decommissioned roads	Miles of trails not on roads
Alternative 1	659	0	0	0	0
Alternative 2	659	46	44	11	69
Alternative 3	659	13	30	7	50
Alternative 4	659	53	62	14	81

Fragmentation of habitat patches

Roads contribute to forest fragmentation by dissecting large patches into smaller patches. Forest fragmentation results in decreased interior forest habitat and increased edge habitat (Askins et al. 1987; Small and Hunter 1988; Schonewald-Cox and Buechner 1992; Askins 1994 in Montana TWS 1999; Reed et al. 1996). Patch size and distribution can determine the probability that a patch may be occupied (Laan and Verboom 1990; Fahrig 1998 in Montana TWS 1999). Habitat fragmentation from roads and 4-wheel-drive trails may reduce a species capacity by disrupting continuous forest cover and reducing space needed by interior species (Hickman 1990 in Montana TWS 1999, Hutto 1996). However, some species such as flycatching birds and accipiters may respond favorably to canopy gaps and corridors, which they utilize as foraging sites or flyways.

Riparian areas are usually areas of high diversity. Fragmentation of riparian habitats by roads may create greater impacts on the landscape. Patch size is reduced and roads may separate important habitat associations between the uplands and riparian areas. Songbirds, such as the brown creeper and dark-eyed junco, utilizing both the riparian and upslope forested habitat (McGarigal and McComb 1992) used habitats more effectively when they were connected (Hutto 1995).

Road and trail edges may serve as ecological traps for some species (Andrews 1990 in Ouren et al. 2007; Kokko and Sutherland 2001). These areas may have the necessary resources for species to live and potentially reproduce but impose high mortality rates. For example, some bird species are attracted to roadsides due to the lush vegetation for nesting and foraging; although the road and trail sides contains suitable habitat, these individuals are at greater risk of mortality of being hit by vehicles or predation (Clark and Karr 1979 in Ouren et al. 2007, Brooks and Lair 2005; Mumme et al. 2000 in Ouren et al. 2007; Yahner et al. 1979 in Ouren et al. 2007; Kokko and Sutherland 2001). In the Ochoco Summit project area, the more likely potential effect would be increased predation, as risk of animals being hit by an OHV on trails designed for slow speed is low.

Forman (2000) described a “road effect distance” of 200 meters (660 feet) for secondary roads to calculate the indirect loss of habitat and the displacement of many species. Forman also mentions the road effect zone is highly variable and is dependent on the species affected, adjacent habitat, road type, and traffic volume. Noss and Cooperrider (1994) report edge effects are not linear and the zone varies in width depending on what is being measured. They report edge effects seen as far as 240 meters. Therefore, the 200 meter road effect distance would be used to assess edge effects as well. This distance may over-estimate effects for some species and would under-estimate effects for others. However, this distance captures known effects for many species and provides a relevant measure of change between the existing condition and the alternatives. The analysis would also assume a 200 meter affected distance for all motorized trails proposed as part of the Ochoco Summit OHV system. It is assumed that the 200 meter road effect distance would also include those effects for motorized access for dispersed camping. Vehicles accessing dispersed campsites are usually traveling at a very low rate of speed for short distance (no more than 300 feet). Engines are only on for short periods of time and therefore, effects realized for the 200 meter road effect zone would include those for motorized access for dispersed camping as well. This 200 meter road effect distance would be referred to as disturbed habitat in the analysis.

For an estimate of acres affected due to fragmentation of habitat by the network of existing open roads and by the proposed activities refer to the column labeled “Acres within 660’ (200m)” in Table 90.

Table 90. Comparison of Alternatives, Acres within distance bands of motorized routes.

Alternative	Acres within 660' (200m)	Acres 660' to ¼ mile	Acres ¼ mile to ½ mile	Acres ½ mile to ¾ mile	Acres ¾ mile to 1 mile
Alternative 1 (existing condition)	115,127	70,793	66,473	26,794	11,614
Alternative 2	125,745	70,192	61,299	23,450	10,484
Alternative 3	123,036	70,652	62,775	24,142	10,565
Alternative 4	129,390	70,155	58,977	22,224	10,423

Behavioral changes in response to human use

A major short-term or immediate response of wildlife to recreation is a change in behavior. Behavioral changes include stopping foraging until the disturbances ceases, fleeing, flushing, nest abandonment, and stopping mating calls (Knight and Cole 1995; Taylor and Knight 2003). Frid and Dill (2002) suggested human-caused disturbance (e.g. walking, motorized vehicles, wildlife viewing) is a form of predation risk, in that animals respond to human activities in the same way they might respond to their predators. A human approaching straight towards an animal may trigger a flight response (Bennett and Zuelke 1999; Klein et al. 1995). In addition, if the human is off-trail, the animal may have a much stronger tendency to flee (Knight and Cole 1995; Taylor and Knight 2003).

The stress of a flight response in any animal can cause physiological changes, including increased heart rate, oxygen consumption, metabolism, respiratory rate, blood flow, body temperature and blood sugar, and decreased blood flow to skin and digestive organs (Gabrielsen and Smith in Knight 1995). These types of energy expenditures can reduce vigor and decrease energy.

Long-term disturbances can reduce overall vigor and energy. Wildlife may change their habits, including reproductive behaviors, foraging habitats, food consumption, food sources, foraging areas and home ranges (Giest 1978; Klien 1971; Knight and Cole 1995). Elk have been found to avoid open roads, while deer avoid areas occupied by elk. Thus the presence of open roads can result in spatial partitioning in response to distance from motorized routes (Wisdom, et. al 2005). Some species become habituated to human presence; habituation can result in reduced sensitivity to disturbance, but may increase vulnerability to hunting or poaching.

Impacts due to noise

For the purposes of this analysis, noise is defined as any "human made sound that alters the behavior of animals or interferes with their normal functioning" (Bowles in Knight and Gutzwoulder 1995). The potential effects of noise on wildlife (AMEC 2005, Forman and Alexander 1998) include:

Altered behaviors
Hearing loss and decreased sound sensitivity
Communication confusion
Habitat loss
Habituation

The impacts of these effects may include reduced reproductive success, mortality, and/or reduced habitat quality or habitat loss (AMEC 2005). An animal's sensitivity to sound varies with the frequency band to which it is most sensitive to (AMEC 2005). Sound is usually measured in decibels (dB) and can vary with distance from the source due to a variety of factors like topography, weather, features that act as barriers (trees), volume, and the source (AMEC 2005). Noise emitted from many OHVs today can reach 101.1 dBs and higher (http://www.fs.fed.us/r6/centraloregon/recreation/cohvops/sound.shtml). In Oregon there is a state

law of 99 dBs maximum (at 20 inches from the muffler) on all OHVs (http://www.nohvcc.org/IMAGES/ohvregs.htm).

Altered Behaviors: Behavioral responses to noise can be mild, (wariness, walking slowly away, freezing, or crouching), moderate (running away, hiding in dens or burrows, flying short distances) to intense (panic flight, urinating or defecating and running at high speeds). These behaviors interrupt foraging, nurturing young, and in the case of panic responses can lead to injury or death (Bowles in Knight 1995). Burger and Gochfeld (1991) found shorebirds' foraging time decreased and avoidance of disturbance increased within 100 m (328 ft). Various mammal studies have shown mammals may leave an area where noise is, but return at some point once the noise is gone (Bowles in Knight 1995).

Hearing loss and decrease in sound sensitivity: Although sounds from OHVs are not the loudest sounds, they are emitted more frequently in wildlife habitats than other high intensity sounds (Brattstrom and Bondello 1983 in Ouren et al. 2007). Effects on animals can vary from partial deafness to hormonal stress responses, depending on loudness and proximity.

Marler et al. (1973) used sound pressure of 95-100 decibels (dB), which represents many OHV sound levels (two stroke engines: 70-101 dB; four stroke engines: 60 dB; ATVs: 78 dB; snowmobiles: 75 dB). The noise level of 99 dB (highest allowed in Oregon) would be loud enough to create partial deafness in canaries and songbirds (Marler et al. 1973; Konishi 1969). Wildlife within the project area would not experience this noise level at a constant rate, nor would they receive this sound level 20 cm away. It is more probable wildlife would be intermittently exposed to vehicles producing sound levels of 99 dB, with a rare occasion of illegal engine reaching above 99 dB, and much farther away than 20 cm. So, while deafness is unlikely there could be a decreased sensitivity. For example, sand lizards and kangaroo rats exposed to playback recordings of dune buggies at lower decibels than they would have been actually exposed to experienced hearing loss for weeks after and were unresponsive to predator sounds (Brattstrom and Bondello 1983 in Ouren et al. 2007).

Communication Confusion: Human-made noise has the potential of interfering with animal communication signals, sounds animals listen to for orientation, and for predator-prey detection (Erbe et al. 1999 in AMEC 2005). Noisy environments can cause problems with intra-species communication and can interfere with detection, discrimination, and localization of appropriate signals (Wollerman 1998 in AMEC 2005). Klump et al. (1984) showed how the great tit can hear the sparrow hawk coming and gives one of three alarm calls to warn others of the presence of sparrow hawks. Communication between the species fails if noise masks either the noise produced from the sparrow hawk or the alarm call. Reijen and Foppen (1994) stated that where primary song was affected by vehicle disturbance, birds appeared reluctant to establish nesting territories. This could affect populations whose numbers are already low (AMEC 2005). Konish (1970) found all birds could hear frequencies below 1kHz, which may be used to detect low broad-band noises by predators. Vehicle noise may indirectly cause mortality by eliminating a species' ability to detect and capture necessary food items or detect and avoid predators (Montana TWS 1999). In addition, ambient (background) noise affects the distance at which vocalizations, human-made noises, and other sounds can be detected (AMEC 2005). Ambient noise in terrestrial environments includes sound like animal calls and songs (e.g. birds, frogs, and insects), water, and wind (AMEC 2005). At times, OHV noise may simulate natural sounds (e.g. thunder) to which animals are adapted and result in inappropriate responses. In a study conducted by Brattstrom and Bondello (1983 in Ouren et al. 2007), spadefoot toads subjected to taped motorcycle sounds emerged prematurely from their burrows during the wrong season (absence of rain).

Habitat Loss: Habitat loss is a potential impact of noise disturbance on wildlife. Studies on ungulates and carnivores have shown heavily traveled roads are avoided or used little in comparison to lightly traveled roads (Forman et al. 2003; Rowland et al. 2005). Large mammals tend to have lower population densities within 100-200 meters of roads and other animals seem to avoid roads (i.e.

arthropods, small mammals, birds) (Forman and Alexander 1998; Barton and Holmes 2007; Eigenbrod et al. 2007; Fletcher et al. 1999; Montana TWS 1999; Gaines et al. 2003; and Ouren et al. 2007).

Many studies show breeding birds near highways and OHV trails have reduced densities, population decline and/or are more likely to abandon their nest (Forman et al. 2003; Barton and Holmes 2007; Montana TWS 1999; Kaseloo 2006; Van der Zande et al.1980; Reijnen et al. 1995; Reijnen and Foppen 1995). Depending on the species the amount of habitat lost due to noise varies.

Habituation: Some animals do show the ability to adapt to noise. Flushing distance may decrease, avoidance distances may decrease, and individual wildlife may learn to ignore the sound (Bennett and Zurlke 1999; Burter 1981; Zande et al. 1980; Dorrance et al. 1975; Richins and Lavigne 1978; Moen at al. 1982 in Zielinski et al. 2007). Additionally, some songbirds can become habituated to certain people visiting their nest sites and may become aggressive to others they have not become accustomed to (Knight 1995). Mule deer were found to use areas closer to roads at Starkey Experimental Forest and Range (Johnson, 2000), but this pattern of use was attributed to avoidance of elk rather than selection of habitat near roads. Preisler (2006) noted that the response of elk to human disturbance lessened after a few days of disturbance and suggested that the elk had either habituated or found refugia close to roads, rather than fleeing to the far corners of experimental pastures at Starkey Experimental Forest and Range.

Whittaker and Knight (1999) stated that animals may become habituated to trail recreation because the movement is always occurring on a certain line of travel continually. Their study illustrated an animal's probability of flushing due to recreation increased when the activity was off-trail versus on-trail. Other studies have shown animals are also more prone to habituate to trail activities versus those activities that are unpredictable (MacAurthur et al. 1982; Miller et al. 2001). The energetic cost for wildlife of responding to disturbances from recreation can also affect the carrying capacity of wildlife habitat (Stalmaster 1983). In some cases, wildlife may habituate to predictable disturbance from recreation, but in other cases they may not (Taylor and Knight 2003). However, habituation may lead to attraction, which could have wildlife consequences. For example, habituated wildlife may be more susceptible to mortality from poaching and hunting (Singer 1975).

Disturbance associated with noise is assumed to be greatest within the road effect zone (200 meters each side of roads) as well as along unauthorized routes and via cross country travel. Disturbance would decrease beyond the road or motorized trail effect zone for each of the action alternatives and as a result, habitat quality would increase as distance from road or trail increases. Acreage within five potential disturbance bands is displayed in Table 90. At 1 mile or more from a motorized route noise and disturbance impacts are assumed to drop to the ambient level (zero impact from motorized use of the route); Table 91 displays the acreage in the project area that is within one mile of an existing or proposed route, and the acreage that is more than one mile from existing or proposed routes.

Table 91. Acreage within and more than one mile from motorized routes in the Ochoco Summit project area.

Alternative	Total Acres (% of area) less than 1 mile from motorized route	Total Acres (% of area) more than 1 mile from motorized route
Alternative 1	290,802 (96.4%)	10,779 (3.6%)
Alternative 2	291,170 (96.5%)	10,411 (3.5%)
Alternative 3	291,170 (96.5%)	10,411 (3.5%)
Alternative 4	291,170 (96.5%)	10,411 (3.5%)

Physical Alteration of Habitat

Effects of direct habitat alteration depend on the scale at which they occur and the tolerance of the species in question. Reducing one acre of habitat for a species that has a large home range and large

quantities of habitat available would have very little impact, if any, on that species. Reducing one acre of habitat on a species that is not mobile and has a three acre home range may affect that individual's ability to successfully reproduce or survive. Affecting one or a few such individuals may have little or no effect on the population or species across the landscape.

This project would not remove substantial amounts of dead and down wood, would have limited landscape level impacts to various plant associations, and would avoid springs, bogs and other unique habitat. Thus, this project is not expected to result in changes to habitat for species that use dead and down logs (including bears, American marten and other species); a wide range of species that use various plant communities; and species that use springs, bogs and other unique habitat (including shorebirds, waterfowl, gastropods, amphibians and a variety of other species).

Alternative 1: Physical effects to special habitats (SHAB) such as meadows, riparian woodlands, shrublands and rocky sites would continue within the affected zone along open roads. No physical closure of unauthorized routes would be implemented. Direct and indirect effects of existing open roads are related to road maintenance activities, dust, run-off and vehicles being driven off the road surface for various reasons such as campsite access, firewood cutting, parking, etc. There would be no effects from a designated trail system.

Action Alternatives: Direct and indirect effects would continue within the road effect zone on roads that remain open and for any additional length of motorized route included in the OHV trail system described in each alternative. Direct and indirect effects include those described above for Alternative 1, as well as for soil disturbance associated with new trail construction, maintenance and conversion of old road beds to motorized trails.

Alternative 2: Within the designated trail system approximately 36 miles of designated route impact 18 acres of special habitat. Of the designated route miles on SHAB, 11 miles are on open roads. The designated system would include 126 miles in forested plant association groups (PAGs) and 44 miles in PAGs other than forested (juniper woodland, juniper steppe, non-forested). Of the designated route miles in forested PAGs: 11miles of class I routes are on open roads; 16 miles of class II routes are on open roads; and 3 miles of class III routes are on open roads. If an average width of 10' of impact to vegetation is assumed on routes not on existing roads, then approximately 1.2 acres per mile could be affected by direct habitat alteration of forested PAGs, a total of 115 acres. Of the route miles in PAGs that are not forest land, 3 miles of class I routes are on open roads; 13 miles of class II routes are on open roads; and 1 mile of class III routes are on open roads. If the same average width of habitat alteration is assumed as in forested PAGs, then non-forested habitat alteration could potentially affect 32 acres. The area impacted by clearing could be reduced in the long-run on routes where roads are converted to trails (up to 55 miles), as well as where unauthorized routes are closed. Such closures are proposed on a total of 209 sites.

Alternative 3: Within the designated trail system approximately 17 miles of designated route impact 7 acres of special habitat. Of the designated route miles on SHAB, 5 miles are on open roads. The designated system would include 82 miles in forested plant association groups (PAGs) and 19 miles in PAGs other than forested (juniper woodland, juniper steppe, non-forested). Of the designated route miles in forested PAGs 4 miles of class I routes are on open roads, and 6 miles of class III routes are on open roads. If an average width of 10' of impact to vegetation is assumed on routes not on existing roads, then the area potentially affected by direct habitat alteration of forested PAGs would be a total of 86 acres. Of the route miles in PAGs that are not forest land, 1 mile of class I route is on open roads, and 4 miles of class III routes are on open roads. There are no class II routes proposed under this alternative. If the same average width of habitat alteration is assumed as in forested PAGs, then non-forested habitat alteration could potentially affect 17 acres. The area impacted by clearing could be reduced in the long-run on routes where roads are converted to trails (up to 37 miles), as well as where unauthorized routes are closed. Such closures are proposed on a total of 145 sites.

Alternative 4: Within the designated trail system approximately 40 miles of designated route impact 22 acres of special habitat. Of the designated route miles on SHAB, 14 miles are on open roads. The designated system would include 164 miles in forested plant association groups (PAGs) and 48 miles in PAGs other than forested (juniper woodland, juniper steppe, non-forested). Of the designated route miles in forested PAGs: 24 miles of class I routes are on open roads; 6 miles of class II routes are on open roads; and 7 miles of class III routes are on open roads. If an average width of 10' of impact to vegetation is assumed on routes not on existing roads, then the area potentially affected by direct habitat alteration of forested PAGs would be a total of 152 acres. Of the route miles in PAGs that are not forest land, 10 miles of class I routes are on open roads; 5 miles of class II routes are on open roads; and 1 mile of class III routes are on open roads. If the same average width of habitat alteration is assumed as in forested PAGs, then non-forested habitat alteration could potentially affect 38 acres. The area impacted by clearing could be reduced in the long-run on routes where roads are converted to trails (up to 76 miles), as well as where unauthorized routes are closed. Such closures are proposed on a total of 277 sites.

Threatened, Endangered and Sensitive Species

Greater Sage Grouse and California wolverine, both candidate species, are the only terrestrial wildlife species federally listed or under review for listing under the Endangered Species Act that are likely to occupy any portion of this project area based on the 2011 R6 Regional Forester's Threatened, Endangered and Sensitive Species List (R6 TES List).

Sensitive species were analyzed using the 2011 update to the R6 TES List. Table 81 includes all terrestrial animal species documented or suspected to occur on the Ochoco National Forest and their status.

Species classified as sensitive by the Forest Service are to be considered by conducting biological evaluations (BE) to determine potential effects of all programs and activities on these species (FSM 2670.32). The BE is a documented review of Forest Service activities in sufficient detail to determine how a proposed action may affect sensitive wildlife species. Columbia spotted frog, western ridged mussel (bivalve mollusk), Columbia clubtail (dragonfly), *Namamyia plutonis* (caddisfly), Harney Basin duskysnail, Indian Ford juga and Crater Lake tightcoil (snails) occupy aquatic or semi-aquatic environments and are discussed in the aquatic species section.

Table 92. Regional TES Terrestrial Animal Species for the Ochoco National Forest.

Species	Listing Status	Habitat	Presence Within Ochoco Summit Area
Bald Eagle (*Haliaeetus leucocephalus*)	Regional Forester Sensitive	Lakes, Reservoirs, Large Trees for Nesting	Habitat Present - Known Nests
Upland Sandpiper (*Bartramia longicauda)*	Regional Forester Sensitive	Large Wetlands	Habitat Present – historic occurrence
Bufflehead (*Bucephala albeola*)	Regional Forester Sensitive	Mountain Lakes and Ponds	Habitat Present - Migratory
American Peregrine Falcon (*Falco pergrinus anatum*)	Regional Forester Sensitive	Lakes, Rivers, Snags	Habitat Present - Unknown
Tricolor Blackbird (*Agelaius tricolor*)	Regional Forester Sensitive	Marshes and Bogs with Emergent Plants	No Habitat
Lewis' Woodpecker (*Melanerpes lewis*)	Regional Forester Sensitive	Open Forests, Burned Forest or Cottonwood Galleries	Habitat Present – Documented occurrence

Table 92. Regional TES Terrestrial Animal Species for the Ochoco National Forest.

Species	Listing Status	Habitat	Presence Within Ochoco Summit Area
White-Headed Woodpecker (*Picoides albolarvatus*)	Regional Forester Sensitive	Ponderosa Pine or Mixed Conifer Forests Dominated by Ponderosa Pine	Habitat Present – Documented occurrence
Greater Sage Grouse (*Centrocercus urophasianus phaeios*)	Federal Candidate	Sagebrush Without Tree Cover	Habitat Present – Documented occurrence
California Wolverine (*Gulo gulo*)	Federal Candidate	Mixed Forest Mosaic, High Elevations	Habitat Present – Historic occurrence
Pygmy Rabbit (*Brachylagus idahoensis*)	Regional Forester Sensitive	Sagebrush with Friable Soils	No Habitat
Townsend's Big-Eared Bat (*Plecotus townsendii*)	Regional Forester Sensitive	Roost Sites in Buildings, Caves and Bridges	Habitat Present – Documented occurrence
Silver-Bordered Fritillary (*Boloria selene*)	Regional Forester Sensitive	Wet meadows, marshes, bogs and more open parts of shrubbier wetlands	Habitat Present – Documented occurrence
Johnson's Hairstreak (C*allophrys johnsoni*)	Regional Forester Sensitive	Mostly in old growth coniferous forests with mistletoe presence	Unknown

After a review of existing records, habitat requirements, and existing habitat components, it was determined that the following sensitive species have habitat present in the project area or are known to occur and would be included in this analysis: Greater Sage Grouse (*Centrocercus urophasianus phaeios*), Northern bald eagle (*Halaieetus leucocephalus*), Upland Sandpiper (*Bartramia longicauda*), Bufflehead (*Bucephala albeola*), American Peregrine Falcon (*Falco pergrinus anatum*), Lewis' woodpecker (*Melanerpes lewis*), White-headed woodpecker (*Picoides albolarvatus*), California wolverine (*Gulo gulo*), Townsend's Big-Eared Bat (*Plecotus townsendii*), Silver-bordered fritillary (*Boloria selene)* and Johnson's hairstreak (*Callophrys johnsoni*).

The following species were determined not to occur in the project area based on a review of habitat requirements, and habitat types present in the project area and a lack of existing sighting information: tricolored blackbird (*Agelaius tricolor)* and pygmy rabbit (*Brachylagus idahoensis).* These species will not be included in any further analysis for this project.

American Peregrine Falcon (Falco pergrinus anatum), R6 Sensitive

In Oregon peregrine falcons occur as resident and migratory populations. They nest on cliffs greater than 75 feet in height and within one mile of some form of water (Pagel 1992). Nesting occurs in xeric areas of eastern Oregon, marine habitats of western Oregon, montane habitats to 6,000 feet elevation, small riparian corridors statewide, and more recently urban habitats of the lower Willamette and Columbia Rivers. Riparian corridors are used for travel and as hunting areas (90-95 percent of all prey items are birds that may come from these systems, Pagel 1992).

Existing Condition: There are no known peregrine falcon eyries on Ochoco National Forest. Within the Ochoco Summit project area there is a limited amount of suitable cliff habitat that could function as nesting habitat. Cliffs in the area are considered to have low potential to support nesting peregrine falcons. In the project area general observations of peregrine falcons were recorded near Duncan Butte in May of 1978, near Buck Point in July of 2002 and at Deep Creek in 2003. Additional records

occurred on private land between 1986 and 1995 approximately 3 miles south of the project area's southeast corner, one in July and three in January.

Effects Common to All Alternatives: Cliff habitat and potential foraging areas would not be modified by any alternative proposed by this project. There are no proposed trails or staging areas within 1 mile of any know nest area.

Determination: Implementation of any alternative would have "**No Impact**" on the peregrine falcon. Because no effects are anticipated, there are no cumulative effects.

Greater Sage-Grouse (Centrocercus urophasianus phaeios), Federal Candidate

Greater sage grouse are found in foothills, plains, and mountain slopes where sagebrush is present and the habitat contains a mixture of sagebrush and meadows in close proximity. Winter habitat containing palatable sagebrush probably is the most limited seasonal habitat in some areas (NatureServe 2008). In Oregon sage-grouse occur in Central and Southeastern Oregon in the Western and Northern portions of the Great Basin (USFWS, 2012).

Existing Condition: While this habitat type and sage grouse are known to occur on the Ochoco National Forest, this habitat type does not occur in large enough patches to provide high quality nesting and brood rearing habitat within the project area. Numerous records exist for sage-grouse sightings within 1 to 6 miles of the southeast boundary of the project area. These were all general sightings and most occurred between July and October. However, two springtime records occurred, both outside the project area by at least 3 miles. Core area has been mapped along the southeast corner of the project area (ODFW 2012).

Effects Common to All Alternatives: Some relatively small patches of potentially suitable nesting or brood rearing habitat occur in proximity to proposed trails. However, these sagebrush habitat patches are not likely to be utilized by nesting sage-grouse hens due to the presence of raptor perches (small patches or intermixed scab/stringer habitat) and distance from known leks (breeding sites). There are no proposed trails or staging areas within 4 miles of sighting locations, within the core area or within four miles of any known lek.

Determination: The Deschutes and Ochoco National Forests completed a Joint Aquatic and Terrestrial Programmatic Biological Assessment for Federal Lands within the Deschutes and John Day River Basin's Administered by the Deschutes and Ochoco National Forests in August 2006. At the time of document completion, the greater sage grouse was under review for federal listing. Current direction is to continue to incorporate the Project Design Criteria (PDCs) to limit effects to sage-grouse. The PDCs for the sage grouse were reviewed in relation to the Ochoco Summit OHV project as proposed and were determined to be consistent. A new programmatic BA for 2010-2013 does not include the greater sage-grouse since it is not currently federally listed or proposed for listing under ESA. Implementation of any alternative would have "**No Impact"** on the greater sage-grouse. Because no effects are anticipated, there are no cumulative effects.

Townsend's Big-Eared Bat (Plecotus townsendii), R6 Sensitive

Townsend big-eared bat maternity and hibernation colonies are typically in caves and mine tunnels. They roost almost exclusively in cavity roosts, both in human-made structures (that is, buildings, bridges, and mines) and caves (Christy and West 1993). They are extremely sensitive to disturbance while roosting, because they hang directly from the ceiling of the roost and do not go into torpor (temporary hibernation) during the day in summer colonies (Barbour and Davis 1969 and Dalquist 1948 cited in Christy and West 1993). Perkins and Levesque (1987) estimated the Oregon population at 2,300-2,600 bats and Gaines (1997 cited in NatureServe 2008) estimated 3,000-5,000 individuals in Oregon. The species range extends from southwestern British Columbia, western Washington, western and central Oregon, and northwestern and west-central California. NatureServe (2009) gives

them a status of S2, Imperiled in the state of Oregon. The greatest threat to the species is vandalism and disturbance by humans. Disturbance of a nursery colony or of a hibernating group is likely to cause the bats to abandon the site and move to an alternate roost. An additional threat is blockage of cave/mine entrances through collapse or human activities (NatureServe 2009).

Existing Condition: Though there are mines on Lookout Mountain Ranger District and there are documented reports of Townsend's big-eared bats occurring on the district, these are not located in proximity to any proposed trail or staging area. There is one known location for Townsend's big-eared bat in the project area. This location was first recorded in 1998 and is known to have continued occupancy by bats, though species determinations have not been confirmed in recent years. Another record, about 1 ½ miles west of the project area, came from a bat survey conducted in June of 1997.

Effects Common To All Alternatives: Cave, mine and existing wooden structures (potential roost sites) and potential foraging areas would not be modified by any alternative proposed by this project. There are no proposed trails or staging areas within 5 miles of the roost location.

Determination: The selection and implementation of any alternative would have "**No Impact**" on the Townsend's big-eared bat. Because no effects are anticipated, there are no cumulative effects.

Northern Bald Eagle (Haliaeetus luecocephalus), R6 Sensitive

The northern bald eagle was officially de-listed as a federal threatened species on August 8, 2007; however, they are still protected under the Bald and Golden Eagle Protection Act of 1940. This law provides for the protection of bald and golden eagles by prohibiting the take, possession, sale, purchase, barter, offer to sell, transport, export or import, of any bald or golden eagle, dead or alive, including any part, nest, or egg, unless allowed by permit (16 U.S.C. 668(a); 50 CFR 22). The U.S. Fish and Wildlife Service (2007) has prepared Bald Eagle Management Guidelines to help landowners, land managers, and others to meet the intent of this Act. In addition, monitoring of selected bald eagle nest sites would continue to occur including sites on national forest system lands. The Land and Resource Management Plan (LRMP) also provides direction for the management of habitat through the protection of known nest and roost sites. The designation of Bald Eagle Management Areas (BEMAs) has occurred at known nest sites subsequent to publication of the LRMP.

A detailed account of bald eagle habitat requirements can be found in the Pacific Bald Eagle Recovery Plan (USDI 1986). Bald eagle nesting territories are normally associated with lakes, reservoirs, or rivers. Nests are usually located in large conifers in uneven-aged, multi-storied stands with old-growth components (Anthony et al. 1982). Nest trees usually provide an unobstructed view of the associated body of water. Live, mature trees with deformed tops are often selected for nesting. East of the Cascade Mountains in Oregon, bald eagles prefer nesting in ponderosa pine trees that average 46 inches in diameter (range 21-76 inches) and tend to be larger than the surrounding trees (Anthony et al 1982).

Existing Condition: Within the Ochoco Summit project area there are three designated BEMAs and two mapped bald eagle winter roost areas. The bald eagle observations that have been documented in the project area are associated with established nesting territories or roost sites.

Table 93 displays the results of nesting surveys conducted in the project area by Frank Isaacs (Isaacs and Anthony 2007) and by district personnel over a period of 10 years. Nesting surveys that contribute to post de-listing monitoring data were conducted through 2012.

Table 93. Bald eagle territories and historical nesting status 2002-2012 within Ochoco Summit project area.

Territory Name	Status 2012	Status 2011	Status 2010	Status 2009	Status 2008	Status 2007	Status 2006	Status 2005	Status 2004	Status 2003	Status 2002
Shady Creek	1	1	1	oF	1	oF	O?	1	2	oF	O?
Yellowjacket	1	O?	1	_ (new)							
Rock Creek	NS	O?	_	NS	NS	NS	NS	1	2	2	oF
Wolf Creek	2	2	2	O?	2	NS	2d	1	2	2d	2
Total Young	4	3	4	0	3	0	2	3	6	4	2

compilation from Isaacs and Anthony 2002 to 2006 and survey results from 2007 to 2012

Effects Common to All Alternatives: All action alternatives exclude roads in proximity to known nests and roosts from the designated OHV system of routes. None of the proposed trail system would occur within ½ mile of any known eagle nest or within any BEMA or mapped roost area.

Determination: The Deschutes and Ochoco National Forests completed a *Joint Aquatic and Terrestrial Programmatic Biological Assessment for Federal Lands* within the Deschutes and John Day River Basin Administered by the Deschutes and Ochoco National Forests in August 2006. At the time of document completion, the northern bald eagle was still federally listed as a threatened species. A new programmatic BA for 2010-2013 does not include the bald eagle since it is no longer a federally listed species. Current emphasis is to continue to incorporate the Project Design Criteria (PDCs) to limit effects to bald eagles where possible. Guidance on legal protection for bald eagles is provided in the National Bald Eagle Management Guidelines (USFWS 2007). The PDCs for the northern bald eagle were reviewed in relation to the Ochoco Summit OHV project as proposed and were determined to be consistent. The project is also consistent with the National Bald Eagle Management Guidelines (USFWS 2007). Because there would be no removal of nest trees or potential nest trees, that all motorized routes are greater than ½ mile from the known nests, and that BEMAs would not be entered with new trail construction, the determination is "**No Impact"** to the bald eagle or their habitat. Because no effects are anticipated, there are no cumulative effects.

Bufflehead (Bucephala albeola), R6 Sensitive

The bufflehead is North America's smallest diving duck. It winters throughout Oregon but is an uncommon breeder in the central and southern Cascades (Marshall 2003). The bufflehead would use tree cavities or artificial nest boxes in trees close to water. Marshall (1996) stated that human disturbance from high recreation use at Cascade Lakes and a shortage of suitable nesting cavities due to forestry practices may be having an impact on their population status. The Oregon breeding population is considered sensitive by the ODFW because of small size and limited nesting habitat (Marshall et al 2003). The Montana Chapter of the Wildlife Society conducted a review of effects of recreation on Rocky Mountain wildlife species including waterfowl. Korschgen and Dahlgren (1992) reviewed 21 journal articles on human disturbance of waterfowl and compiled and reported that waterfowl are wary, seeking refuge from all forms of disturbance, particularly those associated with loud noise and rapid movement. Activities along shorelines such as fishing, bird watching, hiking, and traffic were noted as disturbances to waterfowl although to a lesser degree compared to rapid overwater movement and loud noise; sailing, windsurfing, rowing, or canoeing, wading, and swimming. Disturbance effects can include increased rate of nest desertion and/or reduced hatching rate, both of which can lead to a declining population.

Existing Condition: On the Lookout Mountain Ranger District buffleheads are not commonly seen. Older forested stands adjacent to the lakes may provide snag habitat for this cavity nester, but most lakes of substantial size in the project area have developed or dispersed campsites used during the summer months and fall hunting seasons. Thus, there is limited potential for lakes and ponds in this

project area to provide suitable habitat for nesting bufflehead ducks. One bufflehead sighting was recorded in June of 1999 about 1 ½ miles east of the southeast corner of the project area, and a migrating bufflehead was observed on a borrow pit pond in the project areas in November of 2007.

Effects - Alternative 1: This alternative would result in no direct effects to the bufflehead because no new OHV trails or closed roads would be opened or developed within the riparian zone of lakes or ponds in the project area. Because of the known recreational use of closed or unauthorized routes to otherwise protected lakes and ponds during the breeding season, it is assumed the selection of this alternative may result in some level of disturbance to nesting buffleheads, if present, along the riparian zones of these small lakes. The determination is "**May Impact Individuals Or Habitat, But Would Not Likely Contribute To A Trend Toward Federal Listing Or Cause A Loss Of Viability To The Population Or Species"** of bufflehead**.**

Effects Common to All Action Alternatives: All action alternatives propose to reinforce existing closures on routes that access riparian zones of several small lakes or ponds. Overall, this would result in a reduction of motorized use within the riparian zone of these water bodies. However, all action alternatives also propose staging areas in locations with borrow pit ponds. These sites are accessed by open roads, are devoid of snags and subject to heavy recreational use and thus are not likely to provide nesting habitat for buffleheads. However, they may provide resting areas during migration. Motorized access to these ponds is generally snowed in during spring migration and seasonal restriction on the trail would also reduce disturbance during spring migration. However, the increase in use of these sites due to designation of a new trail system may reduce the capability of these ponds to provide secure stop-over sites during fall migration.

Determination: All action alternatives would reduce motorized use of several small ponds and reservoirs compared to the existing condition. However, the action alternatives may compound disturbance effects at Cottonwood Pit and Walton Sno-Park ponds. Therefore, implementation of any action alternative "**May Impact Individuals or Habitat, But Would Not Likely Contribute to a Trend toward Federal Listing or Cause a Loss of Viability to the Population or Species"** of bufflehead**.**

Lewis' Woodpecker (Melanerpes lewis), R6 Sensitive

This woodpecker is a medium-sized bird that relies on flycatching during the spring and summer and stored mast and fruits in the fall. They breed in low numbers in open habitats along Eastern Oregon river and stream valleys. The species is most common in open habitats (e.g. burns) and uses cottonwood galleries in the Blue Mountains (Marshall et al. 2003). Wisdom (2000) reported that burned ponderosa pine forest created by stand-replacing fires provide highly productive habitats as compared to unburned pine. They are not considered strong cavity excavators but require large snags in an advanced stage of decay that are easier to excavate. Lewis' woodpeckers would also use old cavities created by other woodpeckers. Forty-two percent of the nest trees on the eastern edge of the Mt. Hood National Forest were in ponderosa pine (typically snags) and 43 percent were in living and declining Oregon white oak. The mean diameter of nest trees was 26 inches and mean nest tree height was 41 feet (Marshall et al. 2003). Haggard and Gaines (2001) determined that the Lewis' woodpecker was most abundant in low snag density stands within a stand replacement fire study conducted on the Wenatchee National Forest in Washington. Marshall et al. (2003) reports the species is declining throughout its range possibly due to loss of suitable habitat, competition for nest holes, and the effects of pesticides.

Existing Condition: Existing district wildlife sighting records show a few observations of Lewis's woodpeckers in or near the project area. Woodpecker surveys conducted between 1992 and 1995 (targeting pileated, white-headed, black-backed and three-toed) did not produce any records for Lewis' woodpecker. Surveys conducted in 2008 (targeting white-headed and Lewis' woodpeckers) produced records for six other species of woodpeckers and sapsuckers, but no Lewis' woodpeckers.

Records (2003 to 2007) from the local chapter of the Audubon Society (formerly East Cascade Bird Conservancy) had the majority of its Lewis' woodpecker records at lower elevations (off the Forest), during migration. However, one record included four woodpeckers in late August within the project area. Of the three records of Lewis's woodpeckers in the project area, two are more than 5 miles from any proposed trail or staging area, while the other is within 1 mile of a class III trail and about 1 mile from a class III staging area in an active gravel pit.

Effects Common To All Alternatives: Hamann et al. (1999) and Gaines et al.(2003) conducted literature reviews of recreational associated effects on wildlife including studies on woodpeckers and other cavity nesting birds. Their reviews of existing published literature showed that recreational trail-associated disturbances did not present a problem to woodpeckers and cavity nesters as a group. Hamann et al. (1999) also stated that recreational activity is unlikely to be focused around nest sites of these species and by design woodpeckers and other cavity users are relatively more secure from nest predation than any other group of forest birds. Therefore at the present, recreational disturbance is not known to be a major limiting factor.

Altman in the Landbird Conservation Strategies for the Northern Rocky Mountains (2000) lists the Lewis' woodpecker as the Focal Species for both 1) the Burned Old Forest conservation focus in the Dry Forest habitat type and 2) the Large Snags in Riparian Woodland conservation focus in the Riparian habitat type. He also lists them as a species to benefit from the presence of large patches of old dry forests. Recommendations include road closures or fuel wood restrictions to minimize the loss of large ponderosa pine snags. No snags would be intentionally targeted for felling with the exception of hazard trees or snags near trails or staging areas. Project design and layout would minimize the loss of existing large snags and this would be consistent with the recommendations by Altman (2000).

Determination: Current literature reviews state that the woodpecker guild is not known to be disturbed from recreational trail users and Project Design Features have been incorporated to minimize the intentional removal of large diameter trees and snags. The selection of any alternative would lead to a determination of "**No Impact**" on the Lewis' woodpecker. Because effects are limited to incidental loss of snag habitat on a very small proportion of the landscape in a scattered arrangement, proposed activities are not likely to substantially reduce habitat within individual home ranges or at the landscape scale. Refer to the discussion on effects to snag habitat in the section on Primary Cavity Excavators, under Management Indicator Species.

White-Headed Woodpecker (Picoides albolarvatus), R6 Sensitive

The white-headed woodpecker is a resident of montane forests from southern interior British Columbia south through Central Washington, Northern Idaho, Eastern Oregon and Southwest Oregon, Northern and Central California, and the eastern edge of Central Nevada to the mountains of Southern California (Marshall et al. 2003). The presence of old growth pine is thought to be important to white-headed woodpeckers. Large diameter pines provide bark crevices for the invertebrate prey of white-headed woodpeckers and are good cone producers; white-headed woodpeckers rely on pine seeds for food during the winter months. Old-growth stands have greater densities of the large-diameter snags that white-headed woodpeckers appear to select for nesting (Frenzel 2002). White-headed woodpeckers usually excavate nest cavities in snags, but other recorded substrates include stumps, leaning logs, and the dead tops of live trees. Frenzel (2002) studied white-headed woodpecker nesting areas on the Deschutes and Winema National Forests; he found that nest trees ranged from 23.6 to 118.1 cm (9-46 inches) with an average diameter of 27 inches, 89 percent of the nest trees were in ponderosa pine, and canopy closure at the nest tree ranged from 0 percent to 57 percent with a mean of 13 percent.

Frenzel (2002) concluded population recruitment for this woodpecker was insufficient to offset mortality in his study areas on the Deschutes and Winema National Forests. He also reported that shrub growth, increased understory tree densities from fire suppression, may be factors affecting

levels of mammalian nest predation and vulnerability of adults to avian predation. Marshall et al. (2003) stated that the long-term stability of this woodpecker in Oregon and Washington appears to rest with reversing the declining health of ponderosa pine forest.

Existing Condition: Existing district wildlife sighting records show numerous observations of white-headed woodpeckers in or near the project area between 1989 and 2010. Woodpecker surveys conducted between 1992 and 1995 (targeting pileated, white-headed, black-backed and three-toed) produced many records for white-headed woodpecker, including multiple records within the project area. Surveys conducted in 2008 (targeting white-headed and Lewis' woodpeckers) produced records for six species of woodpeckers and sapsuckers, including white-headed woodpeckers within the project area (Polie Creek, Marks Creek, Ochoco Creek, Rush Creek). Survey efforts in spring/summer 2010 have recorded white-headed woodpecker responses near Polie Creek and Little Summit Prairie (both within the project area). In addition, records from local Audubon Society members (formerly East Cascade Bird Conservancy) from 2003 to 2007 described numerous sightings of white-headed woodpeckers, including nine in the project area from June to October in 2004 through 2006.

Effects Common To All Alternatives: Hamann et al. (1999) and Gaines et al. (2003) conducted literature reviews of recreational associated effects on wildlife including studies on woodpeckers and other cavity nesting birds. Their reviews of existing published literature showed that recreational trail-associated disturbances did not present a problem to woodpeckers and cavity nesters as a group. Hamann et al. (1999) also stated that recreational activity is unlikely to be focused around nest sites of these species and by design woodpeckers and other cavity users are relatively more secure from nest predation than any other group of forest birds. Therefore at the present, recreational disturbance is not known to be a major limiting factor.

Altman in the Landbird Conservation Strategies for the Northern Rocky Mountains (2000) lists the white-headed woodpecker as the Focal Species for the Large Patches of Old Forest conservation focus in the Dry Forest habitat type. He also lists them as a species to benefit from the presence of grassy edges and openings in dry forest. Recommendations include various measures to minimize the loss of snags, particularly soft snags, and high cut stumps for hazard tree removal. No snags would be intentionally targeted for felling with the exception of hazard trees or snags near trails or staging areas. Project design and layout would minimize the loss of existing large snags and high stumping in suitable white-headed woodpecker habitat types will be included in the design elements for this project, consistent with the recommendations by Altman (2000).

Determination: Current literature reviews state that the woodpecker guild is not known to be disturbed from recreational trail users and Project Design Features have been incorporated to minimize the intentional removal of large diameter trees and snags. These measures incorporated into any alternative would have "**No Impact**" on the white-headed woodpecker. Because effects are limited to incidental loss of snag habitat on a very small proportion of the landscape in a scattered arrangement, proposed activities are not likely to substantially reduce habitat within individual home ranges or at the landscape scale. Refer to the discussion on effects to snag habitat in the section on Primary Cavity Excavators, under Management Indicator Species.

California Wolverine (Gulo gulo), Federal Candidate

The wolverine is the largest terrestrial member of the mustelid family with males weighing 26 to 40 pounds and females 17 to 26 pounds. Wolverines are opportunistic feeders consuming a variety of foods depending on availability. There is no evidence hunting by wolverines is limited by habitat structure. Primarily a scavenger rather than a hunter, the wolverine forages where carrion can be found (Ruggiero 1994). In addition to carrion they would also prey on small animals and birds and eat fruits, berries, and insects. Copeland et al. (2007) reported little seasonal movement (400 meter elevational band) among collared wolverines in Idaho and the modest shift was likely due to prey

availability in the form of ungulate carrion at lower elevation and upslope movement to locate rodents at higher elevations in the summer.

Wolverines occupy a wide variety of habitats from the arctic tundra to coniferous forest. The most common habitats are those that contain a high diversity of microhabitats and high prey populations. Copeland (2007) described wolverine habitat in the contiguous United States as consisting of small, isolated "islands" of high-elevation, alpine habitats containing sufficient depth of snow during the denning period, separated from each other by low valleys of unsuitable habitats. Wolverines occupy habitat in a high elevation band from 6,888 feet to 8,528 feet in the mountains of the lower 48 states (Federal Register/ Vol. 73, No. 48/ Tuesday, March 11, 2008). The intervening valleys in this area range from 3,198 feet to 4,920 feet and are unsuitable for long-term wolverine habitat because they do not have the snow conditions or other habitat features required by wolverines (Aubry et al. 2007 in Federal Register/ Vol. 73, No. 48/ Tuesday, March 11, 2008). High elevation alpine wilderness areas appear to be preferred in summer, which tends to effectively separate most wolverine and human interactions. Aubry et al. (2007) reported that virtually all of the wolverine records located in the Pacific states were within or near alpine areas. Copeland et al. (2007) reported that adult males tend to travel more widely than females and as such, they are more likely found in lower, coniferous-dominated habitats simply by chance. The essential component of wolverine habitat may be isolation and the total absence of disturbance by humans (Ruggiero 1994). However, Copeland et al. (2007) reported that unmaintained winter roads used for snowmobile access to trapping sites in the study area were frequently used for travel by wolverines.

The most critical and limiting habitat for wolverines seems to be acceptable natal denning habitat. Magoun and Copeland (1998) described two types of dens used by wolverines: natal and maternal. Natal dens are used during parturition and occur more commonly in subalpine cirque basins associated with boulder talus slopes. Maternal dens are used subsequent to natal dens and before weaning occurs. They consist of a complex of dens associated with boulders or fallen trees. Magoun and Copeland (1998) believe that a critical feature of wolverine denning habitat is the dependability of deep snow to persist through the denning period of February through May with at least one meter of snow depth. Ruggiero (1994) described natal dens having been found in snow tunnels, hollow trees and even caves in the ground. Ruggierro (1994) also reported that in forested habitats the structural diversity provided by large snags, fallen logs, and stumps would likely provide natal den sites. Aubry et al. (2007) reported that virtually all of the wolverine records located in the Pacific states were within or near alpine areas. They also reported that spring snow cover was the only habitat layer in their study that fully accounted for the distribution of historical wolverine records in the western mountains.

Home ranges for adult wolverines tend to be large ranging from 38.5 square miles to 348 square miles (Banci 1994 in Federal Register Doc. 03-26475). Copeland (1996) radio collared wolverines in Idaho and reported annual home ranges of resident adult females averaged 148 square miles and an average of 588 square miles for resident adult males. Aubry et al. (2007) compiled verifiable and documented records of wolverine occurrences and suggest that the historical distribution of wolverines in the Cascade Mountain and Sierra Nevada was disjunct, contradicting previous interpretations. Current records (1995-2005) are limited to north-central Washington, northern and central Idaho, western Montana, and northwestern Wyoming (Aubry et al. 2007). A recent observation with photographs indicates wolverines are still present in California (Zielinski, pers. comm. 2008). Aubrey et al. (2007) found no current records in Oregon despite concerted efforts to obtain verifiable evidence of wolverine occurrence using remote cameras, bait stations, and helicopter surveys in many areas of the Pacific states. However, five verifiable records of wolverine presence in Oregon were documented from 1961 to 1994 (Aubry et al. 2007). Recently confirmed sightings were recorded in the Eagle Cap Wilderness.

Wolverine may be impacted by management practices that influence subalpine and alpine communities, particularly those that reduce the presence and opportunity for carrion availability (Copeland et al. 2007). Resource extraction (including timber harvesting), backcountry skiing and snowmobiling, roads and other forms of human disturbance merit careful consideration by those concerned about wolverine conservation (Ruggiero et al. 2007) Researchers in British Columbia found a consistent negative association between wolverine occurrence and areas where helicopter and backcountry skiing occur. However, the causal factors associated with these patterns are not well understood (Copeland et al. 2007). Squires et al. (2007) found that trapping was the primary factor explaining decreased survival in western Montana. He also determined that harvest pressure was capable of reducing isolated populations beyond sustainable levels despite a regulated harvest within a state-wide quota system.

Existing Conditions: District records list multiple wolverine sightings near the west end of the project area between 1969 and 1992. There are also multiple records near the northeast corner of the project area between 1975 and 1997. Between these clusters of sighting were two records along the North Fork of the Crooked River in the 1980s. Potentially suitable natal denning habitat may be found in the Bridge Creek Wilderness Area, Lookout Mountain Recreation Area and Rock Creek/Cottonwood Creek area, as well as on the talus areas on north to northeast facing slopes below Mt Pisgah, Peterson Point, the rim above Keeton and Fry Creeks, Buck Point and the rim between Buck Point and Rock Creek . It is unlikely that denning habitat would be found in remainder of the project area because of open roads, moderately high recreational use, and the lack of persistent snow cover in subalpine areas where denning might occur.

Effects – Alternative 1: This alternative would result in no direct effects to the wolverine because no new OHV trails or closed roads would be opened or developed which access potential denning habitat in the project area. However, because of the known recreational use of closed or unauthorized routes to otherwise protected talus slopes, remote high elevation areas and northeast facing basins, it is assumed the selection of this alternative may result in some level of disturbance to wolverine, if they are present, in these areas. The determination is "**May Impact Individuals or Habitat, but Would Not Likely Contribute to a Trend toward Federal Listing or Cause a Loss of Viability to the Population or Species."**

Effects Common to All Action Alternatives: The selection of any action alternative would have no effect on potential wolverine denning in the project area. The most suitable potential denning habitat is found in wilderness, roadless or unroaded areas, none of which are in proximity to any proposed trails or areas. High road densities, and year-round recreational use, including the designated snowmobile and Nordic ski trails, across the project area would likely preclude wolverine use of the Ochoco Summit project area as denning habitat. However, there are occasional reports of wolverine in the project area, so it is possible that increased motorized route density (action alternatives) could result in disturbance to individual wolverine passing through the area. The additional impact from proposed trails would likely be negligible compared to the existing impacts from open roads and designated over-the-snow routes.

Determination: Although at the present time there are no recent confirmed records of wolverine presence in the project area there are numerous unconfirmed historic records for this species. As this animal is known to be affected by motorized use, particularly over the snow, and this project would not prohibit use of proposed routes by over the snow vehicles, the action alternatives "**May Impact Individuals or Habitat, but Would Not Likely Contribute to a Trend toward Federal Listing or Cause a Loss of Viability to the Population or Species."**

Silver-Bordered Fritillary (Boloria selene), R6 Sensitive

The silver-bordered fritillary butterfly has a holarctic range extending from northern Canada southward into the United States and as far south as New Mexico (NatureServe 2008). While the

species is common and widespread in northeastern Washington and northern Idaho, colonies are extremely local and isolated southward, and are particularly vulnerable to local extinctions. Only two primary colonies are found in Oregon, one at Big Summit Prairie on the Ochoco National Forest and one in the Strawberry Mountains Wilderness on the Malheur National Forest (Miller and Hammond 2007). NatureServe (2008) lists this species as G5, demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery. In Oregon its ranking is listed as S2, Imperiled. Suitable habitat for this species is described as mostly wet meadows, marshes, bogs, and more open parts of shrubbier wetlands (NatureServe 2008, Miller and Hammond 2007). This species is dependent on the maintenance of open and wet meadow habitats (Miller and Hammond 2007). Food sources for the adults include nectar sources such as composite flowers, including goldenrod and black-eyed susans (Opler et al. 2006). Eggs are laid singly near host plants and caterpillar hosts are violets including *Viola glabella* and *Viola nephrophylla* (Opler et al. 2006).

Existing Conditions: Surveys for this fritillary species were conducted on the Lookout Mountain Ranger District (now part of Paulina Ranger District) in suitable habitat surrounding Big Summit Prairie between 1995 and 1998. Several sub-populations of this species were confirmed and mapped. Within the project area suitable habitat for this species may occur in the wet meadow complexes where tributary streams enter wet meadow or marsh areas. Riparian habitat is also present in the project area on private lands along Little Summit Creek and North Fork of the Crooked River. However, it is currently unknown if suitable habitat conditions exist for this species on private lands.

Effects Common to All Alternatives: There are no proposals to develop new motorized trails or include user-created trails that access wet meadow habitat that may be providing habitat for this species of butterfly. Crossings of any meadow areas would have a hardened surface or crossing structure to prevent impacts to wetland vegetation in accordance with design criteria outlined in Chapter 2 of this document. Mitigations for botanical resources should also provide protection to reproductive habitat for this species. There are no proposed trails or staging areas within 1 mile of documented populations of this species.

Determination: The selection of any alternative would have **"No Impact"** on the Silver-bordered Fritillary butterfly. This determination is based on the premise that no suitable habitat would be negatively impacted by project activities.

Johnson's Hairstreak (Callophrys johnsoni), R6 Sensitive

The Johnson hairstreak butterfly is found from southwest British Columbia southward into the Coast Ranges to San Francisco in California; south in the Cascades and Sierra Nevada to Yosemite and also in the Blue Mountains of eastern Oregon. In Oregon its ranking is listed as S2, Imperiled, while globally its status is G3, very rare or local throughout its range or found locally in a restricted range (NatureServe 2008).

Suitable habitat for this species is described as coniferous forests, especially old growth (Opler et al. 2006) and old growth coniferous forests with red firs, western hemlocks, or gray pines on which its parasitic (mistletoe) hosts grows (NatureServe 2008). Johnson's hairstreak is believed to feed generally on all dwarf mistletoe species throughout its range, and to perhaps specialize on locally available dwarf mistletoes in specific localities (Miller per comm. 2008 cited by Schmitt and Spiegel 2008). Miller and Hammond (2007) describe suitable habitat as almost identical to that of the northern spotted owl except that the butterfly does not occur south of central California. The caterpillar food plant is western dwarf mistletoe. Adults find nectar on low growing plants such as Oregon grape, ceanothus and pussypaws (NatureServe 2008; Pyle, 1981; and USDA, NRCS 2008). Miller and Hammond (2007) indicated that to benefit this species management practices need to promote the maintenance of mature and old-growth conifers at middle to low elevations on the west slope of the Cascade Mountains and Coast Range.

Existing Conditions: Opler et al. (2006) shows Johnson hairstreak documentation for western and central Oregon plus the Blue Mountains in northeastern Oregon. The species is suspected to occur on the Ochoco National Forest, but currently there is no confirmed documentation for this species anywhere on Ochoco National Forest. Formal surveys have not been conducted. The species is closely associated with dwarf mistletoe which is present in the project area. However, an association of Johnson's hairstreak with the species of mistletoe present on this Forest has not been confirmed. Schmitt and Spiegel (2008) state that in the absence of recent large scale disturbance, dwarf mistletoe infestation levels can occur in early, mid, and late successional stands. Though the project area includes several small to moderately sized recent fire events, the project area has not experienced a large scale stand replacement event associated with an uncharacteristic wildfire. Therefore, mistletoe infection is assumed to be present in all stand age classes which could serve as a host for the caterpillar, if it occurs in association with the mistletoe present on this Forest. In 2010 the Interagency Special Status/Sensitive Species Program (ISSSSP) funded widespread field surveys in Oregon and Washington to document presence of Johnson's Hairstreak butterfly (Callophrys johnsoni) at locations where species presence was currently unknown, but likely based on habitat modeling and specific survey site selection criteria. The resulting report (Davis and Weaver, 2010) discloses that no historic record for this species back to 1891 has been found in Crook or Wheeler County and that the entire Ochoco Summit Trail System project area has a low probability of occurrence for this species.

Direct and Indirect Effects - Alternative 1: The selection of this alternative would not result in any change in vegetative conditions of conifer stands in the project area because no new trail construction would be completed. The species may occur in the area, but no management action is planned that would impact the species. Thus, the determination is **"No Impact"** to the Johnson's hairstreak butterfly and their habitat.

Effects Common to All Action Alternatives: The selection of any action alternative would result in the designation of user created trails, roads converted to trails and inclusion of new trail construction. Trail widths needed for new construction would be approximately 50 inches wide for Class I machines (ATVs), approximately 80 inches wide for Class II machines (jeeps and buggies), and approximately 24 inches for Class III (motorcycles). New trails would be designed to minimize tree removal but may require trees up to six to eight inches in diameter to be cut some of which may be infected with mistletoe. Mistletoe infection, however, is considered to be widespread throughout all plant associations and size classes over much of the 301,580-acre project area. Mistletoe infection would remain widespread throughout the project area if any of the action alternatives were selected for implementation. The incidental removal of mistletoe-infected trees during construction or maintenance would have a negligible effect on mistletoe in the project area, and thus would have very little effect on reproductive habitat for this species. Likewise, due to the relatively small proportion of the area physically impacted during construction, maintenance and use of the trail system (refer to the Botany section), the abundance of flowering plants to serve as foraging sites for adults would not be substantially changed by the alternatives.

Determination: This species has not been documented to occur on Ochoco National Forest and formal surveys have not been conducted in the Ochoco Summit project area. Because the host species are present, this butterfly may also be present. Due to the minimal scale of mistletoe removal relative to the extensive scale of mistletoe infection, the abundance and distribution of mistletoe host brooms (reproductive habitat for this butterfly) will not be substantially changed at the landscape scale under any action alternative. Likewise, the abundance of flowering plants that could serve as foraging sites for adults would be subject to a negligible reduction. Implementation of any action alternative "**May impact individuals or habitat, but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species"** for the Johnson's hairstreak. This conclusion is based on the limited scope of this project and the narrow trail width needed for trail construction compared to the size of the project area and the current magnitude of mistletoe infection.

Upland Sandpiper (Bartramia longicauda), R6 Sensitive

Upland sandpipers breed in prairie-grassland habitats from Alaska and Canada to N. Dakota and adjacent states. A small, disjunct relict population occurs in Oregon and Idaho. The species winters in papas of South America. Habitat for upland sandpiper is present in this project area due to the inclusion of Big Summit and Little Summit Prairies and their extensive open wetland areas. According to Marshall et al. 2003, Oregon's upland sandpiper population, probably the largest west of the Rocky Mountains, is close to extirpation, and that remnant breeding populations are limited to Bear and Logan Valleys in Grant County. However, some field guides show isolated or rare occurrences in South Central Oregon and northern California (Kaufman 2000, Sibley 2000). Breeding by this species at Big Summit Prairie was reported in 1919 and a single bird was observed in that area in 1987. Continental range has been decreasing over the last two centuries due to hunting in the late 1800's, and conversion of prairie habitat to farming and grazing (White 1983). Though populations east of the Rocky Mountains are stable or increasing, populations west of the Rockies are declining and its continued existence in the Northwest is precarious (Marshall et al. 2003). Marshall et al offered as possible reasons for the western population declines the following: encroachment of pine into meadows, use of herbicides to control or eliminate forbs in nesting meadows, overgrazing in meadows especially during incubation and brood rearing, down-cutting of streams which impacts the water table and meadow systems and management practices on wintering grounds. The species currently holds rankings in Oregon as Sensitive and by the Oregon Natural Heritage Information Center as G5 globally secure, S1 critically imperiled in Oregon.

Existing Condition: Upland sandpipers have been recorded historically at Big Summit Prairie, but no records are known from the area since 1987. The expansive wetland complex of Big Summit Prairie is largely under private ownership, with only small amounts under management by the Bureau of Land Management. The majority of the prairie habitat in Big Summit Prairie is grazed seasonally by cattle. The majority of Little Summit Prairie is also under private ownership and is grazed seasonally by cattle. It is suspected that the historic breeding population reported in the area early in the 1900s is no longer present on the prairies of the Ochoco Mountains. Surveys conducted in 1993 did not result in any sightings and there are no records of upland sandpipers in the sighting record database forest-wide.

Effects Common to All Alternatives: This alternative would result in no direct effects to the upland sandpipers or potential habitat for them because no new OHV trails, trailheads or staging areas would be developed within expansive prairie-grassland habitats in the project area. Crossings of any meadow areas would have a hardened surface or crossing structure to prevent impacts to wetland vegetation in accordance with design criteria outlined in Chapter 2 of this EIS. Mitigations for botanical resources should also provide protection to reproductive habitat for this species. There are no proposed trails or staging areas within 1 mile of documented populations of this species.

Determination: The selection of any alternative would have "No Impact" on the upland sandpipers. This determination is based on the absence of this species within the project area, and because no suitable habitat would be impacted by project activities. Because no effects are anticipated, there are no cumulative effects.

Cumulative Effects to TES Species with Habitat Present in the Project Area

Past, present and reasonably foreseeable projects which have effects that overlap in time and space with effects of this project are listed in Table 6.

As described above, due to the fact that this project does not include large scale vegetation management, there are no cumulative impacts to habitat components based on vegetative composition and structure when considered in combination with thinning and prescribed burning treatments. However, this project's effect of increased access could combine with effects of increased

accessibility due to development of routes used to implement commercial thinning projects, and with the more open forest conditions created through vegetation and fuels management projects. If this occurred in proximity to occupied habitat for TES species there could be an increase in the potential for disturbance. However, there is no overlap of proposed trails or staging areas with Bald Eagle Management Areas or bald eagle roosts or nest buffers. There is no mapped critical or essential habitat, or occupied habitat for the other TES species within the zone of influence of any proposed route or staging area, with the exception of white-headed woodpecker. As noted in the section on Primary Cavity Excavators, white-headed woodpeckers prefer open forest conditions, and woodpeckers are not considered to be sensitive to disturbance from recreational activity. On the other hand, woodpecker habitat is vulnerable to illegal woodcutting. No new routes would be constructed of sufficient width to accommodate full size trucks and trailers typically used by woodcutters. Some full width roads would have their width reduced to trail standards, or would be closed under the action alternatives and thus, woodcutter access reduced. In addition, effects of project implementation on snag habitat are limited to incidental loss of snag habitat on a very small proportion of the landscape, in a scattered arrangement that is not likely to substantially reduce habitat within individual home ranges or at the landscape scale. Therefore, cumulative effects to white-headed woodpeckers are not expected to result in loss of occupied habitat and the cumulative effect on snag abundance would be negligible at the landscape scale.

The Forest-level Travel Management Plan closes the Forest to cross country travel except on designated routes or in designated areas. Following full implementation of the forest-level Travel Management Plan, acres of disturbed habitat would be limited to only those roads and motorized trails that are designated as open to the public for motorized use. Thus, the physical road closure reinforcements, rehabilitation of user created trails and additional road closures proposed in the action alternatives would combine with the rules for motorized travel in the Travel Management Plan, so that disturbance would be reduced in areas distant from open roads and trails, but would be increased in proximity to the routes that are designated open.

Summary of Conclusions for Sensitive Species

There is no habitat present and/or the following species are not expected to occur within the project area and therefore the determination is **"No Impact"** for pygmy rabbit and tricolored blackbird.

The selection of any alternative (1, 2, 3 or 4) is expected to have **"No Impact"** on the bald eagle, peregrine falcon, Lewis' woodpecker, white-headed woodpecker, greater sage-grouse, Townsend's big-eared bat and the silver-border fritillary.

The No Action alternative would result in a determination of "**May Impact Individuals or Habitat, but Would Not Contribute to a Trend toward Federal Listing or Loss of Viability to the Population or Species"** to the bufflehead and California wolverine.

The No Action alternative would have **"No Impact"** on the Johnson hairstreak.

The action alternatives (2, 3 and 4) "**May Impact Individuals or Habitat, but Would Not Contribute to a Trend toward Federal Listing or Loss of Viability to the Population or Species"** for the bufflehead, California wolverine and Johnson's hairstreak.

Table 94. Summary of Conclusion of Effects to Region 6 Sensitive Animal Species.

Species	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Bald Eagle	NI	NI	NI	NI
Upland Sandpiper	NI	NI	NI	NI
Bufflehead	MIIH	MIIH	MIIH	MIIH
American Peregrine Falcon	NI	NI	NI	NI
Tricolored Blackbird	NI	NI	NI	NI
Lewis' Woodpecker	NI	NI	NI	NI

Table 94. Summary of Conclusion of Effects to Region 6 Sensitive Animal Species.

Species	Alt. 1	Alt. 2	Alt. 3	Alt. 4
White-Headed Woodpecker	NI	NI	NI	NI
Greater Sage-Grouse	NI	NI	NI	NI
California Wolverine	MIIH	MIIH	MIIH	MIIH
Pygmy Rabbit	NI	NI	NI	NI
Townsend's Big-Eared Bat	NI	NI	NI	NI
Silver-Bordered Fritillary	NI	NI	NI	NI
Johnson's Hairstreak	NI	MIIH	MIIH	MIIH

NI = No Impact
MIIH = May impact individuals or habitat, but would not likely contribute to a trend toward federal listing or loss of viability to the population or species
BI = Beneficial Impact

Management Indicator Species (LRMP)

During the preparation of the Ochoco National Forest Land and Resource Management Plan (USDA 1989), a group of wildlife species were identified as Management Indicator Species (MIS). These species were selected because their well-being could be used as an indicator of other species dependent upon similar habitat conditions. Indicator species can be used to assess the impacts of management actions on a wide range of other wildlife with similar habitat requirements. The species listed in Table 95 were selected for the Ochoco National Forest.

Table 95. Ochoco National Forest Management Indicator Species.

Ochoco National Forest Management Indicator Species	Habitat	Species Present Within Analysis Area	Habitat Present Within Analysis Area
Primary Cavity Excavators	Dead wood habitat	Yes	Yes
Pileated Woodpecker	Old-growth mixed conifer forests	Yes	Yes
Northern Flicker	Old Growth Juniper	Yes	Yes
Golden Eagle and Prairie Falcon	Cliffs, talus, caves	Yes	Yes
Northern Bald Eagle	Lakeside/Reservoir, Large Trees	Yes	Yes
Rocky Mountain Elk and Mule Deer	Mosaic of early, forage-producing stages and later, cover-forming stages of forests, in close proximity	Yes	Yes

Effects to the northern bald eagle and American peregrine falcon were discussed in the Proposed, Endangered, Threatened, and Sensitive Species section, previously in this Chapter. Golden eagles and prairie falcons are discussed in the section on raptors, later in this chapter in the section titled "Other Species (LRMP)." Potential effects to the remaining MIS species are discussed in this section.

Primary Cavity Excavators (woodpeckers, chickadees and nuthatches)

Primary Cavity Excavators (PCE) include the Pileated Woodpecker and Northern Flicker (LRMP MIS), white-headed woodpecker and Lewis' woodpecker (TES and focal species), red-naped sapsucker (focal species) and other avian species that excavate their own cavities.

Primary cavity excavators are listed as a group, as Management Indicator Species (MIS) in the Ochoco National Forest Land and Resource Management Plan (LRMP). The primary cavity excavator MIS group includes birds that feed primarily on dead wood insects and that excavate their own nest cavities. Primary cavity excavators were selected to represent the species that require snag

habitat, or that utilize dead or defective wood habitat that is often reduced by forest management activities. The primary cavity nesters serve as ecological indicators for a large number of species and for secondary cavity users, like swallow, blue birds and bats (FEIS pp 3-22).

The PCE species associated with the project area are listed below (Thomas et al., 1979). The species with an asterisk (*) are also dead wood insect users.

Pileated Woodpecker*
White-headed Woodpecker
Northern Flicker
Lewis' Woodpecker*
Williamson's Sapsucker*
Black-backed Woodpecker*
White-breasted Nuthatch*
Pygmy Nuthatch*
Red-naped Sapsucker*
Hairy Woodpecker*
Three-toed Woodpecker*
Red-breasted Nuthatch*
Downy Woodpecker*

Effects to the white-headed and Lewis' woodpeckers have been disclosed in the Threatened, Endangered, and Sensitive section of this Chapter. Effects to the black-backed, three-toed, pileated, hairy and downy woodpeckers and the red-naped and Williamson's sapsuckers, common flicker, chickadees and nuthatches are discussed here. These species have been grouped together into the PCE. Direct, indirect, and cumulative effects are discussed for this group below.

Habitat use by woodpeckers that depend on the presence of bark beetles shows some similarities and some differences in stands selected for nesting, roosting, and foraging. Habitats for these species include lodgepole pine forests, mixed conifer, and mountain hemlock, although forest type may not be as important as the presence of bark beetles (Marshall et al. 2003). Stand-replacing fires produce habitats that briefly contain abundant food resources for woodpeckers (McCullough et al. 1998 cited in Marshall et al. 2003). After three to five years, the majority of the insects inhabiting the dead wood emerge as adults and do not re-colonize the dead trees, resulting in a decrease in food availability and hence habitat suitability for woodpeckers.

Wisdom et al. (2000) stated there are several factors affecting these species. Silvicultural practices (tree harvest before susceptibility to beetle attack) and fire management policies (salvage logging) have altered natural patterns of beetle outbreaks. Also, increasing road densities have allowed greater human access into forested regions for snag removal as firewood.

Some PCE species are dependent upon snags and/or live trees with internal rot for nesting or roosting cavities and as a forage substrate. Many of the PCE species listed above fall into this group. However, there are differences in their selection of preferred habitats. For example, the common flicker is generally most abundant in open forests and forest edges while the pileated woodpecker occurs primarily in dense mixed conifer forests in late seral stages or in deciduous trees stands in valley bottoms (Marshall et al. 2003).

The pileated woodpecker holds a ranking in Oregon as Sensitive; all of these species are ranked by the Oregon Natural Heritage Information Center as G5 globally secure. NatureServe (2009) listed the following as the top five major threats afflicting pileated woodpeckers (1) conversion of forest habitats to non-forest habitats, (2) short rotation, even-age forestry, (3) monoculture forestry, (4) forest fragmentation, and (5) removal of logging residue, downed wood, and pine straw that would ultimately put nutrients back into the ecosystem and provide foraging substrate. The northern flicker is ranked as S5: demonstrably widespread, abundant and secure (NatureServe 2009, Csuti 1998). Other PCE species depend upon dead or defective woody materials that allow access for use of natural cavities or for excavation of cavities using existing cracks to gain entrance to hollow or decaying wood. These species will also utilize cavities left by other primary cavity excavators (sapsuckers and woodpeckers) and thus they can be used as an indicator for many other species of secondary cavity nesters. There are differences in their selection of preferred habitats. Some are more common in the mountainous areas of Central Oregon, while others tend to be restricted to riparian

woodlands and lower elevation areas in eastern Oregon. Some prefer dense moist forests in comparison to others which prefer open ponderosa pine forests. For some the presence of large hollow trees and snags is important. For example to survive cold winter nights, the pygmy nuthatch goes into a state of torpor when roosting communally inside tree cavities (Marshall et al. 2003).

Existing Condition: Events affecting bark beetle abundance have occurred in the past. In 1967 to 1968 three fires burned approximately 6,100 in the Ochoco Creek and Marks Creek Watersheds, which were subsequently salvaged. The Hash Rock Fire of 2000 burned about 4,600 acres in the Marks Creek Watershed; the Maxwell Fire of 2006 burned about 6,965 acres in Upper North Fork Crooked River Watershed; the Bridge Creek fire of 2008 burned about 5,300 acres in the Bridge Creek Watershed; and the 747 Fire of 2002 burned 15,091 acre on national forest system land in Rock Creek Watershed. These are examples of wildland fires that have occurred irregularly across the project area and provided short-term foraging areas in the past. Potential nesting habitat is distributed in patches across the planning area as well.

Pileated woodpecker habitat in the Ochoco National Forest is defined as ponderosa pine stands with Douglas-fir and grand fir understories, or mixed conifer stands with greater than 15-20 inch in diameter trees and a dense canopy condition. Northern flickers are habitat generalists and occur throughout the project area, especially in open stands.

The Land and Resource Management Plan (LRMP) allocated a network of Old-growth Management Areas (OGMA) including approximately 19,570 acres across the Forest (outside of Wilderness and Research Natural Areas). The OGMAs are in mixed conifer or ponderosa pine stands and average 300 acres in size. The emphasis for these areas is to provide habitat for wildlife species dependent on old growth stands, with pileated woodpecker as the major indicator species. Adjacent or in proximity to each of these OGMAs is an additional 300 acres (average size) of mapped pileated woodpecker feeding habitat (pfh). The mapped feeding habitat is not identified as a management allocation in the LRMP, but recommendations for this habitat are included along with the standards and guidelines for OGMAs. Generally the OGMAs are intended to provide reproductive habitat for pileated woodpeckers, while the mapped feeding habitat is intended to provide supplemental foraging habitat no further than ½ mile from reproductive areas.

Several of these species were detected and recorded in surveys conducted between 1992 and 1995, and in 2008 and 2010.

Direct and Indirect Effects

Alternative 1- No Action

Alternative 1 is most likely to result in retention of the current pattern of disturbance from unregulated cross country motorized vehicle access, user-created trails, as closure of unauthorized routes would not be done. Since typical user-created trails develop without felling of trees, and since woodpeckers are relatively protected from increases in predation, effects associated with this alternative would be the result of disturbance associated with motorized travel on user created or unauthorized trails rather than through habitat loss or increased predation. As stated below for the action alternatives, recreational trail-associated disturbance does not affect the PCEs, so there would be no direct or indirect effects to primary cavity excavators from implementation of this alternative.

This alternative would not designate any motorized routes, or modify the current patterns of human use in OGMAs or mapped feeding habitat for pileated woodpeckers. Existing user created or unauthorized routes within these habitats would not be closed or rehabilitated.

Action Alternatives (2,3,4)

By design (nesting in tree cavities), woodpeckers and other cavity users are relatively more secure from nest predation than any other group of forest birds because they nest in tree cavities. For the

woodpeckers and other cavity nesters, Hamann et al. (1999) and Gaines et al. (2003) have conducted literature reviews of recreational effects, including OHV use. Their reviews showed that recreational trail-associated disturbances did not present a problem to woodpeckers and cavity nesters as a group. Hamann et al. (1999) also stated that recreational activity is unlikely to be focused around nest sites of these species. Gaines et al. (2003) also concluded recreational trail-associated disturbance does not affect the guild. Therefore, recreational disturbance and increased nest predation are not known to be a limiting factor to primary cavity excavators along motorized trails.

Refer to Chapter 2 for a full description of each alternative. Alternatives 2, 3, and 4 propose new trail construction ranging from 50-81 miles (dependent upon alternative) where trees potentially could be felled and thus habitat directly altered. A Project Design Feature (Chapter 2) would limit tree felling during trail construction unless the trail design cannot be modified. This circumstance would be considered infrequent, as most trails would be routed along previously disturbed areas (also a Project Design Feature). Generally dead trees along trail systems are not felled unless the lean over the trail, or lean toward the trail and are within striking distance of the trail. During initial construction and maintenance on designated routes on closed or decommissioned roads, hazard tree felling may occur. Action alternatives propose trail placement on existing closed and decommissioned roads ranging from 37 to 76 miles (dependent on the alternative). Felled hazard trees would remain on site either as large wood habitat or as strategically placed obstacles to control trail width, to add complexity or difficulty (trail features), or to augment road and trail closures or restoration sites. These actions would be short-term events with project completion taking from a few hours to a few days to implement for each segment. Rehabilitation is not projected to result in any impact to PCEs. Staging areas are also proposed for OHV users including using existing campgrounds, Sno-Parks or mineral sources (rock pits). Alternatives 2 and 4 also propose new staging areas to provide OHV parking and may include amenities like toilets, picnic tables, and fire rings. Larger staging areas maybe three to five acres in size and the small staging areas with fewer facilities would range from one to two acres in size. Danger tree felling would focus on staging areas where the greatest hazard exists. Since these staging areas involve open roads, mineral sources and existing campsites, some level of hazard abatement will occur in these areas regardless of whether they are established as staging areas or not, see Cumulative Effects below.

Because of the very limited circumstances in which snags or live trees would be removed during construction or maintenance activities, effects would be limited to individual woodpeckers from habitat alteration, alternatives would have a negligible effect on snag distribution and abundance at the landscape scale and no effect to local populations is expected to result from implementation of this project.

The action alternatives would each designate motorized routes within OGMA and mapped feeding habitat for pileated woodpeckers (pfh). Alternative 2 proposes 2.6 miles; Alternative 3 proposes 1.4 miles; and Alternative 4 proposes 2.9 miles of designated route in OGMAs. Each of the action alternatives also proposes to designate motorized routes within mapped feeding habitat as follows: Alternative 2 has 2.8 miles; Alternative 3 has 0.7 miles; and Alternative 4 has 2.5 miles of designated routes in pfh. The majority of these route miles (both in OGMA and pfh) are on, or connect existing roads or are near the exterior boundary of the OGMA or pfh. Existing unwanted user created or unauthorized routes within these habitats would be closed, concealed and rehabilitated. No habitat would be removed within the Ochoco Summit OHV project area, other than minimal hazardous snags. Because the Ochoco Summit project area is over 300,000 acres and there are likely tens of thousands of existing snags present, the impact of removing incidental hazard trees during trail maintenance would not result in a measurable change in available habitat. New trail layout would also avoid placing trails where snags currently exist. Hamann et al. (1999) and Gaines et al. (2003) studies show woodpeckers are not disturbed by OHV traffic. Therefore, Ochoco Summit OHV project will

not contribute to a negative trend in viability on the Ochoco National Forest for any primary cavity excavator, including the pileated woodpecker and northern flicker.

Cumulative Effects

With implementation of the Travel Management Rule, motorized travel is restricted to designated routes and existing Maintenance Level 2 (and higher) roads. Hazard tree abatement would continue to occur along 674 miles of open maintenance level 2 roads, 125 miles of maintenance level 3 to 5 roads, at numerous industrial work areas (such as gravel pits, corrals, and industrial camps) and at administrative sites and high recreational use areas (such as campgrounds and trailheads). At the same time continued tree mortality due to inherent levels of insects and disease would result in snag recruitment overtime which would partially offset loss of snags to hazard abatement and firewood cutting. In addition, many acres of ponderosa pine forests and mixed conifer stands would be treated to maintain open pine-dominated forests with large trees to the benefit of the subset of the woodpecker guild dependent on such habitat. Treatments to improve forest health in all forest types would occur which would alter the rate of tree mortality and thus snag recruitment. Dead and defective tree and log habitat would continue to be well distributed at the landscape scale, though the area along open roads would likely experience reduced snag abundance over time. Table 6 was reviewed for projects that overlap in time and space with the Ochoco Summit OHV project. Several recent large-scale vegetation management decisions have been implemented or are in the process of implementation (Spears, Canyon, Howard Elliot Johnson, Zane, Jackson) or are being planned (Wolf) that partially overlap the Ochoco Summit OHV project area. The hazard trees potentially removed during implementation of these projects added to the very minimal numbers projected for OHV trail maintenance and staging areas, and combined they are not expected to result in measurable changes in existing snag numbers across the project area. The primary effect of these vegetation management projects on snag habitat is related to rate, size and density of snag recruitment due to improved forest health. These effects are disclosed in the NEPA documents for those projects and this OHV trail project would result in negligible changes to the rate, size or density of snag recruitment over time. Therefore, no additive cumulative effects to the woodpeckers and other primary cavity nesters are projected due to implementation of this project. In summary, there would be no aggregated effects for the PCEs in general beyond those discussed under direct and indirect effects because this trail system project would not appreciably change snag habitat at a landscape scale.

Snag densities on private land in the project area are assumed to be low because most landowners want to reduce wildfire potential and utilize wood products on their land. Consequently, snag habitat is likely limited and may not be available to woodpeckers for very long and would not contribute to nesting populations.

Viability Assessment for Pileated Woodpecker

Background (Ecology): The pileated woodpecker was chosen as a terrestrial management indicator species (MIS) for mature and old-growth forest (LRMP 1989, p. 243 and 251). The pileated woodpecker is also an indicator of late-successional habitat on all forests across the region. It is assumed that if good habitat is provided for pileated woodpeckers and their population is maintained at some desired level, that adequate habitat is also being provided for other species that share similar habitat requirements (LRMP FEIS p. 3-21). The pileated woodpecker plays an important ecological role by excavating nest cavities that are later used by other birds and small mammals (Thomas 1979) and by feeding on forest insect pests.

The pileated woodpecker occurs primarily in dense mixed conifer forests in late seral stages or in deciduous stands in valley bottoms (Marshall et al. 2003). Pileated woodpeckers nest in large diameter (> 21”d.b.h.) and tall snags, and depend heavily on carpenter ants for food. They commonly feed on dead grand fir trees and downed logs. They also roost in large hollow trees and tend to select relatively dense stands with grand fir common. They typically select for multi-strata mixed conifer

LOS. The pileated woodpecker's habitat associates prefer dense forest conditions, and they include Townsend's warbler, hermit thrush and red-breasted nuthatch among others. Some of these are discussed further in the Landbirds section of this document. As dense mixed coniferous stands often contain a high density of dead or dying trees, habitat for this species also represents habitat for the black-backed and three-toed woodpeckers, which are attracted to stands with abundant snags and activity by bark beetles and wood boring beetles.

Pileated woodpecker habitat is managed through guidelines in the Ochoco Forest Plan and recommendations of best available science. The BBS indicate that the population trend of the pileated woodpecker is increasing in both Oregon and the Northern Rockies BCR during all time intervals. The trend represents the yearly percentage change. During the period of the 1966 to 2006, there was an estimated 2 percent population increase per year in Oregon and a 4.6 percent population increase per year in the Northern Rockies BCR. The Oregon Natural Heritage Information Center 2009 list states the pileated woodpecker species ranking as S4, Apparently Secure. NatureServe (2009) listed the following as the top five major threats affecting pileated woodpeckers (1) conversion of forest habitats to non-forest habitats, (2) short rotation, even-age forestry, (3) monoculture forestry, (4) forest fragmentation, and (5) removal of logging residue, downed wood, and pine straw that would ultimately put nutrients back into the ecosystem and provide foraging substrate.

Recommendations for management of the Pileated woodpecker ("Habitat Use and Management of Pileated Woodpeckers in Northeastern Oregon," Bull et al. 1992), includes management of 900 acres of habitat for each territory. It is also recommended that the 900 acres contain 75% grand fir types; 25% would be old growth and the remainder in mature stands. At least 50% would have 60% canopy closure or greater. Dense stands in these relatively moist PAGs, dominated by large tree structure would have provided the best primary nesting habitat for pileated woodpeckers.

Existing Condition: The pileated woodpecker is considered to be an uncommon species in Oregon, limited attitudinally by habitat availability, and they are an uncommon permanent resident in the Blue Mountains (Marshall et al. 2003). Pileated woodpecker habitat for the Ochoco National Forest is defined as ponderosa pine stands with Douglas-fir and grand fir understories, or mixed conifer stands with greater than 15-20 inch in diameter trees and a dense canopy condition. The Ochoco National Forest Land and Resource Management Plan allocated Old Growth Management areas (OGMA) across the Forest to serve as reproductive habitat for the pileated woodpeckers. An additional 300 ac. of supplemental feeding habitat has been designated adjacent to each OGMA reproductive habitat area. Currently there are twenty-five allocated old growth areas within the project area totaling 7,693 acres. Satellite imagery from 2004 was used to characterize vegetation, which was subsequently used to estimate pileated woodpecker reproductive habitat within the watersheds potentially affected by this project. Currently pileated woodpecker primary reproductive habitat (based on GNN data) includes approximately 7,931 acres across the project area. The satellite imagery only provides a broad scale look at the live-tree component and does not provide information on stand specific snag or down log levels. In general, multistoried large tree structure with a significant fir component with abundant snags is the preferred habitat for the pileated woodpecker. The large blocks of preferred habitat with primary nesting habitat are currently distributed west of Big Summit Prairie and along the northern 1/2 of the project area. The OGMAs were surveyed in the 1990s for the presence of pileated woodpeckers. The surveys confirmed the presence of nesting pileated woodpeckers at Polie Creek OGMA. Numerous pileated woodpecker sightings were also recorded within and adjacent OGMAs across the project area including: Long Prairie OGMA D1-01; Lytle Prairie OGMA D1-02; Fox Canyon OGMA D1-03; Kemp Spring OGMA D1-04; Davis Spring OGMA D1-06; Lost Lake OGMA D1-07; Indian Butte OGMA D1-08; Peterson Creek OGMA D1-09; Scotts Camp OGMA D1-10; Deep Creek OGMA D1-11; East Porter Creek OGMA D1-12; Rush Creek OGMA D1-13; South Lookout OGMA D1-14; Polie Creek OGMA D1-15; Bridge Creek OGMA D1-17; Nature Creek OGMA D1-18; East Wolf Creek OGMA D2-05 and Chamberlin Spring OGMA D2-11.

Pileated woodpeckers have been recorded elsewhere in the project area including multiple general sightings at: Snowshoe Point; Marks Lake; Carrol Glade; South Fork Howard Creek; West Fork Howard Creek; east flanks of Round and Lookout Mountains; north and west flanks of Mt. Pisgah; headwaters of Peterson, Porter and Keeton Creeks; Little Summit Creek and north flanks of Paulina Butte; and upper Wolf and Rock Creeks.

Effects Common to All Alternatives: The alternatives would not treat LOS stands or forest stands within pfh or designated OGMAs. All alternatives would maintain the existing acres of fir-dominated understory and canopy closure, at least in the short term. In all alternatives, all existing snags would be left that are not deemed to be a safety hazards. Because the Ochoco Summit project area is over 300,000 acres and there are likely tens of thousands of existing snags present, the impact of removing of incidental hazard trees during trail maintenance would not result in a measurable change in available habitat. New trail layout would also avoid placing trails where snags currently exist when not in conflict with other Project Design Criteria (see Chapter 2). Since the action alternatives do not propose harvest of snags, the amount of existing snags present within the project area should not be substantially altered by implementation of any alternative. All alternatives would maintain the suitability of all existing habitat for pileated woodpeckers in the short term.

Conclusion: The pileated woodpecker is widely distributed in North America. It occurs primarily in dense, late seral stages of mixed conifer or deciduous tree stands. Its conservation status globally and nationally is secure and it is apparently secure in the State of Oregon (NatureServe). The pileated woodpecker does not have any special federal listing status as Candidate, Threatened or Endangered but it is listed as Vulnerable in the Blue Mountains on the State of Oregon Sensitive Species list. The State Vulnerable status indicates that the pileated woodpecker is facing one or more threats to their populations but is not currently imperiled with extirpation. The pileated woodpecker is not considered a focal species in the Partners in Flight *Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington* and is not a priority species on the USFWS *Birds of Conservation Concern*. Population trend data from the North American Breeding Bird Surveys indicate that the pileated woodpecker has an increasing population trend in Oregon and in the Northern Rockies Bird Conservation Region. While the interpretation of this data should be done with caution, a steady population increase is indicated. The Partners in Flight species assessment database also indicates a large population increase in the Northern Rockies Bird Conservation Region. The Partners in Flight population assessment database indicates that in the portion of the Northern Rockies Bird Conservation Region that is in Oregon (Blue Mountains, including the WWNF) the average number of pileated woodpeckers seen per breeding bird survey route was 1.02.

The broad-scale source habitat analysis conducted by Wisdom et al. (2000) indicated that there have been basin-wide declines of source habitat of the pileated woodpecker in the interior Columbia Basin, however, habitat of the pileated woodpecker is strongly increasing in the Blue Mountains Ecological Reporting Unit. In the Blue Mountains ERU there was more than a 100% increase in the amount of source habitat from historical conditions. This analysis was a coarse-scale analysis and based on a large pixel size (100 hectares or 247 acres), and included both private and public lands. Priority nesting habitat of the pileated woodpecker is still available in adequate amounts and distribution to maintain pileated viability on Ochoco National Forest. Currently, there are approximately 14,508 acres of priority nesting habitat on Ochoco National Forest, within 23 of the 34 watersheds (68%) on the Forest (including Crooked River National Grassland). Of the watersheds that historically provided priority nesting habitat (Ochoco National Forest excluding Crooked River National Grassland), 23 of 24 watersheds (96%) currently provide priority nesting habitat.

This viability assessment indicates the pileated woodpecker is well distributed across the Ochoco National Forest and there are adequate amounts, quality, and distribution of habitat to provide for pileated woodpecker population viability. Given the relatively wide range of this species, increasing population and habitat trends, and the amount and distribution of habitat remaining, within the project

area, at the forest level and across the eco-region, viability for this species is expected to be provided for on Ochoco National Forest. Given that this project impacts less than 1% of the suitable priority nesting habitat across the Forest, the overall direct, indirect and cumulative effects may result in a very small negative trend of habitat in the short term. However, this reduction in nesting habitat is insignificant at the Forest scale and is not expected to reduce the viability of this species at the Forest level. For these reasons this project is expected to result in continued viability of pileated woodpeckers on Ochoco National Forest.

Viability Assessment for Northern Flicker

Background (Ecology): The northern flicker was chosen as a terrestrial management indicator species (MIS) for old growth juniper (LRMP FEIS 3-21 and 4-96). Many researchers have reported on aspects of behavior and nest use by flickers as part of general studies of cavity nesting birds. Recently such interest has intensified as flickers have been recognized as "keystone" excavators which may influence the abundance of secondary cavity nesters in forest systems (Martin et al. 2004).

Existing Condition: A variety of forest types do exist in abundance and well distributed across the Forest and in this project area, including but not limited to dry site pine and juniper woodlands where large or old juniper and other potential nesting sites are available.

Effects Common to All Alternatives: The proposed action alternatives do not include removal of trees in dry site ponderosa pine PAGs with size class 5. No tree removal within size class 5 juniper PAGs is prescribed. The alternatives are not likely to remove old-growth juniper or other juniper trees with sufficient size and defect to serve as potential nest sites for northern flickers.

Conclusion: Even though the flicker was selected as an indicator for old growth juniper, they do nest in a wide variety of forest types. A variety of forest types do exist in abundance and well distributed across the Forest and in this project area, and this species is widespread and common. None of the alternatives would substantially alter habitat for this species. For these reasons this project will not contribute to a negative trend in viability for northern flickers on Ochoco National Forest.

Big Game - Deer and Elk

The 301,580-acre project area provides both summer and winter range habitat for mule deer and Rocky Mountain elk, including 17,828 acres in Winter Range, 25,183 acres in General Forest Winter Range, and 195,735 acres in General Forest (summer range) allocations. Deer and elk are popular big game species, and are associated with thousands of recreational visitor days to the Ochoco forest each year during hunting seasons, and for general wildlife viewing and photographic opportunities during other times of the year. The Oregon Department of Fish and Wildlife and Travel Oregon contracted with Dean Runyan and Associates in 2008 to conduct an economic analysis by county of fishing, hunting, and wildlife viewing (ODFW 2009). Table 96 and Table 97 display the results that survey participants spent on hunting and wildlife viewing in Crook and Wheeler Counties (based on Oregon Travel Impact 1991-2008). The selected counties in the table show an estimated dollar value placed on consumptive and non-consumptive recreational activities associated with terrestrial wildlife in this part of Oregon.

Table 96. Annual Travel-generated estimated expenditures toward hunting and wildlife viewing in Crook and Wheeler Counties, Oregon (overnight or day trips 50+ miles one way, or non-residents).

County	Hunting Expenditures	Wildlife Viewing
Crook	$2,584,000	$6,769,000
Wheeler	$1,168,000	Sample size too small to report data reliably
Total	$3,752,000	$6,769,000
State Total Percent	3.6%	1.4%
State Total	$104,458,000.	$495,260,000.

Table 97. Annual Local estimated expenditures toward hunting and wildlife viewing in Crook and Wheeler Counties, Oregon (residents and day trips less than 50 miles one way).

County	Hunting Expenditures	Wildlife Viewing
Crook	$683,000	$218,000
Wheeler	$103,000	Sample size too small to report data reliably
Total	$786,000	$218,000
State Total Percent	2.5%	1.0%
State Total	$31,574,000.	$33,173,000.

Table 98 displays mule deer hunting data for the wildlife management unit potentially affected by the project (ODFW 5/2009).

Table 98. Numbers of deer hunters, hunter days and hunter success in the Ochoco Wildlife Management Unit (Years 2008-2009).

Mgmt. Unit Number	# of RifleTags 2008 – 2009	# Deer Population Estimate (April 08-09)*	% Success Rifle 2008 - 2009
Ochoco WMU # 237	3,200 - 2,800	15,700 – 15,500	27 - 25
*Population estimate April 2010 was 16,000 deer			

ODFW's interpretation of telemetry data collected from mule deer on Deschutes National Forest between 2005 and 2010 indicated that some collared animals return to the same summer range area each year suggesting strong site fidelity. On Deschutes National Forest, depending on weather conditions, the animals usually return to summer range beginning in April although the spring migration period can last into June. Data also suggest some does drop their fawns before reaching their desired summering area and then continue their migration with their fawns. The fall deer migration to winter ranges usually begins in October and the majority of the deer are out to winter range by mid-November. Some collared deer utilize the same migration route as during the spring and some individuals also appear to follow the same routes in consecutive years (Ardt, pers. comm 2009). Though telemetry data is lacking for deer on Ochoco National Forest, mule deer may not engage in the long distance high density migrations observed with some of the deer of South Central Oregon. Nonetheless, the higher elevations in the Ochoco Summit project area do become snowbound in the winter and deer are known to concentrate in foothills and valley bottoms along the Crooked and John Day Rivers and their tributaries during the winter. Thus, it is likely that during their seasonal movements, some deer migrate across the mid-elevation areas where proposed trails are located.

Spring deer counts are conducted by ODFW to determine population levels as compared to the management objective for each unit. Table 99 shows the April deer counts conducted by ODFW for 2007 - 2012 within the management unit potentially impacted by the Ochoco Summit OHV project.

Table 99. April mule deer populations expressed as a percentage of the management objective (20,500) in the Ochoco Management Unit.

Year	Population Size	Percentage of Management Objective
2007	16,500	80
2008	15,700	77
2009	15,500	76
2010	16,000	78
2011	15,400	75
2012	15,400	75

Mule deer populations in most of the western United States began experiencing a decline in the mid-1990s. The Western Association of Fish and Wildlife Agencies (2004) reported there were a multitude of factors adversely impacting mule deer populations including habitat loss to development,

deterioration of forage quality and quantity, droughts, severe winter weather, competition with other ungulates, predation, disease, poaching and increased hunting mortality. As displayed in Table 99, deer populations are currently reaching 75 percent of the management objectives for the Ochoco Wildlife Management Unit (WMU) and showing a relatively stable population over the years displayed. Elsewhere in Central Oregon and across the West, steady declines in deer populations have been noted. Such population declines for big game in Central Oregon may attributable to a combination of factors, such as residential development, disturbance from increased motorized and non-motorized recreation, poaching, predation and hunting-season mortality. The enforcement of road closures and hunting regulations have not kept up with the increase in the human population in Central Oregon. Table 100 displays elk hunting data for the wildlife management unit potentially affected by the project (ODFW 5/2009).

Table 100. Numbers of elk hunters, estimated population and hunter success in the Ochoco Wildlife Management Unit (Years 2008-2009).

# of Rifle Tags 2008 – 2009	# of Archery Tags 2008 – 2009	# Elk Population Estimate (08-09)	% Success Rifle 2008 - 2009
1,275 - 1,075	850 - 750	4,300 – 4,000	29 - 25

Table 101. Winter elk populations expressed as a percentage of the management objective (4,600) in the Ochoco Management Unit.

Year	Population Size	Percentage of Management Objective
2006	4,600	100
2007	4,700	102
2008	4,300	93
2009	4,000	87
2010	4,300	93
2011	3,900	85

Mule deer and elk are listed as Management Indicator Species for the Ochoco National Forest and elk in particular can act as a barometer for species sensitive to human disturbance. The Land and Resource Management Plan (LRMP, 1989) provides habitat management direction for big game animals. This project would not substantially impact the amount or arrangement of forage and cover. Thus, the analysis for this project is focused on road density, disturbance and security habitat. For this analysis, road densities and motorized impacts are analyzed by subwatersheds. Target open road densities are 3.0 miles per square mile or less, to achieve deer summer range habitat effectiveness targets. The open road density in this analysis is displayed within the 3 allocations with standards and guidelines for road density related to elk management (Winter Range, General Forest Winter Range and General Forest). Road density is also displayed by watershed to distinguish which areas have the highest open road densities. Disturbance was evaluated using distance banding from motorized routes. Bands close to motorized routes have high potential for disturbance to big game, while areas distant from any motorized route have low probability for disturbance to big game from use of the route. Elk security habitat is based on distance from any motorized route of more than ½ mile. High value elk security habitat meets that criteria and occurs in blocks at least 250 acres in size.

Key Indicators for Big Game Habitat

Effects to big game will be displayed at several scales including 5th field watersheds and 6th field subwatersheds and the entire project area. The following indicators will be used to compare the effects of alternatives to big game:

- Open road and trail miles available for motorized use within 5th field watersheds expressed in miles of route per square mile of National Forest System roads and trails.
- Number of 5th-field watersheds and 6th-field subwatersheds with an open route density of greater than 3.0 miles of National Forest System roads and trails open for motorized use.
- Acres of National Forest land greater than 1 mile from an open motorized route in the project area.
- Acres of National Forest land within 4 distance bands within 1 mile from an open motorized route and percent of the project area.
- Acres providing elk security habitat (>1/2 mile from an open motorized route).
- Acres providing elk security habitat (>1/2 mile from an open motorized route) in patches at least 250 acres in size.
- Potential for displacement of big game onto private land as expressed by acres of secure cover within 2 miles of private land.

Of the indices included in the Habitat Effectiveness Index analysis (HEI), motorized route density is the only one that may be affected under the proposed alternatives. This is because change in cover under the proposed alternatives is negligible at the landscape scale. Refer to the section on Physical Alteration of Habitat under General Effects to Wildlife. If the maximum direct physical impact to forested habitat from trail construction is 190 acres (Alternative 4), and the total acres in General Forest in the project area is 195,735 acres, then the largest potential change in cover would be less than 1/10th of one percent at the landscape scale. Since the cover quantity index is derived from tables based on ranges of 4 percentage points, and the cover quality index is based on 10% increments of relative percentages in canopy closure which are not likely to be moved by a change of less than 1/10 of one percent, these indices are not sensitive enough to detect a change of such a small magnitude. Thus, measures based on findings in research from the Starkey Project (Wisdom, et al. 2005), were used as the key indicators for big game effects and serve as the primary basis for comparison of potential alternative impacts on big game. These measures are focused on distance from motorized routes and availability of security habitat.

Effects of Motorized Vehicle Access to Big Game

Effects to deer and elk habitat from motor vehicle access can be discussed in terms of direct and indirect impacts from disturbance, impacts to habitat, and increased legal and illegal harvest. The LRMP approved in 1989 recognized a need to limit motor vehicle access, and set guidelines on target road densities for elk winter range and elk summer range. Of the indices included in the Habitat Effectiveness Index analysis (HEI), motorized route density is the only one that may be affected under the proposed alternatives. Therefore the road density index will be addressed under the effects below. At the time the LRMP was written no guidelines were drafted to account for off-highway vehicle use, consequently motorized densities were based on passenger cars, two wheel and four-wheel drive trucks on open system roads. Off-highway vehicle use has increased greatly since 1990 and is contributing to the amount of motorized vehicle use across the Forest including this project area. Public scoping letters and participation in public meetings conducted for this project indicate many users may prefer trails over driving on roads because of the reduced traffic levels and for the recreational experience provided by trails with complexity, technical difficulty and interesting features.

***Disturbance*:** Stankowich (2008) conducted a comprehensive review and meta-analysis of research on ungulate escape responses from human and vehicle disturbances. His review found evidence that ungulates pay attention to approacher behavior, have greater perceptions of risk when disturbed in open habitats, and that females or groups with young offspring show greater flight responses than adult groups. He also found that humans on foot were more likely to evoke a response than other

stimuli (vehicles, noises) and that hunted populations showed significantly greater flight responses than non-hunted populations.

A key element of elk habitat management is providing hiding cover and security areas especially during the fall hunting seasons. Some studies have shown that elk when disturbed by motor vehicles will leave an area that lacks sufficient hiding cover (Hillis et al. 1991 and Wisdom et al. 2004). Hillis et al. (1991) defined elk security cover as forested habitat at least 250 acres in size and at least ½ mile from a road open to motorized travel. Recent studies at the Starkey Project in northeast Oregon (Wisdom et al. 2005) have disclosed even more information on the effects of roads and road densities on deer and elk. Rowland et al. (2000) summarized the direct impacts of roads and associated traffic on elk, in addition to outright mortality from vehicular collisions as follows: (1) Elk avoid areas near open roads but avoidance varies in response to traffic rates; (2) Elk vulnerability to mortality from hunter harvest, both legal and illegal, increases as open road density increases; and (3) In areas of higher road density, elk exhibit higher levels of stress and increased movement rates. Rowland et al. (2005) also noted that elk use increased as distance from open roads increased and suggested that judicious closing of certain road segments, particularly road spurs, may retain or create blocks of habitat that serve as security areas for elk while allowing sufficient road access for other management needs.

An important finding from the Starkey Experimental Forest and Range studies is that road (or route) density is not the best predictor of habitat effectiveness for elk. Instead a model based on distance bands proved to be a more spatially explicit and biologically meaningful tool for assessing effects from roads. Road densities do not provide a spatial depiction of how roads are distributed on the landscape (Rowland 2005). Consequently, a distance banding analysis was conducted on the 301,580-acre project area. Using geographical information systems (GIS), open motorized routes (roads and trails) were buffered at five scales to display the amount of National Forest acreage within the buffers. The distance bands included: a) acres and percent of the project area within ¼ mile, b) acres and percent of the project area ¼ to ½ mile from an open motorized route, c) acres and percent of the project area ½ to ¾ mile from an open motorized route, d) acres and percent of the project area ¾ to 1 mile from an open motorized route and e) acres and percent of the project area greater than one mile from an open motorized route. Hillis et al. (1991) defined elk security habitat for forested stands greater than 250 acres in size and greater than ½ mile from an open route. Acreage in cover greater than ½ mile from an open motorized route is assumed to provide greater security for elk than cover within ½ mile of a motorized route. Thus, the amount of cover more than ½ mile from motorized routes and within 1 mile of private land was used as a measure of potential to avoid displacement of elk from federal onto private land.

Disturbance impacts to mule deer from off-road use, including motorized use, are more difficult to quantify. Mule deer studies from the Starkey Project in northeastern Oregon showed little measureable response to off-road treatments (ATV riding, mountain biking, hiking and horseback use) as compared to control periods of no activity reported by Wisdom et al. (2004). Mule deer movement rates increased only slightly however, during periods of all four off-road activities except ATV riding. Estimated probabilities of mule deer flight response were similar among all four activities versus control periods. This suggested that deer were not exhibiting the same tendency for flight as shown by elk in relation to off-road activities. However, Wisdom et al. (2004) also reported that deer may be responding to fine-scale changes in habitat use, rather than substantial increases in movement rates and flight responses. For example, it is possible that deer may respond to an off-road activity by seeking dense cover rather than running from the activity. This could lead to animals spending more time in dense cover and less time foraging, resulting in less fat reserves for winter survival.

Studies by Stankowich (2008) showed that humans on foot have more impact on mule deer than other stimuli studied (vehicles, noise, and horseback). Ferris and Kutilek (1989 in Montana TWS 1999)

found black-tailed deer avoided OHV areas during high peak use but returned to established home ranges after traffic levels subsided.

In another study Yarmoloy (1988 in Ouren et al. 2007) studied mule deer does equipped with radio collars and several were intentionally followed by ATVs for nine minutes a day for 15 days. The harassed does shifted their feeding patterns into darkness, used cover more frequently, and increased their flight distance from ATVs. The harassed does also showed reduced reproduction success the following year as compared to the control does that were not harassed. These effects would not be expected to occur in most of the project area because off-route travel would not be permitted under any action alternative (see Project Design Features, Chapter 2).

Hayden et al (2008) stated that disturbance factors in and of themselves have generally not been implicated in lower mule deer population performance. However, given the nutritional and energy requirements of deer, it seems reasonable to assume such factors could combine with a number of other factors to negatively impact deer. Habitat Guidelines for Mule Deer in the Northern Forest Ecoregion (Hayden et al. 2008) provided a list of recommendations to minimize negative effects of human encroachment. Those applicable to the project include:

- Develop consistent regulations for OHV use.
- Develop and maintain interagency coordination in enforcement of OHV regulations.
- Designate specific areas and times (seasonal use restrictions) for activities such as OHV use that disturb habitat or deer.
- Cluster recreational activities to maintain or create large blocks of undisturbed habitat. Direct new development toward previously disturbed areas (clumped rather than dispersed distribution).
- Seasonally separate humans and mule deer at critical periods.
- Through education, modify human behaviors to reduce recreational effects to mule deer.
- Monitor activities that may unduly stress deer at important times of the year. Reduce or regulate disturbance if deemed detrimental. When applicable, encourage enforcement of regulations regarding dogs running at large or chasing wildlife and wildlife harassment by snowmobiles and OHVs.

At the present time, motorized road use in the project area could be described as low to moderate during most of the year. Typically, most roads begin to melt out from winter snow in April and motorized use is available until November depending on snowfall timing and depth. During the spring and summer, road use is generally light, except near dispersed campsites along the main roads and where personal use firewood cutting is permitted. The general exceptions are roads and user-created OHV trails near population centers such as Prineville, which see substantial use during all periods that roads and trails are snow-free. However, motorized use in the entire project area changes dramatically beginning in late August with the onset of archery hunting season. The rifle deer season starts in late September or early October and is followed by rifle elk season in mid-October. Usually in early November the legal personal use firewood permittees shut down because of the end of the season and/or snowfall closes access roads.

***Off-Road Recreation Effects*:** The amount of habitat impacted by OHVs and 4-wheel drives and random cross-country travel is difficult to quantify. It is unlikely all motorized trails have been located; consequently, the amount of habitat currently being disturbed by motorized travel is only estimated. As noted in the Recreation section, based on estimates from the 2008 National Visitor Use Monitoring (NVUM) survey on the Ochoco National Forest, more than 14,000 forest visitors participated in OHV or Motorized Trail Activities on the Forest in that year. For the purpose of this analysis, it is assumed that there are approximately 5000 visitors participating in OHV use within the project area (slightly more than 1/3 of the estimated total forest OHV participation). Most of this use occurs seasonally as the higher elevations become inaccessible due to snow. Based on observational

data from Forest Service staff, the heaviest use within the Ochoco Summit project area occurs on summer weekends, and holidays from approximately May 1 – Sept. 30, with less recreational use occurring weekdays, and during the shoulder seasons. An exception to this is during hunting season. Starting with bow hunting in August and continuing through November, there are hunting camps scattered across the area. During this time, there is increased use of OHVs primarily for hunting purposes, not recreational riding. Most of the ongoing recreational OHV use in the project area occurs in the Marks Creek and Ochoco Creek subwatersheds, especially in the spring when the higher elevation areas are still snowed in. Later in the season OHV use increases in the central and eastern portions of the project area as the snow free season progresses. Known routes in use identified previously by the Central Oregon Motorcycle and ATV Club (COMAC) included routes in eight of the nine watersheds in the project area. However many of the miles identified by COMAC are on open roads. Therefore the length of routes identified by COMAC cannot be used to estimate off-road impacts to big game. Also there is an important distinction between recreational ATV use and use by hunters to access hunting areas or to retrieve game. Recreational users are more likely to use narrow, winding or difficult routes, while hunters on ATVs are more likely to use wider and straighter routes such as roads, whether open or closed (personal communication, Ramming, 2010).

Studies have examined deer and elk response to modes of off-road recreation at Starkey in northeastern Oregon (Wisdom et al. 2005; Naylor et al. 2009). Wisdom et al. (2005) measured responses by mule deer and elk to four off-road recreation activities including hiking, mountain biking, horse riding, and ATV riding. The distance deer and elk moved and movement rates were measured in response to the activity and during control periods where no recreational activity was permitted. Mule deer responses contrasted sharply with elk. Mule deer showed little measureable response to the off-road treatments. However, movement rates increased slightly, during periods of all four off-road activities except ATV riding. Wisdom hypothesized that deer may well be responding to the treatments with fine-scale changes in habitat use (such as seeking cover), rather than substantial increases in movement rates and flight responses. The response by deer to human disturbance can also be complicated in areas with elk due to interspecific avoidance. Johnson (2000) found that while elk selected gentle slopes farther from roads and on westerly aspects, deer selected steeper slopes, closer to roads and on easterly aspects. Johnson concluded that elk and mule deer select resources in opposite ways on shared ranges during the spring in the Blue Mountains Province, and that mule deer selection appears to be explained in large part as a result of avoidance of areas used by elk.

However, Wisdom et al. (2004) cautioned against inferring their study results to other areas where mule deer are common and elk are absent or sparse. In the absence of moderate or high densities of elk, mule deer may exhibit different distribution and selection patterns in relation to roads and traffic. Within the Ochoco Summit project area elk densities are moderate to high. Spatial separation of elk and deer on spring and summer range may occur in the Ochoco Summit area, such as has been observed in numerous studies: Collins and Urness (1983), Wallace and Krausman (1987), Wickstrom et.al. (1984), Latham et.al (1996, 1997), Wisdom et al. (2005) and Johnson (2000). Therefore, if elk patterns of movement or use are altered as a result of human activity, then mule deer use may increase in areas avoided by elk.

Movement rates by elk increased substantially during off-road activities as compared to the control periods (Wisdom et al. 2005 and Naylor et al. 2009). ATV use showed the greatest response by elk resulting in the greatest increase in movement, distance moved, and probability of flight response. The study suggests that elk were displaced from preferred security and foraging areas as a result of flight behavior during the daytime off-road activities. ATV riding and mountain biking caused the largest reductions in elk feeding time and increases in elk travel time and elk showed no habituation to mountain biking (Naylor et al. (2009). Preisler et al. (2006), in a study of elk and ATV use at Starkey, showed that elk appeared to respond at long distances (greater than 1,000 meters) to ATVs and that the estimated probability of flight appeared to be higher when elk were closer to ATV routes,

even when the distance to the ATV was large. His study noted that a significant number of elk appear to 'freeze' while the ATVs pass very close (50-100 meters) that seem to suggest the possibility that elk are using topography and vegetation to escape detection at close distances to roads. Preisler et al. (2006) also concluded that over successive days of treatments (exposure to ATV riders) elk appear to adjust their distribution so that they are located closer to areas that are not visible from routes and during the nine days of rest in-between treatments, the animals appeared to return to their pretreatment distributions. Naylor (2008) found that elk behavior patterns were similar to controls each morning before treatments (ATV exposure) commenced, and then returned to pre-disturbance level 1 to 2 hours after each treatment ended. He also found that behavior patterns outside of the treatment times appeared to be unaffected by the treatment activity. Preisler (2006) also noted that during days 4 and 5 of treatment elk appeared to have either habituated to the activity or found close refugia, rather than fleeing to the far corners of the study pasture. He concluded that over successive days of treatment, that elk appear to adjust their distributions so that they are located in or closer to areas that are not visible from the motorized route.

To assess the amount of big game habitat impacted from motorized disturbance a distance banding analysis was completed showing acreage within four distance bands within 1 mile of open roads or motorized trails, and acres in two distance bands greater than 1 mile from an open road or motorized trail. This analysis does not separate the on-road and off-road effects, but considers them in combination with equal impacts. The distance bands were selected based on several references, including: ODFW (2009); Mason, Bruce and Girard, Inc for ODFW (2008); Preisler (2006); Rowland (2000, 2005), Roloff (1998) and Gaines (2003).

***Effects from Legal and Illegal Harvest*:** Roads open for motorized use provide the predominant hunter access into the Ochoco WMU. As shown in Table 102, current overall open road densities in the watersheds range from 1.17 mi/mi^2 to 2.34 mi/mi^2. The greater the open motorized route density the greater the potential for game violations. Road hunting in itself is not considered illegal by the State of Oregon as long as the driver steps away from the road surface to fire the weapon. High open road and/or motorized trail densities may provide additional access for poaching of big game animals. Poaching is considered one of the factors contributing to the general decline in mule deer numbers in Central Oregon. However, as stated above, trails proposed under this project would be designed for slow speed and increased technical difficulty so would not necessarily provide easy access for poachers.

In addition to big game mortality from motorized access, there are other impacts to deer and elk. Johnson et al. (2004 in Wisdom et al. 2005) stated that elk trying to elude hunters can deplete fat reserves needed for over-winter survival and that elk responded to hunters by fleeing, whereas deer appear to elude hunters by hiding. Cook et al. (1996, 2005) reported that forage intake and nutritional quality during August and September can be determinants of winter survival of elk calves. Cook et al. (2005) also reported that the effects of the summer-autumn nutrition on fat accretion of cows and growth of calves significantly influenced their survival probability under harsh winter conditions. These months coincide with archery elk seasons and also when other recreationists such as late season campers, photographers and other forest visitors take to the woods to enjoy the fall colors. Time spent hiding from people takes away from foraging. While Rowland et al. (2000, 2004) found elk showed increasingly strong selection toward areas with increasing distance from roads open to motorized traffic, some recreationists would travel on foot that distance to pursue their activity. The research at Starkey also indicated that mule deer moved closer to roads with the assumption that they changed their distribution within the study area in relation to opposite changes in distribution by elk. This could lead to higher levels of deer harvest where road densities are also high.

The distributional pattern of open roads and motorized trails is important in determining the security an area can provide for elk during hunting seasons. Where possible, clumping road/trail closures can maintain security areas, which Hillis et al. (1991) have described as a non-linear patch greater than

250 acres in size and greater than ½ mile from an open motorized route. Other authors have also referred to the ½ mile distance as a threshold for security (Rowland, 2005) though smaller patches may also be of benefit. Other authors have suggested that the highest impacts occur within the first ¼ mile (ODFW, 2008; Gaines, 2003). Some references imply that the level of the impact decreases on a continuum as distance from motorized increases (ODFW, 2008; Rowland, 2000, 2005). In their report to ODFW, Mason et al (2008) stated that the anticipated effect of a roadway on deer and elk drops to zero one mile (1600 m) away from the road. Naylor (2000) states that a distance greater than 1,290 m was beyond the distance where roads would greatly affect elk distribution. Gains (2003) provides tables displaying suggested zones of influence for a variety human uses, including motorized routes. He suggests a zone of influence on deer and elk of 300 m for motorized trails and up to 1300 m for open roads. The effects discussion on alternatives provide analysis conducted at several distance banding scales to determine and display various zones of influence and the amount of security habitat for big game under each alternative.

Table 102 displays open road and motorized trail densities in the project area expressed as miles of route per square mile of land base on National Forest System land within each 5th field watershed. All acres within any subwatershed that overlapped with any project alternative have been included in the analysis; the actual area within 1 mile of any proposed motorized trail system is about 100,000 to 110,000 acres.

Table 102. Total combined open motorized density of roads and trails expressed in miles per square mile, by alternative and watershed (National Forest System lands only) without mitigation.

5th Field Watershed	5th Field square miles NFS Lands Only	Alt. 1 Total Motorized Density(Roads + Trails) mi/mi2	Alt. 2 Total Motorized Density (Roads + Trails) mi/mi2	Alt. 3 Total Motorized Density (Roads + Trails) mi/mi2	Alt. 4 Total Motorized Density (Roads + Trails) mi/mi2
Bridge Creek	24.37	1.31	1.31	1.31	1.33
Deep Creek	82.25	1.90	2.57	2.34	2.68
Lower Beaver Creek	36.86	1.60	1.85	1.85	1.90
Lower North Fork Crooked River	33.52	1.27	1.27	1.27	1.27
Mountain Creek	30.06	1.17	1.20	1.17	1.20
Paulina Creek	25.15	1.89	1.93	1.93	1.93
Rock Creek	22.16	1.52	1.56	1.56	1.56
Upper North Fork Crooked River	139.07	2.34	2.65	2.46	2.66
Upper Ochoco Creek	74.70	1.66	1.81	1.95	2.10
Total	471.14	1.83	2.09	2.01	2.17

Direct and Indirect Effects

Alternative 1 – No Action

***Disturbance*:** Alternative 1 would be most likely to retain the current pattern of disturbance from unregulated cross-country motor vehicle access, user-created trails, and use of closed roads because no closure of unauthorized routes would be implemented under this alternative. Though this alternative would provide the highest amount of security habitat based on open roads, it would offer the poorest assurance of security for deer and elk due to the current configuration of the existing network of roads and the current pattern of use. There would be limited opportunity to close roads, reinforce existing closures, designate a defined OHV trail system or rehabilitate user-created trails. Open road densities on National Forest system lands would remain at the current level (refer to Table 102). Open road densities would exceed Forest Plan guidelines of 3.0 mi/mi2 in General Forest

allocation in 2 of the 31 subwatersheds in the project area (Lower Big Summit Prairie and Lower Marks Creek; see Table 103). Mixed use by passenger cars, industrial traffic and OHVs would occur on 659 miles of operational maintenance level 2 roads. Motorized use other than by OHVs would continue to occur on 140 miles of highway legal only (maintenance level 2 to 5) roads

Table 103. Subwatersheds with Open Road Density at or above 3 miles/sq. mile in General Forest, Alternative 1 combined with closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Upper North Fork Crooked River	Lower Big Summit Prairie	3.31 GF
Upper Ochoco Creek	Lower Marks Creek	3.15 GF

Distance banding analysis of existing open roads (based on operational maintenance level) shows there are a total of 50,177 acres of National Forest lands greater than 800 m (1/2 mile) from an existing road (elk security habitat). This represents approximately 17% of the project area. Of these, 47,969 acres occur in patches greater than 250 acres in size, or 96% of the total area more than ½ mile from an open road. Security areas in patches greater than 250 acres are distributed across all nine watersheds (and 28 of 31 subwatersheds) within the project area. The subwatersheds that did not contain elk security patches greater than 250 acres are Drift Canyon (in Lower Beaver Creek), Middle Rock Creek (in Rock Creek) and Lower Big Summit Prairie (in Upper North Fork Crooked River). In contrast, 115,127 acres (38 percent) of the project area are within 200 m (660 feet) of an existing open road. These high-disturbance zone acres are distributed across all nine watersheds (and 30 of 31 subwatersheds) in the project area. Within these areas elk would continue to experience high levels of disturbance from motorized use. It is assumed that lands within the 200 m (660 foot) zone are unavailable for consistent elk use as cover or foraging areas at least during daylight hours when motorized traffic is more likely to occur.

***Off-road Motor Vehicle Access*:** Unregulated motorized access from all user groups would likely continue to degrade big game habitats because no closure of unauthorized routes would be implemented under this alternative. This would result from unregulated access into deer hiding cover patches, elk security cover blocks, and into calving and fawning grounds during critical time periods of May and June. In the absence of a designated system of OHV routes, it is reasonable to assume user-created trails may continue to increase in mileage and further expand across the project area until the Travel Management Plan is fully implemented. Legal and illegal harvest of deer and elk would be expected to continue at the same rate or slightly increasing as human population increases and more user-created motorized routes are established.

Negative impacts including disturbance during calving seasons would be expected to continue at the current trend. Security areas in patches greater than 250 acres in size would be available to elk across nine 5th field watersheds in the project area as displayed in Table 104. This alternative would provide a total of 47,969 acres of security habitat in blocks greater than 250 acres in size. Security areas (greater than ½ mile from open roads) in patches less than 250 acres in size would occur on a total of 2,208 acres distributed across eight watersheds. There would also be limited opportunity to obtain grant funding to reduce road densities or increase security habitat acreage.

Table 104. Acres of Elk Security Area Greater than ½ mile from any open motorized routes.

5th Field Watershed	Watershed Acres (ONF)	Alt. 1 Elk Security Area	Alt. 2 Elk Security Area	Alt. 3 Elk Security Area	Alt. 4 Elk Security Area
Bridge Creek	15,595	4,385 (4,274)	4,373 (4,263)	4,373 (4,263)	4,373 (4,263)
Deep Creek	54,561	4,551 (3,745)	1191 (378)	2,114 (1,024)	794 (1)
Lower Beaver Creek	23,611	4,364 (4,176)	3,559 (3,421)	3,559 (3,421)	3,559 (3,421)
Lower North Fork Crooked River	21,458	4,920 (4,868)	4,644 (4,593)	4,644 (4,593)	4,644 (4,593)

Table 104. Acres of Elk Security Area Greater than ½ mile from any open motorized routes.

5th Field Watershed	Watershed Acres (ONF)	Alt. 1 Elk Security Area	Alt. 2 Elk Security Area	Alt. 3 Elk Security Area	Alt. 4 Elk Security Area
Mountain Creek	19,244	6,986 (6,986)	6,959 (6959)	6,986 (6,986)	6,959 (6,959)
Paulina Creek	16,094	1,704 (1,609)	1,697 (1,602)	1,697 (1,602)	1,697 (1,602)
Rock Creek	14,181	3,567 (3,466)	3,510 (3,409)	3,510 (3,409)	3,510 (3,409)
Upper North Fork Crooked River	89,005	9,907 (9,433)	9,362 (9,104)	9,778 (9,108)	9,352 (9,067)
Upper Ochoco Creek	47,832	9,793 (9,412)	9,078 (8,734)	8,486 (8,108)	8,197 (7,819)
Total	301,580	50,177 (47,969)	44,374 (42,460)	45,148 (42,514)	43,085 (41,132)

Acres in ( ) are in blocks greater than 250 acres in size.
Shaded cells represent more than 10% reduction in total elk security area.
Bold print acres represent more than 50% reduction in 250+ acre security areas.

Alternative 2

***Disturbance and Off-road Motor Vehicle Access*:** Alternative 2 would reduce the current pattern of disturbance from unregulated cross-country motor vehicle access, user-created trails, and use of closed roads because of the rehabilitation and concealment proposed at 89 sites on user created routes, 11 sites on decommissioned roads and 109 sites on closed roads. Alternative 2 would reinforce existing closures. However, this alternative would also increase the length of motorized route network by 69 miles. This alternative would provide a system of designated routes intended to provide a legal, planned, designed, engineered and maintained series of routes for motorized use. This should reduce the level of traffic on existing unauthorized or unwanted user-created routes. A regulated trail network would be established, providing approximately 69 miles of new motorized trails and up to 55 miles of roads converted to trails for a total of 124 miles in the designated trail system. The trail systems would be linked with shared use roads, including 46 miles which would be designated as connecting routes for the trail network.

Refer to Chapter 2 for a detailed description of each alternative.

Legally open road and trail densities on National Forest system lands would increase in some watersheds as shown in Table 102. Open road densities would exceed Forest Plan guidelines of 3.0 mi/mi2 in General Forest allocation on 4 of the 31 subwatersheds in the project area (Elliot Creek, Lower Big Summit Prairie, Porter Creek and Lower Marks Creek; see Table 105). Mixed use by passenger cars, industrial traffic and OHVs would occur on 659 miles of operational maintenance level 2 roads. It is projected that motorized use would increase approximately 2 to 5 percent per year as the OHV trail system develops and becomes more widely known to users. Motorized use other than by OHVs would continue to occur on 140 miles of highway legal only (maintenance level 2 to 5) roads.

Table 105. Subwatersheds with Open Road and Trail Density at or above 3 miles/sq. mile in General Forest, Alternative 2 combined with closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Deep Creek	Jackson Creek	2.95 GF
Upper North Fork Crooked River	Elliot Creek	3.06 GF
	Lower Big Summit Prairie	3.31 GF
	Porter Creek	3.26 GF
Upper Ochoco Creek	Lower Marks Creek	3.15 GF

Distance banding analysis of existing open roads (based on operational maintenance level) shows there are a total of 50,177 acres of National Forest lands greater than 800 m (1/2 mile) from an existing road (elk security habitat). This represents approximately 17% of the project area. Of these,

47,969 acres occur in patches greater than 250 acres in size, or 96% of the total area more than ½ mile from an open road. Security areas in patches greater than 250 acres are distributed across all nine watersheds (and 28 of 31 subwatersheds) within the project area. The subwatersheds that did not contain elk security patches greater than 250 acres are Drift Canyon (in Lower Beaver Creek), Middle Rock Creek (in Rock Creek) and Lower Big Summit Prairie (in Upper North Fork Crooked River). In contrast, 115,127 acres (38 percent) of the project area are within 200 m (660 feet) of an existing open road. These high-disturbance zone acres are distributed across all nine watersheds (and 30 of 31 subwatersheds) in the project area. Within these areas elk would continue to experience high levels of disturbance from motorized use. It is assumed that lands within the 200 m (660 foot) zone are unavailable for consistent elk use as cover or foraging areas at least during daylight hours when motorized traffic is more likely to occur.

Rocky Mountain Elk Foundation (RMEF) has mapped elk habitat at a State by State scale. This habitat map may be too coarse of a scale to predict high use areas at the local level. However, the alternative was compared to the RMEF map, particularly areas identified as "crucial." Under this alternative, 31 miles of designated routes occur within RMEF's Crucial Winter Habitat including routes both on and off of existing open roads. This represents 18% of the total designated route miles under this alternative. Assuming a reduction in habitat availability of 200 meters on each side of the route (160 acres per mile), this would translate to a potential reduction of 4,960 acres, or approximately 9 percent of the 53,435 acres of winter crucial habitat mapped within the project area. However, the mapped habitat is coded as summer, winter crucial and winter habitat on the RMEF map, and includes elevations ranging from 3800 feet to over 6,200 feet including all available aspects and slopes (including north facing cliffs and talus slopes). It is also entirely within the Rager Travel Management area where motorized access is limited as described above. The proposed season of OHV use for the trail network is outside of the critical winter period both inside and outside of the Rager TMA under all action alternatives. Therefore, although these routes are within the polygon shown on the RMEF habitat map as crucial winter habitat, the proposed trails would not be open for use by OHVs during the critical winter period. The impact of these trails on elk habitat would be during the summer use period. The entire 301,580 acre project area is coded as summer habitat on the RMEF map regardless of slope, elevation, aspect or terrain features. Using the same assumptions as described above, the 170 miles of trail system (including 46 miles of open roads) could increase impacts to summer habitat on 9 percent of the RMEF mapped summer habitat within the project area.

Potential elk calving and deer fawning areas were mapped based on areas in proximity (within ¼ mile) to meadows, aspen and other riparian shrub habitats, where such areas occur on terrain with less than 25% slope. Under this alternative 84 miles of designated routes occur within potential elk calving habitat. Of those 30 miles are on open roads and 54 miles are not on open roads. There is potential for increased traffic on open roads included as part of the OHV trail system as well as on proposed routes that are not on open roads. Assuming a reduction in habitat availability of 200 meters on each side of the route (160 acres per mile), proposed system routes would impact habitat in potential elk calving areas on 13,440 acres or 12 percent of the 115,540 acres available within the project area. Areas with high concentrations of elk during the calving period based on telemetry data collected by Oregon Department of Fisheries and Wildlife between 1989 and 1994 were avoided when planning for trail placement (ODFW 1998).

This alternative would have a moderate impact to elk compared to Alternatives 3 and 4 because of the amount of road closures, medium trail extent and density. As shown in Table 104, Alternative 2 would result in a reduction in amount and distribution of undisturbed security habitat for deer and elk compared to Alternatives 1 and 3. Designation of new motorized routes would result in the decrease in lands greater than ½ mile from a route. This alternative would provide a total of 42,460 acres of security habitat in blocks greater than 250 acres in size. Security habitat less than 250 acres in size do

not provide the same security cover advantages present in larger security area blocks, but they would occur on USFS managed land on 1,914 acres.

Alternative 3

Distance banding analysis of existing open roads (based on operational maintenance level) shows there are a total of 50,177 acres of National Forest lands greater than 800 m (1/2 mile) from an existing road (elk security habitat). This represents approximately 17% of the project area. Of these, 47,969 acres occur in patches greater than 250 acres in size, or 96% of the total area more than ½ mile from an open road. Security areas in patches greater than 250 acres are distributed across all nine watersheds (and 28 of 31 subwatersheds) within the project area. The subwatersheds that did not contain elk security patches greater than 250 acres are Drift Canyon (in Lower Beaver Creek), Middle Rock Creek (in Rock Creek) and Lower Big Summit Prairie (in Upper North Fork Crooked River). In contrast, 115,127 acres (38 percent) of the project area are within 200 m (660 feet) of an existing open road. These high-disturbance zone acres are distributed across all nine watersheds (and 30 of 31 subwatersheds) in the project area. Within these areas elk would continue to experience high levels of disturbance from motorized use. It is assumed that lands within the 200 m (660 foot) zone are unavailable for consistent elk use as cover or foraging areas at least during daylight hours when motorized traffic is more likely to occur.

Table 106. Subwatersheds with Open Road and Trail Density at or above 3 mi/sq. mi in General Forest, Alternative 3 combined with closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Upper North Fork Crooked River	Lower Big Summit Prairie	3.01 GF
Upper Ochoco Creek	Lower Marks Creek	2.40 GF

Distance banding analysis of the combination of existing open roads (based on operational maintenance level) and proposed trails indicates that there would be a total of 45,147 acres of National Forest lands greater than 800 m (1/2 mile) from an existing road (elk security habitat). This represents approximately 15% of the project area (a 2% reduction compared to existing condition). Of these, 42,514 acres occur in patches greater than 250 acres in size, or 94% of the total security area more than ½ mile from an open road. Security areas in patches greater than 250 acres are distributed across all nine watersheds (and 27 of 31 subwatersheds) within the project area. The subwatersheds that did not contain elk security in patches greater than 250 acres are Drift Canyon (in Lower Beaver Creek), Middle Rock Creek (in Rock Creek), Lower Big Summit Prairie and Porter Creek (in Upper North Fork Crooked River). In contrast, 123,032 acres (41 percent) of the project area would be within 200 m (660 feet) of an open road or motorized trail. These high-disturbance zone acres are distributed across all nine watersheds (and 30 of 31 subwatersheds) in the project area. Within these areas elk would continue to experience high levels of disturbance from motorized use. It is assumed that lands within the 200 m (660 foot) zone are unavailable for consistent elk use as cover or foraging areas during daylight hours when motorized traffic is more likely to occur.

Rocky Mountain Elk Foundation (RMEF) has mapped elk habitat at a State by State scale. This habitat map may be too coarse of a scale to predict high use areas at the local level. However, the alternative was compared to the RMEF map, particularly areas identified as “crucial.” Under this alternative, 15 miles of designated routes occur within RMEF’s Crucial Winter Habitat including routes both on and off of existing open roads. This represents 15% of the total designated route miles under this alternative. Assuming a reduction in habitat availability of 200 meters on each side of the route (160 acres per mile), this would translate to a potential reduction of 2,400 acres, or approximately 4 percent of the 53,435 acres of winter crucial habitat mapped within the project area. However, this mapped habitat is coded as summer, winter crucial and winter habitat on the RMEF map, and includes elevations ranging from 3800 feet to over 6,200 feet including all available aspects

and slopes (including north facing cliffs and talus slopes). It is also entirely within the Rager Travel Management area where motorized access is limited as described above. The proposed season of OHV use for the trail network is outside of the critical winter period both inside and outside of the Rager TMA under all action alternatives. Therefore, although these routes are within the polygon shown on the RMEF habitat map as crucial winter habitat, the proposed trails would not be open for use by OHVs during the critical winter period. The impact of these trails on elk habitat would be during the summer use period. The entire 301,580 acre project area is coded as summer habitat on the RMEF map regardless of slope, elevation, aspect or terrain features. Using the same assumptions as described above, the 101 miles of trail system (including 13 miles of open roads) could increase impacts to summer habitat on 5 percent of the RMEF mapped summer habitat within the project area.

Potential elk calving and deer fawning areas were mapped based on areas in proximity (within ¼ mile) to meadows, aspen and other riparian shrub habitats, where such areas occur on terrain with less than 25% slope. Under this alternative 54 miles of designated routes occur within potential elk calving habitat. Of those 9 miles are on open roads and 45 miles are not on open roads. There is potential for increased traffic on open roads included as part of the OHV trail system as well as on proposed routes that are not on open roads. Assuming a reduction in effective habitat of 200 meters on each side of the route (160 acres per mile), proposed system routes would impact habitat in potential elk calving areas by 8,640 acres or 7 percent of the 115,540 acres available within the project area. Areas with high concentrations of elk during the calving period based on telemetry data collected by Oregon Department of Fisheries and Wildlife between 1989 and 1994 were avoided when planning for trail placement (ODFW 1998).

This alternative would have an impact to elk that falls between that of Alternatives 1 and 2 because of the amount of road closures, compact trail extent and density. Designation of new motorized routes would result in a decrease in lands greater than ½ mile from a route. As shown in **Table 104**, Alternative 3 would result in a reduction in amount and distribution of undisturbed security habitat for deer and elk compared to Alternative 1. This alternative would provide a total of 42,514 acres of security habitat in blocks greater than 250 acres in size. Security habitat less than 250 acres in size do not provide the same security cover advantages present in larger security area blocks, but they would occur on USFS managed land on 2,634 acres.

Alternative 4

Disturbance and Off-road Motor Vehicle Access: Alternative 4 would alter the current pattern of disturbance from unregulated cross-country motor vehicle access, user-created trails, and use of closed roads because of the rehabilitation and concealment proposed at 106 sites on user created routes, 8 sites on decommissioned roads and 163 sites on closed roads. This treatment would reinforce existing closures. However, this alternative would also increase the length of legally open motorized routes by 81 miles. This alternative would provide a system of designated routes intended to provide a legal, planned, designed, engineered and maintained series of routes for motorized use. This should reduce the level of traffic on existing unauthorized or unwanted user-created routes. A regulated trail network providing approximately 81 miles of new motorized trails and up to 76 miles of roads converted to trails for a total of 158 miles in the designated trail system would be established. The trail systems would be linked with shared use roads, including 53 miles which would be designated as connecting routes for the trail network. Refer to Chapter 2 for a detailed description of each alternative.

Open road and trail densities on National Forest system lands would increase in some watersheds as shown in Table 102. Open road densities would exceed Forest Plan guidelines of 3.0 mi/mi2 in General Forest allocation on 6 of the 31 subwatersheds in the project area (Jackson Creek, Elliot Creek, Lower Big Summit Prairie, Porter Creek, Lower Marks Creek and Upper Marks Creek). Road density in one subwatershed would be brought to the 3.0 mi/mi2 level (Howard Creek; see Table

107). Mixed use by passenger cars, industrial traffic and OHVs would occur on 659 miles of operational maintenance level 2 roads. It is projected that motorized use would increase approximately 2 to 5 percent per year as the OHV trail system develops and becomes more widely known to users. Motorized use other than by OHVs would continue to occur on 140 miles of highway legal only (maintenance level 2 to 5) roads.

This alternative would likely impact elk to a greater degree than Alternatives 1, 2 or 3. While more road closure reinforcements are proposed than the other action alternatives, the design of the trail system impacts more acreage and results in less undisturbed habitat greater than ½ mile from an open road. There would be fewer acres of security habitat compared to the other action alternatives. One benefit however, is a designated OHV system more capable of reducing unauthorized use in other areas due to its more extensive and varied recreational opportunities. This alternative may also be more likely to be of sufficient size to handle expected increases in future use, and thus may have a higher probability of preventing future proliferation of unauthorized or user-created trails.

Table 107. Subwatersheds with Open Road and Trail Density at or above 3 miles/sq. mile in General Forest, Alternative 4 combined with road closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Deep Creek	Jackson Creek	3.0 GF
Upper North Fork Crooked River	Elliot Creek	3.01 GF
	Howard Creek	3.0 GF
	Lower Big Summit Prairie	3.31 GF
	Porter Creek	3.27 GF
Upper Ochoco Creek	Lower Marks Creek	3.22 GF
	Upper Marks Creek	3.27 GF

Distance banding analysis of the combination of existing open roads (based on operational maintenance level) and proposed trails indicates that there would be a total of 43,085 acres of National Forest lands greater than 800 m (1/2 mile) from an existing road (elk security habitat). This represents approximately 14% of the project area (a 3% reduction compared to existing condition). Of these, 41,132 acres occur in patches greater than 250 acres in size, or 95% of the total security area more than ½ mile from an open road. Security areas in patches greater than 250 acres are distributed across all nine watersheds (and 24 of 31 subwatersheds) within the project area. The subwatersheds that did not contain elk security in patches greater than 250 acres are Drift Canyon (in Lower Beaver Creek), Middle Rock Creek (in Rock Creek), Lower Big Summit Prairie and Porter Creek (in Upper North Fork Crooked River), Jackson Creek and Little Summit Prairie Creek (in Deep Creek), Lower Marks Creek (in Upper Ochoco Creek). In contrast, 129,385 acres (43 percent) of the project area would be within 200 m (660 feet) of an open road or motorized trail. These high-disturbance zone acres are distributed across all nine watersheds (and 30 of 31 subwatersheds) in the project area. Within these areas elk would continue to experience high levels of disturbance from motorized use. It is assumed that lands within the 200 m (660 foot) zone are unavailable for consistent elk use as cover or foraging areas during daylight hours when motorized traffic is more likely to occur.

Rocky Mountain Elk Foundation (RMEF) has mapped elk habitat at a State by State scale. This habitat map may be too coarse of a scale to predict high use areas at the local level. However, the alternative was compared to the RMEF map, particularly areas identified as “crucial.” Under this alternative, 38 miles of designated routes occur within RMEF’s Crucial Winter Habitat including routes both on and off of existing open roads. This represents 18% of the total designated route miles under this alternative. Assuming a reduction in habitat availability of 200 meters on each side of the route (160 acres per mile), this would translate to a potential reduction of 6,080 acres, or approximately 11 percent of the 53,435 acres of winter crucial habitat mapped within the project area. However, this mapped habitat is coded as summer, winter crucial and winter habitat on the RMEF

map, and includes elevations ranging from 3800 feet to over 6,200 feet including all available aspects and slopes (including north facing cliffs and talus slopes). It is also entirely within the Rager Travel Management area where motorized access is limited as described above. The proposed season of OHV use for the trail network is outside of the critical winter period both inside and outside of the Rager TMA under all action alternatives. Therefore, although these routes are within the polygon shown on the RMEF habitat map as crucial winter habitat, the proposed trails would not be open for use by OHVs during the critical winter period. The impact of these trails on elk habitat would be during the summer use period. The entire 301,580 acre project area is coded as summer habitat on the RMEF map regardless of slope, elevation, aspect or terrain features. Using the same assumptions as described above, the 212 miles of trail system (including 53 miles of open roads) could increase impacts to summer habitat on 11 percent of the RMEF mapped summer habitat within the project area.

Potential elk calving and deer fawning areas were mapped based on areas in proximity (within ¼ mile) to meadows, aspen and other riparian shrub habitats, where such areas occur on terrain with less than 25% slope. Under this alternative 102 miles of designated routes occur within potential elk calving habitat. Of those 31 miles are on open roads and 70 miles are not on open roads. There is potential for increased traffic on open roads included as part of the OHV trail system as well as on proposed routes that are not on open roads. Assuming a reduction in effective habitat of 200 meters on each side of the route (160 acres per mile), proposed system routes would impact habitat in potential elk calving areas by 16,320 acres or 14 percent of the 115,540 acres available within the project area. Areas with high concentrations of elk during the calving period based on telemetry data collected by Oregon Department of Fisheries and Wildlife between 1989 and 1994 were avoided when planning for trail placement (ODFW 1998).

This alternative would have the highest impact to elk compared to Alternatives 1, 2 and 3 because of the extensive trail system it proposes. The designation of new motorized routes would result in a decrease in lands greater than ½ mile from a motorized route. As shown in Table 104, Alternative 4 would result in a reduction in amount and distribution of undisturbed security habitat for elk compared to Alternatives 1, 2 and 3. This alternative would provide a total of 41,132 acres of security habitat in blocks greater than 250 acres in size. Security habitat less than 250 acres in size do not provide the same security cover advantages present in larger security area blocks, but they would occur on USFS managed lands on 1,953 acres.

Effects Common to All Action Alternatives

***Off-road Motor Vehicle Access*:** Unregulated cross-country motorized travel including user created trails across the project area is expected to be reduced as a result of provision of a designated system of trails and rehabilitation and concealment work at intersections of the proposed trail system with user created, decommissioned and closed roads. The extent of this relief from unauthorized travel likely depends to some extent on the amount and diversity of opportunities provided. In other words, a small-sized trail system may not be as effective in providing alternative riding areas compared to a more extensive system. On the other hand, some unauthorized use may continue in some areas of the Forest regardless of the provision of a designated system. In addition to the provision of alternate riding areas, the action alternatives are expected to result in less motorized disturbance to big game animals in specific locations where existing road closures are reinforced and where unwanted user-created trails are rehabilitated. The increase in law enforcement presence that comes with a designated trail system, may reduce violation of unauthorized routes in proximity to the trail system, but is not likely to affect the level of compliance elsewhere in the project area.

Cumulative Effects

Under the Deschutes and Ochoco Travel Management Plan, motorized use is restricted to designated routes, and OHV use is allowed only on designated OHV trail systems and those Maintenance Level

2 roads open for mixed use and selected rock pits designated as open for cross country travel as shown on the MVUM maps. Law enforcement actions will likely encourage compliance through education in the first couple years although it is unknown what level of non-compliance may occur initially. In the long-term, there will be reduced disturbance due to anticipated restriction of motorized use cross-country and on closed roads.

Projects that may have effects that would combine with proposed alternative effects are displayed in Table 6.

Alternative 1

The discussion of cumulative effects for Alternative 1 is the result of effects from past and present actions that have contributed to the current condition of motorized use and hiding cover in the project area, and how they combine with effects of the No Action alternative. Land management actions include commercial timber harvest entries, small tree thinning, prescribed fire, wildfires, wildlife habitat enhancements such as riparian restoration, water developments, and commercial and personal use firewood removal. Fuel and vegetation management actions have left some areas with improved forage conditions and reduced cover. Timber management has left behind a footprint of road systems built to extract wood products. Implementation of Alternative 1 would leave existing routes that are open on the ground in their current condition and enforcement of the new Travel Management Plan would be based largely on user compliance with the Motor Vehicle Use Map (MVUM). Legal use by OHVs would be confined to open mixed-use roads and rock pits designated as open for cross country travel within the project area.

All Action Alternatives

The Canyon and Spears Vegetation Management EISs have recently been implemented, while Howard Elliot Johnson and Jackson are currently in the implementation phase. These projects include management in areas that overlap the Ochoco Summit OHV project area. Approximately 70,000 acres of vegetation and fuels management have been proposed for treatments including commercial thinning, small diameter thinning and prescribed burning. The primary effect of these vegetation management projects on big game is related to roads used for access to treatment areas, roads closed as part of these projects, and changes in cover as a result of proposed vegetative treatments. Vegetative treatments may require the construction of temporary roads to access units and extract wood products. Temporary roads are typically in place for several years and then closed at the completion of all harvest associated activities. Currently closed roads may also have to be used for haul routes during timber harvest operations and are generally returned to closed status following timber sale operations. Collectively, these actions would have a temporary short-term impact on road densities. In addition, the vegetation treatments would likely result in a reduction in the amount of big game hiding cover and potentially increased human access due to removal of small trees and woody debris. The effects of vegetative treatments on hiding and thermal cover are disclosed in the NEPA documents for those projects and this OHV trail project would result in minimal changes to canopy closure, and therefore acres meeting the criteria for these cover classes. However, this project may affect the availability of these cover areas due to the impact of human disturbance within cover. There is a potential cumulative impact of disturbance to big game animals that may be utilizing hiding cover adjacent to active logging operations, from additional disturbance related to use of OHV trails in those areas. Over the short term, increased motorized route densities as compared to the existing condition may result in an increase in legal and illegal harvest of deer and elk because of more vehicular access. In addition, effects of human activity and reduction of cover associated with implementation of the vegetation and fuels management projects may combine with effects from proposed establishment of new motorized routes in limiting the amount or effectiveness of security habitat in the short term. In the long-term however, road closures included in some of these vegetation and fuels management projects would reduce the network of open motorized routes within

those project areas, potentially reducing the negative impacts from construction of the proposed trails within the project areas where road closures are implemented.

Deschutes and Ochoco Travel Management Plan now has a signed decision and implementation of the plan will occur over the next few years. The Travel Management Plan has done the following:

- Designate specific conditions, if any, under which existing routes or areas will continue to provide for sustainable motorized use considering a variety of societal and resource factors
- Identify existing roads, trails, and areas that will continue to support sustainable motorized use
- Identify potential motorized routes and/or areas that could be added to the forests and grasslands transportation system for motorized use.

After implementation of the forest-level Travel Management Plan, in the long-term, there would be reduced disturbance due to anticipated restriction of motorized use cross-country and on closed roads.

All action alternatives would develop a designated OHV trail system to replace the unregulated use that occurred prior to the Travel Management project Record of Decision. Under implementation of the 2005 Travel Management Rule and the forest-level Travel Management EIS, on-the-ground motorized route densities would decline from the current levels as a result of closing user created trails not included in the designated OHV system, enforcement of existing road closures and prohibiting cross-country travel. Roads Analysis has been conducted for all subwatersheds that overlap the proposed alternatives. The Roads Analysis process helps to prioritize roads for closure, reinforcement of existing closures or decommissioning. Implementation of the forest-level Travel Management Plan, in combination with closures and restoration proposed under this project would benefit mule deer and elk in the project area, because portions of this project area are heavily roaded with many closed or decommissioned roads that are still receiving motorized use, with relatively small percentages of elk security habitat. Refer to Table 102 and Table 104.

Private land ownership in the project area includes rural ranch and timberland. These lands do provide quality big game habitat because of restricted human access, and slope position which provides productive soils and water availability. While the industrial timberland acreage has been managed for timber harvest, big game hiding cover and secure habitat acreage is available. Consequently, the potential for development of an OHV system on National Forest lands to displace elk to private land has been considered in this analysis. Table 108 shows the amount of secure cover available to deer and elk on USFS managed land within 2 miles of private land. This measure was used as an estimate of capability to retain elk on federal land and not cause displacement to private land. This analysis assumes that elk would be more likely to find secure cover and not be displaced to private land where forested stands exceeding 40% crown closure occur at a distance of more than ½ mile from a motorized route and where this occurs within 2 miles of private land. As can be seen in Table 108 the difference between alternatives detected by this measure is very small (up to a 4 percent reduction between Alternatives 1 and 4). This is because of the relatively large network of existing open motorized routes and the abundance of open vegetation such as meadows and scabland that affect the distribution of forested cover within two miles of private land. Alternative 2 shows slightly more (up to 2% more) forested cover in proximity to private land compared to the other action alternatives due to the lack of interconnected loops on the west end in that alternative. These west end loops in Alternatives 3 and 4 are in a forested setting within 2 miles of private land, and thus they affect the amount of undisturbed forested cover in proximity to private land.

Table 108. Comparison of Alternatives for Hiding and Thermal Cover (more than ½ mile from open motorized route and within 2 miles of private land).

Cover Type	Alt 1	Alt 2	Alt 3	Alt 4
Hiding cover (40 to 70% cc)	11,847	11,558	11,465	11,285
Thermal cover (70+ % cc)	9,197	9,089	8,978	8,915
Total cover (40 - 100% cc)	21,044	20,647	20,443	20,200

Table 109 displays a summary of the predicted effects of the proposed alternatives on big game key indicators. No trails or areas are proposed in Winter Range or General Forest Winter Range, so there are not differences in these areas between the alternatives.

Table 109. Summary Comparison of Key Indicators for Big Game by Alternative.

Key Indicators	1	2	3	4
National Forest road and motorized trail density in mi/mi2 averaged for 31 subwatersheds in GF, GFWR and WR combined	1.83	2.09	2.01	2.17
National Forest road and motorized trail density in mi/mi2 in General Forest averaged across 31 subwatersheds	1.91	2.23	2.13	2.31
National Forest road and motorized trail density in mi/mi2 in Winter Range + GFWR averaged across 31 subwatersheds (without credit for gate closure mitigations)	1.41	1.41	1.41	1.41
National Forest road and motorized trail density in mi/mi2 in Winter Range + GFWR averaged across 31 subwatersheds (with credit for seasonal closure, MVUM)	0.9	0.9	0.9	0.9
Number of 6th-field subwatersheds with 3.0 miles or more of roads and trails open for motorized use in General Forest	2	4	2	6
Acres of National Forest land > than 1 mile from an open motorized route in the project area and percent of project area	10,779 (3.6%)	10,411 (3.5%)	10,411 (3.5%)	10,411 (3.5%)
Acres of National Forest land > than 1/2 mile from an open motorized route and percent of project area	49,187 (16.3%)	44,345 (14.7%)	45,118 (15.0%)	43,059 (14.6%)
Acres of National Forest land < than 660 feet (200 m) from an open motorized route and percent of project area	115,127 (38.2%)	125,745 (41.7%)	123,036 (40.8%)	129,390 (42.9%)
Acres elk security habitat (>1/2 mile from open motorized route) in blocks at least 250 acres in size and percent of project area	47,969 (15.9%)	42,460 (14.1%)	42,514 (14.1%)	41,132 (13.6%)
Acres elk security habitat (>1/2 mile from open motorized route) in patches less than 250 acres in size and percent of project area	2,208 (0.7%)	1,914 (0.6%)	2,634 (0.9%)	1,953 (0.6%)
Total Elk Security areas regardless of patch size and percent of project area	50,177 (16.6%)	44,374 (14.7)	45,148 (15.0%)	43,085 (14.3%)
Miles of trail in RMEF Crucial Winter Range (MAPS)	0	30.8	15.5	37.7
Miles of trail in calving/fawning habitat not on open roads	0	54.1	44.5	70.4
Acres of secure cover within 2 miles of private land	21,044	20,647	20,443	20,200

Viability Assessment for Rocky Mountain Elk and Mule Deer

Background: Mule deer and Rocky Mountain elk were chosen as terrestrial management indicator species (MIS) for populations of big game and their habitat (LRMP 4-245). A great deal of research and scientific literature on the Rocky Mountain elk was generated from studies conducted in the Blue Mountains. Research conducted at the Starkey Experimental Forest beginning in the 1980's on the Rocky Mountain elk has defined much of the science and current understanding of elk in the Blue Mountains of Oregon.

Existing Condition: Rocky Mountain elk and mule deer occur in populations across the State of Oregon, and across Ochoco National Forest. Deer and elk may utilize the watershed throughout the year during below normal snow years, but generally use the high elevation areas primarily as summer range, wintering on the lower elevation USFS managed lands and on private lands. Within the Forest boundary, the Ochoco Summit project area contains 14,442 acres within the General Forest (GF), 11,083 acres within General Forest Winter Range (GFWR) and 14,442 acres within the Winter Range (WR) LRMP allocations.

The project area lies within one Oregon Department of Fish and Wildlife (ODFW) management zone, the Ochoco Wildlife Management Unit (WMU). The Ochoco WMU contains 47% private lands and 53% public lands. The estimated 2011 population for elk and deer was 3900 elk and 15,400 deer. The management objective (MO) is the number of elk and deer that ODFW manages for to prevent depletion of big game animals and to provide optimum recreational and aesthetic benefits for the public (quality hunting and wildlife viewing opportunities in the present and in the future). In the Ochoco WMU the MOs are 4,600 elk and 20,500 deer. Mule deer populations have been generally declining across the Western States. This decline is evident in the Ochoco WMU as well. The mule deer MO was met in 1988, but has not been met since. Population estimates within the WMU have decreased from 18,500 in the late 1990s to 15,400 in 2011, but was estimated at 16,000 in 2010. The elk population steadily increased from the 1970s through the early 2000s, exceeded the 4,300 elk target starting in 1999, and has been holding fairly steady in recent years (between 3,900 and 4,700 between 2006 and 2012) with a slight downward trend.

Effects Common to All Alternatives: The potential effects are described in detail above. This project would increase motorized route density and would reduce the effectiveness of security cover within the project area. For these reasons the project may result in localized redistribution of big game, particularly of elk, from less secure locations into more secure locations (at least in the short term). The project does not increase motorized route density in winter range, and does propose reinforcement of closures on unwanted trails and closed roads to ensure consistency with the Ochoco National Forest Plan standards and guidelines for deer and elk.

Conclusion: Both species have a demonstrated harvestable surplus across the State of Oregon and within the Ochoco WMU. Oregon Department of Fish and Wildlife monitors these populations annually and sets harvest levels based on the results of annual monitoring. Given the widespread distribution of these species and their habitat across the Forest and WMU, and the potential effects described above (this project would increase motorized road and trail density, and reduce security habitat) the project's overall direct, indirect and cumulative effects may result in a small negative trend particularly in proximity to routes that are more than ½ mile from existing open roads. However this impact becomes unmeasurable beyond the one mile distance band from any proposed trails. Given the existing motorized route density, the relatively small change in motorized route density and the presence of demonstrated harvestable surplus populations of elk and mule deer, the continued viability of these species is expected to occur on Ochoco National Forest.

Bald Eagle

The bald eagle was selected as a management indicator species because it was a Threatened species. The bald eagle was previously discussed in the Threatened Endangered and Sensitive Species section. Please refer to the TES section for details on the northern bald eagle and the effects determination.

Golden Eagle

The golden eagle was chosen as a terrestrial management indicator species (MIS) for cliff, talus or cave habitat (LRMP 4-245).

Gilligan et al. (1994) describes the golden eagle as an uncommon to fairly common summer resident in open country east of the Cascade Mountains and a very uncommon summer resident high in the Cascades. Marshall et al. (2003) lists them as common to uncommon year round resident of all counties east of the Cascade Range, with the highest nesting densities in Lake, Harney and Malheur Counties. The golden eagle nests in open large (greater than 30 inches in diameter) live ponderosa pine or cliff ledges that support its 3-10 foot tall nest (Marshall et al. 2003). The Oregon Natural Heritage Information Center ranks golden eagles as S4, Apparently Secure (NatureServe 2009). NatureServe (2009) listed the following as the major threats golden eagles experience: (1) powerline electrocution because wings can span phase-to-phase or phase-to-ground wires (Biosystems Analysis 1989), (2) poison intended for coyotes, (3) occasional shootings, and (4) habitat loss to agriculture and suburban land uses.

Existing Condition

Wildlife observation records list 48 golden eagle sightings across the project area, including 2 nests. The majority of the district records are from wintering birds (October through February). However, a number of sightings on the Forest occurred between March and August and these may be associated with nesting territories that have not been discovered. The State database (ODFW, 2007) lists 1 site record within the project area, the area was checked in 2002, 2005, 2006, 2007 and 2013, no golden eagle nests were located. Two additional nest locations in the district records have been monitored, one was checked in 2006, 2007, 2011 and 2012 and no nest was confirmed. The other nest has been confirmed and was found to successfully fledge young in 2004 and 2005. This nest was checked in 2012 and no sign of occupancy was found. Two nesting territories are being monitored just outside of the project area; they are each four miles or more from any proposed trail under any action alternative.

Viability Assessment for Golden Eagle:

Background: Golden eagles inhabit shrub-steppe, grassland, juniper, and open ponderosa pine, and mixed conifer/deciduous habitats. They forage in a variety of habitat types and successional stages, preferring areas with an open shrub component that provides food and cover for prey. Suitable nesting and foraging habitat can be found in mountains, canyons, and rolling hills. Of 506 occupied nests in Oregon in 1982, 35% were in mature trees and 65% on ledges along rims and cliffs (Isaacs and Opp 1991). Nest trees are typically large live ponderosa pine with sturdy open branching and a trunk dbh >30 in. Golden Eagles have large breeding territories ranging 10-40 sq.mi. Nest territories may contain several alternate nests. They forage on a variety of prey species including: jackrabbit, cottontail, California and Belding's ground squirrels, marmots, woodrats, small mammals, fresh carrion, and a variety of birds species (Marshall 2003). This species has a holarctic distribution. In the North America this species breeds from Alaska and Canada south to Central Mexico. In the U. S. it occurs primarily west of the east slope of the Rocky Mountains. In Oregon, golden eagles are common to uncommon year round residents in all counties east of the Cascade Range (Marshall, 2003).

The population trend in Oregon is unknown. In 2011 a state-wide effort was initiated to determine the status of historic nesting territories across the State of Oregon. All known historic golden eagle territories within, or in proximity to, the project area are being surveyed under the state-wide golden eagle inventory and survey program (Isaacs, 2014). Golden Eagles counted during the mid-winter Bald Eagle survey in Oregon for 1992-2001 have varied from 79 to 128 and averaged 97 (Isaacs 2001). The populations of resident golden eagles in the northern part of the Great Basin, particularly in Idaho and Northern Utah, have shown indications of a decline (Marshall, 2003). The Natural Heritage program rank golden eagles as S4, Apparently Secure (NatureServe 2009). NatureServe (2009) listed the following as the major threats golden eagles experience: (1) powerline electrocution because wings can span phase-to-phase or phase-to-ground wires (Biosystems Analysis 1989), (2) poison intended for coyotes, (3) occasional shootings, and (4) habitat loss to agriculture and suburban land uses.

Existing Condition: On the Ochoco National Forest, including Crooked River National Grassland, there are records for 147 historic nesting sites. The majority of the nests are associated with extensive rimrock habitat present in Jefferson County, as noted below. Of 147 historic sites forest-wide, only 12 occur in Crook County. Sightings within the project area are described above.

Of the occupied nests studied by Isaacs and Opp in 1982, 65% were on rock ledges. A forest-level analysis was conducted in 2011 using updated GIS data on rock features. The output from this analysis reflects the majority of rock features with potential nesting habitat. Rock features identified in the GIS data are those that are of sufficient size to be detected from aerial photographs. The rock categories included in estimating potential nesting habitat for this species included the following: rimrock, rock, rock/limestone, rocky knob, talus, talus/rocky knob, talus/rimrock. The GIS data layer is estimated to be 80% accurate in detecting rock features with cliff faces that have any potential as nesting sites. Some small cliffs may have been overlooked in the aerial photo interpretation, and some rock features identified as potentially having cliff habitat, may not be suitable for nesting sites. However, this data is expected to be representative of the majority of suitable nesting substrate and of sufficient accuracy for a comparison of potential rock habitat within the project area and across the landscape at a forest-wide scale. From this analysis it was estimated that at the forest level there are approximately 18,838 acres of rock habitat with potential cliff nesting habitat (2,149 acres within the project area). There are a total of 34 watersheds (5th field HUC) on Ochoco National Forest. Potential cliff nesting habitat is distributed within all 34 of these watersheds, though some watersheds (Crooked River Grassland, Headwaters Deschutes River, Lake Billy Chinook, Lower Metolius River and Willow Creek) have substantially more cliff habitat than other watersheds across the Forest.

Golden eagle nests that are not on cliffs are typically on large ponderosa pine trees or snags in open stands, or on scattered individual large pine trees in otherwise open habitat such as rocky canyons, shrub/steppe or grassland settings. These individual scattered pines may occur in a variety of plant associations including juniper woodland, juniper steppe or xeric ponderosa pine.

Effects Common to All Alternatives: All action alternatives exclude roads in proximity to known nests and roosts from the designated OHV system of routes. None of the proposed trail system would occur within ½ mile of any known eagle nest.

Conclusion: This project area is likely to have a relatively minor influence on potential nesting and foraging habitat for golden eagles due to a general lack of extensive low to mid elevation cliff features and limited habitat for primary prey species within proximity to any proposed routes or facilities. For these reasons implementation of any alternative proposed in the Ochoco Summit Project will not contribute to a negative trend in viability on the Ochoco National Forest for the golden eagle.

Prairie Falcon

The prairie falcon was chosen as a terrestrial management indicator species (MIS) for cliff, talus or cave habitat (LRMP 4-245). The prairie falcon is also discussed in the section on Raptors under Other Species. Please refer to that section for further details on this species.

Prairie falcons breed throughout the open country east of the Cascades wherever cliffs and outcrops provide opportunities for nesting (Marshall 2003). Prairie Falcons are most common in rimrock country, where they nest, but may travel great distances in search of prey (Marshall 2003, Birds of Oregon). A combination of rimrock or other outcrops and adjacent open country provides ideal breeding habitat. They winter over much of the breeding range south to Mexico (Marshall 2003).

Existing Condition

District wildlife sighting records list 2 observations within the project area. Private forest and rangeland in the project area are likely to provide suitable habitat for prairie falcons, where cliff or rimrock faces provide nest sites situated within or near open shrub and grassland habitat. Multiple records for this species are associated with privately owned meadowlands within 1 mile of the Forest boundary, more than 2 miles from the project area boundary.

Viability Assessment for Prairie Falcon

This species breeds from c. British Columbia east to N. Dakota, south to Baja California and Texas. It winters over much of its breeding range south to Mexico (Marshall 2003). They breed throughout the open country east of the Cascades wherever cliffs and outcrops provide opportunities for nesting (Marshall 2003). Prairie Falcons are most common in rimrock country, where they nest, but may travel great distances in search of prey (Marshall 2003). A combination of rimrock or other outcrops and adjacent open country provides ideal breeding habitat. Cliffs need not be large. Denton (1979) found 59% of nest on cliffs less than 100 ft, some as low as 15 ft. The principal requirement is that the nest site be sheltered from above (Bent 1938, Webster 1976). This appears to reflect a need for shade and possibly protection from predators (Marshall 2003).

Grasslands are the preferred habitat although they also occur in less-productive areas dominated by sagebrush. The principal requirement for foraging appears to be low and sparse vegetation that accommodates their foraging style. Prey most often consists of small mammals, usually ground squirrels (Denton 1976, Haak 1982b).

This species occurs in low density and exhibits wide-ranging habits (Marshall, 2003). Densities of 3.9-8.0 breeding pairs/100square miles were found in Wasco and Wheeler counties (Janes 1975). Lardy (1980) found higher average densities in Malheur Co. (9.8-14.0/100sq.mi.). Populations, including those in Oregon, appear to be stable (White 1994).

Existing Condition: District wildlife sighting records list 2 observations within the project area. Private forest and rangeland in the project area are likely to provide suitable habitat for prairie falcons, where cliff or rimrock faces provide nest sites situated within or near open shrub and grassland habitat. Multiple records for this species are associated with privately owned meadowlands within 1 mile of the Forest boundary, more than 2 miles from the project area boundary. Prairie falcon nests have been confirmed at other locations on Ochoco National Forest at low elevation, near the Forest boundary.

A forest-level analysis was conducted in 2011 using updated GIS data on rock features. The output from this analysis reflects the majority of rock features with potential nesting habitat. Rock features identified in the GIS data are those that are of sufficient size to be detected from aerial photographs. The rock categories included in estimating potential nesting habitat for this species included the following: rimrock, rock, rock/limestone, rocky knob, talus, talus/rocky knob, talus/rimrock. The GIS data layer is estimated to be 80% accurate in detecting rock features with cliff faces that have any

potential as nesting sites. Some small cliffs may have been overlooked in the aerial photo interpretation, and some rock features identified as potentially having cliff habitat, may not be suitable for nesting sites. However, this data is expected to be representative of the majority of suitable nesting substrate and of sufficient accuracy for a comparison of potential rock habitat within the project area and across the landscape at a forest-wide scale. From this analysis it was estimated that at the forest level there are approximately 18,838 acres of potential cliff nesting habitat (2,149 acres within the project area). There are a total of 34 watersheds (5th field HUC) on Ochoco National Forest. Potential cliff nesting habitat for is distributed within all 34 of these watersheds, though some watersheds (Crooked River Grassland, Headwaters Deschutes River, Lake Billy Chinook, Lower Metolius River and Willow Creek) have substantially more cliff habitat than other watersheds across the Forest. Rock habitat with potential for cliff nesting species occurs within nine watersheds in the project area, with the majority occurring in Upper Ochoco Creek (578 acres), Rock Creek (388 acres) and Deep Creek (329 acres). Proposed alternatives increase the amount of area within ½ mile of a motorized route within these watersheds as follows: Upper Ochoco Creek Alt. 2 by 18%, Alt. 3 by 20%, Alt. 4 by 21%; Rock Creek 12% all action alternatives; Deep Creek Alt.2 by 38%, Alt. 3 by 36%, Alt. 4 by 39%. However, rock habitat is not uniformly distributed across each watershed, so increases in acreage in proximity to motorized routes at a watershed scale does not necessarily reflect a direct increase in potential for disturbance.

Effects Common to All Alternatives: No alternative would modify potential cliff nesting habitat. There is potential for effects from human disturbance as described above.

Conclusion: This project area is likely to have a relatively minor influence on potential nesting and foraging habitat for prairie falcons due to a general lack of extensive low to mid elevations sheer cliff features within proximity to any proposed routes or facilities. For these reasons implementation of any alternative proposed in the Ochoco Summit Project will not contribute to a negative trend in viability on the Ochoco National Forest for the prairie falcon.

Other Wildlife Species (LRMP)

During the preparation of the Ochoco National Forest Land and Resource Management Plan (USDA 1989), a group of wildlife species were identified as Other Species. These species were selected because their well-being was of interest and therefore specific standards were provided. The species listed in Table 110 were listed in the Ochoco National Forest LRMP.

Table 110. Ochoco National Forest Other Species (LRMP).

Ochoco National Forest Other Species (LRMP)	Habitat	Presence Within The Analysis Area
Antelope	Open country, sagebrush flats	Yes
Raptor Habitat (eagles, hawks, owls, falcons, osprey)	Nest sites/nesting habitat	Yes
Species that use dead and down logs	Snags and logs	Yes
Species that use plant communities	Diversity of PAGs and SS stages	Yes
Species that use springs, bogs and other unique habitat	Seeps, springs, bogs, wetlands,	Yes

Antelope

The LRMP specifies that habitat for antelope (pronghorn) is to be managed in accordance with ODFW Management Objectives. For the Ochoco WMU the population trend measured as an index using the number of animals per mile, and it was estimated at 3.1 in 2009 and 2.6 in 2010. This trend index was not surveyed in 2011 or 2012. The kid ratio was estimated at 34 kids per 100 does in 2008, at 43 in 2009, at 36 in 2010 and at 34 in 2011. The buck ratio was estimated at 25 bucks per 100 does in 2008, at 35 in 2009, at 36 in 2010 and at 34 in 2011. Percent rifle success was reported at 67% in

2009, at 73% in 2010 and at 76% in 2011. This project does not substantially alter vegetation that would provide primary pronghorn (antelope) habitat. However, as with other hunted big game species, pronghorn are likely to respond to traffic whether on an open road or a trail, and to human presence, whether motorized or not. This species has evolved with running swiftly as a primary means of escaping from predators. Thus, disturbances which are perceived as threatening in the eyes of a pronghorn may generate a fleeing response when such disturbances occur in suitable and occupied pronghorn habitat. Refer to Big Game – Deer and Elk in the section on Management Indicator Species for disclosure of potential impacts to big game from motor vehicle access. These animals select relatively dry and open sagebrush and upland shrub habitat on gentle slopes. To estimate the relative impact of alternatives on potential pronghorn habitat the length of trail on suitable plant association groups (PAGs) was measured in GIS. The total length of trail proposed under each alternative within juniper steppe, juniper woodland and non-forested areas combined is displayed in Table 111. This represents the relative potential for disturbance to pronghorn in their preferred habitat. As can be seen in this table, Alternative 3 has the lowest potential impact to pronghorn of the three action alternatives based on trail system miles within preferred habitat.

Table 111. Comparison of Alternatives for Length of Trail in Potential Pronghorn Antelope Habitat.

Type of Route	Alt 1	Alt 2	Alt 3	Alt 4
Open Road	No OHV System	16.2	4.9	15.8
Closed Road	No OHV System	8.1	4.8	9.9
Decommissioned Road	No OHV System	2.9	1.3	3.4
“New” Construction	No OHV System	16.3	7.6	19.1
Total OHV Designated Route Miles	No OHV System	43.5 miles	18.6 miles	48.2 miles

Raptors

The term raptors refer to birds of prey, those that kill other animals for meat, and which generally have talons and hooked beaks. Existing condition and potential effects to the northern goshawk, Cooper’s hawk, sharp-shinned hawk, red-tailed hawk, prairie falcon and golden eagle are discussed in this section along with other hawks and owls. Refer to the TES Species section for further information on bald eagles. Refer to the MIS Species section for further information on golden eagle and prairie falcon.

Existing Conditions of Raptors

Northern Goshawk

The northern goshawk is the largest member of the accipiter family and is distributed across most of Canada, the northern and western United States, and into Mexico. Reynolds et al. (1978) located goshawk nests in Oregon from 580 meters elevation on the west slopes of the Cascades to 1,860 meters nest site. Reynolds et al. (1992) stated preferred nest stands have a minimum of 40 percent canopy cover and the nest sites within these stands have greater than 60 percent canopy cover. Greenwald et al. (2005) reviewed goshawk nesting data and found that a majority of studies found a selection for stands with greater than 40 percent canopy as suitable goshawk nesting habitat. Vegetation plot data collected from Deschutes National Forest goshawk nest sites showed canopy cover ranging from 49-94 percent (USDA 1993). Foraging areas are typically 4,900-5,900 acres; comprised of a forest mosaic that must support a wide range of suitable prey including ground dwellers or those occurring near the forest floor (Marshall et al. 2003).

Sauer et al. (1996 cited in Wisdom et al. 2000) determined that breeding bird survey data for goshawk was insufficient to determine population trends for any state or physiographic region within the Interior Columbia River Basin because of low detection rates. However, sufficient data was available to indicate a stable trend in numbers between the years 1966-1995 for western North America.

Breeding bird surveys provided insufficient data to determine population trends within any state or physiographic province in the Interior Columbia Basin. However, it is anticipated that goshawk populations on the Deschutes National Forest would decline in response to the loss of habitat due to wildfires over the last 6-8 years. The Oregon Natural Heritage Information Center maintains a list of the most current information available on the distribution and abundance of animals native to Oregon. They rank the northern goshawk population as demonstrably wide-spread, abundant, and secure.

The wildlife sighting database has numerous documented observations of goshawks in the project area, including 36 nesting territories (22 on Lookout Mtn R.D. and 14 on Paulina R.D.). Goshawk surveys using broadcasts of recorded calls have occurred in portions of the project area in conjunction with vegetation management projects over the course of four decades. Most of the systematic survey records were initiated following implementation of the Regional Forester's Plan Amendment #2 (Eastside Screens) in 1995. However, there are records for goshawks in the project area dating back into the 1970s and up to 2010. The level of past survey work conducted to date is dependent on the location and timing of various vegetation management projects within the project area over time. Table 112 displays the survey and reproductive history of each known goshawk nesting territory within the project area.

Table 112. Reproductive History of Goshawks within the Ochoco Summit Analysis Area.

Post Fledgling Area	Year of last confirmed nesting	Year of first nesting record	Number of documented nest trees	Number of documented nest cores	Number of nest attempts with young, years surveyed
LOM 2497	2007	1997	2	1	Active nest 5 of 7 years checked
LOM 1169	2011	1992	4	2	Active nest 5 of 7 years checked
LOM 9902	1999	1999	1	1	Active nest 1 of 4 years checked
LOM 0265	2009	1981	2	1	Active nest 2 of 2 years checked
LOM 1168	2003	1995	3	2	Active nest 2 of 4 years checked
LOM 5108	2009	2004	3	1	Active nest 3 of 3 years checked
LOM 2494	2010	1996	2	1	Active nest 3 of 4 years checked
LOM 0242	1992	1992	1	1	Active nest 1 of 3 years checked
LOM 9603	2003	1996	4	1	Active nest 2 of 2 years checked
LOM 2496	2003	1999	2	1	Active nest 2 of 2 years checked
LOM 0089	2007	2007	1	1	Active nest 1 of 1 years checked
LOM 0253	1992	1922	1	1	Active nest 1 of 1 years checked
LOM 1262	1995	1995	2	1	Active nest 1 of 1 years checked
LOM 1256	1995	1995	2	1	Active nest 1 of 3 years checked
LOM 1286	2011	1995	2	1	Active nest 2 of 5 years checked
LOM 1271	1995	1955	1	1	Active nest 1 of 2

Table 112. Reproductive History of Goshawks within the Ochoco Summit Analysis Area.

Post Fledgling Area	Year of last confirmed nesting	Year of first nesting record	Number of documented nest trees	Number of documented nest cores	Number of nest attempts with young, years surveyed
					years checked
LOM 1222	2009	1995	2	1	Active nest 3 of 3 years checked
LOM 1285	1995	1995	2	1	Active nest 1 of 2 years checked
LOM 1219	2009	1995	2	1	Active nest 3 of 4 years checked
LOM 0249	1998	1981	2	2	Active nest 2 of 6 years checked
LOM 5113	2009	2009	1	1	Active nest 1 of 1 years checked
LOM 1172	2009	2009	1	1	Active nest 1 of 1 years checked
LOM 0244	2012	2010	3	1	Active nest 2 of 2 years checked
LOM 5114	2011	2011	2	1	Active nest 1 of 1 years checked
PAU 3263	2002	1997	2	1	Active nest 2 of 3 years checked
PAU 1846	1989	1989	1	1	Active nest 1of 2 years checked
PAU 3243	1999	1998	1	1	Active nest 1 of 6 years checked
PAU 3270/3271/3427	2004	2001	3	1	Active nest 3 of 3 years checked
PAU 3260/3261/3262	2002	1999	3	1	Active nest 2 of 5 years checked
PAU 3252	2002	1999	2	1	Active nest 2 of 5 years checked
PAU 3256	2002	1998	1	1	Active nest 2 of 3 years checked
PAU 2367/3247/3248	2002	1998	3	2	Active nest 5 of 5 years checked
PAU 3266/3431	2002	2000	2	1	Active nest 3 of 4 years checked
PAU 3259	2002	1998	1	1	Active nest 3 of 5 years checked
PAU 2370/3272/3428	2002	1996	4	2	Active nest 5 of 7 years checked
PAU 2368/3244	2005	1998	2	2	Active nest 4 of 6 years checked
PAU 3432/3433	2010	2000	3	1	Active nest 3 of 4 years checked
PAU 3251/3438	unknown	unknown	2	1	Active nest 0 of 4 years checked

Sharp-shinned and Cooper's Hawks

Sharp-shinned and Cooper's hawks are both ranked S4, Apparently Secure in the state of Oregon (NatureServe 2009). For sharp-shined hawks small declines may be attributed to loss of preferred

young dense forest stands in boreal forest due to logging, and pesticides (NatureServe 2009). The use of pesticides on farmlands and loss of habitat are the major threats for Cooper's hawks (NatureServe 2009).

Both species are closely associated with deciduous and mixed coniferous forests, open woodlands, and riparian woodlands. They can occur in large forests but are more likely to be found near forest edges and clearings near lakes or streams. In a study in eastern Oregon, Reynolds (1983) found nesting sharp-shinned hawks to use 25-50 year-old even-aged conifer stands while Cooper's hawks used 30-70 year old even-aged conifer stands with somewhat larger and more widely spaced trees than those stands used by sharp-shins. Reynolds also reported the mean distance between the nearest nesting neighbors was 4.1 km. (2.5 miles) for sharp-shins and 4.7 km (2.8 miles) for Cooper's hawks. Both species are adapted to catch avian prey but each would also capture small mammals, lizards and various large insects and amphibians (Johnsgard 1990). Home range estimates were 1,590 hectares (3,975 acres) for Cooper's hawks and 460 hectares (1,150 acres) for sharp-shin hawks in Oregon (Reynolds 1983). Reynolds et al. (1983) studied accipiter nest sites in eastern Oregon and determined the mean canopy cover for sharp-shinned nests was 68 percent and 64 percent for Cooper's hawks, although the range extends from 20-95 percent for sharp-shins and from 15-100 percent for Cooper's. Both species select nest placement well up in the tree canopy for nest concealment or shading during warm temperatures (Moore and Henny 1983; Reynolds et al. 1983). Dense vegetation provides screening cover and physical protection from predators and predation may account for the high foliage density in the immediate vicinity of the nests of sharp-shins and Cooper's hawks (Reynolds et al. 1982).

The wildlife sighting database lists 20 sightings and 11 nests for Cooper's hawks in the project area. While there are 8 recorded sharp-shinned sightings and 1 documented sharp-shinned nest within the project area. The sightings came from general observations during other forest management activities as well as during surveys for northern goshawks. There is considerable overlap of habitat for each species and habitat. Formal surveys have not been conducted specifically for either species and reported observations are the results of random observations and responses from conducting northern goshawk surveys.

Red-tail Hawk

Red-tail hawks are widely distributed across North America and winter from southern Canada south into the United States and Central America. Red-tail habitat consists of large snag or deformed trees on forest edges, open country interspersed with forests, and suitable perches (trees, utility poles, outcrops etc). They are known to use agriculture land, clearcut harvest units, grasslands, woodlands and alpine environments (Marshall et al. 2003). It uses any habitat that has perches to hunt from and open enough to capture its prey on the ground. Small mammals, such as rabbits, hares, and mice provide the bulk of their diet. They are also known to capture birds, reptiles, and amphibians. Red-tails use a wide variety of structures for nests, including trees, utility poles and cliffs (Marshall et al. 2003). They place their nests higher in trees than other raptors, and generally select larger trees or smaller deformed trees where branch structure supports this higher placement. The red-tail hawk has increased in numbers and expanded its range since Euro-American settlement (Marshall et al. 2003). Red-tailed hawks are ranked S5, Secure in Oregon (NatureServe 2009).

Red-tail hawks are common and widely scattered on the Forest. District wildlife sighting records list numerous red-tail hawk observations and 12 nests scattered across the project area. Private forestlands in the project area are likely to provide suitable habitat for red-tail hawks, where overstory trees provide nest sites situated within open forests and grasslands.

Golden Eagle

Refer to the MIS section for the discussion of golden eagles.

Osprey

Ospreys are good biological indicators of ecosystem health, because they are long-lived and are the top predator of aquatic food webs (USGS 2005). Various fish species comprise 99 percent of their diet. Ospreys dramatically declined in abundance through the mid-1970s, as a side effect of pesticide use, but have since recovered and become a common nesting species along the Columbia and Willamette waterways in western Oregon (USGS 2005). Osprey nesting habitat consists of forests that have large live or dead tree components for nesting near bodies of fish bearing water. They nest within two miles of fish bearing bodies of water and generally nest in larger broken top live trees or snags, but also utilize utility poles, man-made Canada goose nest boxes, channel markers and other manmade structures where natural structures are lacking (Marshall et al. 2003). The primary habitat requirements of osprey include a dependable source of fish that can be captured near the surface and an elevated nesting platform within a few kilometers of their food supply. Ospreys are migratory, typically arriving in the area in April and May and they stay into early autumn until fall migration. While the pair would mate for life, they migrate separately and re-unite at their nest site the following spring. The birds winter in central California south into Central and South America. They are currently ranked as S4 in Oregon, Apparently Secure (NatureServe 2009). NatureServe (2009) listed the following as major threats to ospreys: (1) pesticides, (2) gunshots, (3) steel traps, (4) impact with or electrocution by high-tension wires, and (5) being caught or drowned in nets (Wiemeyer et al. 1980, cited in Henny and Anthony 1989).

There are 7 known osprey nests located in the project area or adjacent to it. These are scattered across the project area in proximity to fish bearing streams, ponds and reservoirs. There is not a concentration of nests within the project area like there are along some of the more productive water bodies in Central Oregon.

Some of the nesting ospreys occupy territories that include high recreational use or residential areas, such as near Walton Lake Campground, Allen Creek Reservoir and Marks Lake. Other pairs have nests in more remote locations such as along the North Fork of the Crooked River and at various small ponds. It is assumed that where there is high recreational use in osprey territories, nests have either been abandoned or if in use, ospreys have become tolerant or habituated to the activity.

Prairie Falcon

Refer to the MIS section for the discussion of prairie falcons.

Other Hawks

Other species of hawks are found in the project area, particularly during migration. Some occupy habitat in the area during nesting season, while others may winter in the area or pass through during spring and fall migration.

District wildlife sighting records list 3 observations and 1 nest for American kestrel; 3 observations of northern harrier; 2 peregrine falcon sightings; 2 rough-legged hawks scattered within the project area. Private forestlands in the project area are likely to provide suitable habitat for these raptors that prefer open country dominated by open forest or shrub and grassland habitat.

Long-eared Owl

District wildlife sighting records list 2 records of long-eared owl within the project area. Private forestlands in the project area are not as likely to provide suitable habitat for long-eared owls, as this species tends to select very dense stands with an abundance of dwarf mistletoe in Douglas fir, where they are adjacent to open forests, shrublands and grasslands.

Great-horned Owl

District wildlife sighting records list 20 records of great horned owls, including 1 nest scattered across the project area. Private forestlands in the project area are likely to provide suitable habitat for this species where old hawk nests, hollow trees, caves or buildings provide nest sites situated within a mosaic of open forest or woodland mixed with open areas.

Great Gray Owl

District wildlife sighting records list 3 records of great gray owl observations in the project area, all in the vicinity of Lookout Mountain. This species finds suitable nesting habitat where dense stands of timber with broken-topped soft snags occur adjacent to open grassy areas with abundant small mammals (gophers and voles). These conditions are present in portions of the project area.

Other Owls

District wildlife sighting records list four observations and one nest for barred owl; two records of boreal owl; two records of flammulated owl; 14 northern pygmy owl records; and four northern saw-whet owl records scattered across the project area. These species select from a variety of habitat types from low elevation woodlands to high elevation subalpine forests. The project area does contain a variety of habitat types capable of supporting a variety of owl species. Private forestlands in the project area are likely to provide suitable habitat for flammulated, pygmy and saw-whet owls, but are less likely to have suitable habitat for boreal owls, which typically reside in high elevation stands where spruce and lodgepole pine area common.

Effects to Raptors

There is conflicting science when assessing the human disturbance effects on raptors. Gunnison National Forest Travel Management Plan, USDA (2001) and Hamann et al. (1999) suggested in both their literature reviews that sensitivity occurs near nest sites and mainly affects eggs or young. Direct activities, such as noise from vehicles, could disturb these species during nesting and foraging and may negatively affect them. These species may be sensitive to prolonged OHV use adjacent to their nest. USDA (2001) and Hamann (1999) also found prolonged disturbance during nesting season may result in nest and young abandonment and increased stress levels. Both findings suggest possible recreational disturbances affect raptors by causing parents to desert young or eggs, exposure of unprotected egg or nestling to weather, avian nest predation, or nestling leaving the nest prematurely; recreation on cliffs may cause accidental pushing of nests off cliffs (Hamann et al. 1999). Also, cross-country motorized travel could lead to disturbance that disrupts pair-bonding and increases adult energy expenditures.

Some studies have found that walking straight to a birds' nest (including raptors) is more disruptive than vehicle or OHV use (Lee 1981; Skagen 1980; Holmes et al. 1993; Burger and Gochfeld 1991; Gill et al. 1996). Specifically, in a northern goshawk and Cooper's hawk study conducted by Lee (1981), female goshawk did not show signs of agitation or flushing from snowmobiles until the riders stopped and got off their machines. In another observation, Lee (1981) found that female hawks did not flush from nests when motorcycles passed by; the author suggested that hawks may become habituated to moving machines, and may tolerate disturbances such as hikers, snowmobiles, motorcycles, and horseback riders so they can keep territories that meet resource needs.

Flecher et al. (1999) conducted a raptor study in Colorado riparian corridors that included some recreation trails. They found red-tailed hawk abundance was similar between the controlled sites to the trail sites. They concluded red-tailed hawks seem to tolerate human activity along the recreational trails. A study of red-tailed hawks in Wasco County, Oregon found that normal human activity did not affect red-tailed hawk reproductive success; additionally, the presence of dwellings or frequently travelled roads and the locations of nests near roads had no significant effects and compensation for normal human activities was not necessary for estimates of reproductive success (Janes 1984). Additionally, raptors have been known to use small two-track roads and trails that experience low use

and have existing canopy cover on the sides as foraging habitat (Flecher at al. 1999, St. Pierre 2008). Some avian scavengers prefer to use these types of open areas because vegetation may hide potential predators while they are feeding (Skagen et al. 1991).

Ospreys nest around lakes with high human activity (including fishing, boating, OHV use, snowmobile use, camping, hiking, biking, and bird viewing) but still can be sensitive to the recreational disturbances, especially in remote areas (Hamann 1999; Poole 1981). During recreation seasons, ospreys have been known to keep territories with low level of human activity (Levenson and Koplin 1984). The more remote the nest location is the higher probability of an osprey is to flush when disturbed; flushing can increase risk during hatching and raising young, causes adult ospreys to expel needed energy, and leaves the egg or nestling at risk of exposure to weather and predation (Reese 1991). User-created routes can decrease habitat by providing increased access to snags and other deadwood for firewood harvest (USDA 2001), which could affect osprey habitat.

Direct and Indirect Effects Common to All Alternatives

Existing and potential disturbance from vehicle use on roads and motorized trails and the associated fragmentation (edge effect) was modeled. The assumption was disturbance would continue within the road effect zone (660 feet or 200 meters each side of roads or motorized trails) for the OHV travel system described in each alternative. Decreased habitat quality, reduced reproductive potential, and avoidance of the road effect zone are potential effects as a result of habitat alteration physically or due to disturbance. The acres within the 660 foot disturbance band (200 m) displayed in **Table 113** are based on additional trail placement, but do not reflect improvements from mitigations. Disturbance would decrease beyond the road or motorized trail effect zone for each alternative and as a result, habitat quality and amount would increase in areas more distant from motorized routes. Disturbance would decrease in areas where existing road closures are reinforced, user-created trails are rehabilitated and new road closures are implemented under the action alternatives.

Table 113 illustrates the amount of potentially disturbed nesting habitat for the northern goshawk, osprey and other raptors. The increase in potential disturbed area is directly related to the change in roads and trails open for motorized use in proximity to known nest sites.

Alternative 1

The current level of disturbance to raptors, whether they are habituated or not, would be most likely to continue until the Travel Management Rule is fully implemented as no physical reinforcement of existing closures would be done under this alternative. Several studies have suggested that walking straight to a bird nest (including raptors) is more disruptive than vehicle or OHV use (Lee 1981; Skagen 1980; Holmes et al. 1993; Burger and Gochfeld 1991; Gill et al. 1996). The majority of the existing open road network in the project area has been in place for several years or more, and some level of habituation to motorized traffic has probably occurred for nesting red-tailed hawks since 8 nests are documented in the project area in proximity to open roads.

Off-road travel is unlikely to occur early in the nesting season in the majority of the project area due to elevation and snowpack, but is fairly common in much of the project area in the middle of the nesting season and later as snowpack recedes and firewood cutting season opens. Exceptions can occur during vegetation management actions that require snowplowing to access treatment units. Off-road foot travel increases substantially during the big game archery season, which starts after the critical period of raptor nesting season.

Action Alternatives

There are 0.25 miles of designated trail system within 660’ of hawk nests on existing open roads in Alternative 2. There are also designated trail segments within ¼ mile of osprey nests as follows: 0.6 miles in Alternative 2; 0.5 miles in Alternative 3; and 0.5 miles in Alternative 4. Within ¼ mile of goshawk nests there are 3.0 miles in Alternative 2; 1.5 miles in Alternative 3 and 2.8 miles in

Alternative 4. The lengths of trail system within proximity to raptor nests are displayed in **Table 113**. Some of these trail system miles within distance bands around raptor nests are on existing open roads.

Table 113. Raptor Nest Buffer Impacts within the Ochoco Summit Analysis Area.

Raptor Species	Buffer Radius	Alternative 1	Alternative 2	Alternative 3	Alternative 4
goshawk	¼ mile	0	3.0 miles	1.5 miles	2.8 miles
osprey	¼ mile	0	0.6 miles	0.5 miles	0.5 miles
Other raptor	660’	0	0.25 miles	0	0

For each of the action alternatives the amount of undisturbed habitat changes due to the opening up of trails on closed roads, construction of new trails, closing of roads and defining which roads and trails would become part of the trail system. Studies have shown that human activity near a nest site, e.g. walking around or stopping vehicles, has more of an effect than OHV use, riding by a nest (Lee 1981; Skagen 1980; Holmes et al 1993; Burger and Gochfeld 1991; Gill et al. 1996). For this reason stationary long duration activities such as construction and maintenance activities would be restricted seasonally where in proximity to active raptor nests as shown in Table 4.

Although new trail construction has potential to remove snags with potential for nesting, a very limited amount would be removed, compared to the snags available on a landscape basis. Only those that are within the tread of the trail, leaning toward the trail, or within striking distance of a staging area or trailhead would be felled. Due to the very limited circumstance and scope of snag felling operations, control of where motorized activity would occur, action alternatives would have a negligible effect to osprey and red-tailed hawk.

Cumulative Effects - Raptors

Once the Travel Management Rule is fully implemented, action alternatives should result in a decrease of disturbed habitat when compared to Alternative 1. This would be the result of the combined effect of existing road closure reinforcement and rehabilitation of user-created trails in combination with implementation of the forest-level Travel Management Plan. Motorized travel would then be limited to designated motorized routes and potential for users to forge new routes into existing known or unknown nest sites off of mixed use roads and designated trails would be reduced.

Recent and ongoing vegetation management projects that overlap the project area, (including Spears, Canyon, Howard Elliot Johnson, Zane, Jackson and Deep Restoration) are designed to return many forested stands back to sustainable conditions that can withstand appropriate disturbance processes. These projects would mostly reduce the density of understory trees and apply prescribed fire where appropriate, with the objective of maintaining large trees on the landscape. Implementation of these large scale projects include several years of activity involving multiple timber sales, stewardship projects, force account project work and service contracts. The planned projects would reduce the amount of dense structured forested stands the goshawk, Cooper’s hawk and sharp-shinned hawk prefer for nesting. However, ongoing and planned vegetation management projects include mitigation measures such as no harvest nest buffers and seasonal restrictions on disturbing activities, and portions of each planning area would remain unharvested, which could provide suitable nesting stands for these species.

Mitigation measures planned for active and proposed vegetation management projects include protection of active nest sites by application of a seasonal restriction for timber harvest and post-sale activities, as well as potentially disturbing non-commercial treatments. This should reduce potential for additive effects to occur during the nesting season. Because large diameter trees would be maintained in each project, nesting habitat would be provided for osprey, golden eagles and red-tailed hawks. Because prescribed burning tends to reduce soft snag abundance and reduce tree density, less nesting habitat would be available for great gray and other forest dwelling owls in treated areas. On the other hand, species that prefer to forage in open areas such as great-horned owl and red-tailed

hawk would benefit from commercial thinning. This project would have very little direct effect on existing or potential nesting habitat due to the small scale of impact to the vegetation and supporting land base compared to what is available at the landscape scale. It is not expected that implementation of the Ochoco Summit OHV project in conjunction with overlapping or adjacent vegetation management actions would lead to a change in populations of raptors across the project area because suitable habitat would be provided at the landscape scale with little change resulting from this project, and as shown in Table 90, the action alternatives result in less than a 5% increase in area within 200m (660 feet), and less than 2% increase in lands less than ½ mile from motorized routes. In addition, proposed closures offer better access management, including some existing routes in proximity to known raptor nests.

Land Birds

The Migratory Bird Treaty Act of 1918 (MBTA) implements various treaties and conventions between the U.S., Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. The U.S. Fish and Wildlife Service (FWS) is the lead federal agency for managing and conserving migratory birds in the United States. The BLM and USFS have implemented management guidelines that direct migratory birds to be addressed in the NEPA process. In January 2001, President Clinton issued an executive order (E. O. 13186 (66 Fed. Reg. 3853) on migratory birds, directing federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. A Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service and the Department of Agriculture, Forest Service was signed in late 2008 to conserve migratory birds including taking steps to restore and enhance habitat, prevent or abate pollution affecting birds, and incorporating migratory bird conservation into agency planning processes: 1) when developing, amending or revising management plans for national forests and grasslands, and 2) within the NEPA process, evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors. For this project analysis species of management concern are evaluated based on those species listed by USFWS as “Birds of Conservation Concern” and those species listed as “Focal Species” in the Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman, 2000).

Birds of Conservation Concern

The “Birds of Conservation Concern 2002” (BCC) revised in 2008 identifies species, subspecies, and populations of all migratory and resident birds not already listed under the Endangered Species Act of 1973 that represent the highest conservation priorities and are in need of additional conservation actions. While all of the bird species included in the BCC are priorities for conservation action, the list makes no finding with regard to whether they warrant consideration for ESA listing. The goal is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions.

Bird Conservations Regions (BCRs) were developed based on similar geographic parameters. The map below displays all the BCRs in North America. Only two BCRs overlap the Ochoco Summit OHV project project area: BCR 9 (Great Basin) and BCR 10 (Northern Rockies). The table below displays Birds of Conservation Concern species associated with BCR 9 and BCR 10 along with their preferred habitat and whether suitable habitat is present in the project area. A coastal species (yellow-billed loon) is not expected to occur within the project area is not included in the tables and will not be discussed further in this document.

The Great Basin (BCR 9) is a large and complex region that includes the Northern Basin and Range, Columbia Plateau, and the eastern slope of the Cascade Range. This area is dry due to its position in the rainshadow of the Cascade Range and the Sierra Nevada. Grasslands, sagebrush, and other xeric shrubs dominate the flats and lowlands, with piñon-juniper woodlands and open ponderosa pine

forests on higher slopes. Lodgepole pine/sub-alpine fir forests occur at higher elevations on north-facing slopes. Several substantial lowland wetlands are extremely important to shorebirds, including breeding American Avocet; Black-necked Stilt; and Willet, migrating Wilson's Phalarope, and other water birds, notably Eared Grebe. The region is also important for breeding Mountain Plover and Snowy Plover. Most of North American breeding White-faced Ibis and California Gulls nest in marshes and lakes scattered across the region. The Great Salt Lake and adjacent marshes host large numbers of American White Pelican, Cinnamon Teal, Northern Pintail, Redhead, Tundra Swan, and other waterfowl and many species of migrant shorebirds. Sage Grouse, Sage Sparrow, Sage Thrasher, and Brewer's Sparrow are priority land birds of lowlands, with White-headed Woodpecker, Flammulated Owl, and Cassin's Finch leading the list of characteristic birds of the region's pine forests.

The Northern Rockies (BCR 10) includes the Northern Rocky Mountains and outlying ranges in both the United States and Canada, and also the intermontane Wyoming Basin and Fraser Basin. The Rockies are dominated by a variety of coniferous forest habitats. Drier areas are dominated by ponderosa pine, with Douglas fir and lodgepole pine at higher elevations and Engelman spruce and subalpine fir even higher. More mesic forests to the north and west are dominated by western larch, grand fir, western red cedar, and western hemlock. High priority forest birds include the Flammulated Owl, Lewis' and Black-backed Woodpecker, Olive-sided Flycatcher, Townsend's Warbler, Rufous Hummingbird, Black Swift, and Blue Grouse. Barrow's Goldeneye, Harlequin Duck, and Trumpeter Swan breed in high-elevation lakes and streams. The Wyoming Basin and other lower-lying valleys are characterized by sagebrush shrubland and shrubsteppe habitat, much of which has been degraded by conversion to other uses or invasion of non-native plants. High priority birds include Sage Grouse, Ferruginous Hawk, Brewer's Sparrow, and Sage Thrasher.

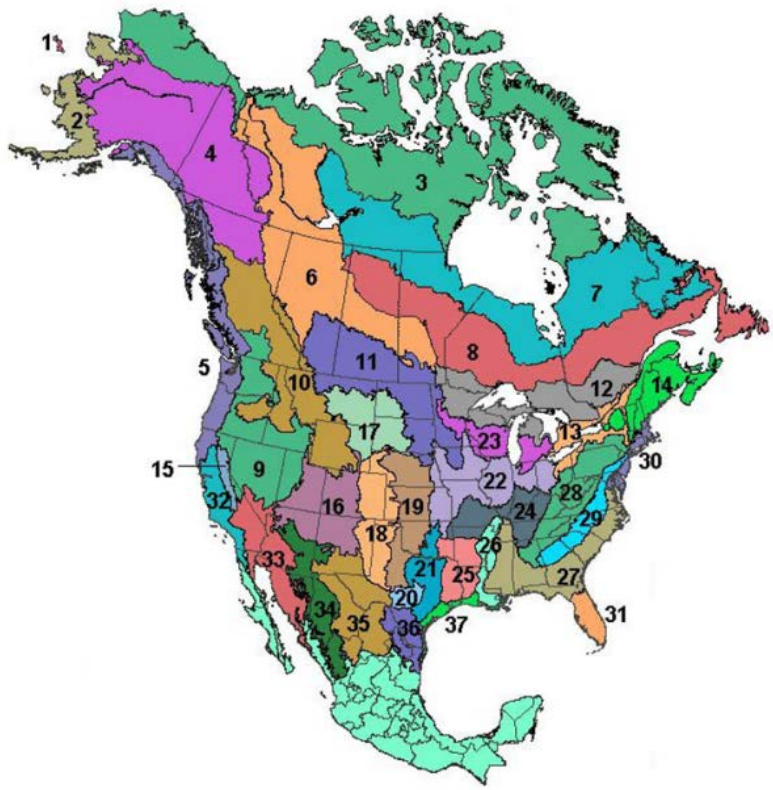

Figure 4. Bird Conservation Regions.

Table 114. Bird Conservation Regions 9 and 10 (combined) 2008 List.

Bird Species	Preferred Habitat	Habitat in Ochoco Summit OHV Project Area
Greater Sage Grouse (Columbia Basin DPS) (a)	Sagebrush dominated rangelands with bunchgrass/forb understory, and limited or no tree cover	Yes
Eared Grebe (nb)	Nests near shore on small freshwater lakes and reservoirs with emergent vegetation	Yes
Bald Eagle	Nests in large conifers usually near lakes, reservoirs or rivers	Yes
Ferruginous Hawk	Sagebrush-shrub steppe or bunchgrass prairie and low tree density	Yes
Swainson's Hawk	Open country, prairies and irrigated farmland	Yes
Golden Eagle	Elevated cliff or open grown tree nest sites in open country	Yes
Peregrine Falcon (b)	Cliffs or rock pinnacles with ledges or caves	Yes
Yellow Rail	Marshes with shallow water 4,100 to 5,000 ft elevation	No
Snowy Plover (c)	Dry, open, sandy beaches, alkali flats or salt ponds	No
Long-billed Curlew	Open grassland areas	Yes
Marbled Godwit (nb)	Grassy meadows near lakes and ponds, migrant (irregular E. OR)	No
Upland Sandpiper	Montane meadows 1,000 to 3,000 acres at 3,400 to 5060 ft. elevation surrounded by pine	Yes
Yellow-billed Cuckoo (w. U.S. DPS) (a)	Large expanses of dense riparian forest/cottonwoods	No
Flammulated Owl	Ponderosa pine forests with open understory and patches of saplings or shrubs	Yes
Black Swift	Cliffs associated with waterfalls	No
Calliope Hummingbird	Open mountain meadows, open young forests, meadow edges, and riparian areas	Yes
Lewis's Woodpecker	Open forests with brushy understory, dead and down wood	Yes
Williamson's Sapsucker	Open ponderosa pine and mixed forests with snags	Yes
White-headed Woodpecker	Mature, open ponderosa pine forests with snags	Yes
Willow Flycatcher (c)	Breeding habitat is dense shrubs and/or tall herbaceous vegetation especially riparian willow thickets	Yes
Olive-sided Flycatcher	Open conifer forests and edges with scattered tall trees and snags	Yes
Loggerhead Shrike	Open country with scattered juniper trees, tall shrubs	Yes
Pinyon Jay	Juniper, juniper-ponderosa pine transition, and ponderosa pine edge with sagebrush or juniper	Yes
Sage Thrasher	Big sagebrush, shrublands of greasewood, shadscale and rabbitbrush.	Yes
Virginia's Warbler	High elevation, steep shrublands, juniper or mountain mahogany woodlands, SE Oregon	No
Green-tailed Towhee	Vigorous shrub stands with high shrub species diversity on mountainsides and high plateaus	Yes
Brewer's Sparrow	Sagebrush shrublands, clearings with shrubs in coniferous forests	Yes
Black-chinned Sparrow	Dry slopes and rocky hillsides, sagebrush steppe,	

Table 114. Bird Conservation Regions 9 and 10 (combined) 2008 List.

Bird Species	Preferred Habitat	Habitat in Ochoco Summit OHV Project Area
	desert shrub	Yes
Sage Sparrow	Semi-open sagebrush up to 6,800 ft elevation	Yes
McCown's Longspur	Dry sparse prairies Great Plains, rare in Oregon and Washington	No
Tricolored Blackbird	Large expanses of cattails, bulrush, willow or tules	No
Black Rosy-Finch	Bare rock outcrops, cliffs and talus above timberline, rare in Oregon (SE Oregon)	No
Cassin's Finch	Open, mature forests and woodlands, coniferous or aspen	Yes
(a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR		

Landbird Strategic Plan

The Oregon and Washington Chapter of Partners in Flight (PIF) was formed in 1992 and has prepared a series of publications aimed at assisting private, state, tribal and federal agencies in managing for landbird populations. The Landbird Strategic Plan (January 2000) to maintain, restore, and protect habitats necessary to sustain healthy migratory and resident bird populations to achieve biological objectives. The primary purpose of the strategic plan is to provide guidance for the Landbird Conservation Program and to focus efforts in a common direction. On a more local level, individuals from multiple agencies and organizations within the Oregon-Washington Chapter of Partners in Flight participated in developing five publications for conserving landbirds in this region (Oregon and Washington). The strategy identifies conditions and habitat attributes important to landbird communities, describing the desired landscape based on habitat relationships of a select group of species (focal species). By describing habitat requirements and managing for the needs of focal species that are representative of important components in a functioning ecosystem, many other species and elements of biodiversity will also be conserved. A Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington was published in May 2000 (Altman, 2000) is one of five plans that cover all priority habitats for landbirds in Oregon and Washington. This strategy covers the geographic area of this project has been used since its development in planning and projects analysis on Ochoco National Forest.

General Effects to Land Birds

Literature is available that discusses vehicle and trail impacts to songbirds, also known as passerine species. Impacts known to affect songbirds are noise and distance from roads and trails. For example, noise can affect avian species by masking mating songs or communication calls (Konish 1970, Marler et al. 1973, Klump et al. 1984, Reynolds et al. 1992, Wollerman 1998 in AMEC 2005, and AMEC 2005). Species cannot hear territory calls, mating calls, or low frequency noise from predators with increased background noise from vehicles (Klump et al. 1984, Reijen and Foppen 1994, Montana TWS 1999, and Erbe et al. 1999 in AMEC 2005). Studies also found that the further away from the road or trail the more abundant the passerine species are (Sauvajot 1998, Miller et al. 1998, Forman 2000 and Barton and Holms 2006).

Romain-Bondi (2009) stated the common wildlife response to increased human activity is avoidance or displacement. The roads and trails may not provide enough protection/cover from predators and may not provide foraging and roosting areas for wildlife. Other variables that may impact wildlife include, but are not limited to noise, dust, speed, soil compaction, and possible harassment of wildlife (Romain-Bondi 2009, Ouren, 2007). The selection of Alternative 1 would result in no change in

motorized use in the project area. However, assuming some species displacement or individuals or pairs may occur, a disturbance buffer analysis was conducted as shown in Table 115. It was assumed all open roads are being used and a 200 m (660 feet) zone of disturbance was applied to each side of the motorized routes. This analysis showed 38 percent of the project area is within the disturbance zone although it is unknown if this level of disturbance is resulting in reduced nesting success in the project area. With Alternative 1 the existing open and closed roads and user created trails would be expected to continue having motorized use. Refer to the noise impacts discussion in the General Wildlife section of this Chapter. Based on a 200 meter (660 ft) distance band on each side of an open road, approximately 160 acres may be impacted by noise from open roads. However, this buffer may overestimate effects to these species based on the Ingerlfinger and Anderson (2004) study showing reduced species density within 100 meters (330 ft) from a roadside (80 acres per mile). On the other hand, the open road analysis does not include unauthorized use of closed, decommissioned or user created routes. In many cases traffic on these unauthorized routes may occur infrequently enough that the noise would not disrupt reproductive behavior or survival of passerine birds.

Among the open roads, there are multiple high speed paved or gravel roads with traffic volumes of ten or more motorized vehicles per day within the project area during nesting season. Nesting habitat 100 meters (330 feet) from these roads would likely experience similar disturbance levels Ingerlfinger and Anderson (2004) found in their study. While road volume does increase during the hunting seasons beginning in mid-August, the increase occurs after the nesting period for local passerine species.

A 200 meter (660 feet) each side road and trail disturbance zone was modeled to determine the area with potential noise disturbance for the entire project area. Due to the fact that the majority of motorized routes under any alternative are on or in proximity to existing open roads, there is only about a 5% difference in the amount of area within this disturbance zone between the action alternatives and a 6 to 11% difference between the action alternatives and the no action alternative. Results from the disturbance zone analysis across the project project area are displayed in Table 115. The addition of proposed trails to the existing network of open roads resulted in an increase in disturbance area of 3 to 5% across the project area. Under Alternatives 2, 3 and 4, the percentage of the project area within 200 m (660 feet) of an open motorized route is 42%, 41% and 43% respectively.

Table 115. Acres within 200 m (660’) of any open road or trail.

Alternative 1	Alternative 2	Alternative 3	Alternative 4
115,127	125,745	123,036	129,390

Alternatives 2, 3 and 4 would designate an official OHV trail system. Selected unauthorized roads and trails not designated as part of the system would be closed for motorized vehicle use. Improvement of existing road closures, and blockage of unauthorized and user created trails could result in improvement to local passerine species habitat by reduction of motorized disturbance along those routes that are closed. This potential improvement is not reflected in Table 115, as the disturbance band analysis was based on open system roads and did not include breached closures, user created routes and other unauthorized travel routes such as horse trails and non-system roads. OHV use is projected to increase 2 to 5 percent per year with the new system and open roads may also experience an increase in volume. The area within 200 m of a designated open road or trail should not increase as this level of use increases, but the intensity of disturbance on the designated network is expected to increase as the level of use increases.

Existing Condition of Individual Focal Species of Land Birds

Chipping sparrow: In Central Oregon, chipping sparrows can be found in open coniferous forests or stands of trees interspersed with grassy openings or low foliage and are found in good numbers in central Oregon in juniper, ponderosa pine, and lodgepole pine forests (Marshall et al. 2003). They are

associated with higher elevations are summer residents preferring open habitats with a shrub or regenerating pine component. Chipping sparrows occupy successional habitats after logging or burning because of an affinity for open, older stands of western mixed conifer forest (DeGraaf and Rappole 1995).

The current NatureServe Conservation Status Rank for chipping sparrows in Oregon is a S4, 'apparently secure,' and National 5, 'secure' and Global 5 'secure' (2009). Breeding bird surveys have shown that population declines of chipping sparrows have averaged 3.9 percent annually in Oregon due to a decrease in fire to maintained open woodlands but also due to cowbird brood parasitism and competition with house sparrows and house finches (Marshall et al. 2003). Chipping sparrows are known to occur on both Lookout Mountain and Paulina Ranger District, including locations within the project area for this project. Habitat for the chipping sparrow includes open canopied stands of lodgepole pine, ponderosa pine, Douglas-fir, or grand fir with tree diameters 10-15 inches or larger, especially where patches of regenerating pine seedlings and saplings are present. Such habitat is present in patches across the project area.

Vaux's swift: The Vaux's swift is associated with large snags in mesic mixed conifer forests. It is an aerial insectivore typically associated with late-successional forest and dependent on very large, hollow snags for nests and roosts. The best variables to predict Vaux's swift occurrence is the number of snags greater than 20 inches dbh and the number of tress with conks of Indian paint fungus (Bull and Beckwith, 1993). Conservation issues listed in the landbird plan include loss of large snags during intensive forest management and insufficient recruitment of large snags through harvest rotations. Habitat objectives include retention and development of snags greater than 27 inches dbh and 82 feet in height in different stages of decay, including hollow snags. Recommended conservation measures include retention of broken topped trees, especially those over 4' inches dbh, large snag retention and recruitment of replacement snags (large live trees with defect).

The current NatureServe Conservation Status Rank for Vaux's swift is Global G5 'secure', National N5B 'secure, breeding' and Oregon S5 'secure' (2009). Breeding bird surveys have shown state-wide population increases for Vaux's swift of 3.7 percent annually in Oregon (1966-1999), while Sharp (1992) estimated a 8.9% decrease on National Forests during the 1980's. The decline was attributed to harvest of late seral coniferous forests and conversion of stands of late seral grand fir dominated stands to early seral stands dominated by ponderosa pine which do not develop hollow tree structure as readily as grand fir does (Marshall et al. 2003). Vaux's swifts have been recorded on Paulina Ranger District, but not within the project area.

Townsend's warbler: The Townsend's warbler is associated with overstory canopy closure and understory structure in mesic mixed conifer forests. It foraged preferentially in grand fir and to a lesser extent larch and avoids ponderosa pine and Douglas-fir in northeastern Oregon. It has also shown a positive association with larger tracts of closed canopy forests than in stands with more perimeter (edge). Conservation issues listed in the landbird plan include loss of habitat where restoration of historic dry forest conditions return current stands of mixed forest to open pine dominated stands. Habitat objectives include where ecologically appropriate, retain patches of mixed conifer forest at least 100 acres in size, with greater than 50% crown closure and with late successional conditions (mature and old-growth forest) dominate by grand fir or Douglas-fir. Recommended conservation measures include designation of unmanaged or lightly managed areas where overstory canopy closure is emphasized.

The current NatureServe Conservation Status Rank for Townsend's warbler is Global G5, 'secure', National N5B 'secure, breeding' and NNRN 'not ranked, nesting' and Oregon S4 'apparently secure' (2009). The Townsend's warbler has greatly increased in abundance in the Blue Mountains as a result of fire suppression and subsequent increases in understory Douglas-fir and grand fir (Marshall et al.

2003). Townsend's warblers are known to occur on both Lookout Mountain and Paulina Ranger District, including locations within the project area for this project.

Varied thrush: The varied thrush is associated with structurally diverse, multi-layered canopy conditions in mesic mixed conifer forests. It is an omnivore that gleans understory debris in dense, older, mesic mixed conifer stands, especially in wet sites with closed canopy above 3000' elevation. Conservation issues listed in the landbird plan include loss of structural complexity, canopy layering and organic matter on the forest floor due to forest management practices. Several studies indicate that this species is area sensitive and avoids edges (McGarigal and McComb, 1995, Manuwal and Pearson, 1997). Habitat objectives include retaining blocks of late successional forest at least 75 acres in size; retention of patches with high canopy closure (greater than 60%), and with multiple tree layers with mixed species composition including at least 25% deciduous vegetative cover for dense leaf litter. Recommended conservation measures include maintaining large tracts of forested stands to reduce the amount of edge and fragmentation; conduct thinning from below to enhance diversity in forest structure, to enhance survival of suppressed and intermediate trees, and to promote growth; conduct thinning in conjunction with underplanting where necessary to increase tree layering and species diversity; and retaining or planting native berry and fruit producing shrubs in the understory.

The current NatureServe Conservation Status Rank for varied thrush is G5 globally 'secure', N5 nationally 'secure' and Oregon S4 'apparently secure' (2009). Breeding and wintering abundance varies cyclically every 2 to 5 years. Though the overall population trend is declining in Oregon, Washington and Northern California, its status east of the Cascades is unknown (Marshall et al. 2003). Varied thrushes are known to occur on both Lookout Mountain and Paulina Ranger District, including locations within the project area for this project.

MacGillivray's warbler: The MacGillivray's warbler is an indicator for dense shrub layer in forest openings or understory in mesic mixed conifer forests. This species is more common in open-canopy stands and regenerating forests than in closed canopy stands and are positively associated with wood shrubs up to 15 ft in height. In grand fir forests of the Blue Mountains they are associated with well-developed understories of shrubs, seedlings and saplings. Habitat objectives include where ecologically appropriate manage stands to tree canopy cover and herbaceous ground cover to less than 25% each, and dense understory shrub cover of greater than 40% and 270 stems/acre (including shrubs, seedlings and saplings). Recommended conservation measures include grazing management to achieve habitat objectives described above.

The current NatureServe Conservation Status Rank for MacGillivray's warbler is G5 globally 'secure,' N5B nationally 'secure, breeding' and Oregon S4 'apparently secure' (2009). According to Marshall et al. (2003) loss of riparian habitat and forest management practices that are intended to return stand conditions to open understory may have, or are likely to result in local population declines east of the Cascades. Breeding bird surveys have shown conflicting population trends between states and regions within the Oregon range depending on trends in forest practices that provide or remove shrubland habitat. Grazing, fire and herbicide treatments have also been identified as threats to this species (Marshall et al. 2003). MacGillivray's warblers have been recorded in every county in Oregon, and breeds throughout the Blue Mountains (Marshall et al. 2003). There are records for this species on Ochoco National Forest in the vicinity of Mt. Pisgah and along the Barnhouse Breeding Bird Survey route, part of which is in the project area.

Olive-sided flycatcher: The Olive-sided flycatcher inhabits montane and northern coniferous forests up to 3,000 meters in elevation, especially in burned-over forest areas with tall standing dead trees (DeGraaf and Rappole 1995). In Oregon this flycatcher is a summer resident that breeds in low densities throughout coniferous forests. The olive-sided flycatcher is an aerial insectivore that prefers forest openings or edge habitats where forest meets meadows, timber harvest units, rivers, bogs or marshes (Marshall et al. 2003). The current NatureServe Conservation Status Rank for the olive-sided

flycatcher in Oregon is a S3B, 'breeding vulnerable,' National 4B, 'breeding apparently secure' and Global G4 'apparently secure' (2009). NatureServe (2010) stated that fire suppression throughout the breeding range has limited the acreage of available habitat. It also reports that the species is "apparently secure" globally although at risk from deforestation on wintering grounds in Central and South America.

This flycatcher is considered a contrast species using old forests for nesting and either openings or gaps in old forests for foraging. Large trees and snags are preferred habitat elements for the olive-sided flycatcher (Romain-Bondi 2009). The species is positively associated with recent burns (Hejl 1994 cited by Wisdom et al. 2000).

Veery: The veery is associated with understory foliage and structure in riparian woodlands. In the Blue Mountains hawthorne, dogwood and willow are listed as important. Though black hawthorne is listed as encountered in the Blue and Ochoco Mountains (USFS, 1992), it is an uncommon species and generally limited in distribution on Ochoco National Forest. Dogwood and willow are widely distributed across riparian habitats within the project area.

The current NatureServe Conservation Status Rank for veery is Global G5 'secure', National N5B 'secure, breeding' and Oregon S4?B 'apparently secure, inexact numeric rank, breeding' (2009). According to Marshall et al. (2003) the Ochoco Mountain breeding colonies have remained relatively small and isolated for at least 30 years, and that population trends for breeding birds in Oregon remain relatively unknown. Breeding bird surveys have shown that this species is an uncommon breeder at low to middle elevations in the Blue Mountains, where sufficient riparian thickets exist, and that they are uncommon and local in Crook County (Marshall et al. 2003). Sightings of veery have been recorded on Lookout Mountain Ranger District in the vicinity of Ochoco Ranger Station, which is within the project area for this project.

Willow flycatcher: Marshall et al. (2003) describe the willow flycatcher as a relatively late-arriving migrant to Oregon that is associated with shrub-dominated habitats, especially riparian willow thickets. Breeding habitat is characterized by dense shrubs and/or tall herbaceous plants with scattered openings of shorter herbaceous vegetation. Marshall's et al. (2003) book *Birds of Oregon* displays a map showing locations of willow flycatchers by county. In the project area reproductive potential ranges from none to probable, with no confirmed nesting. Three requirements for willow flycatcher habitat are large meadow size, water and willows (Sanders and Flett 1989). Nest sites tend to be in shrubs or other shrub-level vegetation within a few feet of the ground. Territories tend to be small approximately one acre. Diets have not been studied in Oregon but the species is an aerial insectivore that feeds primarily on the wing and occasionally gleans (Sedgewick 2000 cited in Marshall et al. (2003). Factors indicated as a conservation concern include loss and degradation of the quality of riparian shrub habitats from altered hydrologic regimes, disturbance, and loss of habitat from overgrazing, and cowbird parasitism. Proposed conservation strategies are to increase width of riparian shrub zones through plantings, discourage aggregations of livestock near riparian areas, and eliminate willow cutting and herbicide use in the riparian zone. The current NatureServe Conservation Status Rank for willow flycatcher in Oregon is a S4, 'apparently secure', National NNR, 'unranked nationally' and Global G5T5 'secure' both at the species level and at the Oregon/Nevada subspecies level, (2009).

Nesting habitat consists of riparian areas with the presence of dense willow clumps, or other shrubbery, and uplands. Nesting uplands are low elevation valleys to high mountain areas in early seral stages of high conifer dominated stands (Marshall et al. 2003). The project area contains very limited acreage of dense willow thickets. However, there are a few pockets with well-established willows along meadow edges in or near Big Summit Prairie and Little Summit Prairie. Observations of willow flycatchers have not been reported within the Ochoco Summit OHV project area or elsewhere on Lookout Mountain or Paulina Ranger Districts.

Hermit thrush: The hermit thrush is a summer resident preferring mid to high elevation mature and old growth forests. It breeds in mature forests of all types especially those with a shaded understory of brush and small trees ranging from aspen groves to juniper woodlands to moderately open coniferous forests. Gilligan et al. (1994) described the Hermit thrush as a fairly common summer resident in the Cascade, Siskiyou and Blue Mountains and uncommon in the Coast Range of Oregon. Hermit thrushes nest on the ground, in brush or small trees. It is an opportunistic ground forager, feeding on insects and an occasional reptile or amphibian (Marshall et al. 2003). During the winter months they are rarely seen east of the Cascades and tend to winter in the west-side lowlands and foothills along the coast. There appear to be no serious conservation problems at this time (Marshall et al. 2003). The current NatureServe Conservation Status Rank for hermit thrushes in Oregon is a S4, 'apparently secure', National N5, 'secure' and Global G5 'secure' (2009).

Though hermit thrush was identified as a focal species for subalpine forest as a unique habitat, this species may include all forested PAGs with tree diameters exceeding 10-15 inches with a dense canopy within Ochoco National Forest. Virtually all of the suitable habitat for this species in the project area is on National Forest System lands within the grand fir (mixed conifer), Douglas-fir and ponderosa pine PAGs. Within the Ochoco Summit project area suitable habitat is present all along the Ochoco Mountains, with nesting habitat located on Coyle Butte, Round Mountain, Lookout Mountain, Slide Mountain, Indian Butte, Mt. Pisgah, East Point, Peterson Point, Buck Point, Bear Mountain and all the moderate to high elevation, north and east facing, forested slopes in between. Very limited surveys have occurred on the project area, though there are numerous records from Breeding Bird Surveys on Paulina Ranger District.

Vesper sparrow: The Vesper sparrow is associated with steppe-shrubland habitat. It can be found in a variety of habitat types including grassland, sagebrush, fallow fields, montane meadows, juniper steppe, cropland, open woodlands and openings in forest habitat such as clearcuts. Habitat objectives include where ecologically appropriate initiate actions in steppe-shrublands to maintain or provide a mosaic of steppe and shrubland habitat with less than 10% tree cover. Recommended conservation measures include eliminating or restricting human access and livestock grazing in steppe shrublands that have been degraded.

The current NatureServe Conservation Status Rank for vesper sparrows is a G5T3 Global 'secure,' but with the Oregon subspecies ranking as 'vulnerable,' National N5B, N5N 'secure, breeding and non-breeding' for the species, but NNR 'unranked' for the Oregon subspecies. The federal status US ESA ranking of SC, 'species of concern' applies to the Oregon subspecies. The conservation status ranking in Oregon is S4B 'apparently secure, breeding' for the species, but S2B, S2N for the Oregon subspecies 'imperiled, breeding and non-breeding' (2009). Breeding bird surveys have shown that population trends in Oregon have been relatively stable long-term (1966-1996), but declining in the short-term (1980-1996). Declines are attributed to a variety of factors including agricultural conversion of grasslands and shrub-steppe habitat, changes in agricultural practices and trampling of ground nests. (Marshall et al. 2003). Vesper sparrows have not been recorded on either Lookout Mountain or Paulina Ranger District. However, they are listed as common in spring, summer and fall in "Common Birds or the Ochoco Region."

Effects of the Action Alternatives to Individual Species of Land Birds

This project would have very little direct effect on existing or potential nesting habitat of any of these landbird species due to the small scale of impact to the vegetation and supporting land base compared to what is available at the landscape scale in the vegetation type where each species is most likely to be found. The potential reduction of habitat types under each action alternative was estimated by determining how many miles of new trail (not on an existing road) would be created in each habitat type, and how many acres would need to be cleared for trail creation. Also, acres that would need to

be cleared in association with staging areas were estimated (the assumption is up to 5 acres per staging area would need to be cleared). These acre estimates are summarized in Table 116.

Table 116. Estimate of acres that would need to be cleared by action alternative for the Ochoco Summit OHV Trail System project.

Land Bird	Habitat Type	Alternative 2			Alternative 3			Alternative 4		
		Acres Cleared for New Trail	Acres Cleared for Staging Area	Total Acres of Habitat Reduced	Acres Cleared for New Trail	Acres Cleared for Staging Area	Total Acres of Habitat Reduced	Acres Cleared for New Trail	Acres Cleared for Staging Area	Total Acres of Habitat Reduced
Chipping Sparrow	Ponderosa Pine	16	35	51	8	15	23	19	35	54
Vaux's Swift; Townsend's Warbler	Grand Fir	40	5	45	28	5	33	55	5	60
Varied Thrush; MacGillivray's Warbler	Riparian Hardwood	.4	0	.4	.2	0	.2	.4	0	.4
Olive-sided Flycatcher; Hermit Thrush	All Forested PAGs	68	40	108	46	20	66	90	40	130
Veery; Willow Flycatcher	Alder/ Willow	.22	0	.22	.15	0	.15	.22	0	.22
Vesper Sparrow	Grassland, Meadow, Steppe/ Shrubland	17	0	17	6	0	6	21	0	21

Cumulative Effects

All action alternatives would designate an OHV trail system available for use, while the reasonably forseeable forest-level travel management plan would prohibit cross country travel and/or use of closed roads. Some user created trails not used for the designated system would be closed and rehabilitated. This would result in an increase in the amount of undisturbed nesting habitat in selected areas under all action alternatives. While local landbirds may still be subjected to motorized disturbance during the nesting season (May – July) increased levels of undisturbed nesting habitat would be available as compared to the existing condition where closed roads and non-motorized trails are currently receiving motorized use, and where cross country travel is occurring. Thus proposed closures and rehabilitation of user created trails, in combination with implementation of the forest-level travel management plan should result in improved amounts of undisturbed nesting habitat in the long run.

This project alone would have very little direct effect on existing or potential nesting habitat of local land birds due to the small scale of impact to the vegetation and supporting land base compared to what is available at the landscape scale in the ponderosa pine PAGs, and in comparison to the much larger vegetation management projects that overlap the project area. The Spears, Canyon, HEJ and Deep Vegetation Management projects propose a variety of activities to increase the dominance of open forest conditions in ponderosa pine, and improve riparian hardwood, grassland, meadow and steppe shrubland habitat types; vegetation management associated with these projects would reduce the amount of grand fir in treated units. Species associated with open forest, riparian hardwood and shrub, grassland, meadow and steppe shrubland habitats, including chipping sparrow, varied thrush, MacGillivray's warbler, olive-sided flycatcher, veery, willow flycatcher, and vesper sparrow should benefit from improved habitat conditions in the long run as a result of these vegetation management projects. These vegetation management projects may reduce habitat for Vaux's swift, Townsend's warbler, and hermit thrush, at least in the short-term.

All vegetation management projects in the project area include prescribed burning. These actions would reduce the amount of shrub and sapling habitat in the treatment units in the short term.

Although Project Design Features in the NEPA documents and burn plan prescriptions usually call for the retention of untreated patches for the nesting birds, small mammal habitat, and big game forage, these actions would reduce the amount of land bird habitat as a result of burning. Short term reduction of understory shrub and pine regeneration is a trade-off for the benefit of long term resiliency of the stands as a whole, as well as for the reduction in fuel loading and subsequent risk of loss to high intensity wildfire. Depending on the prescribed fire return interval some of the shrubs would regenerate and provide nesting habitat until prescribed fire is applied again. While some nesting habitat would be removed, the application of fire would more closely mimic natural disturbance events that occurred in ponderosa pine plant associations. Nesting habitat would still be retained across the landscape (in some stands not selected for vegetative treatments in these NEPA documents) and within treatment units (although potentially in smaller patches depending on burn conditions and the resulting mosaic due to variable fire intensity). Within an project area of more than 300,000 acres and with multiple projects affecting potential habitat at a scale of hundreds or thousands of acres, the direct impact of this project on nesting habitat is relatively minute and the cumulative impact on habitat is negligible at the landscape scale.

Botany

This section includes a summary of the Botany specialist's report and Biological Evaluation; the entire report is in the Ochoco Summit Trail System project record, located at the Ochoco National Forest, Prineville, Oregon.

Introduction

This section describes expected effects of the Ochoco Summit Trail System project proposed action and alternatives upon botanical resources. Included is 1) the Biological Evaluation for proposed, endangered, threatened, and sensitive plant species, 2) analysis of effects of non-native invasive plants, and 3) effects to special plant habitats.

Threatened, Endangered and Sensitive Plants

Regulatory Framework

Direction for managing habitats for all existing native and desired non-native plants in order to maintain viable populations of species comes from Forest Service Manual 2600 (USFS 1995, WO Amendment 2600-95-7). Sensitive plants receive management emphasis to ensure viability and to preclude trends toward endangerment that would result in the need for federal listing (Forest Service Manual 2672.1). A biological evaluation is conducted to review Forest Service programs and activities for possible effects on endangered, threatened, proposed, or sensitive species, as required in Forest Service Manual 2672.4.

The desired future condition for sensitive species is to ultimately remove them from the U.S. Fish and Wildlife Service's Species of Concern list, and from the Regional Forester's Sensitive Species list. Ensuring that habitat is well distributed with viable, increasing populations within the Ochoco National Forest can contribute to this effort. The LRMP does not specifically identify a desired future condition for sensitive plant species. It does address riparian areas, which provide important habitat for many sensitive species within the Willow Pine Project Area. The LRMP states that most of the riparian areas will be in excellent condition within 50 years, characterized by vigorous stands of forbs, grasses, and grass-like species on stable stream banks.

Analysis Methods

There are no federally listed proposed, threatened or endangered plant species that occur on the Ochoco National Forest. There is no habitat recognized as essential for listed or proposed plant species recovery under the Endangered Species Act; this analysis is therefore limited to species

included on the Regional Forester's Sensitive Species List (hereafter referred to as sensitive species) for the Ochoco National Forest. Sensitive species will be grouped by habitat into riparian and scabland species. Design criteria that protect sensitive plants as described in Chapter 2 of the EIS will be taken into account when determining effects. The analysis area for sensitive plants includes the project area boundary as designated by the District Ranger (see maps in Chapter 2). Effects of the proposal will be measured by:

- Acres of sensitive plant populations impacted by proposed trails.
- Number of sensitive plant populations within ¼ mile of proposed trails.
- Acres of sensitive plant habitat impacted by proposed trails.

Information was integrated in part through GIS mapping to portray spatial relationships among sensitive plants and their habitat, and the proposed trail system. Spatial and tabular data for inventoried sites of sensitive plants were taken from the National Resource Inventory System (NRIS) database. To compare the alternatives for effects from motorized travel on trails, GIS was used to calculate the number of acres under each alternative.

Effects of new trail construction and re-construction of revegetated closed roads will be analyzed for short-term effects of 3-5 years. Use is expected to continue on all trails for the long term, >10 years.

Assumptions

Areas open to motorized recreation have a higher risk of impacting vegetation, including special habitats.

All forms of motorized vehicles are lumped together in the botany analysis, regardless of class of vehicle.

Areas that are seasonally closed were analyzed as open because there can be impacts to native plants and native plant habitats regardless of when the area is open. If the area is not 100% closed all year long then it is considered open.

A primary assumption related to cumulative effects is that the reduction of motorized access off designated routes and modification of motorized access for dispersed camping has a beneficial effect.

Existing Condition

Of the 39 sensitive plant species documented or suspected of occurring on the Ochoco National Forest and the Crooked River National Grassland, 15 have been documented in or near the analysis area, or have potential habitat that has not been surveyed. Species that occur in the project area are listed in Table 117 in bold type. Resources used to identify potential sensitive plant habitat were aerial photographs, vegetation maps, as well as personal knowledge of the analysis area.

The Regional Forester's sensitive species list was updated in 2011; however, the cover letter attached to the new list stated, *"Projects initiated prior to the date of this letter may use the updated list transmitted in this letter or the Regional Forester's Sensitive Species list that was in effect when the project was initiated"* (USFS 2011). The analysis included here is based on the 2008 list. However, the most current species list would be reviewed during project implementation planning; habitat would be evaluated, and surveys conducted according to project design criteria as needed.

Table 117. Summary of the prefield review for sensitive plants in the Ochoco Summit Project Area.

Species	Habitat	Probability of Occurrence	Rationale
Achnatherum hendersonii (Vasey) Bark. Henderson's needlegrass	Sagebrush scablands	High	Habitat Present
Achnatherum wallowaensis Maze & K.A. Robson Wallowa needlegrass	Sagebrush scablands	High	Habitat Present

Table 117. Summary of the prefield review for sensitive plants in the Ochoco Summit Project Area.

Species	Habitat	Probability of Occurrence	Rationale
Astragalus diaphanus var. *diurnus* Douglas ex Hook. S. Fk. John Day milkvetch	Western juniper woodland	Low	Outside documented range
Astragalus peckii Piper Peck's milkvetch	Sage/juniper/lodgepole pumice/coarse soils	Low	Outside documented range
Astragalus tegetarioides M.E. Jones bastard milkvetch	Sage steppe/ponderosa pine forest	Low	Outside documented range
Botrychium ascendens W.H. Wagner ascending moonwort	Wet meadows, springs, seeps	High	Habitat Present
Botrychium crenulatum W.H. Wagner crenulate moonwort	Wet meadows, springs, seeps	High	Habitat Present
Botrychium minganense Vict. Mingan's moonwort	Wet meadows, springs, seeps	High	Habitat Present
Botrychium montanum W.H. Wagner mountain moonwort	Wet meadows, springs, seeps	High	Habitat Present
Botrychium paradoxum W.H. Wagner twin-spike moonwort	Wet meadows, springs, seeps	High	Habitat Present
Calochortus longebarbatus Wats. var. *peckii* Ownbey Peck's mariposa lily	Vernally moist meadows, streambanks	High	Habitat Present
Camissonia pygmaea (Dougl. ex Lehm) Raven dwarf suncup	Low elev plains/washes w/ coarse soil or gravel	Low	No Habitat
Carex abrupta Mack. abrupt-beaked sedge	Montane, mid/high elev moist mdw/open forest	Moderate	Habitat Present
Carex diandra Schrank lesser panicled sedge	Sphagnum bog, lakeshores	Low	No Habitat
Carex lasiocarpa Ehrh. var. *americana* slender sedge	Very wet sedge mdws, along lakes/streams	Moderate	Habitat Present
Carex retrorsa Schwein. retrorse sedge	Swamps, marsh, meadows, along lakes, streams	Moderate	Habitat Present
Cheilanthes feei T. Moore Fee's lip fern	Basalt cliffs but occasionally limestone	Low	Outside documented range
Cyperus lupulinus (Spreng.) Marcks ssp. *lupulinus* Great Plains flatsedge	Riparian edge but dry hackberry, wheatgrass	Low	No Habitat
Elatine brachysperma A. Gray short-seeded waterwort	Muddy shores, shallow pools	Low	No Habitat
Eleocharis bolanderi A. Gray Bolander's spikerush	Seasonally wet; low sage/Sandberg in basalt	Moderate	Habitat Present
Eriogonum cusickii M.E. Jones Cusick's buckwheat	Juniper/big sage and low sage scabland	Moderate	Habitat Present
Heliotropium curassavicum L. salt heliotrope	Moist to dry, saline soils	Low	No Habitat
Lipocarpha aristulata (Coville) G. Tucker aristulate liptocarpa	Low elev, silty below high water along banks	Low	No Habitat
Lomatium ochocense Helliwell & Constance Ochoco lomatium	Sagebrush scablands	Low	Outside documented range
Mimulus evanescens R.J. Meinke disappearing monkeyflower	Sage/juniper vernally moist streambanks	Low	No Habitat

Table 117. Summary of the prefield review for sensitive plants in the Ochoco Summit Project Area.

Species	Habitat	Probability of Occurrence	Rationale
Muhlenbergia minutissima (Steud.) Swallen annual dropseed	Weathered lava soils in riparian	Low	No Habitat
Penstemon peckii Pennell Peck's penstemon	Stream banks Disturbed areas	Low	Outside documented range
Potamogeton diversifolius Raf. waterthread pondweed	Lakes, ponds, including created habitat	Low	Habitat Present
Rorippa columbiae (Suksd. ex B.L. Rob.) Suksd. ex Howell Columbia yellowcress	Wet meadows, moist plains, streams	Low	No Habitat
Rotala ramosior (L.) Koehne lowland toothcup	Sand and silt below high water, Low elevation	Low	No Habitat
Salix wolfii Bebb Wolf's willow	Riparian	Low	No Habitat
Talinum spinescens Torr. (*Phemeranthus spinescens*) spiny fameflower	Sagebrush scablands	Low	No Habitat
Thelypodium eucosmum B.L. Rob. arrow leaf thelypody	Dry slopes in vernal drainages	Low	Outside documented range
Utricularia minor L. lesser bladderwort	Lowland and montane fens, sedge meadows	Low	Outside documented range
Helodium blandowii (F. Weber & D. Mohr) Warnst. Blandow's bogmoss	Montane fens	Low	Specialized Habitat Present
Tomentypnum nitens (Hedw.) Loeske* tomentypnum moss	Montane fens	Low	Specialized Habitat Present
Tortula mucronifolia Schwägr. mucronleaf tortula moss	Riparian *Populus;* montane *Abies*	Moderate	Habitat Present
Dermatocarpon meiophyllizum Vain. silverskin lichen	Rocks inundated at least most of the year	Moderate	Habitat Present
Texosporium sancti-jacobi (Tuck.) Nadv. woven spore lichen	Often old root clumps, scat, or rocks	Low	Outside documented range

Management guidance for sensitive species comes from a variety of sources, including:

- *Calochortus longebarbatus var. peckii* is managed with guidance from a draft Conservation Strategy for the Ochoco National Forest (Dewey 2005).
- *Achnatherum hendersonii* and *A. wallowaensis* are managed with guidance from a draft Conservation Assessment for the Ochoco National Forest (Dewey 2007).
- *Botrychium ascendens*, *B. crenulatum*, and *B. paradoxum* are managed with guidance from a Conservation Strategy for the Wallowa-Whitman, Umatilla and Ochoco National Forests (Zika 1992).

Other species are not managed under Conservation Strategies developed specifically for Central Oregon, but guidance is used from Species Fact Sheets and Conservation Strategies from other parts of the State, such as "*Botrychium* on the Mount Hood National Forest" (Zika 1992).

Species that will not be carried through the analysis

Those species in Table 117 that are listed as "Low" do not have potential habitat, are geographically unlikely to occur within the project area, or only occur in specific habitats that would not be affected by the proposed activities. These species will not be carried further in the analysis. The *Astragalus tegetarioides* population in the southeastern part of the project area on Paulina Ranger District is the northernmost population in its range, and is not thought to extend any further; proposed activities are outside the documented range for the species. The same can be said for the *Lomatium ochocense* population on the Lookout Mountain District in the south part of the project area. Extensive surveys have been completed for both species. *Helodium blandowii* and *Tomentypnum nitens* occur in unique high elevation montane fens that are not within areas of proposed trails, and would be protected by design criteria as well.

Field surveys

Surveys for vascular sensitive plants in the project area have been conducted as early as 1980, continuing to the present. Populations of sensitive and rare plants are recorded in the NRIS database; surveys are done by the Limited Focus, and Intuitive Control survey methods. Surveys for sensitive nonvascular plant occurred in riparian areas thought to be high probability habitat from 2004 to 2009. Records containing information on survey routes, surveyor, and results are on file at the Lookout Mountain Ranger District and Paulina Ranger District offices. All routes on existing roadbeds, regardless of whether the road is open, closed, or decommissioned, is considered previously disturbed and covered with past NEPA analysis. No surveys would be necessary. Any trail proposed in this project that involves new construction will be surveyed for sensitive plants before disturbance takes place and the route is designated for use. This includes user-created trails, snowmobile routes, and other areas not previously surveyed.

The Ochoco Summit Trails project area comprises 266,738 acres within three watersheds. This boundary extends far beyond the actual area affected by the proposed trail system; it takes in the eastern portion of Lookout Mountain Ranger District and the western portion of the Paulina Ranger District. The area has a wide variety of suitable sensitive plant habitat throughout. Elevation ranges from 4,040 feet to 6,926 feet at Lookout Mountain, and corresponding precipitation from 13" to 31" annually (majority receives 21 inches). Human use has affected the project area. Impacts such as deep soil compaction and construction of roads are effectively permanent. Other effects such as erosion, dropping water tables due to stream entrenchment, livestock grazing, and activities such as fire suppression and recreational use are likely to continue, which may limit opportunities for achieving desired conditions. Sensitive plant species that may be affected by the Ochoco Summit Trail System project include those listed in Table 118.

Table 118. Populations of sensitive species that occur, or are likely to occur, within the Ochoco Summit project area.

Species	Known number of populations in the project area	Acres
Species associated with riparian habitat		
Ascending moonwort	1	11.0
Scalloped moonwort	16	26.6
Mingan's moonwort	8	7.7
Mountain moonwort	9	3.2
Peculiar moonwort	1	0.2
Peck's mariposa lily	201	2,744.8
Abrupt-beaked sedge	0	0
Slender sedge	0	0
Retrorse sedge	0	0
Mucronleaf tortula moss	0	0

Table 118. Populations of sensitive species that occur, or are likely to occur, within the Ochoco Summit project area.

Species	Known number of populations in the project area	Acres
Silverskin lichen	5	3.0
Species associated with scabland habitat		
Bolander's spikerush	0	0
Cusick's buckwheat	0	0
Henderson's/Wallowa needlegrass	21	126.5
Total	*262*	*2,923.0*

Quantity and diversity of documented sensitive species is high within the project area. Table 2 lists the known total acreage of sensitive species in the project area. Populations often are made up of separate occurrences called subpopulations that may be up to ¼ mile away from each other, usually connected by suitable habitat. Therefore spatially, the populations are spread out on the landscape.

Native vegetation in the project area has been influenced by human activities and associated changes within the last one hundred and fifty years. Most notable changes include eroded stream channels and loss of meadow and riparian habitats due to lowered water tables because of road construction, logging, livestock grazing, loss of beaver, and fire exclusion (USDA 1999). The density of fire intolerant conifers has increased, while the density of understory vegetation (grasses and shrubs) has decreased due to fire exclusion and grazing (Miller and Rose 1999, USDA 1999, Arno 2000, Agee 1993. Conditions in the analysis area generally reflect that described in the Interior Columbia Basin Draft Environmental Impact Statements (USDA/USDI 1997, 2000). As a result of human influences, conditions include a decline in species diversity and biomass of available forage, increased threats from non-native invasive plants (noxious weeds), and decline in overall landscape health.

General Effects of OHV Use on Vegetation Common to all Alternatives

Direct effects occur from physical damage to vegetation from crushing and breaking of plants as vehicles drive over them (Wilshire et. el. 1978). Plant foliage and stems can be damaged and plants uprooted by vehicles, so that actual plant damage may occur over an area much larger than the track width. Indirect effects of vehicles on vegetation include undercutting of root systems as vehicle paths are enlarged by erosion (Wilshire 1978). Other indirect effects from off-highway vehicle use include the proliferation of exotic plant species and a higher frequency of fire (Lovich and Bainbridge 1999). Effects of these impacts include alteration or destruction of macro- and micro-vegetation elements, establishment of annual plant communities dominated by exotic species, destruction of soil stabilizers, soil compaction, and increased erosion.

The severity of damage to vegetation from vehicles is related to the amount of use that a given area is receiving from OHV use. As the number of vehicle passes increases, an increase in the impact to vegetation is also seen (Adams 1982, Payne et al. 1983, Bolling and Walker 2000). Such impacts have been shown to reduce the cover of native vegetation in OHV areas (Bolling and Walker 2000). When rare plants are present in OHV areas, motorized use can detrimentally impact plant populations by reducing the number and cover of individual plants (Groom et. al. 2005). Table 119 below lists the user-created trail system being used by Central Oregon Motorcycle and ATV Club (COMAC) and the associated sensitive plant locations within travel routes. Currently it is estimated that off road vehicles are affecting approximately 2.52 miles of sensitive plants (those listed as closed or trails in the table).

Table 119. COMAC routes within sensitive plant populations.

Species	Length	Vehicle Type	Maintenance Level
Peck's mariposa lily	6,724 feet	ATV & Shared use	Open road
Peck's mariposa lily	11,571 feet	ATV & Motorcycle	Closed road
Peck's mariposa lily	1,640 feet	ATV & Motorcycle	User-created trail
Silverskin lichen	353 feet	All	Open road
Tomentypnum moss	50 feet	ATV	User-created trail
Blandow's bugmoss	51 feet	ATV	User-created trail

This is a direct effect from tires crushing plant material, but also to soil properties. Even a few passes of a vehicle can compact soil, and repeated use leads to severely compacted and disturbed soils. Such soil compaction can lead to a considerable reduction in vegetation cover, with native plant establishment impaired (Web et al. 1978, Adams 1982, Lovich and Bainbridge 1999, Bolling and Walker 2000). Soil compaction can also increase the potential for non-native, invasive plants to displace native vegetation (Prose et al. 1987, Lovich and Bainbridge, 1999).

The dirt and dust associated with OHV roads and trails can also effect the trailside vegetation (Brooks and Lair 2005). Dust accumulation on plants can impair crucial plant functions such as photosynthesis and transpiration, which can lead to reduced plant growth, recruitment, cover, and survivorship (Walker and Everett 1987).

Direct and Indirect Effects– TES Plants –Alternative 1

Alternative 1 is the No Action Alternative; no trail system would be designated, and no staging or associated camping areas would be developed. Prior to 2011, the current management policy was that most areas within the project area were open to off-road travel by motorized vehicles. This policy changed with the signed Record of Decision for the Travel Access Management Project, which became effective December 2011. This decision prohibits all motorized access outside of designated roads, trails and areas. Dispersed camping is allowed within 300' of roads. Most vehicle use occurs on roads (personal observation), and the disturbance to native vegetation from the construction of the road is a past action. In the Ochoco Summit project area as a whole there is a low level of off-road use by antler hunters and some amount of willful "mud bogging" in sensitive areas such as meadows and riparian areas (personal observation). The amount of designated open road use is expected to continue as the popularity of OHV use continues to increase and the population of Prineville and the surrounding area continues to increase.

Riparian Habitat Sensitive Species

The No Action Alternative would result in a biological evaluation determination of "No Impact" for all riparian sensitive species.

OHV use in Oregon has increased 2.5 to 5.6% per year in the last decade (Skelton pers. comm.), and it would not be unreasonable to assume that parts of the Ochoco Summit project area has also received some increase in use. New rules regulating OHV use to designated roads would presumably decrease further off-road impacts to sensitive plant species. Some amount of illegal off-road use is expected to continue, especially on the Lookout Mountain Ranger District. The Paulina Ranger District, at present, does not exhibit evidence of sustained damage to vegetation from OHVs (personal observation). It is estimated that currently there is minor impacts to Peck's mariposa lily, sedges, moonworts, and silverskin lichen populations and habitat. Tortula moss is probably not being affected

presently due to the specific habitat requirements of rock outcrops and *Populus* species dominated riparian areas.

Of the riparian sensitive species, Peck's mariposa lily has the widest ecological amplitude, occurring on a wide variety of habitat types. The project area contains approximately 46% of the global population of Peck's mariposa lily. Direct impacts to the plants are from crushing of the basal leaf. Repeated damage or loss of the basal leaf each year can reduce the life of an individual by limiting the amount of photosynthate available for bulb renewal (Fiedler 1987). Indirect effects can occur as a result of changes in the microclimate of streams and meadows in the long-term due to streambank disturbance, soil compaction, and vegetation changes. Peck's mariposa lily appears to require a particular moisture regime. The requirements of this condition are not well known due to lack of study, however observations show that altering the hydrology of stream channels is one of the largest threats to the species (Fredricks 1989).

OHV effects to moonwort, sedges, riparian moss and lichen habitat is thought to be less frequent due to the more specific and unique habitats they require. Effects to these species occur from direct crushing of plants and through changes in microclimate. Some moonwort populations are directly adjacent to open roads, such as the crenulate moonwort sites along the 4270-252, 42-430 and 4270 roads, and do have some traffic within the wet spring areas; this vehicle use is expected to continue under Alternative 1. Repeated removal of the sporangia (by crushing from tires, or sediment wash from roadsides) before dispersal could reduce reproductive potential over time (Beatty et al 2003). Habitat modification from changed hydrology patterns is more likely to affect moonwort populations. These species occupy rare, ecologically diverse habitats, and rely on mycorrhizal fungi for water and nutrients. This mycorrhizal relationship is very sensitive to changes in soil moisture, changes in temperature and humidity, or light regime (Potash 1998).

Sensitive species that occur along perennial streams - retrorse, slender and wooley sedges, and silverskin lichen, are vulnerable to direct effects from crushing of plants from OHV traffic or camping activities. Again, effects to habitat are due to changes in stream hydrology and also to soil properties. Even a few passes of a vehicle can compact soil, and repeated use leads to severely compacted and disturbed soils. Such soil compaction can lead to a considerable reduction in vegetation cover, with native plant establishment impaired (Web et al. 1978, Adams 1982, Lovich and Bainbridge 1999, Bolling and Walker 2000). Soil compaction can also increase the potential for non-native, invasive plants to displace native vegetation (Prose et al. 1987, Lovich and Bainbridge, 1999).

The dirt and dust associated with OHV roads and trails can also effect the trailside vegetation (Brooks and Lair 2005). Dust accumulation on plants can impair crucial plant functions such as photosynthesis and transpiration, which can lead to reduced plant growth, recruitment, cover, and survivorship (Walker and Everett 1987).

The current amount of specific damage to riparian sensitive species populations and habitat by OHV use is unknown, and is expected to decline as new travel rules are enforced. Local OHV clubs (COMAC) have been using an un-authorized trail system that includes 254 miles of trail. The COMAC routes, which include all types of travel routes, from open roads and user created trails, are adjacent and within sensitive plant populations. Of the COMAC trails, 2.52 miles are directly within populations, see Table 3 above.

Scabland Sensitive Species

The No Action Alternative would result in a biological evaluation determination of "No Impact" for all scabland sensitive species.

Henderson's/Wallowa needlegrass is a small bunchgrass that occurs on shallow scablands with little vegetation; the greatest potential for impacts comes from soil disturbance. Roads and trails through

these clay soils can cause changes in microclimate surrounding individual ricegrass plants, interrupt moisture flow, and reduce infiltration through compaction. The successional status of Henderson's/Wallowa needlegrass is unknown. It is a deep-rooted perennial bunchgrass confined to a habitat that receives little disturbance. Therefore, it is likely this plant is an indicator of late seral condition. Poor soil productivity does not allow recovery on these sites, and mechanical impacts are long-term, basically permanent (LRMP 1989). Bolander's spikerush occurs in moist areas within habitat similar to the sensitive needlegrasses, as does Cusick's buckwheat, and effects to the plant and habitat would be similar from OHV impacts. There are no known sites of these two species on the Ochoco National Forest. Currently, there are no trails within needlegrass populations, however 40 miles of COMAC trails occur within scabland habitat. Use of these trails is expected to decrease as travel rules are enforced.

Direct and Indirect Effects– TES Plants –Alternative 2

Alternative 2 is the Proposed Action, which would designate a trail system, staging and play areas, and associated camping facilities for all classes of off-highway vehicles. Associated with this action, roads would also be closed and/or decommissioned with appropriate restoration activities to promote recovery of the closed road. Approximately 170 miles of trail would be designated open for travel; this includes 69 miles of new construction, 55 miles of reconstructing previously closed or decommissioned roads, and 46 miles of open road. The trails would include 142 stream crossings, 10 staging areas, and 6 trailheads.

This alternative adds 170 miles of trail to the open roads, trails, and gravel pits that are already designated for OHV use in the project area. In 2007 it was estimated that in Central Oregon as a whole, there were approximately 52,000 visitors using trail systems (Ramming, pers. comm.). The North Millican OHV area had 9,985 riders in 2008, which has similar weather and predicted period of use as the Ochoco Summit proposed trail system (Skelton 2010). In the long-term it is expected that the use would increase by 2.5-5.6 percent per year (Skelton 2010). Estimating on the low end of increase in the first half of the decade due to the current recession, and the high end on the second half of the decade, it is estimated there may be 15,000 riders using the Ochoco Summit trail system by 2020. This may likely be underestimated based on the 52,000 riders using Central Oregon trails.

Riparian Habitat Species

Alternative 2 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all riparian sensitive species.

This alternative proposes 31 crossings of perennial streams, totaling 13.8 miles within the RHCA, which is high-probability habitat for the sedges, tortula moss, silverskin lichen, and moonworts. Perennial streams are also moderate to high probability habitat for Peck's mariposa lily. Table 120 lists the sensitive plant populations that would be affected based on the current trail location proposal, which includes 1,645 feet of trail directly within Peck's mariposa lily populations. Project design criteria would prohibit designating trails within these populations (see Chapter 2 of the EIS); however moving the trail out of the known distribution of this particular plant may still be a risk, as the plant does not flower consistently and exact population perimeter is difficult to determine.

Stream crossings would be designed to reduce impacts to water quality (see project design features in Chapter 2 of the EIS) by development such as bridges, elevated puncheons, or culverts. This would help reduce impacts to sensitive plant habitat from repeated traffic.

Table 120. Length of trail proposed within sensitive plant populations.

Species	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Comments
Peck's mariposa lily	0 feet	200 feet	0 feet	200 feet	Crosses in two places
Peck's mariposa lily	0 feet	160 feet	0 feet	160 feet	Alternatives 2 & 4 include staging area
Peck's mariposa lily	0 feet	750 feet	750 feet	750 feet	
Peck's mariposa lily	0 feet	350 feet	350 feet	350 feet	
Peck's mariposa lily	0 feet	0 feet	0 feet	630 feet	Crosses in two places
Peck's mariposa lily	0 feet	185 feet	185 feet	185 feet	
Total	0 feet	1,645 feet	1,285 feet	2,275 feet	

Approximately 9.9 miles of proposed trail within perennial stream habitat either is a new route, or on a closed or decommissioned roadbed (see Table 121). This equates to 12 acres (at an average 10-foot disturbance width). In addition to trails within perennial streams, there are 76 proposed crossings within class 4 intermittent streams, which is Peck's mariposa lily habitat. The amount of trail within the class 4 RHCA is 2.3 miles, or approximately 2.8 acres of disturbance. These acreages are small when put in context of the overall amount of land in the project area due to the linear nature of trails. This is especially true considering the vast amount of the planning area where no trails are proposed - the southern half of the project area. Indirect effects from dust and carbon emissions to vegetation will be long-term, for however long the trail system is in existence. Dust raised by OHV traffic can disrupt photosynthetic processes, thereby suppressing plant growth and vigor, especially along OHV 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 endemic biodiversity (USGS 2007).

Effects due to erosion and physical crushing of vegetation directly adjacent to the stream, is not expected because of project design criteria mitigations, which include hardened crossings, bridges and culverts.

There are 10 staging areas, 7 trailheads, and 2 play areas planned within ¼ mile of riparian sensitive plant habitat. These are areas where vehicles, both off-road and passenger vehicles, will congregate. There is a staging area planned directly within a Peck's mariposa lily population along a tributary of Buck Hollow Creek. The greatest effect to sensitive plants in Alternative 2 would come from this staging area, which would likely destroy 0.75 acres of Peck's lily and habitat. The effect may be greater if disturbance increases beyond the currently designated area for staging.

The closest distance for the other staging and play areas is about 215 feet away from the stream. There may be impacts to this riparian area habitat from unauthorized riding from these points, where use can radiate out in many directions. Matchett and others (2004) point out that OHV use may be heaviest on slopes, along right-of-ways, in washes, and in the vicinity of camping facilities. Figure 3 was taken from a study by Webb (1982) on effects to desert soil by motorcycles, showing an area open to OHV use. The area was heavily impacted by trail convergence, passenger vehicles and camping. The study found that after 10 passes of a motorcycle on desert soil, crust and annual plants were destroyed. The terrain in the Ochoco Summit project area is more confined than in this example due to a mostly forested, mountainous setting; however, it is reasonable to conclude that OHV use would be heavier and more difficult to regulate around staging and camping areas.

Table 121. Proposed trails within riparian sensitive species habitat, perennial streams.

Trail Type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Closed	0 miles 0 acres	5.57 miles 6.7 acres	1.1 miles 1.3 acres	5.9 miles 7.1 acres
Decommissioned	0 miles 0 acres	0.71 miles 0.9 acres	0.53 miles 0.64acres	0.93 miles 1.1 acres
New	0 miles 0 acres	3.62 miles 4.4 acres	2.9 miles 3.5 acres	3.9 miles 4.7 acres

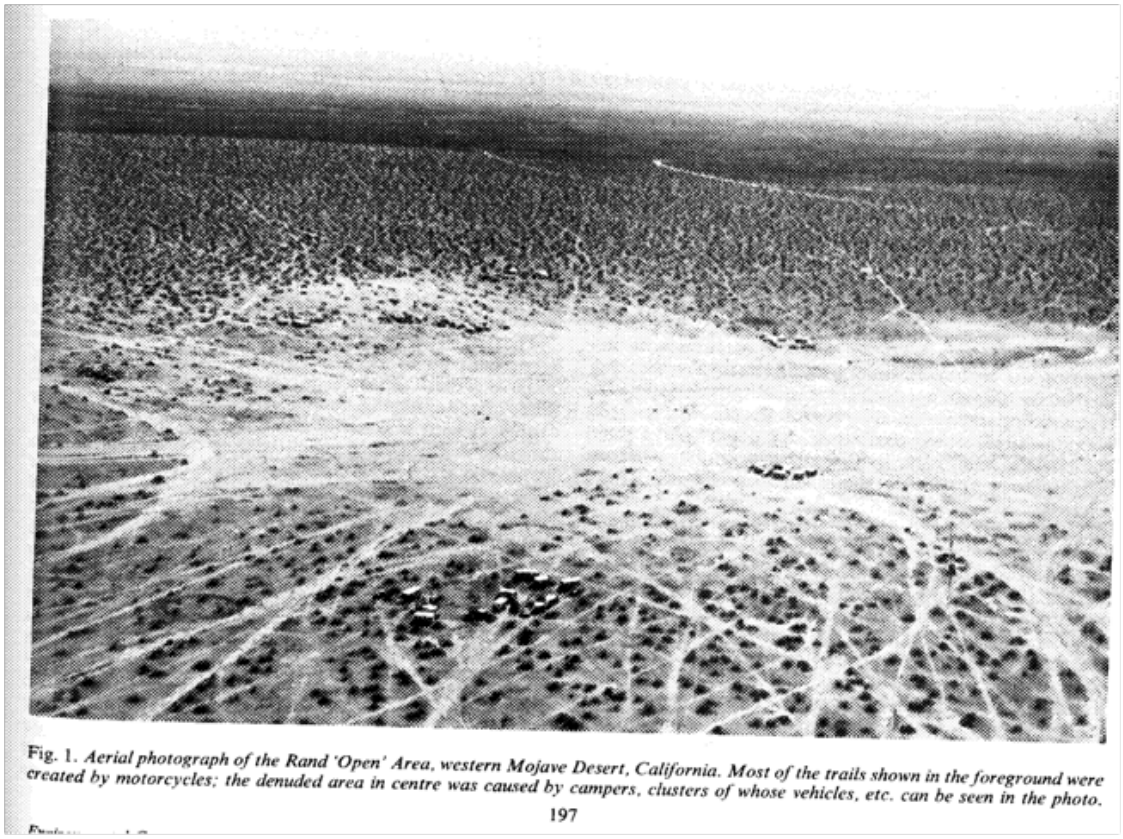
Fig. 1. *Aerial photograph of the Rand 'Open' Area, western Mojave Desert, California. Most of the trails shown in the foreground were created by motorcycles; the denuded area in centre was caused by campers, clusters of whose vehicles, etc. can be seen in the photo.*
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Figure 5. Trail Density and Denuded Camping Area in the Mojave Desert.

Scabland Habitat Species

Alternative 2 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all scabland sensitive species.

There are no trails proposed within needlegrass, Cusick's buckwheat, or Bolander's spikerush populations. These species all occupy roughly the same habitat types, primarily low and rigid sage, Sandberg's bluegrass on shallow soils. There are 72.3 miles of trail proposed in Alternative 2 within this type of habitat (see Table 122). Using an approximate distance of 10 feet for trail disturbance, this equals about 88 acres of the 64,609 acres of scabland sensitive species habitat in the planning area (less than 1%). Affected Bolander's spikerush habitat would be less than 88 acres because it occupies moist meadows within the scabland habitat. Habitat mapping at that level of detail has not been done, so the exact figure is unknown.

Scablands are recognized as among the most fragile ecosystems on the Ochoco National Forest (USDA 1989). Damage to soil and vegetation is nearly impossible to mitigate due to shallow, unproductive soils. These soils also become heavily saturated and are susceptible to rutting (see Chapter 3 Soil Resource). Impacts of constructed trails and roads are very long-term, if not permanent. Although the effect to this habitat is less than 1%, trails are not easily restored or repaired if used when wet. A project design feature was developed to protect TES plant habitat, by closing the trail system when adverse conditions exist that may result in resource damage (rutting, runoff, etc), however in scabland habitat, once the damage is done, it is permanent.

There are 4 staging areas, 1 trailhead, and 2 play areas planned within scabland sensitive plant habitat. These are areas where vehicles, both off-road and passenger vehicles, will congregate. There are impacts expected to this habitat both from the development of the recreation areas (the exact area is unknown because they are not designed yet, but are estimated at 18 acres), and from unauthorized riding from these points, where use can radiate out in many directions (see Figure 3 and discussion above). These gathering area sites were chosen because most of them have already been disturbed. There is a risk of spreading invasive plants to connected sensitive scabland species habitat that is not disturbed (see Invasive Plant discussion).

Table 122. Trails proposed within scabland sensitive species habitat.

Alternative	New construction	Closed/Decommissioned	Open roads
Alternative 2	30.6 miles	20.1 miles	21.6 miles
Alternative 3	19.2 miles	16.2 miles	7.9 miles
Alternative 4	38.6 miles	22.0 miles	22.7 miles

Direct and Indirect Effects– TES Plants –Alternative 3

Alternative 3 would designate a trail system, staging and play areas, and associated camping facilities for motorcycles and ATVs. The motorcycle loop would be concentrated on the west side of the project area (Paulina Ranger District), while the ATV area would be on the east side of the project area near Highway 26. No OHV trails for jeeps and small trucks (80 inch category) would be included in this alternative. Associated with this action, roads would also be closed and/or decommissioned with appropriate restoration activities that would promote the recovery of the closed road. Approximately 101 miles of trail would be designated open for travel; this includes 50 miles of new construction, 37 miles of reconstructing previously closed or decommissioned roads, and 14 miles of open roads. The trails would include 62 stream crossings, and 4 staging areas.

This alternative adds 101 miles of trail designation (approximately 83 acres) in addition to current designated open roads and dispersed camping areas.

Riparian Habitat Species

Alternative 3 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all riparian sensitive species.

This alternative proposes 21 perennial stream crossings, for a total of 6 miles in the RHCA, which is high-probability habitat for the sedges, tortula moss, silverskin lichen, and moonworts. Perennial streams are also moderate to high probability habitat for Peck's mariposa lily. Table 121 lists the sensitive plant populations that would be affected based on the current trail location proposal, which includes 1,285 feet of trail directly within Peck's mariposa lily populations. A project design criteria would prohibit designating trails within these populations (see Chapter 2 of the EIS), however moving the trail out of the known distribution of this particular plant may still be a risk, as the plant does not flower consistently and exact population perimeter is difficult to determine.

Stream crossings would be designed to reduce impacts to water quality (see project design features in Chapter 2 of the EIS) by development such as bridges, elevated puncheons, or culverts. This would help reduce impacts to sensitive plant habitat.

There are also trails planned within riparian sensitive species habitat. Approximately 4.5 miles of proposed trail within perennial stream habitat either is a new route, or on a closed or decommissioned roadbed (see Table 121). This equates to 5.4 acres (at an average10-foot disturbance width). In addition to trails within perennial streams, there are 34 proposed crossings (1.2 miles equating to 1.4 acres) proposed within class 4 intermittent streams, which is Peck's mariposa lily habitat. These acreages are small when put in context of the overall amount of area in the project area due to the linear nature of trails. This is especially true considering the vast amount of the planning area where no trails are proposed - the southern half of the project area. Indirect effects from dust and carbon emissions to vegetation will be long-term, for however long the trail system is in existence. Effects due to erosion and physical crushing of vegetation are not expected because of project design criteria mitigations, which include hardened crossings, bridges and culverts.

Alternative 3 does not include the staging area near Buck Hollow Creek that lies within a Peck's mariposa lily population, eliminating the direct effect to this population. There are four staging areas planned within ¼ mile of riparian sensitive plant habitat. These are areas where vehicles, both off-road and passenger vehicles, will congregate. The closest distance is about 230 feet away from the stream. There may be impacts to this riparian area habitat from unauthorized riding from these staging areas.

Scabland Habitat Species

Alternative 3 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all scabland sensitive species. However, this Alternative would have the least effect to scabland sensitive species of the action alternatives.

There are no trails proposed within needlegrass, Cusick's buckwheat, or Bolander's spikerush populations. These species all occupy roughly the same habitat types, primarily low and rigid sage, Sandberg's bluegrass on shallow soils. There are 43.3 miles of trail proposed in Alternative 3 within this habitat type (see Table 121). Using an approximate distance of 10 feet for trail disturbance this equals about 53 acres of the 64,609 acres of scabland sensitive species habitat in the planning area (less than 1%). Affected Bolander's spikerush habitat would be less than 53 acres because it occupies moist meadows within the scabland habitat. Habitat mapping at that level of detail has not been done, so the exact figure is unknown.

There are no staging areas, trailheads, or play areas planned within scabland sensitive plant habitat in Alternative 3. This, along with the least amount of proposed trails in scablands, results in the least impact of the action alternatives.

Direct and Indirect Effects– TES Plants –Alternative 4

This alternative proposes 212 miles for approximately 173 acres, and 170 stream crossings. New construction of trails would comprise 81 miles (38.4 acres). There are also 10 staging areas, 3 play areas, and 7 trailheads planned. There are 22 miles of OHV trails in Riparian Habitat Conservation Areas. Road closures and associated restoration activities would also take place.

Riparian Habitat Species

Alternative 4 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all riparian sensitive species.

This alternative proposes 38 crossings of perennial streams, totaling 17.6 miles in the RHCA, which is high-probability habitat for the sedges, tortula moss, silverskin lichen, and moonworts. Perennial streams are also moderate to high probability habitat for Peck's mariposa lily. Table 121 lists the sensitive plant populations that would be affected based on the current trail location proposal, which includes 2,275 feet of trail directly within Peck's mariposa lily populations. A project design criteria would prohibit designating trails within these populations (see Chapter 2 of the EIS), however moving the trail out of the known distribution of this particular plant may still be a risk, as the plant does not flower consistently and exact population perimeter is difficult to determine.

Stream crossings would be designed to reduce impacts to water quality (see project design features in Chapter 2 of the EIS) by development such as bridges, elevated puncheons, or culverts. This would help reduce impacts to sensitive plant habitat from repeated traffic.

Approximately 10.7 miles of proposed trail within perennial stream habitat either is a new route, or on a closed or decommissioned roadbed (Table 121). This equates to 12.9 acres (at an average10-foot disturbance width). In addition to trails within perennial streams, there are 2.75 miles, 3.3 acres (92 stream crossings) proposed within class 4 intermittent streams, which is Peck's mariposa lily habitat. These acreages are small when put in context of the overall amount of area in the project area due to the linear nature of trails. This is especially true considering the vast amount of the planning area where no trails are proposed - the southern half of the project area. Indirect effects from dust and carbon emissions to vegetation will be long-term, for however long the trail system is in existence. Dust raised by OHV traffic can disrupt photosynthetic processes, thereby suppressing plant growth and vigor, especially along OHV 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 endemic biodiversity (USGS 2007).

Effects due to erosion and physical crushing of vegetation directly adjacent to the stream, is not expected because of project design criteria mitigations, which include hardened crossings, bridges and culverts.

There are 7 staging areas, 1 trailhead, and 1 play area planned within ¼ mile of riparian sensitive plant habitat. These are areas where vehicles, both off-road and passenger vehicles, will congregate. Like Alternative 2, there is a staging area planned directly within a Peck's mariposa lily population near Buck Hollow Creek. The greatest effect to sensitive plants in Alternative 4 would come from this staging area, which would likely destroy 0.75 acres of Peck's lily and habitat. The effect may be greater if disturbance increases beyond the currently designated area for staging.

The closest distance for the other staging and play areas is about 215 feet away from the stream. There may be impacts to this riparian area habitat from unauthorized riding from these staging and play areas from use radiating out in many directions (Matchett et al 2004).

Scabland Habitat Species

Alternative 4 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all scabland sensitive species.

There are no trails proposed within needlegrass, Cusick's buckwheat, or Bolander's spikerush populations. These species all occupy roughly the same habitat types, primarily low and rigid sage, Sandberg's bluegrass on shallow soils. There are 83.3 miles of trail proposed in Alternative 4 within this type of habitat (see Table 121). Using an approximate distance of 10 feet for trail disturbance, this equals about 101 acres of the 64,609 acres of scabland sensitive species habitat in the planning area (less than 1%). Alternative 4 also proposes the most miles, 38.6, of new trail construction through scabland sensitive species habitat, impacting the most habitat of all the Alternatives. Affected

Bolander's spikerush habitat would be less than 101 acres because it occupies moist meadows within the scabland habitat. Habitat mapping at that level of detail has not been done, so the exact figure is unknown.

Scablands are recognized as among the most fragile ecosystems on the Ochoco National Forest (USDA 1989). Damage to soil and vegetation is nearly impossible to mitigate due to shallow, unproductive soils. These soils also become heavily saturated and are susceptible to rutting (see Chapter 3 Soil Resource). Impacts of constructed trails and roads are very long-term, if not permanent. Although the effect to this habitat is less than 1%, trails are not easily restored or repaired if used when wet. A project design feature was developed to protect TES plant habitat, by closing the trail system when adverse conditions exist that may result in resource damage (rutting, runoff, etc), however in scabland habitat, once the damage is done, it is permanent.

There are 4 staging areas, and 1 play area planned within scabland sensitive plant habitat. This is fewer than Alternative 2. These are areas where vehicles, both off-road and passenger vehicles, will congregate. There are impacts expected to this habitat both from the development of the recreation areas (the exact area is unknown because they are not designed yet, but are estimated at 14 acres), and from unauthorized riding from these points, where use can radiate out in many directions (see discussion under Alternative 2).

Cumulative Effects – TES Plants

Within the last decade, past management in the project area has focused on thinning small diameter trees, and using prescribed fire to reduce fuel loadings, which has little cumulative effect to the proposed trail system. Harvest generally avoids riparian areas where sensitive plants and habitat occur. Harvest also does not occur on scablands. New roads associated with harvest have mostly been limited to temporary roads outside of scabs and riparian areas, and are closed after use. Some areas within the project area, such as Deep Watershed, have had extensive restoration activities in both the uplands and riparian areas. The upland scabland-juniper interface has had juniper encroachment removal, which is a benefit to scabland sensitive species. Riparian areas have also had restoration activities such as headcut repair, fencing, planting, and culvert replacement. While there are short-term effects to riparian sensitive species habitat, cumulatively these actions will be a benefit in the future.

The ground disturbing activities listed in the paragraph above have undoubtedly contributed to and will continue to contribute to the introduction and spread of invasive plant species. The present patterns of recreational use with dispersed campsites and OHV use contribute to the continued spread of invasive plant infestations. The spread of invasive plant species is second only to habitat destruction for endangering imperiled species (Flather et. al. 1994). Implementation of the proposed OHV project would increase the risk of introducing invasive plant infestations in off road areas.

A December 2011 Forest-wide Travel Management Plan decision, closes the Ochoco National Forest to cross country travel except on designated routes or in designated areas. Following implementation of the forest-level Travel Management Plan acres of disturbed habitat would be limited to only those roads and motorized trails that are designated as open to the public for motorized use. COMAC routes that do not overlap with the Ochoco Summit OHV Trails would also be closed. Additional road closures proposed in the action alternatives (see Chapter 2 of the EIS) would combine with the Travel Management Plan so that disturbance would be reduced overall. Prohibiting overland use of OHVs would also reduce the risk of introducing invasive plant infestations in off road areas not associated with designated trails.

Sensitive Species Determination

The Ochoco Summit OHV Environmental Impact Statement addresses the need to provide recreation opportunities for off-road motorized vehicle use. The proposed activities would have negative effects

on sensitive plants with suitable habitat within the project area. Table 123 contains the expected effects to sensitive plants for each of the alternatives. These determinations are based on the assumption that all design elements and proper coordination at implementation is in effect. The environmental effects section of the document provides the rationale for each determination.

Table 123. Alternative effects summary to sensitive plant populations and habitat for the Ochoco Summit OHV Trail System Project Area.

Species	Alt 1	Alt 2	Alt 3	Alt 4
Achnatherum hendersonii	NI	MIIH	MIIH	MIIH
Achnatherum wallowaensis	NI	MIIH	MIIH	MIIH
Astragalus diaphanus var. *diurnus*	NI	NI	NI	NI
Astragalus peckii	NI	NI	NI	NI
Astragalus tegetarioides	NI	NI	NI	NI
Botrychium ascendens	NI	MIIH	MIIH	MIIH
Botrychium crenulatum	NI	MIIH	MIIH	MIIH
Botrychium minganense	NI	MIIH	MIIH	MIIH
Botrychium montanum	NI	MIIH	MIIH	MIIH
Botrychium paradoxum	NI	MIIH	MIIH	MIIH
Calochortus longebarbatus var. *peckii*	NI	MIIH	MIIH	MIIH
Camissonia pygmaea	NI	NI	NI	NI
Carex abrupta	NI	MIIH	MIIH	MIIH
Carex diandra	NI	NI	NI	NI
Carex lasiocarpa var. *americana*	NI	MIIH	MIIH	MIIH
Carex retrorsa	NI	MIIH	MIIH	MIIH
Cheilanthes feei	NI	NI	NI	NI
Cyperus lupulinus ssp. lupulinus	NI	NI	NI	NI
Elatine brachysperma	NI	NI	NI	NI
Eleocharis bolanderi	NI	MIIH	MIIH	MIIH
Eriogonum cusickii	NI	MIIH	MIIH	MIIH
Heliotropium curassavicum	NI	NI	NI	NI
Lipocarpha aristulata	NI	NI	NI	NI
Lomatium ochocense	NI	NI	NI	NI
Mimulus evanescens	NI	NI	NI	NI
Muhlenbergia minutissima	NI	NI	NI	NI
Penstemon peckii	NI	NI	NI	NI
Potamogeton diversifolius	NI	NI	NI	NI
Rorippa columbiae	NI	NI	NI	NI
Rotala ramosior	NI	NI	NI	NI
Salix wolfii	NI	NI	NI	NI
Talinum spinescens (Phemeranthus spinescens)	NI	NI	NI	NI
Thelypodium eucosmum	NI	NI	NI	NI
Utricularia minor	NI	NI	NI	NI
Helodium blandowii	NI	NI	NI	NI
Tomentypnum nitens	NI	NI	NI	NI
Tortula mucronifolia	NI	MIIH	MIIH	MIIH
Dermatocarpon meiophyllizum	NI	MIIH	MIIH	MIIH
Texosporium santi-jacobi	NI	NI	NI	NI

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* - Will Impact Individuals or Habitat With A Consequence That The Action May Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To The Population or Species.
BI - Beneficial Impact
N/A - No Habitat or Species Present
***Trigger For A Significant Action As Defined in NEPA**
****Note: Rationale For Conclusion of Effect Is Contained In The NEPA Document.**
Form 2 (R-1/4/6-2670-95)

Non-native Invasive Plants

Introduction

The term invasive plant broadly encompasses all invasive aggressive or harmful non-indigenous plant species, including those designated as noxious weeds. Noxious weeds are those species of foreign origin, which have been listed by the Secretary of Agriculture or responsible state official, which can directly injure crops, or other interests of agriculture, fish and wildlife resources, or the public health. Some noxious weeds are toxic to wildlife, while others are simply unpalatable. The terms invasive plant, noxious weed, and weed are used interchangeably in the text.

Regulatory Framework

Invasive plants are non-native, introduced plants that have the ability to spread into natural habitats where they alter plant communities by displacing native species. Noxious weed is a legal term designated by state and county weed control laws. Noxious weeds are introduced to the United States; there are no native biological agents to keep them in check, and in sufficient numbers they can reduce biological diversity, increase fire risk, poison livestock, and reduce the quality of wildlife forage. The term invasive plant, as used in this document includes all non-native, aggressive species, including noxious weeds. Management of invasive plants is regulated by:

- The Federal Noxious Weed Act of 1974, as amended (7 U.S.C 2801 et seq.) requires cooperation with state, local, and other federal agencies in the application and enforcement of all laws and regulations relating to management and control of noxious weeds.
- U.S. Forest Service Manual 2900 directs the Forest Service to use an integrated weed management approach to control and contain the spread of noxious weeds on National Forest System (NFS) lands and from NFS lands to adjacent lands.
- Executive Order 13112 (1999) directs federal agencies to reduce the spread of invasive plants. Invasive species have been identified by the current Chief of the Forest Service as one of the four threats to ecosystem health.

In October 2004, the Chief of the Forest Service released a National Strategy and Implementation Plan for Invasive Plant Species Management – part of the President's Healthy Forest Initiative. It focuses on four key elements: preventing invasive species before they arrive; finding new infestations before they spread and become established; containing and reducing existing infestations; and rehabilitating and restoring native habitats and ecosystems.

Invasive plant management direction contained in Land and Resource Management Plans of the Ochoco National Forest has been amended by the recently published *Pacific Northwest Region Invasive Plant Program – Preventing and Managing Invasive Plants* Record of Decision (USFS 2005). This site-specific FEIS follows new Standards and Guidelines as outlined in the regional document. The regional Record of Decision also releases the USDA Forest Service from direction provided by the 1988 Environmental Impact Statement and 1988 Record of Decision for Competing and Unwanted Vegetation, and the associated 1989 Mediated Agreement for invasive plant management. The R6 2005 ROD added goals, objectives, and standards for invasive plant management by amending the Ochoco National Forests' LRMP.

Treatment of noxious weeds is regulated by the 2012 Invasive Plant Treatments Final Environmental Impact Statement for the Deschutes and Ochoco National Forests, and various categorical exclusions for manual treatment.

Local prevention measures are outlined in the "Deschutes and Ochoco National Forests and Crooked River National Grassland Invasive Plant Prevention Practices" dated January 2006.

Analysis Methods

The existence, introduction, and spread of weeds are difficult to quantify and attribute specifically to any one vector on a landscape. As a result, this effects analysis will provide a mostly qualitative assessment of the alternatives on the risk potential for weed spread as a function of off-road vehicles, and adjacency of known invasive plant populations. Off-road vehicles are a physical vector of weed introduction and spread, and cause disturbance that creates a weed-susceptible environment.

Invasive plant population, as used here, describes a weed occurrence that can be as small as one plant, to as large as thousands of plants but are spatially separated from other occurrences. Most noxious weed infestations begin on disturbed areas, such as road shoulders, harvest landings, and recreation sites. The level of potential risk of invasive plants among the four alternatives is measured by:

- total mileage of motorized routes designated for this project
- route adjacency to areas infested with weeds

Assumptions used in the analysis:

- Project Design Criteria (PDCs) for invasive plants listed in Chapter 2 of the EIS would be implemented and enforced.
- Vehicles are a vector for the establishment and spread of invasive plants. The more miles that are open to motorized use, the greater the potential for invasive plant spread.
- All highways and open Forest Service roads would continue to receive motorized use by all types of vehicles, which is the same for all alternatives. The differences between alternatives are based on the number of trail miles proposed.
- All forms of motorized vehicles are lumped together in the botany analysis, regardless of class of vehicle. Trails are considered to be 10-feet wide, regardless of class of vehicle, to account for effects from microclimate changes, dust, vehicles passing, etc.
- As determined by the Travel Access Management decision, cross-country travel would not be permitted within the project area.
- A 2.5 to 5.6 percent yearly increase in the number of riders would occur for each of the action alternatives.

Existing Condition

Currently there are 524 noxious weed populations encompassing 2,090 acres within the project area. See Table 124 for a list of weeds present. These weed sites range from a handful of plants, acres of scattered individuals, to areas with complete noxious weed cover. Systematic weed inventories have been completed in some areas through project botanical surveys; other informal inventories occur as Crook County Weed Control and Forest Service personnel travel throughout the project area.

Table 124. Noxious Weed Occurrence within the Ochoco Summit Analysis Area.

Species	Common Name	Morphology	Number of Populations	Acres
Acroptilon repens	Russian knapweed	Perennial with adventitious shoots	3	0.9
Cardaria draba	Whitetop	Rhizomatous perennial	18	5.8
Carduus nutans	Musk thistle	Biennial / winter annual	1	0.1
Centaurea biebersteinii	Spotted knapweed	Short-lived perennial	73	149.8
Centaurea diffusa	Diffuse knapweed	Herbaceous annual to perennial	26	41.3
Centaurea solstitialis	Yellow starthistle	Herbaceous annual	3	18.4
Cirsium arvense	Canada thistle	Perennial with adventitious root buds	83	21.3

Table 124. Noxious Weed Occurrence within the Ochoco Summit Analysis Area.

Species	Common Name	Morphology	Number of Populations	Acres
Convulvulis arvensis	Field bindweed	Herbaceous perennial	5	0.8
Cynoglossum officinale	Houndstongue	Herbaceous biennial or short-lived perennial	204	1,787.7
Cytisus scoparius	Scotch broom	Woody perennial shrub	1	0.1
Dipsacus fullonum	Teasel	Herbaceous biennial	10	3.0
Euphorbia esula	Leafy spurge	Herbaceous perennial	1	0.25
Hypericum perforatum	St. John's-wort	Rhizomatous perennial	10	4.6
Leucanthimum vulgare	Oxeye daisy	Rhizomatous perennial	3	0.2
Linaria dalmatica	Dalmatian toadflax	Perennial with adventitious root buds	4	0.78
Linaria vulgaris	Yellow toadflax	Perennial with adventitious root buds	3	0.6
Onopordum acanthium	Scotch thistle	Herbaceous biennial	8	3.7
Potentilla recta	Sulfur cinquefoil	Herbaceous perennial	10	3.8
Salvia aethiopis	Mediterranean sage	Herbaceous biennial	11	5.9
Taeniatherum caput-medusae	Medusahead	Annual grass	47	40.7
Total			**524**	**2,089.8**

Table 124 does not include low priority species such as bull thistle, mullein, cheatgrass, North Africa grass, or other species that are not tracked in databases kept by the Forest due to abundance. Canada thistle is also under-represented in Table 124 because the Forest stopped keeping records on small populations due to abundance.

Few noxious weed populations present in the project area can be treated with herbicides under the current authority of the Noxious Weed EA. Weed populations discovered or introduced outside the treatment units designated in 1998 cannot be controlled with herbicides due to lack of environmental analysis. An environmental impact statement is currently being prepared that would allow control of most populations of invasive plants using herbicides; the decision is expected in 2012.

The morphology of noxious weeds determines how a plant reacts to other control methods. Hand-pulling rhizomatous perennials such as whitetop and toadflax, is not effective, they are species that usually increase in density using manual control because new plants form from any root segments left in the soil after pulling the mature plant. Biennial plants can be reduced in density with diligent, twice-yearly manual pulling. Very small patches of medusahead can be controlled by diligent hand pulling throughout the growing season, however most infestations are too large to effectively pull the vast numbers of this annual grass. Species such as spotted and diffuse knapweed are perennial plants that have deep root structures and do not respond to manual control.

Most of the noxious weed sites within the project area are found along road corridors. From these points of initial infestation, weed species become opportunistic in invading suitable microhabitats adjacent to the initial infestation site. Exceptions to this include the Snowshoe area in the northwest corner of the project area, and Roba, which is located in the southeast. These two areas contain large infestations of houndstongue that has invaded riparian and forest habitats rather than roadsides. Most of the noxious weed species within the project area thrive in open full sunlight on disturbed soils in which native species have been diminished or displaced (conditions commonly associated with roads). Most of the noxious weed species listed in Table 124 are spread by vehicle traffic making

road corridor weed sites of high concern. Medusahead and houndstongue are primarily spread by other means. These weeds are extremely competitive, have rapid spread rates and are moved around by wind, and animals in addition to vehicles. Low priority weed species, such as Canada thistle and bull thistle, also readily establish where soil and plant associations have been disturbed. These species, however, are not highly persistent and populations usually decline as the tree canopy closes and/or with competition from seeded/native species.

Direct and Indirect Effects – Alternative 1

All-terrain vehicles can affect the project area in two ways, the new introduction of invasive plants by bringing seed in from elsewhere, and the spread of established infestations in the planning area by creating disturbance. Travel Management rules allow vehicle use and camping on most gravel and native surface roads. Exceptions include individual roads signed as closed to vehicle traffic, and areas such as Lookout Mountain Roadless Area. There are also seasonal closures of spur roads in the southern portion of the project area during fall and winter. OHV use in the east part of the project area is low, mostly local riders, with an increase during hunting season (personal observation). The western part of the project area receives more OHV use, presumably because it is closer to Prineville. There are no designated OHV trails within the area to draw riders specifically for recreational trail riding, and no designated trails are proposed in this alternative. Therefore, the probability of increase in establishment and spread of noxious weeds is equal to the current condition; vehicles would continue to be a vector of weed spread. No new trails that would provide susceptible environment for noxious weed establishment, and there would be fewer OHVs to act as vectors of weed spread.

The effects of the project on noxious weed introduction, establishment, and spread is indicated by the area of potential disturbance as measured in miles of designated roads and trails to be used for OHV routes within the project area. Table 125 indicates miles of potential disturbance by alternative and a description of effects in the sections following.

Table 125. Miles of designated trail, and number of gathering areas by alternative.

Alternative	1	2	3	4
Existing routes	0	46.4	13.8	53.2
Closed routes	0	43.2	29.4	61.1
Decommissioned routes	0	11.4	7.5	13.4
New routes	0	69.1	50.3	84.5
Total miles	**0**	***170.1***	***101***	***212.2***
Staging areas	0	10	4	10
Play areas	0	3	0	1
Parking areas	0	1	0	0
Trailheads	0	6	0	0
Total number of areas	***0***	***20***	***4***	***11***

OHV use would continue to occur under the No Action alternative. The resulting risk of weed introduction is moderate in the planning area. OHVs brought to the project area that are not clean may harbor weed seed and plant parts that can introduce new infestations. OHVs can also run through existing weed infestations, further spreading the population by creating additional disturbance for a seed bed, or picking up seed and carrying it to another portion of the area. There are several areas open to cross country travel (such as rock pits) within the Ochoco Summit project area that have noxious weed populations. These sites include Walton Lake Sno-Park, Crystal, Scotts Camp, Podo and Six Corners. OHV users that recreate in these areas are likely to cause new weed infestations in the project area.

No new trails would be designated or constructed within or adjacent to the Snowshoe or Roba areas. These areas have large populations of noxious weeds, primarily houndstongue, across the landscape. Less soil disturbance and fewer vehicles results in less risk of weed introduction and spread in this alternative.

Direct and Indirect Effects - Alternatives 2, 3, and 4

There has been a dramatic increase in OHV use in Oregon over the last 20 years. A publication by Lindberg (2009) for Oregon State Parks reports that there were nearly 139,000 in-state permits given out in 2008 for OHVs. Central Oregon is the 4th most used region for recreational riding in the state, with 382,218 trip days (including riders from out-of-state it is 449,668 trip days). Designating a trail system within the Ochoco Summit project area would increase the OHV use. The increased use of OHVs within the project area would increase the introduction and spread of noxious weeds for Alternatives 2, 3, and 4.

Seeds from many species of noxious weeds can be carried within the tread of tires or in cracks and crevices of motor vehicles and then become dislodged in other areas. A study done by Montana State University (Tayor 2011) determined that there is little difference in the number of seeds picked up by different vehicles. OHVs and passenger vehicles all collect the same number of seeds, and these seeds can remain attached to the vehicle after travelling 160 miles. It is then reasonable to assume that unwashed vehicles coming from other areas can bring new weed species to the project area. When tires of motor vehicles displace topsoil and damage vegetation, the resulting bare soil becomes potential sites for weed establishment. A Montana State University Extension Service Bulletin (1992) explains that rapid dispersal of weeds is characteristic of motorized routes where “ORVs can quickly spread 2,000 knapweed seeds over a ten mile area,” and a 1998 bulletin states, “Protecting and conserving the surface soil are critical to the long-term sustainability of healthy, functioning ecosystems. In one study, runoff was 1.5 times higher and sediment yield was 3 times higher on spotted knapweed-dominated plots than on plots dominated by the native bluebunch wheatgrass. Loss of soil because of noxious weeds may have very serious consequences in the future” (Sheley et al. 1998). Healthy, functioning plant communities are critical for deterring the establishment of invasive plants.

Alternatives that propose more area open to motor vehicle travel and that have higher densities of designated routes pose a higher risk of noxious weed spread, introduction into new sites, and create greater challenges for detecting and controlling new weed sites. Table 9 displays the planned miles of designated trails for the action alternatives. Alternative 3 proposes the fewest miles of trail and the fewest number of gathering areas, somewhat lowering the risk of weed introduction compared to Alternatives 2 and 4. Alternative 3 also splits the use into two areas, without a designated connection between the two. In one of the two areas, the east side of the project area on the Paulina Ranger District, a motorcycle trail system would be designated where OHV use is currently low. This will increase the risk of weed introduction substantially for that area. Also, while Alternative 3 has the least amount of miles overall, it has the highest percentage (86%) of trails that will either open closed and decommissioned roads, or create new disturbance through trail construction. The density of trails on the west end of the project area is also the highest for Alternative 3. The above combination of factors gives Alternative 3 a high risk level for invasive plant establishment even though the Alternative proposes the least amount of trail miles.

Table 126 shows that Alternatives 2 and 4 would designate 170 miles and 212 miles of trail from Highway 26 across the Forest to Deep Creek Watershed on the Paulina Ranger District. Along with mileage differences for the two alternatives, there are also differences in the number of gathering areas. These are areas where use would be concentrated, and activities such as camping and play-riding for kids would take place. Anywhere that use is concentrated and various vehicle types are gathered, will increase the risk of weed introduction. Alternative 4 proposes 11 different gathering areas compared to the 20 proposed for Alternative 2, which has fewer miles of trail designated. This is in response to one faction of public comments about the project, saying more miles of trail are needed, and fewer trailheads, parking, and playing areas. Alternatives 2 and 4 are similar in the percentage of closed, decommissioned, and new routes, 73%, and 75% respectively. These two

alternatives would expose new bare ground and also recovered vegetation on closed and decommissioned roads resulting in a high risk for invasive plant establishment.

Project design criteria require that trail construction and maintenance equipment be cleaned of all dirt and plant parts before entering Forest Service lands. This requirement would reduce the risk of introducing a new invasive plant population. Another possible form of weed introduction is through materials brought in to build trails (dirt, gravel, rock), or enhance trail difficulty. Enhancement often includes narrowing the trail or placing obstacles such as logs and boulders. A project design criteria requires materials to be weed free. This criterion is thought to be only moderately effective because some materials clean better than others. For example, boulders can be cleaned, while logs and fill material is much more difficult to guarantee to be weed free.

As stated above, the type of activity, intensity and location of associated disturbance, and proximity to a seed source will affect the probability or risk of introducing noxious weeds. When ground and soil disturbance are likely to result in a measurable change from the existing condition, there is a high associated risk of introducing noxious weeds. Location of the proposed trail system is also important to the risk potential and associated effects. OHV use on the east end of the project area on Paulina Ranger District is currently low (personal observation). All alternatives propose trails circling the area surrounding Little Summit Prairie that was designated as a sensitive resource area by the Paulina District Ranger, and who recommended to prohibit off-road OHV use. This area contains important resource attributes including a major population center for Peck's mariposa lily, a Regional Forester's sensitive plant species; a high density of prehistoric archaeological sites; soils that have a high-risk for erosion; and one of the most interconnected habitats for redband trout, another Regional Forester's sensitive species. Although no trails are proposed directly within the Little Summit Prairie area, trail designation in close proximity, and increased use on all open roads would result in increased potential for invasive plant establishment and spread in an important resource area. This area, and others within the project boundary, is scab-stringer habitat, dominated by non-forested plant communities that have shallow clay soils. These areas have seen a dramatic increase in invasive winter annual grasses over the last six years (personal observation). *Ventenata dubia* (North Africa grass) in particular has spread, along with cheatgrass and medusahead rye. Theories on reasons for the increase include distance to infested roads and trails and the nature of soil properties. These heavier textured soils do not support vegetation that provides shade, soil temperatures are higher and the high clay content provides ample winter moisture for early growth of invasive grasses, while native grasses are still dormant (Riegel 2010). Increases in trail miles within or adjacent to scabland habitat is likely to increase the potential for spread of annual grasses.

Directly south of the Little Summit area is a very large infestation of houndstongue scattered throughout 19,000 acres (Roba). This species is spread through "Velcro"-like hooks on the seed, and is readily transported by clothing, vehicles, and animals. It germinates readily anywhere a seed is dropped on bare soil, and OHV trails would be vulnerable to houndstongue establishment. There is also a large infestation of houndstongue on the west end of the project area adjacent to the trail system proposed near Ochoco Divide Research Natural Area (Snowshoe). There is a high risk that houndstongue would be spread in this area as well.

Another element of risk that would have an effect on the potential for weed spread is the proximity to existing weed seed sources. Table 126 displays the trails and gathering areas directly within noxious weed infestations. Overall overlap within noxious weed locations is low. There are three weed infestations being crossed by trails, and 5 gathering areas within weed sites. Weed sites within the concentrated use areas (staging, etc) have the most potential for spread throughout the trail system. The gathering areas would receive intense use and seed would be carried down the trails radiating out of the area. Alternative 2 has the highest risk of spreading existing infestations as it has the highest number of trail/gathering/weed overlap.

Table 126. Summary of proposed trails and gathering areas within noxious weed infestations.

Infestation	Alternative 2	Alternative 3	Alternative 4
Diffuse knapweed #453	2 trail intersections, and Scotts Camp Trailhead	2 trail intersections	2 trail intersections
Spotted knapweed #828	1 trail intersection		2 trail intersections
Spotted knapweed #785	Walton Lake staging area	Walton Lake staging area	Walton Lake staging area
Canada thistle #691	Walton Lake staging area	Walton Lake staging area	Walton Lake staging area
Canada thistle #692	Walton Lake staging area	Walton Lake staging area	Walton Lake staging area
Russian knapweed #922	Walton Lake staging area	Walton Lake staging area	Walton Lake staging area
Spotted knapweed #197	Cottonwood Pit staging area	Cottonwood Pit staging area	Cottonwood Pit staging area
Canada thistle #198	Cottonwood Pit staging area	Cottonwood Pit staging area	Cottonwood Pit staging area
St. John's-wort #167	Staging area on FS road 42		Staging area on FS road 42
Diffuse knapweed #206	Play area on FS road 30		

All action alternatives would result in an increase of noxious weeds and other invasive plants across the project area. This in turn would result in additional expense for controlling invasive plants on the Forest. The nature of the proposal involves a constantly disturbed environment due to continued use of the trail system by vehicles coming from different parts of the state or country with a high probability of bringing in weed seed and plant parts. In 2007 it was estimated that in Central Oregon as a whole, there were approximately 52,000 visitors using trail systems (Ramming, pers. comm.). The North Millican OHV area had 9,985 riders in 2008, which has similar weather and predicted period of use as the Ochoco Summit proposed trail system (Skelton 2010). In the long-term, trail use is expected to increase by 2.5-5.6 percent per year (Skelton 2010). Using the low end of estimated increase in the first half of the decade (due to the current recession), and using the high end on the second half of the decade, it is estimated there may be 15,000 riders using the Ochoco Summit trail system by 2020. Concentrated and increased of use of the area will result in a constant need to monitor the trail system for noxious weed presence, and an increased need for treatment. As the Forest does not currently have the ability to use herbicides as a treatment method for new sites, manual control would be used which is more labor intensive and more expensive. As costs increase, the ability to inventory and monitor the trail system decreases, which limits the ability to catch the infestations while small. Controlling small infestations of most species is less expensive and more effective. Current budgets are not sufficient for the Ochoco National Forest to control all known infestations; due to the high risk potential of noxious weed establishment on an OHV trail system, it is not unreasonable to expect that the proposed trail system would further jeopardize the Forest's ability to detect and control weeds in the long-term.

Summary

Alternative 1 (no trail system) would not increase the potential for invasive plant establishment. Alternatives 2, 3, and 4 would increase the potential for invasive plant establishment. When ground and soil disturbance are likely, there is a high associated risk of introducing noxious weeds and other invasive plants. All action alternatives result in a high risk, with differences due to magnitude. The two measures used to differentiate between alternatives (miles of trail/number of gathering areas, and adjacency to existing seed source) show that Alternative 3 has a somewhat reduced potential for weed spread due to fewer miles of trail, fewer areas of concentrated vehicles in staging and parking, and

less disturbance adjacent to existing weed infestations. Alternative 4, although proposes more miles of trail, has less risk and potential for weed spread than Alternative 2. This is due to fewer gathering areas, 11 staging/parking/play areas versus 20. These concentrated areas of use and collection of vehicles pose a greater potential for weed spread. Alternative 4 also proposes slightly less disturbance adjacent to existing weed infestations than Alternative 2. Alternative 2 has the highest potential for weed introduction and spread and associated expense of treatment.

Cumulative Effects

Alternative 1 does not propose a trail network or disturbance, and as a result there are no cumulative effects. This alternative will not be carried further in the cumulative effects discussion. Cumulative effects are the same under Alternatives 2, 3, and 4 with only the variance in the direct and indirect effects.

Past road construction and maintenance, grazing, timber harvest and other soil disturbance have provided environments for noxious weed species establishment, vectors for noxious weed dispersal, and infestations of noxious weeds as seed sources for spread. Past activities within the analysis area have resulted in moderate amounts of weed infestations occupying 2,090 acres. Over 1,400 acres of this is houndstongue, which is difficult to control and easily spread by a number of vectors, including vehicles.

The potential for noxious weed establishment and spread from passenger vehicles not associated with the project along open road corridors (including seasonally open roads) would continue. The potential for other vectors of spread within the project area including people, wind, or animals would also continue.

Specific on-going activities in the project area are similar to past actions including timber harvest, precommercial thinning, prescribed burning, grazing, OHV use, and other forms of recreation such as hiking, horseback riding, and camping, all of which introduce and spread noxious weeds. Known sites are treated based on priority; effectiveness of the treatment depends on the species and control method – pulling or herbicide (if approved for herbicide treatment).

In addition to the current activities within the project area, adding 101 to 212 miles of designated OHV trail would result in cumulative impacts to native vegetation from invasive plants. OHV travel is allowed on designated routes within most areas of the Ochoco Summit Trail project area, and use is increasing. The proposed designated trail system is adjacent to several large houndstongue infestations. Based on the phenology and mechanism of spread of this particular weed, there is a high risk that the trail system would cause additional disturbance that would provide an optimal seed bed for germination. Designating a trail system would increase the intensity and extent of use in an area susceptible to weed invasion faster than use is occurring at present. The Forest does not currently have the ability to control noxious weeds using the most effective method, herbicide; this increases costs and limits the amount of treatment possible. These factors would cumulatively result in expanding noxious weed populations.

Future actions that have the potential to incrementally increase the risk of weed introduction are the Canyon and Jackson Vegetation Management EISs are currently in the NEPA process and include projected management acreage that overlaps with the Ochoco Summit OHV project area. Approximately 20,000 to 30,000 acres of vegetation and fuels management may be proposed for treatments including commercial thinning, small diameter thinning and prescribed burning. Of these activities, commercial harvest and fuels management (either burning or piling) would produce bare ground that is susceptible to invasive plant establishment, including species such as North Africa grass, medusahead and cheatgrass. Timber harvest may also require the construction of temporary roads to access units, and currently closed roads may be used for haul routes during timber harvest

operations. Collectively, these actions would have a short-term (3-5 years) increase in susceptible area until bare ground is revegetated.

Implementation of the Travel Management Rule of 2005 became effective December 30, 2011. The Deschutes and Ochoco Travel Management Plan is currently in the enforcement stage; and under this forest-level travel management plan, motorized use will be restricted to designated OHV trail systems and those Level II roads open for passenger vehicle travel. Cross-county OHV travel is no longer be allowed within the project area. This will lessen the cumulative impacts of the Ochoco Summit trail system in two ways. It will make it illegal to create new trails modifying those proposed for Ochoco Summit. For example there would be less potential for riders to cut across the loop around Little Summit Prairie, a sensitive resource area, in order to shorten the ride. Prohibiting the ability for users to create their own trails will reduce disturbance to native vegetation, and reduce the amount of exposed soil, thus lowering the risk of creating a susceptible seed bed for weed establishment. Implementing the Travel Rule will also concentrate OHVs as a vector of spread to areas designated in Alternatives 2, 3, and 4. This will help limit the scale of risk to a known location, facilitating surveys and weed control. It may however increase the intensity of use, more vehicles means more risk of weed introduction and spread.

The Ochoco/Deschutes NFs Invasive Plant Treatment is a proposal currently in the NEPA process that would increase the ability to effectively control invasive plants with herbicides. The ability to use herbicides would increase efficiency, thus lowering costs, which results in the ability to treat more acres for the same costs. This proposal does not synergistically interact with the proposed trail system, but does help reduce the extent and duration of effects of noxious weeds on native vegetation. Herbicide is more effective on difficult to control species such as annual grasses and rhizomatous species, resulting in smaller infestations and lower plant densities.

Special Plant Habitats

Introduction

Special plant habitats are areas which sustain unusual and/or particularly rich biological diversity. These habitats have a high probability of supporting rare species. All non-forest and riparian habitats are often treated as special habitats because they encompass such a small percentage of the land base in forested regions but have a disproportionate value in the conservation of biological diversity (USDA Forest Service 1996). For example, riparian areas where hardwood species are found usually constitute about 1-2% of the landbase on the Forest, yet riparian habitats are abundantly used for recreation such as camping, fishing and hiking. For this analysis, Hardwoods, meadow, rock outcrops, shrub-scablands, and grasslands will be considered special habitats.

Regulatory Framework

The Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by NFMA of 1976 requires National Forests to provide for the diversity of plant and animal communities. Forest Service direction for managing habitats for all existing native and desired non-native plants in order to maintain viable populations of species comes from Forest Service Manual 2600 (USFS 1995, WO Amendment 2600-95-7. Direction for Research Natural Areas is found in Forest Service Manual 4063.04b, which gives direction to manage and protect all RNAs and allow natural processes to occur for research and education.

The Ochoco NF Land and Resource Management Plan addresses some facets of special habitats and biological diversity, such as riparian areas, connective habitat, snags, old growth, RNAs, non-forest plant communities including scablands, and sensitive plant and animal species. This analysis will look at a subset of these as described in the introduction. The LRMP does not specifically identify a desired future condition for the biological diversity of plant species. It does address riparian areas, which provide important habitat for many sensitive species within the Project Area. The LRMP states

that most of the riparian areas will be in excellent condition within 50 years, characterized by vigorous stands of forbs, grasses, and grass-like species on stable stream banks. It also addresses scablands, and recognizes them as fragile areas adversely affected by management activities.

Analysis Methods

Hardwoods will include cottonwood, aspen, alder, and willow communities. Meadows include dry, moist and wet meadows that have saturated soils for some of time during the year. Rock outcrops are exposed rocks that are large enough to be mapped in GIS. Shrub-scablands include non-forested areas dominated by low and rigid sagebrush and Sandberg's bluegrass. Unique grassland areas include those dominated by Sandberg's bluegrass and one-spike oatgrass. The Ochoco Divide Research Natural Area will be included in the discussion due to its special status and proximity to proposed trails. Effects of the proposal will be measured by:

- Acres/miles of special plant habitat impacted by proposed trails and gathering areas.

Effects of new trail construction and re-construction of revegetated closed roads will be analyzed for short-term effects of 3-5 years. Use is expected to continue on all trails for the long term, >10 years.

Assumptions:

- Areas open to motorized recreation have a higher risk of impacting vegetation, including special plant habitats.
- All forms of motorized vehicles are lumped together in the analysis, regardless of class of vehicle.
- Areas that are seasonally closed were analyzed as open because there can be impacts to native plants and native plant habitats regardless of when the area is open. If the area is not 100% closed all year long, it is considered open.
- All forms of motorized vehicles are lumped together in the analysis, regardless of class of vehicle. Trails are considered to be 10-feet wide, regardless of class of vehicle, to account for effects from microclimate changes, dust, vehicles passing, etc.
- Calculated acres of hardwood communities are based on potential, and stands are not necessarily currently fully occupied by hardwood species.

Existing Condition – Special Plant Habitats

The texture and pattern of biodiversity can be examined at many different scales, ranging from global to microscopic. At the landscape scale, the coarse scale of Plant Association Groups was used to calculate the amount of special habitat within the project area (see Table 127). This course scale using GIS can miss unusual small scale habitats such as an individual dead tree or root wad, which can provide habitat for rare species of fungi, bryophytes, and lichens. That fine scale of biological diversity will not be analyzed.

Hardwoods – This type is dominated mostly by quaking aspen (*Populus tremuloides*) stands. Black cottonwood (*Populus trichocarpa)*, mountain alder (*Alnus incana*), and willow (*Salix* species) make up a small amount of the acreage listed in Table 11. These deciduous hardwood trees and shrubs provide a variety of important ecological functions, diversification of landscape patterns, and habitat for many other species (USDA Forest Service 1997). Riparian communities made up of these species are extremely diverse in plant life since they initiate forest succession, and thus provide great structural diversity. Hydrologically, hardwoods provide excellent stability to stream banks and soil surfaces. Their deep and spreading root systems can resist flood pressures and slow water velocity. They provide shade to help maintain stream temperatures, and abundant leaf shedding in the fall increases soil fertility.

Aspen and cottonwood are short-lived, early seral species that rely on disturbance for establishment. Black cottonwood has been declining due to conversion of floodplain vegetation to agricultural uses,

changes in stream systems (confining streams into a single channel), over browsing by livestock, elk and deer, and conifer encroachment (USDA Forest Service 1997). Quaking aspen, alder and willow are declining as the result of conifer encroachment and increasing density, over browsing by livestock, deer and elk, and loss of habitat where the water table as dropped due to stream downcutting.

Meadows (wet, moist and dry) – Meadow communities are found in areas where ground water is higher than that found on the surrounding upland sites, such as a spring. They can also include perched water table areas within stream communities. Meadows communities include moist meadows, where moisture is available in the rooting-zone during the growing season, but drops 1-3 feet in the fall, and wet meadows, where available water is at or near the surface all season long (Hall 1989). Dry meadows have no standing water and dry out completely in the summer.

Rock – these are areas of exposed surface rock (pavement), outcrops, or boulders. Dry rock habitats occur when plants establish themselves in soil deposited between rocks. Many plants found here are also found in dry forest and even moist forest habitats; however, some plants occur only when a dry rock habitat receives ample moisture in the spring before drying up in summer. Lichen, mosses, ferns, scarlet gilia, wild rose, ninebark, oceanspray, and smooth sumac, are often found here. This plant habitat is unique, including ephemeral meadows formed by filling of rock pools, and "hanging" clumps of vegetation developed in soil that accumulates in stepped, pocket-like depressions along outcrops and boulder fields.

Shrub-scabland – These non-forested habitats have rocky, shallow soils and are commonly found on topographically high sites such as ridges. Dominated by scattered sagebrush, bunchgrasses, and forbs, these sites are particularly exposed to summer heat and dryness, winter cold, and spring frost-heaving. Occasional species include mountain mahogany and juniper. Scablands are recognized as among the most fragile ecosystems on the Ochoco National Forest. Damage to the soil and vegetation as a result of management activities is nearly impossible to mitigate. Revegetation is nearly impossible due to water saturation and frost heaving (LRMP 1989).

Grassland – These are also scabland habitats, but are even drier and have shallower soils than shrub-scabland described above, and have the highest combined surface rock, pavement, bareground percentage (63%) of any grassland in the Blue and Ochoco Mountains (Johnson and Clausnitzer 1992). This habitat is dominated by Sandberg's bluegrass and one-spike oatgrass. Forbs include low pussytoes, yarrow and bisquitroots.

Table 127. Acres of special habitat within the Ochoco Summit project area.

Special Habitats	Acres	Percent of total area
Hardwood	2,046	0.7
Meadows	8,705	3
Rock	1,668	0.6
Shrub-scabland	41,296	14
Grassland	5,897	2

Biological soil crust is present in scabland and grassland habitat where there are significant areas of open space between vegetative clumps that are exposed to the elements. Erosion in these areas is controlled by pebbles and communities of nonvascular or cryptogamic plants that grow upon or immediately beneath the solid surface. Where established and undisturbed, the cryptogams form a recognizable crust. These plants, made up of algae, lichens and mosses play an important role in soil stabilization (Anderson et al 1982). This crust is a unique feature to semi-arid conditions within scabland habitat.

Research Natural Areas - (RNAs) are part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on National Forest System lands (Forest Service Manual 4063). RNAs are managed such that natural physical or

biological processes are allowed to prevail without human intervention. According to FSM 4063.3, standards, management of an RNA must support and promote the basic objectives and purposes of establishing the area.

Overall objectives for RNAs are to maintain a wide spectrum of high quality representative areas of the major forms of variability found in forest, shrublands, grasslands, alpine, and natural situations, to preserve and maintain genetic diversity, and to protect against human-caused environmental disruptions. Each RNA contains representative or unique natural features in a relatively undisturbed condition. The designation of these areas provides long-term protection and recognition of their natural values for research and baseline ecological study, observation, and conservation of biological diversity. The Ochoco Divide RNA is present within the project area and was chosen to represent the ponderosa pine-Douglas fir and grand fir-western larch-Douglas fir plant associations.

There would be no change to the management of RNAs, regardless of the chosen alternative. These areas are not open for motorized travel off of designated routes nor motorized access to dispersed camping. It is included in the analysis due to the proximity of the proposed trail system and invasive plant populations.

Direct and Indirect Effects – Special Plant Habitats – Alternative 1

Alternative 1 is the No Action Alternative; no trail system would be designated, and no staging or associated camping areas would be developed. The current management policy is that many roads within the project area are open to travel by motorized vehicles, and cross-country travel is prohibited. This policy would remain in effect in this alternative. Areas not open to off-road use includes Ochoco Divide RNA, Bridge Creek Wilderness, and Lookout Mountain Roadless Area. Most of the OHV use in the project area occurs on roads (personal observation), where the disturbance to native vegetation from the construction of the road is a past action. There are some areas where user-created trails are increasing, especially on the west side of the planning area closest to Prineville. The amount of both on and off road use is expected to continue as the popularity of OHV use continues to increase and the population of Prineville and the surrounding area continues to increase. Even though OHV use is expected to increase, the effects under Alternative 1 are minor, because the roads open for travel are already established, and no new disturbance would take place. Minor effects from dust would affect plants along the roadsides (see the effects section below for more detail)

General Effects Common to all Action Alternatives

Direct impacts on vegetation caused by vehicles include crushing of foliage, root systems, and seedlings (Wilshire et al. 1978b). Plant foliage and stems can be damaged and plants uprooted by vehicles, so that actual plant damage may occur over an area much larger than the track width. Indirect effects of vehicles on vegetation include undercutting of root systems as vehicle paths are enlarged by erosion (Wilshire 1978a). Secondary effects from disturbance include the proliferation of exotic plant species and a higher frequency of fire (Lovich and Bainbridge 1999). Effects of these impacts include alteration or destruction of macro- and micro-vegetation elements, establishment of annual plant communities dominated by exotic species, destruction of soil stabilizers, soil compaction, and increased erosion.

Indirect effects can be invasion by invasive plants into disturbed areas which then compete with native plants. In general, grasslands, riparian areas, and relatively dry, open forests are more susceptible to invasion than are dense moist forests and high montane areas (USDA Forest Service 2005a, p. 3-40). The former have frequent gaps in plant cover, which favor invasive plant establishment, whereas the latter have relatively closed plant cover or have extreme climate or soils, which are tolerated by fewer invasive plant species. Invasive plants tend to colonize disturbed ground along roads, highways, along trails, and in campgrounds and quarries. Once established, invasive

plants begin to spread, displacing native vegetation. Eastside forests are more susceptible to invasive plants for the above reasons.

Motorized use, especially concentrated and repeated use, can degrade native plant habitats by denuding areas of understory vegetation and compacting soils. Of particular concern are special habitats, those which sustain unusual and/or particularly rich biological diversity. People are drawn to unique places such as aspen stands, meadows, and rock outcrops; scablands often provide vistas due to their ridgetop location. Visiting these areas by motor vehicle can have a lasting impact to areas of fragile soils, including damage to biological soil crust. When soils are severely disturbed, vegetation cover can be reduced significantly and plant growth can be impaired (reviewed in Ouren et al. 2007). Davidson and Fox (1974) reported significant loss of herbaceous vegetation from motorcycle activity. Bolling and Walker (2000) reported that track roads had significantly lower total vegetative cover than control areas. Total plant density and cover were significantly lower in roads than in controls in the Mojave Desert, and long-lived plant species were greatly reduced in disturbed areas compared to controls (Prose et al. 1987).

Several special habitats are particularly susceptible to invasion of non-native annual grasses (medusahead, cheatgrass, and North Africa grass) including the dry meadows, shrub-scabland and grassland habitats.

Direct and Indirect Effects – Special Plant Habitats – Alternatives 2, 3, and 4

The Ochoco Summit project proposes a designated trail system, and accompanying trailheads, campgrounds, staging areas, parking areas and play areas (herein called gathering areas). Alternatives differ in the number of miles, trail location, and number of gathering areas. Effects to sensitive areas are similar between alternatives, varying by magnitude of interaction.

The action alternatives are expected to increase off road vehicle use, increase number of riders, and provide associated facilities that would impact special habitats.

Relatively low recreational traffic intensities cause a significant drop in plant cover, plant height, species richness and species diversity, leading to an increase in soil compaction and a decrease in soil organic matter and moisture content (reviewed in Kutiel et al. 2000). Kutiel et al. (2000) studied the response of soil and annual plants to various intensities of short-duration pedestrian and motorcycle traffic, and found that motorcycle passage had an immediate detrimental impact on annual plants at all traffic intensities.

Secondary effects from disturbances, such as off-highway vehicle use, include the proliferation of exotic plant species and a higher frequency of fire (Lovich and Bainbridge 1999). Effects of these impacts include alteration or destruction of macro- and micro-vegetation elements, establishment of annual plant communities dominated by exotic species, destruction of soil stabilizers, soil compaction, and increased erosion.

Table 128 displays the number of trail miles and converted acres (at 10’ width of disturbance) within special habitats. The effect of trails on hardwood communities appears low, 0.6 acres for alternatives 2, 3 and 4; however the pattern and location of the trails may have an effect beyond direct overlap with hardwoods. There are ten black cottonwood stands within the 300,000+ acre project area. This project proposes trails within or directly adjacent to three of them, including one that would have new trail built through it. Hardwood communities provide aesthetic enjoyment to humans, and aspen and cottonwood stands are particularly important to biological diversity. They provide important foraging, nesting, breeding, and resting sites for a wide variety of birds and mammals. In addition to the effects on vegetation within hardwood stands, noise may be a factor effecting wildlife (see the EIS Chapter 3 wildlife section). The network of trails shown in Figure 4 shows the adjacency to the many aspen stands in the west end of the planning area.

Table 128. Acres and miles of proposed trails located within special habitat.

Alternative	1	2	3	4
Hardwood	0 acres 0 miles	0.6 acres 0.5 miles	0.6 acres 0.5 miles	0.6 acres 0.5 miles
Meadows	0 acres 0 miles	2.4 acres 2.02 miles	2.5 acres 2.1miles	4.1 acres 3.35 miles
Rock	0 acres 0 miles	1.3 acres 1.1 miles	0.7 acres 0.6 miles	1.6 acres 1.3 miles
Shrub-scabland	0 acres 0 miles	29.1 acres 24.0 miles	10.8 acres 8.9 miles	33.2 acres 27.4 miles
Grassland	0 acres 0 miles	10.3 acres 8.51 miles	5.6 acres 4.75 miles	9.3 acres 7.7 miles
Total	*0 acres* *0 miles*	*43.7 acres* *36.1 miles*	*20.2 acres* *16.8 miles*	*48.8 acres* *40.25 miles*

In addition to the planned trails, the facilities to support the trail network would also occur within special habitats. Table 129 shows the number of gathering areas (staging, playing, trailheads, etc) planned for each alternative. Most of the planned facilities fall within special habitat:

Alternative 2 - 17 out of 20 areas within special habitat
Alternative 3 - 3 of 4 areas within special habitat
Alternative 4 - 10 of 11 areas within special habitat

Some of these locations are on large, already-disturbed sites, such as Marks Creek and Walton Lake Sno-parks, and Six Corners material source, where direct effects to vegetation would be negligible. Other sites would have impacts as developed recreation facilities are added. Impacts to special habitat may come from unauthorized riding from these points, where use can radiate out in many directions (see Figure 3). Matchett and others (2004) point out that OHV use may be heaviest on slopes, along right-of-ways, in washes, and in the vicinity of camping facilities.

Table 129. Number of gathering areas within special habitat.

Alternative	1	2	3	4
Staging areas	0	10	3	9
Play areas	0	3	0	1
Parking areas	0	1	0	0
Trailheads	0	3	0	0
Total number of areas	*0*	*17*	*3*	*10*

Effects to rock habitat would be low; regardless of the Alternative, less than two acres would be impacted by trails or gathering areas (0.1% of the rock in the project area). New trail proposed through rock habitat include 0.5 miles, 0.25 miles, 0.5 miles for Alternatives 2, 3, and 4 respectively. The fractured basalt in the project area does not provide the large boulders desired by jeeps for “rock crawls”. Trails would however, be designed to go through rock habitat to provide roughness and difficulty. Many of the rock areas in the project area are cliffs and rimrock, which have stepped, “hanging” vegetation would not be impacted.

Meadow and scabland soil and vegetation are vulnerable to disturbance by vehicles. Driving through these areas, especially when wet leads to rutting and soil compaction. Natural recovery rates following disturbance depend on the nature and severity of the impact but are generally very slow. Recovery to pre-disturbance plant cover and biomass may take 50-300 years, while complete ecosystem recovery may require over 3,000 years (Lovich and Bainbridge 1999). Table 12 shows that Alternatives 2 and 3 impact about 2.5 acres of the 8,705 acres present in the project area; and roughly 4 acres are impacted in Alternative 4. Within meadows, most of the trail miles would occur on previously closed or decommissioned roads, where the impact to soils and vegetation have already

occurred, especially soil compaction; however recovered vegetation would be impacted. Meadows are also open areas, where keeping traffic on the trail may be more difficult to enforce. Approximately one-half mile of new trails would be built through meadows in Alternative 2, and one mile each in Alternatives 3 and 4. Effects to meadows would be long-term, but small in magnitude.

Scabland soils (both shrub-scabland and grassland special habitats) are fragile ecosystems where damage is nearly impossible to mitigate (USDA 1989). The Ochoco National Forest LRMP states that the transportation system in scablands will be limited to long-term roads because of the inability to restore the impact of the road. Once a trail is constructed through the scabland or grassland, the effect is permanent. Design criteria (see EIS Chapter 2) meant to limit resource damage, such as closing trails if erosion or soil displacement is occurring, have little effect in this situation due to length of recovery period for scabland soil and vegetation. Belnap (1995) discuss how desert soils may recover slowly from surface disturbances, resulting in increased vulnerability to desertification. As a result, recovery from compaction and decreased soil stability is estimated to take several hundred years. The nitrogen fixation capability of soil requires at least 50 years to recover (Belnap 1995).

Combining shrub-scabland and grassland special habitats as having similar vegetation and soils, Table 128 shows that there are 32.5 miles of trail proposed in Alternative 2, 16.6 miles in Alternative 3, and 35 miles in Alternative 4. Off-road vehicle activity has been shown to greatly increase soil compaction in areas of intense traffic (Adams et al. 1982). Soil characteristics, particularly soil compaction, play important roles in the distribution, abundance, growth rate, reproduction, and size of plants. Even a few passes by vehicles can cause significant changes in soil properties (Ouren et al. 2007). Adams et al. (1982) found reduced cover of desert annuals in tracks created by as few as one (on wet loamy sand) to 20 (on dry loamy sand) vehicle passes; the reduction in cover, however, was not due to fewer plants, but to smaller plant sizes. With tracks made by 1, 3, 10, and 20 vehicle passes, Adams et al. (1982) found that annuals with large taproots decreased, whereas there was significantly greater cover of a non-native, fibrous-rooted grass. The fibrous root system allows for easier germination and root growth than large-taprooted species. Overall, the extent of immediate effects increases with the frequency of OHV passes. For example, Webb (1982; reviewed in Ouren et al. 2007) found that after a single pass, annual plants on an OHV route remained intact, but most were destroyed after 10 passes.

In addition to effects to soil and herbaceous vegetation, biological soil crust is impacted by OHV use. Maintaining soil stability and normal water and nutrient cycles in desert systems is critical to avoiding desertification (Belnap 1995). Soil compaction and disruption of biological soil crusts can result in decreased water availability to vascular plants through decreased water infiltration (Belnap 1995). Biological soil crusts are a complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. In rangelands, they function as living mulch by retaining soil moisture and discouraging annual weed growth (Belnap et al. 2001). Biological crusts are an important component of desert ecosystems, as they influence soil stability and fertility (Belnap 2002).

Once disturbed, natural recovery rates were found to be very slow (Belnap 1993). Recovery of biological soil crusts can be hampered by large amounts of moving sediment, and re-establishment can be extremely difficult in some areas. The rate of recovery for some components of biological soil crusts were significantly hastened on areas inoculated with surrounding biological crust material, however, lichen and moss recovery was minimal.

Belnap et al. (2001) also discuss how invasive plants affect biological soil crusts by reducing the diversity of native vascular plants. The risk of invasive plants spread by the project is high (see the Invasive Plants section of this document). The vertical and horizontal vascular plant structure of many arid and semi-arid vegetation communities optimizes growth of biological soil crusts. Vascular plants create windbreaks and shade, influencing how much moisture and light reach the soil surface. They also trap leaf litter, keeping the interspaces free of substantial or persistent litter cover. Invasive exotic

plants generally decrease the structural diversity of native vascular plant communities by creating monocultures of densely spaced plants and by homogenizing litter distribution. They also lead to decreased biological crust cover and species richness in most ecosystems.

Invasion of exotic annual plants into perennial plant communities can pose a long-term threat to biological soil crusts, as the crust-dominated interspace between perennial plants is often heavily invaded. Because biological crusts stabilize soils, germination of seeds of exotic species can be inhibited in sites with well-developed crusts and low plant litter, as was recently demonstrated for the annual exotic grass, cheatgrass (*Bromus tectorum*) (Belnap 2001). Kaltnecker et al. (1999) found that areas with intact biological soil crust cover maintain low cheatgrass densities despite abundant seed sources nearby. In contrast, native species that have evolved with biological soil crusts may have mechanisms, such as a geniculate awn that drills the seed into the soil. Shrub-scabland and grasslands within the project area are experiencing a recent increase in the density of invasive grasses, including cheatgrass, North Africa grass, and medusahead rye.

Effects to shrub-scabland and grassland habitat, including biological soil crust, would be long-term to permanent, but small in magnitude, with the most potential impact occurring near gathering areas. Acreage-wise there would be little scabland area affected, 39 acres, 16.4 acres and 42.5 acres for Alternatives 2, 3, and 4 respectively, out of 47,193 acres present within the project area.

Research Natural Area

The Ochoco Divide RNA is within the project boundary; no trails are proposed with the RNA itself. Direct effects to vegetation within the RNA are not expected. The risk of indirect effects from invasive plants is expected to increase as a result of the project. Alternative 3 proposes ¾ mile of new trail along the south RNA boundary, which is also directly adjacent to a houndstongue population. There are already houndstongue infestations within the RNA in the southeast corner, and all along the northern boundary. For all alternatives, OHV traffic out of the Marks Creek Snopark staging area may increase the risk of spreading the northern populations into the RNA from use of the 26-600 road system.

Cumulative Effects – Special Plant Habitats

Alternative 1 does not propose building and designating trails within special plant habitats, or other disturbance, and as a result there are no cumulative effects. This alternative will not be carried further in the cumulative effects discussion. Cumulative effects are the same under Alternatives 2, 3, and 4 with only the variance in the direct and indirect effects.

Past road construction and maintenance, grazing, timber harvest and other disturbance have impacted special habitats. Hardwood communities have decreased in stand size and health, and have become fragmented, due to lowered water tables. Moisture regimes in meadows have been altered by grazing and road construction. Dry meadows are becoming smaller due to conifer encroachment as a result of fire suppression. Shrub-scabland and grassland plant communities have been altered by invasive plants.

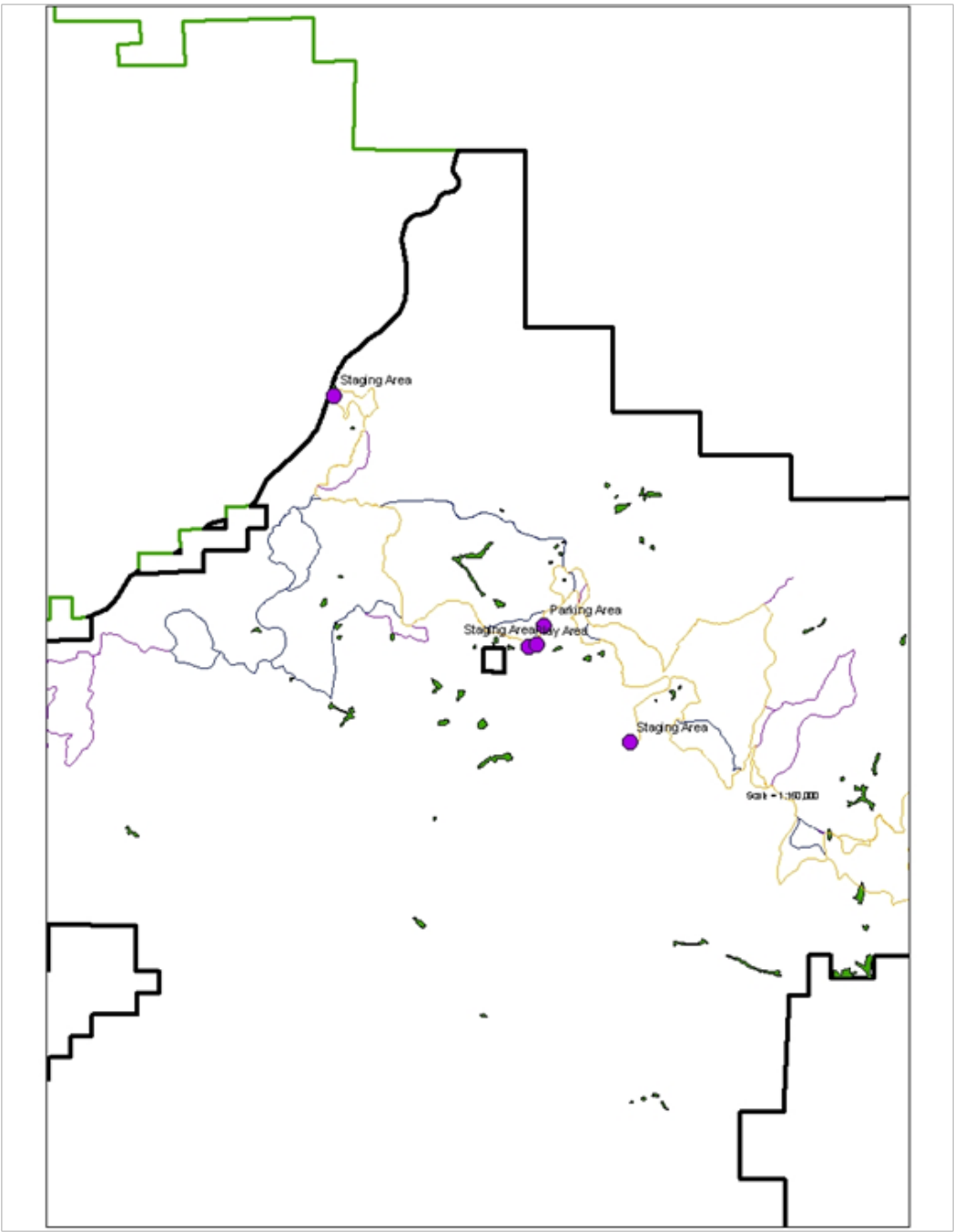
On-going activities will continue across the project. Specific on-going activities in the project area are similar to past actions including timber harvest, precommercial thinning, prescribed burning, grazing, recreation such as hiking, horseback riding, and camping, all of which impact special plant habitat. Some of these actions have positive impacts, such as conifer removal within aspen stands, and juniper encroachment removal in shrub-scablands. Personal observations of current OHV use in the project area see that some OHVs are damaging special habitat. Observations such as ruts in meadows, and hill-climbs on scabland habitat are not uncommon. OHV use in the spring is especially damaging to the soft soil in meadows and scablands. This damage is not limited to OHVs; passenger vehicles also engage in “mud bogging” as a form of recreation.

In addition to the current activities within the project area, adding 101 to 212 miles of designated OHV trail would result in small scale cumulative impacts to some special habitats, including meadows, shrub-scabland, and grassland. Hardwood plant communities are not expected to be cumulatively impacted by the proposed trail project. Noise effects to the wide variety of wildlife using this habitat may be a cumulative effect (see the Wildlife section in Chapter 3 of the EIS). The effects of the project on rock habitat is ½ acre at most from Alternatives 2 and 4, this is not a cumulative impact as there are no other activities affecting rock habitat. Trails through meadows and shrub-scabland would increase soil compaction, damage biological soil crust, and affect native plants as described under the Alternatives. Due to the narrow linear nature of these trails, the amount of area affected is small. These habitats are very open, and there is a risk of OHVs leaving the designated trail, becoming an enforcement issue, and increasing the amount of special habitat affected.

A risk of cumulative impacts to special habitats comes from the increase and spread of invasive plants. The proposed designated trail system is adjacent to several large houndstongue infestations. Based on the phenology and mechanism of spread of this particular weed, there is a high risk that the trail system would cause additional disturbance that would provide an optimal seed bed for germination. Designating a trail system would increase the intensity and extent of use in an area susceptible to weed invasion faster than use is occurring at present. The Forest does not currently have the ability to control noxious weeds using the most effective method, herbicide; this increases costs and limits the amount of treatment possible. These factors would cumulatively result in expanding noxious weed populations.

In addition to the current activities within the project area, adding 101 to 212 miles of designated OHV trail would result in small scale cumulative impacts to some special habitats, including meadows, shrub-scabland, and grassland. Hardwood plant communities are not expected to be cumulatively impacted by the proposed trail project. Noise effects to the wide variety of wildlife using this habitat may be a cumulative effect (see the Wildlife section in Chapter 3 of the EIS). The effects of the project on rock habitat is ½ acre at most from Alternatives 2 and 4, this is not a cumulative impact as there are no other activities affecting rock habitat. Trails through meadows and shrub-scabland would increase soil compaction, damage biological soil crust, and affect native plants as described under the Alternatives. Due to the narrow linear nature of these trails, the amount of area affected is small. These habitats are very open, and there is a risk of OHVs leaving the designated trail, becoming an enforcement issue, and increasing the amount of special habitat affected.

Future actions that have the potential to incrementally increase the risk of weed introduction are the Canyon and Jackson Vegetation Management EISs are currently in the NEPA process and include projected management acreage that overlaps with the Ochoco Summit OHV project area. Approximately 20,000 to 30,000 acres of vegetation and fuels management may be proposed for treatments including commercial thinning, small diameter thinning and prescribed burning. It is unknown at this time what special habitat may be directly affected by these activities. Commercial harvest and fuels management (either burning or piling) would produce bare ground that is susceptible to invasive plant establishment, including species such as North Africa grass, medusahead and cheatgrass. Timber harvest may also require the construction of temporary roads to access units, and currently closed roads may be used for haul routes during timber harvest operations. Collectively, these actions would have a short-term (3-5 years) increase in susceptible area until bare ground is revegetated.



Yellow = proposed trails in Alternative 2
Purple = additional proposed trails in Alternative 3
Blue = additional proposed trails in Alternative 4

Figure 6. Aspen stands (dark green) on the west end of the Ochoco Summit Project Area in relation to proposed trail locations and gathering areas.

Cultural Resources

This section includes a summary of the Cultural Resources specalist's report; the entire report is in the Ochoco Summit Trail System project record, located at the Ochoco National Forest, Prineville, Oregon. Due to the sensitive nature of some information in the report, portions of the report are FOIA-exempt.

History

The Ochoco Mountains form the headwaters for the Crooked River. Drainages including tributaries join the North Fork of the Crooked River as it winds its way through Big Summit Prairie. Likewise tributaries join Little Summit as they feed the wetlands at Little Summit Prairie eventually joining in with Deep Creek drainages and making their way into the North Fork of the Crooked River. These waters, along with the Wolf Creek drainages, flow from the high ridges of the Ochocos through forested uplands to the main stem of the Crooked River in the Deschutes basin. Big Summit Prairie and Little Summit Prairie were especially important to both Indian People and early Anglo settlers for their abundant resources and water. The Ochoco Mountains offered high elevation country in contrast to the arid shrub-steppe lowlands common along the main stem of the Crooked River which makes the high desert country so unique.

Indian people have occupied these upland areas since time immemorial. Archaeological evidence documents the intensive use in and around Big Summit and Little Summit Prairies. The uplands extended seasonal hunting and gathering activities and provided valuable resources. Camas and a variety of other root crops could be dried and stored to sustain these groups through the long cold winters common to the high desert. The North and South Fork of the Crooked River provided north-south access routes between obsidian resources to the south and upland areas like the Ochoco Mountains and their mountain prairies. This area has primarily been occupied seasonally due to cold winters and snowfall. Indian occupation was subsistence based with the more recent. The dominant cultural theme in this area is represented by a long period of Indian occupation. A variety of site types represent a mobile hunting and gathering lifeway dependent on upland resources as part of their seasonal rounds. Site types vary from surface lithic scatters to more complex sites with formed tools and features like house pits, camas ovens and peeled trees. Traditional resources continue to available and gathered today. Traditional foods include root crops like camas, bitterroot, Indian celery, lomatium species, and other foods and resources like hanging black moss, yellow bells, wyethia, and chokecherry along with a host of other plants and faunal resources.

The influx of Anglo-settlement changed cultural patterns in the mid-1800s. Anglo-settlement occupation was based on stock grazing, agricultural practices and forest products. Stock grazing and agricultural practices were introduced to this area in the late 1800s with the influx of Anglo exploration and settlement. The high elevation meadows provided excellent stock grazing opportunities and attracted early homesteaders. By the 1930s for a variety of reasons the population shifted to larger trade centers and communities like Prineville and Mitchell. Changes in the economy and social patterns also led to larger ranches utilizing this area primarily in the summer months compared to year-round homestead parcels.

The timbered lands surrounding Big Summit Prairie were first visited during the exploration and mining periods in the 1860s. Gold was discovered along nearby Ochoco Creek in the 1870s and travel route was established across the Ochoco Mountains to Canyon City. This is mapped as the Canyon City Wagon Road on early maps. Cinnabar was discovered near the turn of the century and the production of mercury flourished until the 1940s when market conditions and the economy changed.

Public domain lands and Forest Reserves were established in the early 1900s. Stock grazing was at its peak and the Forest Service mission was set up to manage grazing and settle range disputes. The mission included marking forest boundaries, coping with beetle infestations and establishing roads, trails, telephone lines and facilities like ranger stations and fire lookouts. Grazing allotments and stock driveways were soon established to better manage stock grazing. Logs were burned out to develop watering troughs for sheep, cattle and horses. Names and dates in many of the surviving aspen stands reflect herders moving stock across the forest. Magnetic telephone lines were soon constructed to provide better communication between local communities, ranger stations and fire lookout points. These administrative developments led the way to fire patrol, range management and access to the forest.

Management Direction

Management direction for cultural resources is found in the Ochoco National Forest Land and Resource Management Plan, in the Forest Service Manual section 2360, in Federal Regulations 36CR64 and 36CFR800 (amended December 2000), and in various federal laws including the National Historic Preservation Act (NHPA) of 1966 (as amended), the National Environmental Policy Act, and the National Forest Management Act.

In general, the existing management direction asks the Forest to consider the effects on cultural resources when considering projects that fall within the Forest's jurisdiction. Further direction indicates that the Forest would determine what cultural resources are present on the Forest, evaluate each resource for eligibility to the National Register of Historic Places (National Register), and protect or mitigate effects to resources that are eligible.

Additional surveys of potentially impacted areas would be done in accordance with the Ochoco Inventory Strategy.

Desired Condition

The desired condition is not clearly stated in the Forest Plan but can be derived from the implied goals of the Standards and Guideliness and the Monitoring Plan. It would be desired to know the location and extent of all cultural resources, to have evaluated each one for eligibility to the National Register, and to have developed management plans for all eligible properties that would provide protection or mitigate effects that may occur to the resources.

It is desired that the current trend of unmanaged recreation activities, such as those occurring on known sites, would in the future have such use directed to areas more appropriate and sustainable in consideration of cultural resources. Existing use patterns have likely affected historic properties and individual site integrity. This project provides an opportunity to direct some of the motorized recreational use to areas away from historic sites and cultural resources.

Existing Condition

It is assumed there has been loss of site integrity from actions that occurred before the implementation of regulations for the National Historic Preservation Act (NHPA). This means that the active protection of cultural resources has a relatively short history, approximately 40 years. Historic use of places beginning in the historic period of discovery, settlement, and subsequent development of forest roads, trails, and other facilities that overlap known and unknown sites has likely caused loss of site integrity.

In addition to pre-field investigations utilizing Geographical Information System layers and existing records, site specific surveys have been conducted on seven percent of the entire analysis area. The area of potential effects (APE) occurs approximately 100 ft on each side of proposed trails and an

area of up to 5 acres at each staging area. The majority of the high probability areas within the APE for the Preferred Alternative (Alternative 3) have been surveyed.

Numerous cultural resource sites are present in the project area. Many of these are linear features such as historic roads and trails, stock driveways and telephone lines. One of the historic linear sites, the Historic Summit Trail, has been evaluated and has been found to be eligible to the National Register of Historic Places (NRHP). A small percentage of the remaining linear features have been recommended for eligibility but have not been fully evaluated. Any on these sites that have been recommended for eligibility would have to be fully evaluated if they were to be found adversely affected by the proposed project. The remaining are prehistoric in age (inferred from the presence of stone tool technologies), or contain evidence of occupation during both time periods.

Sites from the historic period include the Historic Summit Trail, Cold Springs Guard Station, stock driveways and corrals, historic structure remains, utility corridors, fire lookouts, historic trails (many of which are now roads) and the remains of historic sheep camps. Prehistoric site types represented include lithic scatters, lithic scatters with flaked stone tools and sacred sites.

Spatial data review for all known sites in the APE indicated that the majority of the prehistoric sites are not located near any of the proposed routes of the designated trail system. Many of the remaining prehistoric and historic sites in the APE are crossed by or are situated on or adjacent to existing Maintenance Level 1 (closed roads) or Level 2 (roads for high clearance vehicles) that would become part of the designated trail system. Since an effort was made to locate proposed trails on existing disturbance such as roads or trails, some of the designated routes are on top of roads or trails that have been identified as historic sites. Of the sites that are crossed by proposed trail segments, each alternative is described based on the total number of sites crossed and the number of sites that are linear features such as roads, trails or telephone lines.

- Alternative 1 does not propose any designated trails and therefore does not add any designated routes or remove any unauthorized routes across cultural sites. The existing transportation system (roads and trails) would remain as currently in place regardless of the presence or absence of heritage sites.
- Alternative 2 (APE = 4,088 acres): Routes cross or closely approach a total of 26 recorded sites and one traditional food area. Of the recorded sites: four are linear features located on system roads; nine are sites alongside system roads where the proposed route is on the road prism, four are proposed route crossings on linear features that are not system roads; five can be mitigated by implementing minor rerouting to avoid sites; and four are on segments of FS road 2630 which would be mitigated by designing these segments in accordance to the Historic Summit Trail Management Plan. One site is located at a viewpoint, where heritage values would be maintained by coordinating placement of the trail and any associated improvements with the District or Forest Archeologist, and the historic significance would be interpreted for the benefit of the public.
- Alternative 3 (APE = 2,432 acres): Routes cross or closely approach a total of 23 recorded sites and one traditional food area. Of the recorded sites: three are linear features located on system roads; six are sites alongside system roads where the proposed route is on the road prism, six are proposed route crossings on linear features that are not system roads; five can be mitigated by implementing minor rerouting to avoid sites; and two are on segments of FS road 2630 which would be mitigated by designing these segments in accordance to the Historic Summit Trail Management Plan.
- Alternative 4 (APE = 5,087 acres): Routes cross or closely approach a total of 39 recorded sites and one traditional food area. Of the recorded sites: five are linear features located on system roads; eleven are sites alongside system roads where the proposed route is on the road

prism, ten are proposed route crossings on linear features that are not system roads; nine can be mitigated by implementing minor rerouting to avoid sites; and 4 are on segments of FS road 2630 which would be mitigated by designing these segments in accordance to the Historic Summit Trail Management Plan. One site is located at a viewpoint, where heritage values would be maintained by coordinating placement of the trail and any associated improvements with the District or Forest Archeologist, and the historic significance would be interpreted for the benefit of the public.

Historically significant structures exist in the analysis area at the Ochoco Ranger Station, Cold Springs Guard Station, and Salters Cabin. None of these structures are within the APE. Also included within the analysis area are the Blue Ridge, Mother Lode, Amity, Independent, Mayflower and Scissorsville mines. Some of these mines have associated structures. However, none of these mines are within the APE. The Summit Trail was found eligible for nomination to the National Register of Historic Places in 1987. Within the analysis area, the Summit Trail corridor includes approximately 3,036 acres allocated for partial visual retention, 2,780 acres allocated for visual retention and 86 acres allocated for preservation. Within all of these allocations the desired condition is to maintain the existing historic integrity of the Summit Trail and to enhance and interpret significant segment for public enjoyment and education (LRMP 4-61). The LRMP also states that pristine segments will be managed to protect, interpret and preserve their historic qualities.

Direct and Indirect Effects

Alternative 1

In general, this alternative would continue the existing situation of uncontrolled recreation and use of user-created trails through the forest until the Travel Management Rule is implemented. Where new routes are developed through cultural resource sites, there is displacement, crushing, breakage, and general loss of site context and integrity. Where OHV use persists on existing roads that traverse eligible or unevaluated cultural resource sites, integrity would continue to degrade as unrestricted travel allows vehicles to forge into new sites. Lack of maintenance on user-created trails can compound effects on eligible or unevaluated sites by development of deep ruts causing erosion plus breakage, displacement, and loss of artifacts and site integrity.

Action Alternatives

Following guidelines in a 2003 Regional Programmatic Agreement (PA) among USDA-Forest Service, the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Office (SHPO), a finding of “No Adverse Effect” (No Historic Properties Affected) was determined under Stipulation III(B)5 of the Programmatic Agreement. The Forest finds that there are historic properties but the undertaking would have no effect on them as defined by 36 CFR 800.16(i). Any potential information that would otherwise be lost would be documented and reported to the SHPO. This finding is based on Project Design Elements and Mitigation Measures (see Chapter 2 of this document) that have been incorporated to determine the eligibility of unevaluated sites prior to trail construction. This would be accomplished through a series of treatment, data collection, and trail rehabilitation measures to document potential character defining features of the site. For those sites that may be eligible and are already being traversed from user-created trails through or adjacent to the site, Mitigation Measures would include site protection of the remaining portion adjacent to the route, data recovery, and/or avoidance. Protection is not required for those sites that are evaluated and found not eligible.

The Ochoco Land and Resource Management plan provides direction for the historic Summit Trail, which includes maintaining the existing historic integrity. Thus for the proposed trail segments along the Summit Trail further development, including construction, maintenance, signs, information

boards, etc. should be consistent with the emphasis and desired conditions for the Historic Summit Trail (MA-F7, LRMP page 4-61 to 4-62).

A mitigation/site protection table is incorporated in the cultural resource compliance report. Because of its sensitive nature, it is not included here. Coordination between project implementation personnel and the District and/or Forest archaeologist(s) would occur during layout of the trails in the sensitive areas to best adjust designated routes, design mitigating structures or surfacing, or identify site boundaries where avoidance is required.

Trail construction may involve widening or narrowing of the trail clearance to the appropriate width for the class of vehicle to be used for the trail system. On some trails, this would be 50 inches for ATVs (class I), which also accommodates motorcycles. Other trails would be 24 inches to accommodate motorcycles (class III) only. Still other trails would be 80 inches wide for jeeps and buggies (class II), which would also accommodate class 1 and III vehicles. Also, routine ground disturbing activities would occur such as blading of trails for leveling and maintenance, as well as creating and maintaining appropriate drainage features and width limiting obstacles.

There are circumstances where past motorized access for dispersed recreation activities has occurred within known sites. It is unknown if these activities in the area have altered character defining site features and how much site integrity has been compromised. Where a user-created trail is proposed for the designated trail system and it overlaps a known site, rutting and periodic maintenance activities have the potential to bury, crush, displace and/or lose context for artifacts that may be within the footprint of the trail. Prior to trail construction and designation, all known sites would be mitigated or evaluated for eligibility to NRHP. If the site is found to be eligible, the next step would be to determine whether the portion that overlaps the trail would contribute to that eligibility. If it does, then the following may take place: 1) trail relocation; 2) data recovery efforts sufficient to recover available information and the trail system would continue to be used; and/or 3) site protection through tread armoring and/or barriers to off-trail travel.

Trail grooming equipment includes a narrow tracked machine with a blade mounted in the back. Such equipment might eventually expose otherwise unknown cultural material on an unidentified site by removing obscuring deposits. Due to the patchy distribution of ash and clay deposits in the project area, artifacts are likely to be near the surface on tight clay soils, while they may migrate up and down in the ash soil strata. Agents of movement are artificial, as noted above, as well as natural, such as wind and flood events, erosion, tree roots, tree tip ups, burrowing insects, rodents, birds, and especially freeze-thaw cycles. Where ash soils are present, artifacts are not always visible on the surface and may be exposed following disturbance. Where clay soils are present and surface erosion has occurred, artifacts may be transported from their original location.

On proposed trail segments that are on top of existing roads, the trail would be built on ground that is already disturbed. In those instances when the road or existing trail traverses a known cultural resource site, loss of potential site information has been assumed to have already occurred within the depth of the road material and would not increase as a result of changing the use of the road. In some cases, the road would have shared use between regular (passenger cars, pickups, etc.) and trail vehicles. In others, the road would be closed to all but trail system users. Neither of these instances would directly affect a known site that is already traversed by the road. Design elements include the staying within the existing road prism when converting old roads into trails.

Another potential loss of site integrity would occur if an existing road is being converted to a narrower width for a trail segment. The method of ripping the road bed with heavy equipment, especially on a native surface, could directly affect a cultural resource site that may be traversed by the road. Although loss of integrity may have occurred during road formation and continued use, deposits below the surface of the road bed could disturb a buried archaeological site, its artifacts, and their context within the site. Project Design Features in this circumstance would maintain the integrity

of the site by avoiding ripping of the soil on known cultural sites and using trail narrowing methods such as surface impediments in lieu of subsurface ripping during road-to-trail conversion.

Outside of known sites there is potential for disturbance to sites that are yet to be discovered. During ripping or cross drainage installation during conversion of old roads to trails, and during decommissioning of unwanted existing roads or user trails, additional sites may be exposed or disturbed. Monitoring and/or mitigation would be coordinated with the District or Forest archeologist for any newly discovered site. All rehabilitation ground disturbing activities would occur where there would be no effect to eligible historic properties or other known cultural sites. Other rehabilitation activities would use appropriate non-ground disturbing methods such as above ground barriers and shallow scarification and rooting of vegetation especially on native surface project locations.

There is a potential from the sound generated by OHVs to be heard where American Indians potentially hold ceremonies or harvest traditional cultural foods. There may be other unknown sites that would typically remain unidentified because of their sacred nature. The purpose of the sites is of religious importance and is meant to occur in the absence of artificial/outside intrusions. The sound from OHV engines, or other activities unrelated to OHV use could be considered such an intrusion. The Scoping Letter and maps were sent to representatives of Confederated Tribes of Warm Springs, Klamath Tribes, Burns Paiute Tribe and Confederated Tribes of Umatilla. Communication with these tribes will continue throughout the planning and Section 106 (cultural resource management) process. Any information on cultural resources or traditional cultural properties will be addressed following the Project Design Elements in Chapter 2 of this DEIS.

Cumulative Effects

Cumulative effects on cultural resources were determined by focusing on the current aggregate effects of past, present, and reasonably foreseeable future actions. For cultural resources, in general, past actions have avoided effects to eligible or unevaluated cultural resource sites, because of the Forest Service responsibility to protect their values. This has largely been accomplished through avoiding the pertinent cultural resource sites for those activities that are closely monitored. For example, overlapping vegetation management projects (Spears, Canyon, Ochoco Valley Fuels, Howard Elliot Johnson, Zane, Deep Restoration) determination of effect to cultural resources found: “Following guidelines in a 2004 Regional Programmatic Agreement among USDA-Forest Service, the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Office, a finding of “No Historic Properties Adversely Affected” was determined.

In the past, the strategies of site protection or mitigation have been successful because of efforts to inventory, identify, evaluate, and manage cultural resources. Therefore, any overlapping past, present, or reasonably foreseeable action on this project would not result in cumulative effects.

Monitoring

Site monitoring would occur during any phase of soil disturbance when it overlaps a known site. Site monitoring would also occur when excavating for toilet vaults to examine buried deposits for potential artifacts and features that would indicate a buried site not previously identified.

Range Resources

This section includes a summary of the Range specialist's report; the entire report is in the Ochoco Summit Trail System project record, located at the Ochoco National Forest, Prineville, Oregon.

Introduction

The Ochoco Summit Trail System project area is approximately 301,574 acres and is located on the Ochoco National Forest in Crook and Wheeler Counties. The project area has been grazed since the late 1800s and early 1900s by sheep, cattle, and horses with the main objective of providing forage for livestock. The project area is located within portions of twenty-eight allotments and a Wild Horse Management Area. Table 130 describes the 28 allotments adjacent to and intersecting the project area. Twenty-five of the allotments are active allotments, one of which is a sheep allotment. Remaining active allotments are currently grazed by cattle. The Little Summit Allotment is comprised of both private and National Forest System lands. The other allotments are composed solely of National Forest System lands. To facilitate the management of these allotments, water developments and fences have been constructed over the years. A majority of the water developments are associated with spring sources or stock ponds. Water developments benefit both wildlife and livestock.

For the purpose of discussing livestock grazing, all of the area located within the allotments will be included in discussion.

Table 130. Allotment Information.

Allotment	Total Acres	Acres In Project Area	Kind/Class	Permitted Number	Season of Use	AUMs
Antler	661	661	Cattle-cow/calf	114	06/16-09/30	537
Badger	29,942	29,942	Cattle-cow/calf	496	06/21-09/30	2,248
Bearskull/Cottonwood	43,226	6,365			Closed	0
Big Summit	24,750	24,750	Cattle-cow/calf	400	06/16-09/30	1,883
Brush Creek	10,521	10,521	Cattle-cow/calf	110	07/01-09/30	445
Buck	451	451	Cattle-cow/calf	16	07/11-09/25	54
Burn	4,671	3,174	Cattle-cow/calf	130	04/15-08/14	698
Crystal Springs	7,190	7,190	Cattle-cow/calf	185	05/17-08/31	871
Deep Creek	17,577	17,577	Cattle-cow/calf	200	06/16-09/30	929
Derr	12,474	12,474	Cattle-cow/calf	150	07/01-09/30	599
Elkhorn	15,020	15,020	Cattle-cow/calf	290	06-15-09/30	1,340
Fox Canyon	13,007	13,007	Cattle-cow/calf	217	06/15-09/30	1,031
Gray Prairie	10,935	10,935	Cattle-cow/calf	325	06/15-09/30	1,544
Happy	18,624	18,624	Cattle-cow/calf	230	06/21-09/30	1,018
Indian Creek	525	525	Cattle-	30	07/15-	103

Table 130. Allotment Information.

Allotment	Total Acres	Acres In Project Area	Kind/Class	Permitted Number	Season of Use	AUMs
			cow/calf		09/30	
Little Summit	15,704	15,704	Cattle-cow/calf	200	06/21-09/30	886
Lookout	2,625	2,345			Closed	0
Lost Horse	6,848	460	Cattle-cow/calf	100	06/16-09/30	471
Marks Creek	10,542	10,542	Cattle-cow/calf	366	07/01-09/30	1,449
North Fork	6,034	6,034	Cattle-cow/calf	150	06/15-09/30	713
Pisgah	5,079	5,079	Cattle-cow/calf	156	06/16-08/11	391
Prairie Parcels (Shady Cr.)	78	78	Cattle-cow/calf	22	05/01-06/15	45
Prairie Parcels (Brush)	353	353	Cattle-cow/calf	22	07/15-10/15	89
Pringle	7,203	21	Cattle-cow/calf	225	06/21-09/24	950
Reservoir	34,173	34,173	Sheep-ewe/lamb	2,200	06/16-09/30	2,354
Roba	18,266	18,266	Cattle-cow/calf	236	06/16-10/15	1,250
Rock Creek	6,428	6,428			Vacant	0
Snowshoe	2,710	2,710	Cattle-cow/calf	156	08/12-09/30	343
Wolf Creek	42,231	23,901	Cattle-cow/calf	781	06/16-10/15	4,135

Information for pasture turn on dates, turn off dates and numbers were taken from the Grazing Permits at Lookout Mountain Ranger District and Paulina Ranger District.

Cattle Allotments

All cattle allotments in the project area range in size from one pasture to eight pastures. Most allotments containing more than one pasture are on a deferred rotation grazing system. Grazing season varies from April 15th to October 15th. A combination of cow/calf pairs, yearlings, and bulls graze the landscape, within an authorized Animal Unit Months (AUMs) stocking limit per allotment.

Sheep Allotment- Reservoir

The Reservoir allotment is not split into pastures, but is managed by the trailing of two bands of sheep. The permit authorizes 2,200 ewe/lamb pairs from June 16th through September 30th, for a total of 2,354 AUMs. There are two bands of sheep (each 1,100 pairs) that trail through the allotment, the Canyon Creek Band and the Reservoir Band. Herders are with the sheep for the entire grazing season. Sheep are permitted to water and bed at specifically authorized locations only once per season. Actual turn-out dates and permitted numbers have been consistent with the permit. Range readiness criteria have always been met prior to turn-out (2210 Range File, Reservoir Allotment, Inspection Notes).

Wild Horses

The Wild Horse Management Area falls within the same area as the Reservoir allotment and is managed for 55 to 65 animals.

A wild horse is any untamed horse that resides in or has temporarily strayed from a recognized Wild Horse Territory. In 1975 a Wild Horse Management Plan and Environmental Assessment was developed for the Ochoco National Forest. The objective is "to provide protection, management and control of wild, free roaming horses in order that we might perpetuate a sound biological unit consistent with the Wild Free Roaming Horse and Burro Act of 1971" (2260 Range File, Ochoco Wild Horse Management). The plan states that the wild horse herd should be managed for 55 to 65 animals. If population numbers rise above 65 animals, methods of capture and control are utilized to keep a stable population. The Wild Horse Herd Management Area does not fall within the Burn and Crystal Springs Allotments; however, wild horses are commonly found in both. Wild horses have often resided in Hohn Springs pasture of the Burn Allotment and in the Coyle Creek pasture of the Crystal Springs Allotment.

There are several factors that possibly contribute to the migration of wild horses out of the Herd Management Area (HMA). Key factors are fence maintenance (particularly winter damage to fences), lack of winter range and off-road vehicles. Wild horses have been able to move out of the HMA by the means of damaged fence. Currently the HMA does not contain enough winter range to accommodate the herd and horses naturally move to lower elevations where winter forage is more accessible. These areas are typically outside of the HMA. There is some speculation that horses may also be moving to escape harassment from off-road vehicles, which are commonly used within the HMA.

Information on wild horse data was taken from the Wild Horse File for the Herd Management Area, which is located on the Lookout Mountain Ranger District, Ochoco National Forest.

Range Improvements - Cattle and Sheep Allotments

Throughout the project area there are several range improvements including fences and water developments and exclosures. All range improvements help in keeping livestock distributed throughout the allotment. Permittees are responsible for pasture fenceline, allotment boundary fenceline and water developments. Permittees maintain these fences prior to turn-out every year. Most exclosure maintenance is the responsibility of the Forest Service. Several water developments have been recorded as needing maintenance or relocation.

Environmental Effects

Under any alternative, livestock grazing would continue to occur within the Ochoco Summit Trail System project area. Current stocking rates and management practices would remain the same. Wild horse occupancy would continue to occur within the analysis area, and management would target a population size of 55 to 65 horses.

Alternative 1

Under this alternative there would be no dedicated trail system for off-road motorized recreation. Current management plans would guide management of the project area, and OHV use off of designated roads and trails would be expected to decline with implementation of the Travel Management Plan (2011).

Range vegetation trend and livestock distribution would not be altered by trail development or use. Range improvements including troughs, ponds, exclosures and pasture fences would remain at the current level of risk of damage by people. Likelihood for livestock-OHV interactions would not be changed from what is expected to occur under implementation of the current Travel Management Plan. Additional cattle guards would not be needed.

Effects Common to all Action Alternatives

Under these alternatives a system of trails and areas would be designated by class of vehicle and season of use. Trails would be designated in 15 active allotments. Rehabilitation or restoration activities would take place in previously damaged areas and interconnecting unauthorized or user-created routes to promote recovery, and to prevent confusion about which routes are open and which are not. Non-motorized use would not be prohibited on proposed motorized trails.

Alternatives 2, 3 and 4 would decrease available forage for livestock. The implementation of new routes would remove suitable range, which can be a source of forage (see Table 131 and Table 132 for Loss of Forage in Acres). Livestock may be displaced during high use times on the trail system and distribution throughout the project area could also be negatively affected with the increase of OHV use in a localized area. If livestock distribution is negatively impacted, localized areas in uplands and riparian areas may receive greater grazing utilization. The proximity of the trail to several livestock water developments may cause livestock to avoid those areas when approached by OHV users, making those developments ineffective. This would change the distribution of livestock and utilization patterns, which would lead to a need for additional monitoring of livestock and potentially require a change in existing Allotment Management Plans (AMPs). Trail system routes would not go through the Wild Horse Herd Management Area (HMA), resulting in no decrease of available forage in the HMA for wild horses.

Range improvements such as troughs, fences, water tanks, and cattle guards not only help manage livestock, but wildlife as well. Table 133 identifies range improvements that are adjacent to or intersecting a proposed trail segment under each alternative. A major concern with increased use on the trail system adjacent to range improvements is vandalism or user group conflicts. Improvements are used to disperse domestic livestock throughout the allotment. All action alternatives include design elements intended to avoid or reduce the likelihood of damage to improvements. Livestock may avoid trail users entirely, or be harassed by OHVs, which could potentially lead to the destruction of fences or injury to livestock.

Direct and indirect effects to grazing operations should be minimal. Permittees that operate in the project area should continue to be able to access range improvements for maintenance, spread salt, and check the herd for distribution. By restricting travel to designated routes only, permittees may have an increase in labor under this alternative due to the need to pack salt and access improvement by foot or horseback. Permitted off road travel to access range improvements may be administratively authorized under the Term Grazing Permit, but would have to be planned in advance and authorized by a Line Officer.

Direct and indirect effects under action alternatives may affect the introduction and spread of noxious weeds. The type of activity, intensity and location of associated disturbance, and proximity to a seed source will affect the probability or risk of introducing noxious weeds or contributing to their spread. Potential for noxious weed infestations due to cross-country travel across the analysis area will decrease with vehicle access restricted to designated areas. However, there will continue to be unauthorized use, which can potentially create in an increase in the spread of noxious weeds in rangelands if vehicles are not clean. The increase in weed infestations can decrease native vegetation, which provides forage for livestock. As noted in the Invasive Plant section, all action alternatives could result in an increase of noxious weeds and other invasive plants across the project area. Overall overlap of proposed routes within noxious weed locations is low. There are up to three weed infestations crossed by proposed trails, and up to 5 gathering areas within or adjacent to weed sites (varies between alternatives). Weed sites within the concentrated use areas (staging, etc) have the most potential for spread of weeds. Refer to Table 126 in the Botany section for further details on weed sites intersected by proposed routes or areas.

Mitigations that Address Livestock Safety/Harassment Effects are as follows:

- Place cattle guards in place of gates where OHV trails cross existing pasture fences.
- Increase distance of trail from water developments if trail is within 100 ft. of development. This will reduce the potential of collisions between livestock and off-road vehicles and the potential of vandalism to water developments and livestock.
- Provide education literature about livestock management at staging areas.
- If rangeland conditions change due to OHV pressure on livestock movement, DMAs (designated monitoring areas) should be moved to more representative areas if needed.

OHV use for maintaining grazing allotment improvements off the trail system will be by prior authorization as part of AOI (Annual Operating Instructions). This will be reviewed by the Line Officer.

Table 131. Loss of Suitable Rangeland on New Routes (Acres of Forage lost by Alternative).

	Alternative 2			**Alternative 3**			**Alternative 4**		
Vehicle Class	I	II	III	I	II	III	I	II	III
Miles of New Routes	31	12	26	22	0	28	48	11	22
Acres of Suitable Range Lost	15.7	9.7	6.3	11.1	0	6.8	24.2	8.9	5.3
Total Acres	**15.7**	**9.7**	**6.3**	**11.1**	**0**	**6.8**	**24.2**	**8.9**	**5.3**
Total	**31.7**			**17.9**			**38.4**		

Table 132. Loss of Suitable Rangeland on New Routes for Forage by Alternative & Allotment.

		Alternative 2			Alternative 3			Alternative 4		
	Vehicle Class	I	II	III	I	II	III	I	II	III
Badger Allotment	Miles of New Routes	5.45	7.06	0	0	0	2.51	6.62	7	0
	Acres of Suitable Range Lost	2.75	5.7	0	0	0	.61	3.34	5.66	0
	Total Ac. Lost	**8.45**			**.61**			**9**		
Big Summit Allotment	Miles of New Routes	.17	5	.06	0	0	.48	.17	4.24	0
	Acres of Suitable Range Lost	.09	4.04	.01	0	0	.12	.09	3.43	0
	Total Ac. Lost	**4.14**			**.12**			**3.52**		
Crystal Springs Allotment	Miles of New Routes	1.23	0	0	3.05	0	0	3.9	0	0

Table 132. Loss of Suitable Rangeland on New Routes for Forage by Alternative & Allotment.

		Alternative 2			Alternative 3			Alternative 4		
	Vehicle Class	I	II	III	I	II	III	I	II	III
	Acres of Suitable Range Lost	.62	0	0	1.54	0	0	1.97	0	0
	Total Ac. Lost	**.62**			**1.54**			**1.97**		
Deep Creek Allotment	Miles of New Routes	6.5	0	5.78	0	0	11.17	8.54	0	5.06
	Acres of Suitable Range Lost	3.28	0	1.40	0	0	2.71	4.31	0	1.23
	Total Ac. Lost	**4.68**			**2.71**			**5.54**		
Derr Allotment	Miles of New Routes	0	0	1.17	0	0	.45	0	0	2.94
	Acres of Suitable Range Lost	0	0	.28	0	0	.11	0	0	.71
	Total Ac. Lost	**.28**			**.11**			**.71**		
Elkhorn Allotment	Miles of New Routes	1.79	0	3.1	2.64	0	0	6.07	0	0
	Acres of Suitable Range Lost	.90	0	.75	1.33	0	0	3.07	0	0
	Total Ac. Lost	**1.65**			**1.33**			**3.07**		
Happy Allotment	Miles of New Routes	4.46	.32	1.55	0	0	1.99	6.41	0	0
	Acres of Suitable Range Lost	2.25	.26	.38	0	0	.48	3.24	0	0
	Total Ac. Lost	**2.89**			**.48**			**3.24**		
Little Summit Allotment	Miles of New Routes	0	0	5.4	0	0	5.4	1.09	0	6.56

Table 132. Loss of Suitable Rangeland on New Routes for Forage by Alternative & Allotment.

		Alternative 2			Alternative 3			Alternative 4		
	Vehicle Class	I	II	III	I	II	III	I	II	III
	Acres of Suitable Range Lost	0	0	1.31	0	0	1.31	.55	0	1.59
	Total Ac. Lost	**1.31**			**1.31**			**2.14**		
Marks Creek Allotment	Miles of New Routes	1.27	0	0	4.11	0	0	5.49	0	0
	Acres of Suitable Range Lost	.64	0	0	2.08	0	0	2.77	0	0
	Total Ac. Lost	**.64**			**2.08**			**2.77**		
Pisgah Allotment	Miles of New Routes	2.05	0	2.09	2.41	0	0	3.56	0	0
	Acres of Suitable Range Lost	1.04	0	.51	1.22	0	0	1.8	0	0
	Total Ac. Lost	**1.55**			**1.22**			**1.8**		
Reservoir Allotment	Miles of New Routes	6.74	0	.12	7.33	0	0	6.87	0	0
	Acres of Suitable Range Lost	3.4	0	.03	3.7	0	0	3.47	0	0
	Total Ac. Lost	**3.43**			**3.7**			**3.47**		
Roba Allotment	Miles of New Routes	0	0	.65	0	0	.65	0	0	.65
	Acres of Suitable Range Lost	0	0	.16	0	0	.16	0	0	.16
	Total Ac. Lost	**.16**			**.16**			**.16**		
Rock Creek Alltoment	Miles of New Routes	0	0	.39	0	0	.39	0	0	.87

Table 132. Loss of Suitable Rangeland on New Routes for Forage by Alternative & Allotment.

		Alternative 2			Alternative 3			Alternative 4		
	Vehicle Class	I	II	III	I	II	III	I	II	III
	Acres of Suitable Range Lost	0	0	.09	0	0	.09	0	0	.21
	Total Ac. Lost	**.09**			**.09**			**.21**		
Snowshoe Allotment	Miles of New Routes	1.24	0	0	1.24	0	0	1.24	0	0
	Acres of Suitable Range Lost	.63	0	0	.63	0	0	.63	0	0
	Total Ac. Lost	**.63**			**.63**			**.63**		
Wolf Creek Allotment	Miles of New Routes	0	0	5.35	0	0	5.35	0	0	6.06
	Acres of Suitable Range Lost	0	0	1.3	0	0	1.3	0	0	1.47
	Total Ac. Lost	**1.3**			**1.3**			**1.47**		

Table 133. Range Improvements in the Ochoco Summit Trail System Project Area that are Adjacent to or Intersect Proposed Trail Segments.

Improvements	No Action	Proposed Action	Alternative 3	Alternative 4
Troughs or Ponds	0	23	24	39
Fence Crossings/Adjacencies	0	58	50	81
Corrals	0	2	1	2
Cattle guards	0	Est. 50	Est. 50	Est. 65
Troughs indicated are at least within ¼ mile of trail. Fences indicated include fence crossings and/or fence-lines that run adjacent to trail. New cattle guards for trail crossings through range fences would require excavation in the road prism for installation.				

Cumulative Effects

Cumulative effects result from the potential effects of an increase in recreational use by OHVs on designated routes in the Ochoco Summit project area combined with the effects of past, present or ongoing activities. For Alternatives 2, 3, and 4: The proximity of trail users to existing water developments may be expected to cause avoidance of these areas by livestock. Combining OHV use and livestock grazing on allotments may lead to increased livestock use in areas that are generally utilized less or not at all. Travel patterns of cattle may be altered and new cattle trails may be created, which may lead to new areas of soil compaction. Vegetation and forage species composition can be expected to change over time in response to changes in livestock distribution. This effect may be off-set to some degree in areas where implementation of the Travel Management Rule limits motorized

access, thereby reducing effects of human interaction with livestock in areas not associated with designated routes. Past road construction and maintenance, grazing, timber harvest and other soil disturbance have provided environments for noxious weed species establishment. Past activities within the analysis area have resulted in moderate amounts of weed infestations occupying 2,090 acres. The potential for noxious weed establishment and spread from passenger vehicles not associated with the project alternatives along open road corridors (including seasonally open roads) would continue. The potential for other vectors of spread within the project area including people, wind, or animals would also continue.

In addition to the past and current activities within the project area, adding 88 to 158 miles of designated OHV trail on routes that are not otherwise open to motorized travel could result in cumulative impacts to forage production due to establishment or spread of invasive plants. At the same time, implementation of the Travel Management Rule, prohibits overland use of OHVs and all motorized travel on routes that are not designated as open, which would reduce the risk of introducing invasive plants into areas not associated with designated trails.

The Ochoco/Deschutes NFs Invasive Plant Treatment Record of Decision has been recently signed. This decision increases the ability to effectively control invasive plants with herbicides. The ability to use herbicides will increase efficiency, thus lowering costs, which results in the ability to treat more acres for the same costs. This proposal does not synergistically interact with the proposed trail system, but does help reduce the extent and duration of effects of noxious weeds on native vegetation.

Wilderness, Inventoried Roadless and Unroaded Areas

This section contains the entire Wilderness, Inventoried Roadless and Unroaded Areas analysis.

Wilderness and Inventoried Roadless Areas

Existing Condition

One Wilderness Area, two Inventoried Roadless Areas (IRAs) and one Wilderness Study Area are within the Ochoco Summit Trail System project boundary.

The 5,355-acre Bridge Creek Wilderness is within the project area. Emphasis in the Bridge Creek Wilderness Area is to protect the wilderness ecosystems and manage use to maintain a natural setting and preserve solitude. Bridge Creek Wilderness is to be managed as a nontrailed wilderness (Forest Plan, p. 4-51). Generally, no motorized or mechanized use is allowed on trails in Wilderness Areas (Forest Plan, p. 4-188).

Within the 15,660-acre Lookout Mountain Recreation Area, of which 14,365 acres are within the project area, the management emphasis is to maintain a natural setting, provide continued opportunities for high quality semiprimitive recreational activities and wildlife habitat, and maintain healthy forests (Forest Plan, p. 4-68). Year-round trails to facilitate the use of the area by horseback riders, mountain bikers, hikers, snowmobilers and cross-country skiers will be developed (Forest Plan, p. 4-188). Emphasis in the Rock/Cottonwood Roadless Area (5,098 ac in the project area) is to provide opportunities for nonmotorized recreational use while protecting the anadromous fishery, sensitive soils on steep slopes and big game habitat (Forest Plan, p. 4-63).

The management emphasis in The North Fork Crooked River Wilderness Study Area (WSA) as discussed in the Forest Plan (p. 4-54) is to maintain existing conditions of the area for potential wilderness designation or until it's either designated as wilderness or released from further consideration. The North Fork Crooked River WSA was evaluated and recommended as non-suitable for Wilderness designation by the Prineville District BLM in the mid-1980s. This recommendation was approved by the BLM Oregon State Office, the Secretary of the Interior and the President of the United States. The final status of the WSA is to be determined by Congressional legislation. In the

meantime it is being managed for its wilderness potential under Interim Management Policy (BLM Manual H-8550-1) and by guidance under the North Fork Crooked River Management Plan (USDI/USDA 1993).

Environmental Effects

The following values often characterize unroaded values (Federal Register, January 12, 2001):

- High quality soil, water, and air.
- Sources of public drinking water (the Ochoco Summit Trail System project area is not a source of public drinking water).
- Diversity of plant and animal communities.
- Habitat for threatened, endangered, proposed, candidate, and sensitive species, and for those species dependent on large, undisturbed areas of land.
- Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of recreation opportunities (refer to LRMP GL-19).
- Reference landscapes
- Landscape character and scenic integrity.
- Traditional cultural properties and sacred sites.
- Other locally identified unique characteristics.

Alternative 1

Under Alternative 1, characteristics that are used to define unroaded values such as high quality soil and water, and recreational opportunities would remain at current levels. Opportunity to hear and see motorized vehicles would not change. Due to the basic unregulated nature of travel and the expanse of the riding area, law enforcement for incursions of motorized vehicles into unroaded areas would remain problematic. Implementation of the Travel Management Rule generally limits motorized travel to designated routes, and OHV travel to designated mixed-use roads; some mixed-use roads are adjacent to unroaded areas. There are 1.3 miles of road currently open to non-highway legal OHV use adjacent to or within the Lookout Mountain Recreation Area.

Alternatives 2, 3 and 4

Bridge Creek Wilderness would not be affected by the action because the closest point to any proposed motorized OHV trail is over one mile. No portion of the wilderness area is within the noiseband >45 db for designated trail system routes. Management emphasis for the Bridge Creek Wilderness is to maintain a natural setting and preserve solitude. Effects to this resource are discussed in the Recreation section of this EIS.

Activities proposed under any alternative in the Ochoco Summit project do not overlap any IRA; therefore effects to soil, water and air quality are as disclosed in those sections of the EIS.

There would be no effect from any of the action alternatives on any area within the Lookout Mountain Recreation Area. The closest proposed motorized trails are > 4 miles from the boundary of this area. OHV use would be allowed on any road open to non-highway legal vehicles that are within or adjacent to the Recreation area as described for Alternative 1. Management emphasis for Lookout Mountain Recreation Area includes opportunities for high quality semiprimitive recreational activity and wildlife habitat; potential impacts to these resources are disclosed in the Recreation and Wildlife sections of this EIS.

Rock Creek/Cottonwood Creek Area is an unroaded area with a management emphasis on protecting soil, water and fisheries while providing opportunities for nonmotorized recreational use. Activities proposed by this project do not overlap the Rock Creek/Cottonwood Creek Area and therefore do not affect unroaded characteristics within that management area. Potential impacts to nonmotorized

recreation and to Keeton Trail based on areas where sounds may be heard at greater than 45db when OHVs are riding on the designated OHV trail system are discussed in the Recreation Section.

No trails or areas are proposed within the North Fork Crooked River Wild and Scenic River Corridor and no portion of the corridor is within the noiseband for >45db.

How the Action Alternatives Respond to Identified Unroaded Values

High quality soil, water and air: Impacts to the soil resource are limited to the area of activity and are described in the Soils section in Chapter 3 of this FEIS. Soil productivity is maintained through Project Design Criteria and rehabilitation of user-created trails within the identified implementation and OHV management areas. Project Design Criteria were included that would minimize sediment potential and it has been determined that there would be a net maintenance and restorative process overall by meeting Forest Plan standards and guidelines; many user-created trails within riparian areas would be closed or redesigned to meet standards (see discussion in the Hydrology and Aquatic Species section, Chapter 3 of this document). Air quality is also addressed in this chapter. Any localized impairment would be diluted to a scale that would be impractical to measure. A projected 2.5 to 5.6 percent yearly increase in riders would not change this condition because the primary use would be during daylight hours and within a season of use (June 1 to September 30 in Alternative 3) when dispersion is likely to occur.

In summary, there would be no measureable effect to air quality since the net emissions from vehicles, vehicle travel, forest management activities, and wildfires are unlikely to appreciably change under the action alternatives. There may be some temporary air quality impairment from localized vehicle emissions and fugitive dust, but it would be well away from Wilderness, the Wilderness Study Area and Inventoried Roadless Areas.

Sources of public drinking water: The Ochoco Summit project area does not contain any municipal watersheds. The proposed trail system would not affect ground water; therefore there would be no change to ground water wells and spring developments at some Forest Service facilities and developed campgrounds.

Diversity of plant and animal communities: The diversity of plant and animal communities within the Wilderness, Wilderness Study Area, and Inventoried Roadless Areas, and within the greater Ochoco Summit project area, is not unique for the area. Effects to wildlife and botany are disclosed in Chapter 3; in summary, effects of the proposed trail system would be limited in scale to the zone of influence for the designated trail system itself, as described in the effects to wildlife and botanical resources, and no effects to the overall diversity of plant and animal communities are anticipated.

Habitat for threatened, endangered, proposed, candidate, and sensitive species, and for those species dependent on large, undisturbed areas of land: Please see discussions in the "Hydrology and Aquatic Species," "Wildlife," and "Botany" sections in Chapter 3 of this FEIS for effects to threatened, endangered, proposed, candidate and sensitive species. In all action alternatives the proposed trail system is designed on top of, adjacent to, or in proximity to existing disturbed areas (for instance, mixed-use roads, closed/decommissioned roads, and user-created trails). The proposed trail system design avoids large, undisturbed areas of land and therefore would have no effect on species that are dependent upon such habitat.

Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of recreation opportunities: The Ochoco Summit Trail System project does not change the Recreational Opportunity Spectrum (ROS) for these areas. The project area boundary defines where motorized trail use might be designated; this is further refined by the identified trail implementation areas (see Chapter 2 in this FEIS). OHV trail may be designated in the vicinity of primitive and semi-primitive ROS areas, and in some cases sound may carry into these areas (see Table 45 in the "Recreation"

section of this FEIS); however, non-motorized opportunities would continue to operate unchanged from the current condition.

Landscape character and scenic integrity: The landscape character would be similar following trail construction. Disturbance associated with unregulated motorized use has already occurred; closure and rehabilitation of user-created trails that are located in undesirable locations or in areas that are valued for riparian, cultural or wildlife habitat would offset new trail construction and route designation. Trails would essentially be designed to not dominate the landscape, thus maintaining the current scenery and landscape character. For more information, see the "Visual Quality" section in Chapter 3 of this FEIS.

Traditional cultural properties and sacred sites: There are no effects to known traditional cultural resources or sacred sites in Wilderness areas, IRAs or the WSA, including potential linkage from a historic trail from the project area. Appropriate consultation with affected parties has occurred ("Cultural Resources" section, Chapter 3).

Potential Wilderness Consistency

Forest Service Handbook 1909.12 Chapter 70 section 71.1 outlines the criteria to be applied to meet the statutory definition of wilderness. Essentially, these criteria are limited to size requirements and presence of roads; however the Forest Service also looked at trail construction for (2.a) areas that can be preserved due to physical terrain and natural conditions, (2.b) Areas that are self-contained ecosystems, such as an island, and (2.c) Areas that are contiguous to existing wilderness, primitive areas, or potential wilderness in other Federal ownership, regardless of size.

Within the Ochoco Summit Trail System project area, there are no unroaded areas with potential to meet or exceed the threshold of 5,000 acres besides the IRAs and wilderness discussed above.

Because of active forest and range management and ongoing recreation both within and adjacent to the project area, the project area is generally well-roaded except in areas already identified and established to preclude roads and motorized access.

Generally, the implementation areas within the Ochoco Summit Trail System project area cannot be preserved due to physical terrain and natural conditions (subpart a), are not a self-contained ecosystem (subpart b), and are not contiguous to existing wilderness, primitive areas, administratively endorsed wilderness, potential wilderness in other federal ownership (subpart c). See the Recreation section in Chapter 3 for more details. Essentially, all proposed routes are closely associated with existing roads and user-created trails; where new trails are proposed, they are intended to connect areas of existing disturbance and would not create incursions into unroaded areas.

Unroaded Areas Identified by Commenters

In the early 2000s, the interest group Oregon Wild conducted an inventory across Oregon, including the Ochoco National Forest, to determine areas that are unroaded, using inventory criteria that they developed for their purposes. A map of Oregon Wild's unroaded areas was provided to the Ochoco National Forest during the comment period on the draft EIS for the Ochoco Summit project (see Figure 5).

The proposed action alternatives were evaluated against Oregon Wild's map, as follows:

Alternative 3

The northern side of the loop at Indian Butte skirts the edge of the southwestern most tip of the polygon that is shown across both sides of the county line near the top center of Oregon Wild's map. The majority of this route is on existing old road beds; however there is a proposed trail crossing the peripheral extension of this polygon that connects between roads 2200-306, 307 and 309 in the

vicinity of Indian Creek. All three of these roads are open year-round under the 2011 Travel Management Plan and are displayed as open on the MVUM map. Therefore the character of this finger of Oregon Wild's polygon is not unroaded. The area in which this trail system loop is proposed is identified as a Recreation Opportunity Spectrum (ROS) of Roaded Modified (Forest Plan page 4-179).

The largest polygons on Oregon Wild's map at Lookout Mountain and Rock/Cottonwood are entirely avoided by all proposed system trails.

The two smaller polygons south of Deep Creek (one along the North Fork of the Crooked River and the one south of Roba Butte sandwiched between private land and the 4260 road) are entirely avoided by all proposed system trails.

All polygons south of Big Summit Prairie are entirely avoided by all proposed system trails.

Alternatives 2 and 4

For Alternatives 2 and 4, the overlap on the southwest finger of the mapped polygon that crosses the county line (north central part of the map provided) is the same as described for Alternative 3. However these alternatives include routes that continue eastward from Indian Butte across the south facing flank of Mt. Pisgah. Under both of these alternatives proposed routes are approximately along the southern exterior edge of the central lobe of this polygon. Alternative 4 continues along the eastern exterior edge of this same central lobe, while Alternative 2 pulls away from it. Continuing eastward, both of these alternatives travel along the edge of this polygon on open road 2630. Both alternatives then travel into the southeastern lobe of this polygon primarily on road 2630 and adjacent spurs, with two short connector trails between roads 2630-555 and 556 and between 2630-600 and 606. All of these roads are open year-round and approved for mixed use (OHV legal) under the 2011 Travel Management Plan as displayed as such on the Motor Vehicle Use Maps (MVUM).

Alternatives 2 and 4 both propose class II trails in the peripheral tip of the finger at the southeast corner of this same northern polygon. These proposed trails are along ridges on and adjacent to road 3000-550 and connecting between roads 3000-550 and 3000-500. These routes are partially on existing road beds and partially on proposed new trails between existing road beds. Road 3000-550 and part of 500 are open year round and approved for mixed use.

No routes are proposed within any other polygon on the map provided under any action alternative.

A map was also provided by Wildlands CPR. Wildlands CPR used their own data and Geographical Information System analysis to estimate areas that are greater than one mile from a motorized travel route (see the green polygons in Figure 6).

The proposed action alternatives were evaluated against Wildlands CPR's map, as follows:

Of the areas shown on Wildlands CPR's map as being more than 1 mile from an open road, only the small polygon in the area of Big Spring Creek (west of Little Summit Prairie) is directly involved with any proposed designated route. Alternatives 2, 3 and 4 all had a single proposed route on an existing closed road within close proximity to that polygon. Under Alternative 3 that route has been relocated to another closed road bed that is to the west of the polygon, yet in proximity to it. Though the route is not within the polygon under this alternative, it does affect it because at least a portion of the polygon is within 1 mile of the proposed route. It would therefore no longer be more than a mile from any motorized route. For a detailed analysis of impacts to areas more than 1 mile from open motorized routes, refer to EIS sections on General Effects to Wildlife (Table 91), and Big Game – Deer and Elk (Table 108).

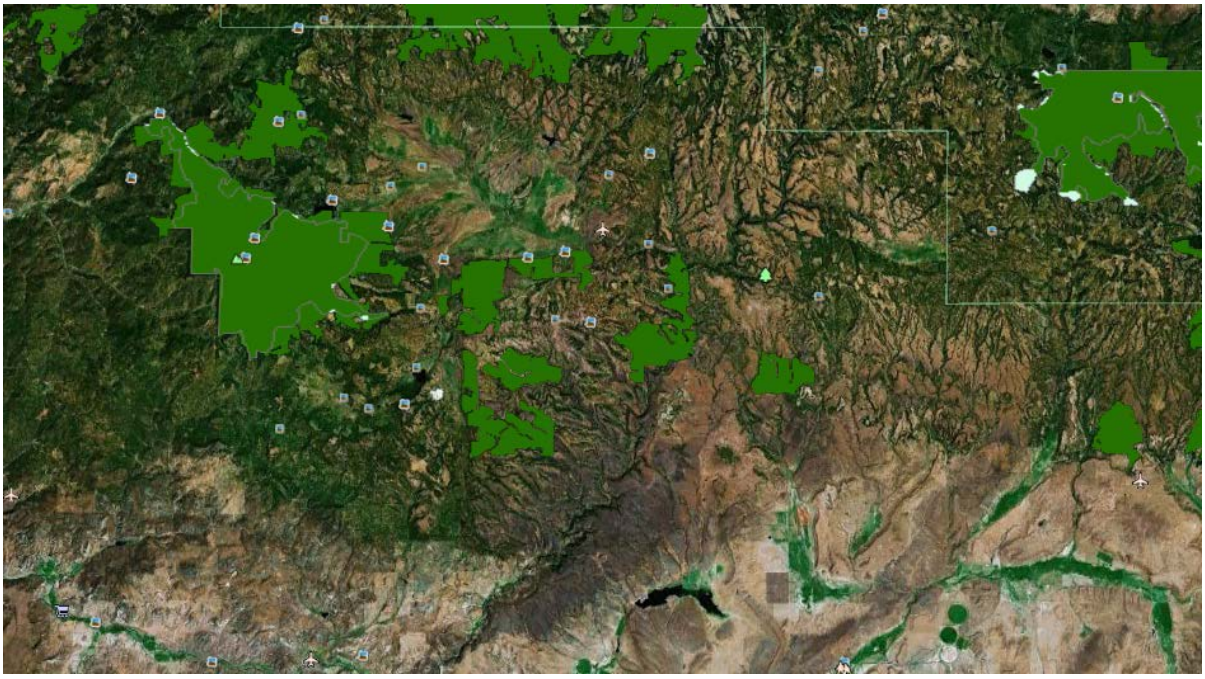


Figure 7. Map of "unroaded areas" provided by Oregon Wild during the comment period on the DEIS.

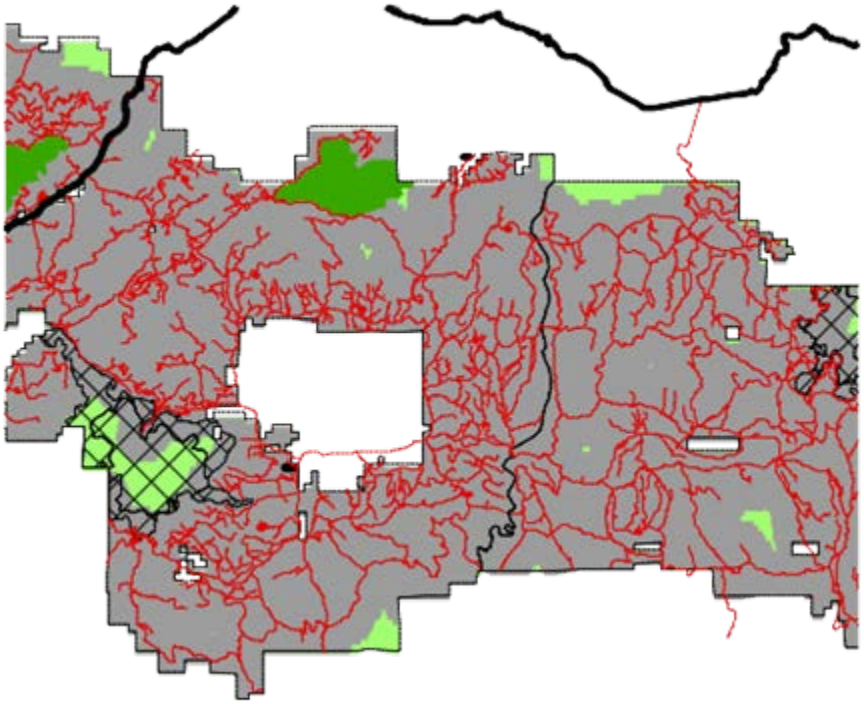


Figure 8. Map of "areas greater than 1 mile from a road" provided by Wildlands CPR.

Visual Quality

This section includes the entire Visual Quality analysis.

The existing scenery has a variety of disturbed and undisturbed areas. Human-caused activities and natural disturbances have altered the appearance of the landscape. Diverse vegetative composition and structure across the project area provide textural and color patterns that vary seasonally. Depth-of-field views vary between restricted to immediate foreground in high density stands, to filtered middleground views in moderate density to open timbered stands, to wide-open spaces offering long distance background views (vistas). This project would have a very limited amount of clearing of vegetation. Clearing would be the minimum width necessary to meet trail clearing standards along proposed routes, and clearing at staging areas or trail heads would be focused on safety and providing adequate room for turning-around, parking and in some cases campsites. Impacts to vegetative scenery would be evident, but would be of a relatively small scale in comparison to more expansive activities associated with vegetation and fuel management projects that have occurred, are being planned, or are ongoing within the project area.

There are specific Project Design Criteria (PDC) listed in Chapter 2 for visual emphasis areas including the Historic Summit Trail and visual corridors. Visually attractive areas such as aspen stands, cottonwood groves, meadows, seeps and springs would also be avoided during trail lay-out and construction as described in the PDC. The trail designs and sign plan would be developed that consider Forest Plan Visual Quality Objectives. However, directional and traffic management signs would be installed at trail system intersections, at trail crossings over open roads, and at Staging areas and/or Trail Heads. These signs may be considered to be an impact to the natural appearance of the sites where these signs are installed. However, they would be comparable to other signs that are already present across the project area for traffic control, recreation sites, trail markers and visitor information. Where rehabilitation or concealment of unwanted routes is proposed, these sites should improve in natural appearance compared to their current condition once vegetation becomes established.

Air Quality

This section includes the entire Air Quality analysis.

Affected Environment

The 1970 Federal Clean Air Act, as amended in 1977 and 1990 (42 U.S.C. §7401 et seq.), is a legal mandate designed to protect human health and welfare. National Ambient Air Quality Standards are defined in the Clean Air Act as levels of “criteria” pollutants above which may result in detrimental effects on human health and welfare. These criteria pollutants include carbon monoxide, lead, nitrogen oxides, particulate matter (PM2.5 and PM10), ozone, and sulfur dioxide.

State Implementation Plans (SIPs) are adopted by each state to implement the provisions of the Clean Air Act. State Implementation Plans describe the state’s actions to achieve and maintain National Ambient Air Quality Standards. Oregon Department of Environmental Quality is responsible for assuring compliance with the Clean Air Act. In 1994, the Forest Service, in cooperation with Oregon Department of Forestry and the Bureau of Land Management signed a Memorandum of Understanding (MOU) to establish a framework for implementing an air quality program in Northeast Oregon. However the MOU is specific to smoke management associated with prescribed fire. Implementation of this project is not expected to alter smoke emissions from prescribed fire and would thus not affect compliance with the MOU.

Section 160 of the Federal Clean Air Act also requires measures to "preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other places of specific national or regional natural, scenic, or historic values." Class I airsheds include Forest Service and Fish and Wildlife Service Wilderness areas over 5,000 acres that were in existence before August 1977, and National Parks in excess of 6,000 acres as of August 1977. Designation of Class I airsheds allows only very small increments of new pollution above existing air pollution levels, Class I airsheds have high air quality protection standards, in part, because visibility was identified as an important value. The nearest Class 1 Wilderness Airshed is The Strawberry Mountain Wilderness. Due to the location of the project area, prevailing winds and low volume of emissions anticipated from construction, use and maintenance of this OHV trail system, this project is not likely to affect any Class I Airshed.

Class 2 airshed is an airshed classification representing National Forest System Land that is not within a Class I airshed. The Ochoco Summit project area is a Class 2 airshed. Class 2 airsheds may receive a greater amount of human-caused pollution than Class I airsheds. These areas include areas that are neither industrialized nor meet the specific requirements for classification as Class I areas. They are protected by the Prevention of Significant Deterioration (PSD) program. The Prevention of Significant Deterioration (PSD) permitting program is a Clean Air Act permitting program for new and modified major sources of air pollution such as power plants, manufacturing facilities, and other facilities that emit air pollution.

Background

The U.S. Environmental Protection Agency (EPA) set national air quality standards for six common pollutants (also referred to as "criteria" pollutants. These standards are known as National Ambient Air Quality Standards (NAAQS) and are listed at the following web site: http://www.deq.state.or.us/aq/planning/. PSD applies to all pollutants that do not exceed the National Ambient Air Quality Standards (NAAQS) in an area. PSD also applies to other pollutants that do not have a NAAQS. These non-criteria pollutants are listed in EPA's regulations. Maintenance Areas are those geographic areas that had a history of nonattainment, while Nonattainment Areas have not consistently met the clean air levels set by the U.S. Environmental Protection Agency in the National Ambient Air Quality Standards (NAAQS). There are no mapped Air Quality Maintenance or Non-attainment Areas in Crook, Wheeler or Grant Counties (Oregon DEQ 2009). The Oregon Smoke Management Report displays principal population centers that are smoke sensitive receptors. The cities of Bend, Redmond and John Day are the closest municipalities shown as smoke sensitive areas on the Oregon Smoke Management Plan map which can be viewed at the following web site: http://www.oregon.gov/odf/pages/fire/smp/smkmgtannualrpts.aspx. The City of Bend was previously classified as a "Designated Area" in an Oregon Smoke Management Report as potentially air quality impaired. The City of Prineville, which is closest to the project area, is not shown as smoke sensitive on the Smoke Management Plan map, but is tracked by DEQ with an Air Quality Index. The Air Quality Index (AQI) is a color-coded tool which shows air pollution levels. The AQI for particulate matter (both $PM_{2.5}$ and PM_{10}) is based on the average of the previous 24 hours of pollution levels and is coded as good, moderate and two classes of unhealthy.

Fugitive Dust

"Fugitive dust" is the term used when the soil crust is disturbed or broken and soil particles are released and raised into the air by air currents generated by vehicles (Ouren et al. 2007).

Soil disturbance and migration are items to be considered in any setting where motor vehicle travel is off hardened surface roads. These soil particles, created when the crust is disturbed, are considered particulate matter. Particulate matter is a mixture of small liquid droplets and microscopic solid particles that can be formed or emitted directly into the air (including dust, dirt, smoke and soot) The

haze associated with air pollution is caused when these tiny particles scatter or absorb visible light (McCarthy et al. 2006; EPA 2010). The EPA (2009) defines the following sizes of particulate matter:

Ultrafine particles generally defined as those less than 0.1 microns.

$PM_{2.5}$, also known as fine fraction particles (generally defined as those particles with an aerodynamic diameter of 2.5 microns or less), are usually 1/30th the diameter of a hair.

PM_{10} (generally defined as all particles equal to and less than 10 microns in aerodynamic diameter; particles larger than this are not generally deposited in the lung).

The Clean Air Act directs the EPA to set standards for particulate matter in the form of primary and secondary standards. Primary standards set limits on the amount and size of particulate matter that could be injurious to human health, while secondary standards set public welfare limits (damage to crops, animals, visibility impairment). These pollutants and standards are displayed in Table 134.

McCarthy et al. (2006) describe the dust plume raised by passing vehicles as PM_{10} whereas the emissions created by engine combustion are usually $PM_{2.5}$. The smaller size of the $PM_{2.5}$ particles allows for easy ingestion into human lungs and has been linked to health issues, such as asthma and strokes (EPA 2003). Road surface type, speed, and vehicle type all play a part in how much dust is created (Goossens and Buck 2009).

Consistent dispersal patterns indicate that larger particles travel shorter distances and stay relatively close to the ground while smaller particles go higher into the air and travel further away from the source (Padgett 2006). Wind direction, velocity, and canopy cover are factors in dust dispersal patterns and distance. Riders may not ride at mid-day on hot summer days due to the hot, dry and dusty conditions. Optimum riding is typically in the slightly cooler morning and evening periods during mid to late summer and during the moister and cooler spring, early summer and fall months.

In one study, the more open the trail terrain with adequate air circulation the faster the dust particles dispersed, and conversely, if the riding area was under heavy canopy with poor air circulation dust particles hang in the air for longer amounts of time (Meadows et al. 2008). In the Ochoco Mountains air circulation is also effected by time of day, with afternoon and evening breeze common during the summer use period.

Emissions

Vehicle emissions, particularly those resulting from two-stroke engines (nitrogen oxides, sulfur dioxide, carbon monoxide, ozone, aldehydes, and extremely persistent polycyclic aromatic hydrocarbons) and lightweight soil particles or “dust” resulting from vehicle travel on unpaved surfaces (also known as fugitive dust) can contribute to localized air quality degradation, even though National Ambient Air Quality Standards in a larger area are being met (Ouren et al. 2007).

Emissions from OHVs, particularly two-stroke engines (engines that use a gas and oil mixture in the combustion chamber), can contribute to decreased air quality because two-stroke engines do not completely burn fuels resulting in increased emissions containing nitrogen oxides (NO_x), sulfur dioxide (SO_x), carbon monoxide (CO) and ozone (O_3). Research has shown that a small two-stroke engine (e.g. chainsaw, which is considerably smaller than a standard two-stroke OHV engine) running for two hours emits the same amount of hydrocarbons as driving 10 fuel-efficient cars for 250 miles each (http://www/arb/ca/gov/msprog/offroad/sm_en_fs.pdf). Pollutants emitted from exhaust can create varying impacts on vegetation.

The U.S. Environmental Protection Agency (EPA), as directed by the Clean Air Act, set national air quality standards for six common pollutants, also referred to as “criteria pollutants.” These pollutants, carbon monoxide (CO), lead (Pb), nitrogen dioxide (N_2), Ozone (O_3), particulate matter (PM), and sulfur dioxide (SO_2), can damage crops, reduce visibility, combine with other pollutants to form wet and dry acids (acid rain), and prevent heat from escaping into space. This latter effect

contributes to the increasing concentrations of greenhouse gases that are considered responsible for climate change. Weather plays a part in the formation of some pollutants like ozone. Hotter, drier weather means higher ozone levels (EPA 2008), but the reduction of nitrogen oxide (NO_x) emissions reduces ozone levels.

Table 134 shows the criteria pollutants and their current allowable limits. These limits have been reviewed by the EPA to determine if the levels set in the 1990s are still appropriate or if more stringent measures are needed to reduce the potential impacts on greenhouse gases and human health. Previously, just registered vehicle engines (passenger cars and trucks) were tested and had exhaust emissions criteria set. Historically nonroad engines (recreational vehicles, diesel marine engines, and snowmobiles, etc.) were not required to have emissions standards. The EPA started implementing emissions standard requirements for these type engines (off-highway motorcycles and ATVs) in 2006, with 100 percent phase-in in 2007 (see 40CFR 1051). As new engines are designed to meet these criteria, older and less clean OHVs would be gradually phased out.

Table 134. Pollutants and standards.

Pollutant	Average Time	National Ambient Air Quality Standard (NAAQS) Violation Determination[1]	Federal Primary Health Standard (NAAQS) Exceedance Level	State Standard Exceedance Level
Carbon monoxide	1-hour	Not to be exceeded more than once/year	35 ppm	35 ppm
	8-hour	Not to be exceeded more than once/year	9 ppm	9 ppm
Lead	Calendar Quarter	Quarterly arithmetic mean	0.15 µg/m^3	0.15 µg/m^3
Nitrogen dioxide	Annual	Annual arithmetic mean	53 ppb	53 ppb
	1-hour	3-year average of the maximum daily 98th percentile one hour average	100 ppb	NA
Ozone	8-hour	3-year average of the annual 4th highest daily maximum 8-hour average concentration	75 ppb	75 ppb
$PM_{2.5}$	24 hour	98th percentile of the 24-hour values determined for each year. 3-year average of the 98th percentile values.	35 µg/m^3	35 µg/m^3
	Annual Average	3-year average of the annual arithmetic mean	15 µg/m^3	15 µg/m^3
PM_{10}	24 hour	The expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than 1 over a 3-year period.	150 µg/m^3	150 µg/m^3
Sulfur dioxide	1 hour	3-year average of the maximum daily 99th percentile one hour average	75 ppb	NA
Units of measure are parts per million (ppm), parts per billion (ppb) or micrograms per cubic meter of air (µg/m^3). For more information about the standards, visit http://www.epa.gov/air/criteria.html (EPA 2011).				

Direct and Indirect Effects

Alternative 1

Under the No Action Alternative, fugitive dust is present and a result of cross-country travel along user-created trails and existing motorized travel on established roads. With implementation of the Travel Management Rule motorized travel on designated routes the dust would be localized close to

the open unpaved roads within the analysis area. Motor vehicle travel on unpaved or native surface roads would produce dust but most would settle back out quickly and close to the trail. Some of the lighter particles would travel higher in the air and farther from the trail, but given the open nature of the trail design and air circulation, these would settle out in relatively short distances.

Alternatives 2, 3, and 4

The action alternatives affect where motorized vehicles can be legally operated on National Forest lands, and thus could potentially affect the location and concentration of vehicle emissions and fugitive dust resulting from vehicle travel on non-paved surfaces. There may be some increased temporary localized air quality impairment from vehicle emissions and fugitive dust in areas where a high level of OHV use occurs. This increased effect on air quality is assumed to be minimal, except in localized areas, because none of the alternatives are likely to change the overall amount of motorized use across the Forest. Vehicle travel on unpaved surfaces in areas prone to dust will continue to occur on the system of native and aggregate surface open roads, with larger vehicles and at speeds much higher than what is anticipated to occur on the proposed OHV trails, and when dusty conditions are likely. Thus there would be an increase in fugitive dust in close proximity to the proposed trail network, but it would be relatively small in comparison to the effect of ongoing travel across the project area.

The alternatives could also indirectly affect the location of unplanned human-caused wildfire starts, which could then have an indirect effect on air quality. It is possible that fire starts could occur as a result of OHV equipment or associated human use along the trail system. Since under Alternatives 2 through 4 would designate a motorized trail system fire risk associated with use of the trail system would be more readily monitored and restricted as necessary during extreme fire conditions. This could lead to reduced ignitions, more rapid detection and suppression, thereby potentially reducing emissions. However, these effects on air quality from human-caused wildfire that could be attributed to fire starts from OHVs or other uses within the designated trail system are highly speculative and are therefore not measurable. The potential for any of the alternatives to affect air quality indirectly as related to wildfires is predicted to be negligible and is therefore not discussed in further detail in this analysis.

In Alternatives 2 and 4 the areas with trail segments and supporting areas at or near the Ahalt Mineral Source, Peterson Lava, Ross/Peterson Ridge, Road 600 and Happy Camp would have increased levels of dust and emissions at those locations compared to the other alternatives. Alternative 2 and 4 include a class II network that would be largely utilized by vehicles that run 4-cycle engines and that travel the trail at very low speeds. These factors would combine to produce less of the pollutants associated with 2-cycle engines as well as fugitive dust. On the other hand the trails would be slightly wider and thus could be exposed to slightly higher levels of wind erosion, except where the trails are on lava or constructed boulder trails which are resistant to wind erosion. Alternatives 3 and 4 have more concentrated loops at the west end of the proposed system and thus, the opportunity for riders to encounter fugitive dust and associated dust particles with potential to affect human health would be greater in that area, as well as compared to the other alternatives. Although riders tend to utilize the trail systems during the seasons when dust can be avoided[9], the potential for exposure to dust is the greatest during the core summer season.

For all alternatives there may be some localized temporary air quality impairments from vehicle emissions and areas prone to dust. This would be particularly evident in staging areas where engines are started and warming up and where warm up loops and youth riding areas are provided. However, from an airshed perspective, the Ochoco Summit project area is far from the nearest area designated as potentially air quality impaired (Bend, Oregon), as well as from the nearest non-attainment and

[9] 2009, communication with Vicki Ramming, COHVOPS Program Director

maintenance areas (Klamath Falls, Lakeview), and the DEQ smoke sensitive communities (Bend, Redmond and John Day). Any localized impairment would be diluted to a scale that would be impractical to measure and negligible at the scale of airsheds. A projected 2 to 5 percent yearly increase in riders would not change this condition.

Cumulative Effects

For all of the alternatives, smoke and smoke drift from prescribed burns would have the potential to impact the Ochoco Summit OHV area. There is the potential for portions of the trail system to be closed on burn days due to reduced visibility from smoke and any possible health concerns. The prevailing winds are out of the southwest and normally would push the smoke east away from the proposed OHV area. The alternatives would have no direct or indirect effect on smoke emissions from Forest management activities, which are managed by the Oregon Department of Forestry as delegated by the Oregon Department of Environmental Quality.

Implementation of the Travel Management Rule across the Forest will reduce fugitive dust by restricting motorized cross county travel. Ongoing forest thinning projects in the project area could potentially reduce the time the dust is in the air by opening stands, thus allowing for increased air circulation and settling the dust more quickly. Fugitive dust and its effects would remain localized and would not change the disclosures for human health or water quality.

Potential cumulative effects include the vegetation and fuels management program that overlaps the project area, with a foreseeable action of up to 20,000 acres of prescribed fire across the project area (Spears, Canyon, HEJ, Zane, Jackson). Although it is acknowledged that prescribed burning releases common criteria pollutants, such as CO, the overlap of effects cannot be expressed as an aggregate. Smoke from prescribed fire contains much more particulate matter and travels a greater distance, and dispersion is highly dependent on prevailing winds, terrain and weather conditions. Effects to air quality from OHV use of a trail system tends be localized, with dispersion in proximity to the trail network and staging areas, rather than moving at landscape scales across airsheds.

Climate Change and Carbon Cycling

This section includes the entire Climate Change and Carbon Cycling analysis.

On January 16, 2009, the Washington Office of the Forest Service released guidance to Forest Service to assess the effect of proposals on the climate into project-level NEPA documents. This guidance provides that units should consider two kinds of climate change effects. First, units may, where appropriate, consider the effect of a project on climate change. Second, units may, where appropriate, consider the effect of climate change on a proposal.

Assessing the Effect of the Ochoco Summit Trail System project on Climate Change

The Ochoco Summit project planning team considered relevant factors of how a designated trail system on a National Forest could potentially affect a change in global climate. It was determined that the relationship and contribution of exhaust emissions was likely a key factor to consider. In addition, how this project would affect forests and their role in the carbon cycle was also considered.

Given the very limited circumstances when vegetation would be removed for a segment of new trail, it was determined that those activities would not be analyzed as a potential effect on global climate change. Areas of user-created trails to be rehabilitated and returned to a vegetative state would offset any actions that remove vegetative cover on proposed new trails or at staging areas. In addition, closed roads that are not needed for future administrative use, as determined by roads analysis, may be converted to trails where designated as part of the proposed trail system. Road to trail conversions

would narrow the footprint of the route to the designated trail width, which would increase recovery of vegetation on the portions of the road bed that are not utilized for the trail. This would also offset the loss of vegetation associated with establishment of new trails and at staging areas.

Emissions from OHVs, particularly two-stroke engines (engines that use a gas and oil mixture in the combustion chamber) do not completely burn fuels. The result is an increase in emissions that contain nitrogen oxides (NOx), sulfur dioxide (SOx), carbon monoxide (CO) and ozone (O_3), which are also identified as "greenhouse gasses" (or GHG) that contribute to warming of the atmosphere. These emissions are also what the Environmental Protection Agency (EPA) identifies as criteria pollutants in which they set National Air Quality Standards. These commonly found air pollutants are found all over the United States and beyond.

Because the Ochoco Summit Trail System area is not as close to urban centers along the Highway 97 corridor as some of the other OHV systems in Central Oregon, it is not expected to get high levels of use during peak periods such as those predicted for locations closer to Bend, Redmond and La Pine. The use estimated for the project area (see Recreation section in Chapter 3 of this document) is expected to be spread out over the season of use on the designated system and across the proposed trail system, as well as through the year and across the project area on the network of existing mixed-use roads. This annual use estimate equates to up to 5000 motor vehicles emitting GHG over the period of one year, plus additional vehicles used for transport to the staging areas or trailheads. This represents a very small fraction of the total internal combustion engines globally emitting GHG, even with the anticipated 2.5 to 5.6 percent increase in riders annually over the next decade. Therefore, this incremental contribution to global climate change is negligible.

Agency direction states: "[b]ecause greenhouse gases mix readily into the global pool of greenhouse gases, it is not currently possible to ascertain the indirect effects of emissions from single or multiple sources (projects). Also, because the large majority of Forest Service projects are extremely small in the global atmospheric CO_2 context, it is not presently possible to conduct quantitative analysis of actual climate change effects based on individual projects."

Under this definition, there would be no measurable direct effect associated with any of the OHV action alternatives. The action alternatives do not authorize the emission of GHG; the action alternatives do not limit the emission of GHG; and, the action alternatives are unlikely to change the emission of GHG as compared to the no action alternative. Emissions of GHG from OHV use in the Ochoco Summit Trail System project area are not directly affected by the designation of routes in a project area with 659 miles of existing routes (mixed use roads), areas open to cross country travel (rock pits shown as open on MVUM), 140 miles of open road for highway legal vehicles, along with commercial equipment operation. In other words, OHV use will continue to occur in the project area with or without trail system designation, and designation of OHV routes is not expected to increase the level of OHV use by a magnitude that would affect overall emissions of GHG within the project area.

The EPA is now implementing emissions standard requirements for two stroke (among other types of) engines (40 CFR 1051). As new engines are designed to meet these criteria, older and less clean OHVs would be phased out, likely to offset the contribution from predicted increases in riders.

Because the designation of motorized routes has no quantifiable direct or indirect effect on climate change, it cannot have a cumulative effect.

Assessing the Effect of Climate Change on the Ochoco Summit Trail System Project

Although El Niño/Southern Oscillation and the Pacific Decadal Oscillation comprise the primary factors for climate variability in the Pacific Northwest, the influence from global climate change is a

growing concern. According to the Climate Impacts Group, based out of the University of Washington, climate modeling for the Pacific Northwest predicts a future rate of warming of approximately 0.5 degrees Fahrenheit per decade for the Pacific Northwest through at least 2050, relative to the 1970-1999 average temperature. Temperatures are projected to increase across all seasons, although most models project the largest temperature increases in summer (June-August), and the average temperatures could increase beyond the year-to-year variability observed in the Pacific Northwest during the 20th century as early as the 2020s. Warmer temperatures during the OHV season of use may increase the demand for recreational opportunities in a forested setting where the temperatures tend to be lower than in the surrounding low elevation areas.

Assessing the influence of these factors on impacts to soils and vegetation associated with trail construction, operation and maintenance activities within the project area: a warming and drying climate combined with less of a snowpack could potentially extend the season of access to the trail system. This could provide additional time for monitoring and maintenance activities prior to the season of use. Recreational OHV use would remain limited to an exact season use as described in Chapter 2. Dry soil conditions early in the year may reduce potential for impacts from OHV to sensitive resources that are vulnerable to damage under wet soil conditions (such as scabland habitat and seasonal drainages), thus potentially reducing maintenance needs. However, early access in the spring and later access in the fall/winter by non-motorized users and illegal motorized use could lead to subsequent associated effects.

Very little removal of vegetation would occur associated with trail construction and maintenance. Project design included a focus on, wherever possible, locating trails to overlay existing snowmobile trails, existing user-created trails, and/or areas where vegetation and soil may be previously disturbed. Chapter 2 in this analysis discloses a season of use generally from June 1 through September 30 (Alternative 3). Monitoring is also an important element described for many resources and summarized in Chapter 2. If undesired consequences associated with an extended season are encountered, then the Forest Service has the authority to immediate suspend operation of the trail system to protect resources. Designation of a trail system allows the Forest Service greater flexibility in monitoring and adapting the project to a changing environment.

Social and Economic Analysis

This section contains the entire Social and Economic Analysis.

Social and economic elements, which are interrelated and interdependent with ecological elements, comprise the human components of the ecosystem. The implications of resource management decisions for the Ochoco Summit OHV project to the social and economic values are of interest to the residents, business owners, and users of the area. For the purposes of describing socio-economic effects on the economy, this analysis focuses on the economy of central and southeastern Oregon. The effects to the local economies are based on the estimated number of jobs created. The bulk of the area and communities potentially influenced by actions on the Ochoco National Forest lie within Deschutes, Crook, and Jefferson, the southernmost part of Wheeler, eastern most part of Grant, and the northern most sections of Harney and Lake counties. This is referred to as the Zone of Influence.

General Information and Population Estimates

The following information was retrieved from the Oregon State Archives website[10] and from reports generated in October, 2012, from the "Economic Profile System-Human Dimensions Toolkit" (see project file, Ochoco National Forest, Prineville, Oregon, for the complete reports). Population estimates discussed in the following text are summarized in Table 135.

[10] http://arcweb.sos.state.or.us/pages/records/local/county/histories.html

Crook County

Crook County was established on October 24, 1882. It was created from the southern part of Wasco County and named after U.S. Army Major-General George Crook, a hero of the Snake Indian Wars.

Crook County is situated in the geographic center of Oregon. It has been reduced from its original size of 8,600 square miles to 2,991 square miles by the creation of Jefferson County in 1914 and Deschutes County in 1916. The current boundaries were established in 1927. Crook County is bounded by Jefferson and Wheeler Counties to the north, Grant and Harney Counties to the east, and Deschutes County to the south and west.

In 1882 the Legislative Assembly established Prineville as the county seat. The voters confirmed the choice of Prineville, the only incorporated town in the county, in the 1884 general election. Prineville was named in honor of the town's first merchant, Barney Prine.

The first census in 1890 showed a population of 3,244 excluding the Indians. The last several censuses have shown an increase in inhabitants with the 2010 population of 21,515 representing a 12.2% increase from 2000. The fast pace of growth in the nearby Bend-Redmond area has played a role in the rising population of Crook County.

While the economy of the county historically was based on agriculture and forestry, currently manufacturing, retail trade, and education, health care and social assistance support the greatest number of jobs in Crook County.

Deschutes County

Deschutes County was created from the western portion of Crook County on December 13, 1916. The county encompasses 3,055 square miles and is located in the central portion of the state. Geographically, the county includes portions of the Cascade Mountains and the central high desert plateau. It is bounded by Jefferson County to the north, Crook County to the east, Klamath and Lake Counties to the south, and Lane and Linn counties to the west. The county seat is located in the city of Bend which was incorporated in 1905.

Principal industries in the county are tourism, timber, and agriculture, chiefly cattle and potatoes. The destination resort, Inn of the Seventh Mountain, and the resort communities of Black Butte and Sunriver, were developed during the 1970s. The Mount Bachelor ski area and High Desert Museum add to the tourism-based economy in the county as well. Numerous golf courses have been added in recent years.

The first county census was taken in 1920 and counted a population of 9,622. The 2010 population of 154,568 represented an increase of 34.0% over 2000.

Grant County

Grant County was established on October 14, 1864, and named for General Ulysses S. Grant, commander of the Union Army during the Civil War. Earlier in his military career Grant had been stationed at Fort Vancouver and assigned to protect the increasing number of emigrants traveling the Oregon Trail. Grant County is located in eastern Oregon and was created out of Wasco and Umatilla Counties. At that time Grant County was the largest county in the state. Its size was later reduced by the transfer of land to Lake County and the creation of Harney and Wheeler Counties. Grant County shares boundaries with eight counties: Morrow, Umatilla, and Union to the north; Harney to the south; Malheur and Baker to the east; and Crook and Wheeler to the west. It has an area of 4,528 square miles.

Grant County contains the headwaters of the John Day River, which has more miles of wild and scenic designation than any other river in the United States. More than sixty percent of the county's

land area is under public ownership, and the county contains parts of four national forests. Principal industries are agriculture, livestock, forestry, and recreation.

The first census was taken in 1870 and counted 2,251 persons. The population of Grant County in 2010 was 7,349. This represented a 7.4% decrease from 2000.

Harney County

Harney County was created from the southern two-thirds of Grant County on February 25, 1889. It is located in the high desert country in the southeast portion of the state and is the largest county in Oregon, comprising 10,228 square miles. Counties with contiguous borders include Malheur to the east; Lake, Deschutes, and Crook to the west; Grant to the north; and the State of Nevada to the south. The county was named after the lake that lies within its territory, which was named in honor of General William S. Harney, commander of the Department of Oregon of the U.S. Army in 1858-1859.

Harney County's population is primarily concentrated in a small urbanized sector of Burns-Hines with the remainder mostly in the Harney Basin. The county's population was recorded as 2,559 during the 1890 census and rose steadily until the decade of 1930-40, and then resumed an upward curve until the 1980s. The county experienced a net out migration of nearly fifteen percent in the 1980s primarily due to the closure of the lumber mill in Burns. The 2010 population of 7,364 represented a 3.2% decrease from 2000.

Jefferson County

Jefferson County was created on December 12, 1914, out of territory that was once part of Crook County. The county was named after Mount Jefferson, the second highest peak in Oregon with an elevation of 10,497 feet, which marks the county's western skyline. The county is bounded on the north by Wasco County, on the east by Wheeler and Crook Counties, on the south by Deschutes County, and on the west by Linn and Marion Counties. The county encompasses 1791 square miles.

The county's population at its first federal census in 1920 was 3,211. The 2010 population of 21,652 represented a 13.9% increase from 2000.

Lake County

Lake County was established on October 24, 1874. It was created from the southern part of Wasco County and the eastern part of Jackson County. It was named because of the numerous large lakes that are entirely or partly within its borders.

Lake County is situated in south central Oregon. The western boundary was changed with the creation of Klamath County in 1882. It regained some area when the southwestern part of Grant County was annexed in 1885. It currently has 8,275 square miles. Lake County is bounded on the north by Deschutes County, on the east by Harney County, on the south by the State of California, and on the west by Klamath County.

The 1875 Lake County census showed a population of 944, which jumped to 2,804 by 1880. Since then there has been some fluctuation in population, but with a fairly steady growth to a population of 7,882 in 2010. This represented a 6.2% increase over the 2000 population.

Wheeler County

Wheeler County was established on February 17, 1899. Formed from parts of Grant, Gilliam, and Crook Counties, there have been no boundary changes since its creation. The county shares boundaries with Gilliam and Morrow Counties to the north, Wasco and Jefferson to the west, Crook to the south, and Grant to the east. The county was named for Henry Wheeler, who operated the first stage line through the county. The area of the county is 1,713 square miles, and the county seat is located in the city of Fossil.

Wheeler County's 2010 population was 1,443. This represented a decrease of 6.7% from 2000.

Table 135. Population data in the seven Zone of Influence counties for the Ochoco Summit OHV Trails project.

County	Population		Change	Percent Change
	2000 Census Data	2010 Estimate		
Crook	19,182	21,515	2,333	12.2
Deschutes	115,367	154,568	39,201	34.0
Grant	7,935	7,349	-568	-7.4
Harney	7,609	7,364	-245	-3.2
Jefferson	19,009	21,652	2,643	13.9
Lake	7,422	7,882	460	6.2
Wheeler	1,547	1,443	-104	-6.7
Total	**178,071**	**221,773**	**43,702**	**24.5**
Information obtained from reports generated in October, 2012, from the "Economic Profile System-Human Dimensions Toolkit."				

Future population projections are expected to mimic that of the past decade. Deschutes, Crook, and Jefferson Counties are expected to continue with growth, whereas the more rural counties, Wheeler, Grant, Harney, and Lake are projected to grow quite slowly, if at all.

Employment

Table 136 summarizes the changes in the civilian labor force in Central Oregon over the last decade.

Table 136. Changes in civilian labor force in the Zone of Influence for the Ochoco Summit OHV Trail System project.

County	Civilian Labor Force		Change	Percent Change
	2000 Census Data	2010		
Crook	8,764	9,252	488	5.5
Deschutes	58,836	72,837	14,001	23.8
Grant	3,792	3,135	-657	-17.3
Harney	3,765	3,313	-452	-12.0
Jefferson	8,918	8,571	-347	-3.9
Lake	3,371	3,373	2	0
Wheeler	662	614	-48	-7.2
Total	88,108	103,105	14,997	17.0
Information obtained from reports generated in October, 2012, from the "Economic Profile System-Human Dimensions Toolkit."				

The following information comes from a report generated by the "Economic Profile System-Human Dimensions Toolkit" in October, 2012. In Crook County, the three largest sectors were education, health care and social assistance, (1,494), manufacturing (1,400), and retail trade (1,355). In Deschutes County the three largest sectors were education, health care, and social assistance (13,364), retail trade (9,219) and construction (8,539). In Grant County the three largest sectors were education, health care and social assistance (695), agriculture, forestry, fishing, hunting, and mining (469), and retail trade (294). In Harney County, education, health care and social assistance was tied with agriculture, forestry, fishing, hunting and mining for largest sector (618), followed by arts, entertainment, recreation, accommodation, and food (430) and retail trade (363). In Jefferson County the three largest sectors were education, health care and social assistance (1,629), manufacturing (1,552), and retail trade (989). In Lake County the three largest sectors were agriculture, forestry, fishing, hunting and mining (710), education, health care and social assistance (520), and retail trade (376). In Wheeler County the three largest sectors were arts, entertainment, recreation, accommodation, and food (163), agriculture, forestry, fishing, hunting and mining (110), and

education, health care and social assistance (107). Overall, the number of jobs in most sectors has declined in recent years; in Deschutes County, however, jobs increased in all sectors.

As of August, 2012, the unemployment rate in Oregon as a whole was 8.2 percent; while unemployment rates in the individual counties were[11]:

- Crook, 12.9 percent;
- Deschutes, 10.4 percent;
- Grant, 10.6 percent;
- Harney, 10.9 percent;
- Jefferson, 11.2 percent;
- Lake, 10.7 percent; and
- Wheeler, 7.1 percent.

Population Characteristics of OHV Users

This section briefly describes the population characteristics of OHV users in the Pacific Region (Oregon, Washington, and California), Oregon, and the local Central Oregon area; the information is based on the 2008 report "Off-Highway Recreation in the United States and its Regions and States: An Updated National Report," which was produced by the National Survey on Recreation and Environment, Internet Research Information Series.

Population Characteristics of OHV Users in the Pacific Region

In the Pacific Region (Washington, Oregon, and California), the rate of OHV participation (18.7 percent) is nearly the same as the national rate. The 6.9 million OHV users living in the Pacific region are about 16 percent of the national total. Similar to other regions, participation declines with age. People under age 30 are about three times more likely to participate as those over 50. Males are also significantly more likely to be OHV users than females. American Indians have the highest participation rate (31 percent) among racial and ethnic groups, just as they do in every other region. Though the Hispanic rate (14 percent) is next to the lowest, the number of Pacific Hispanic OHV users (about 1.3 million) is second only to Whites. This is due to the large Hispanic population, especially in California.

People with family incomes over $50,000 all participated at similar rates (23 to 27 percent). Only 12 percent of the lowest income class participated. Similar to every other region, the highest educated strata participated at the lowest rates. Just 13 percent of people with post-graduate degrees were OHV users compared with 21 percent of high school graduates and those attending some college or technical school. Also similar to every other region, the participation rate for non-metropolitan residents (32 percent) was much higher than for metro-area dwellers (18 percent), however, since the population in the Pacific region is more than 90 percent metropolitan, this population group dominated the OHV users, accounting for about 89 percent of the 6.9 million participants.

Population Characteristics of OHV Users in Oregon

The data show that Oregon has a slightly higher percentage of OHV users than the Pacific region as a whole. The 2004 Oregon Statewide Motorized Trail User Survey was conducted over a four-month period from January to April 2004 by the University of Oregon's Survey Research Laboratory. The survey found that seven percent of Oregon households have a person reporting motorized trail use, amounting to 98,000 households in the state. ATV riding is the most popular activity, with 70 percent of motorized trail users having engaged in that activity during the past year followed by off-road motorcycling (44 percent). Most motorized respondents were male, and the median age was 40 – 49

[11] Retrieved on October 9, 2012, from http://www.qualityinfo.org/pubs/rolf/12/rolf-0912.pdf.

years old. More than half had some college (62 percent), although most were not college graduates (21 percent). Median income was $40,000 to $69,999.

Population Characteristics of OHV Users in Central Oregon

Based on the initial data of the Central Oregon Off-Highway Vehicle Use Study conducted by Virginia State University during 2008, 77 percent of the visitors are returning users to Central Oregon OHV trails. Seventy percent of the visits are overnight use and average a three day trip. Thirty percent make day use trips averaging a six hour day. In a typical year, 12 days were spent recreating in Central Oregon, 24 days at other OHV areas. The average miles from the primary residence to this area was 129 miles.

The composition of the various groups visiting the area was 42 percent friends, 30 percent family and friends, 24 percent family, three percent single and 1½ percent organized club or organization. Forty one percent of the visitors were 31-40 years old.

A 2006 study (Outdoor Industry Foundation) estimated that 72 percent of Americans aged 16 and older participated in an outdoor activity in 2005, with hiking, running and bicycling on trails being three of the most frequently reported activities. Non-motorized recreation continues to be one of the most popular categories of recreation throughout the state and within the local region. National Visitor Use Monitoring (NVUM) findings show that most visitors participate in non-motorized activities (English et al., 2003). A description of visitor activities was compiled from the survey. Visitor's top picks while visiting the Ochoco National Forest were viewing wildlife, natural features and scenery; primitive camping; fishing, hunting, and developed camping. Each visitor also picked one of these activities as their primary activity for the current recreation visit to the Forest; the top primary activities on the Ochoco were developed camping, viewing wildlife/nature, hunting, horseback riding, and general relaxing. Dispersed camping and day use picnicking on the Ochoco account for about 27 percent of visitors' primary or secondary activities.

National Visitor Use Monitoring data indicate that big game hunting is a popular activity on the Ochoco National Forest, which is a regionally and even nationally popular destination for big game hunting. Approximately 22.6 percent of visitors identified hunting as either a primary or secondary activity on the Ochoco. Hunting was also in the top five most popular activities for visitors to the Ochoco.

Although many of these activities are often classified as "non-motorized," the lines between motorized and non-motorized uses begin to blur for many of these activities. For instance, viewing natural features and hunting can be motorized or non-motorized activities. Primitive camping could be considered by some to be any camp outside of developed campgrounds that they may have accessed with motorized vehicles for generations, while other visitors taking the survey might consider primitive camping to be a campsite in a remote Wilderness area only accessible after many hours of hiking. Available survey data do not make any distinction for whether motorized use is associated with these activities, although there are data regarding OHV use specifically as both a primary and secondary activity.

Off-Highway Vehicle Uses

National Visitor Use Monitoring (NVUM) findings indicate that the Ochoco was not a major provider of OHV (Off-Highway Vehicle) recreation in the year surveyed. Nationally, about 2.5 percent of the 205 million annual recreation visits to National Forests identified OHV use as their primary activity, with a slightly higher percentage (3.1 percent) as a secondary activity. Data for the Ochoco National Forest indicate a secondary use of 3.1 percent. For the Ochoco National Forest, the survey found that there were no recreation visits that year that were primarily for OHV use; the Ochoco ranks in the bottom three out of twenty administrative units in the Pacific Northwest Region of the Forest Service (R6) for primary OHV uses.

A somewhat larger percentage of visitors indicated that they participated in OHV recreation even if it was not their primary reason for visiting the Forest. For the Ochoco National Forest, the total percentage of visitors that reported OHV use as a primary or secondary activity was 3.35 percent of all the visits, or roughly 19,900 visits. These data are considerably below the average percent participation for Oregon overall (22.2 percent participation) as reported in the National Survey on Recreation and the Environment (Cordell et al., 2008). Considering both primary and secondary percentages, the Deschutes ranks slightly lower than middle, while the Ochoco ranks near the middle.

These data do not necessarily reflect the apparent local and regional demand for motorized trail systems in the area. Central Oregon is a regional destination for OHV trails, with many hundreds of miles of trails that can be used throughout the year. Based on the initial data of the Central Oregon Off-Highway Vehicle Use Study conducted by Virginia State University during 2008, East Fort Rock is the most used area for OHV recreational purposes; second is Millican Valley.

Cost Estimates

As constructions costs can vary significantly, only rough cost estimates can be used to demonstrate the economic range between the alternatives. With each of the proposed trail systems, there will be rutting, surface concerns, design needs for steep slopes and stream adjacency design concerns which would add to the construction cost. As a way to compare the construction of the new routes proposed for each alternative, the following rough cost estimates, based on ground slope, were developed. Estimates were based on the use of a Sweco trail building machine, a generic mini-excavator, operators, several laborers and saws for clearing and construction of the Class I and Class 3 trails. These values are only for analysis purposes to show the economic comparison of the alternatives. The estimates were broken into three slope ranges and do not include design, layout, signage or any sort of special constructed features or techniques:

- 0 - 15% Ground slope: $1,760/Mile
- 16 - 25% Ground slope: $2,840/Mile
- 26% + Ground slope: $4,340/Mile.

For this project, the slope breaks in the slope erosion map are 0-20%, 21-35%, 36-50% and greater than 51%. Table 137 reflects a summary of the new routes length (miles) for each alternative, broken out by slope. In order to use the cost per mile, 0-20% equates to the 0-15% value, 21-35% = 16-25%, >36% = 26%+. It was recognized that the flatter slope cost of $1,760/mile might be low for the 20% slope but this is a very rough estimate. For the purposes of this analysis, a rough estimate at $45,000 for each fiberglass bridge is assumed. The price for culverts might range from $10,000 - $20,000. For comparison purposes, the estimated costs for each alternative displayed in Table 137.

These estimates do not include design, contract development, installation nor construction inspection costs. An estimate for the boardwalks or fords was not developed. These costs also do not reflect development of the proposed staging areas, play areas, parking area or trail heads.

Alternative 2

In Alternative 2, for the majority of the new route construction, the slopes range from 0-20%. Cost for construction of new routes will vary by the slopes they cross. Based on cost estimates, the rough cost for actual construction of the new segments would run around $166,500, and bridges would cost $720,000, not including design costs.

Alternative 3

In Alternative 3, for the majority of the new route construction, the slopes range from 0-20%. Cost for construction of new routes will vary by the slopes they cross. Based on cost estimates, the rough cost

for actual construction of the new segments would run around $101,960, and bridges would cost $630,000, not including design costs.

Alternative 4

In Alternative 4, for the majority of the new route construction, the slopes range from 0-20%. Cost for construction of new routes will vary by the slopes they cross. Based on cost estimates, the rough cost for actual construction of the new segments would run around $194,800, and bridges would cost $765,000.

Table 137. Comparative costs per alternative based on new route length, ground slope and proposed culverts and bridges.

	Alternative 2	Alternative 3	Alternative 4
Class 1 (ATV)	31.06 miles/$62,627	21.92 miles/$47,991	51.09 miles/$105,029
Class 2 (Jeep)	12.39 miles/$53,772		11.24 miles/$48,797
Class 3 (Motorcycle)	25.67 miles/$50,027	28.40 miles/$53,971	22.14 miles/$40,937
Trail Cost Estimate	$166,500	$101,961	$194,762
Culverts	92 cmps at $92,000	27 cmps at $27,000	111 cmps at $111,000
Bridges	16 at $720,000	14 at $630,000	17 at $765,000
Total Cost Estimate	**$978,500**	**$759,000**	**$1,071,000**

Effects of Forest Plan Amendments

This section includes the entire analysis of effects of Forest Plan amendments.

The description of the alternatives in Chapter 2 of this final EIS includes five Forest Plan amendments proposed for the implementation of Alternatives 2 and 4 and four Forest Plan amendments for Alternative 3. The amendments relate to Forest Plan standards and guidelines within Old Growth Management Areas and on scablands.

Old Growth Management Area Forest Plan Amendments

As described in Chapter 2 of this FEIS, Alternatives 2 and 4 include site-specific Forest Plan amendments to standards and guidelines that apply within Management Area F6, Old Growth Management Areas (OGMA). Alternative 3 includes the same proposed amendments, except for #3 (amendment in OGMA OG-D2-11)

The following amendments are proposed:

1. Amend standards and guidelines that apply to Old Growth Management Area (OG-D1-08) at Indian Butte to allow motorized recreation only on designated routes including one new trail segment to connect between roads 2200-306 and 2200-309.
2. Amend standards and guidelines that apply to Old Growth Management Area (OG-D1-12) at East Porter to allow motorized recreation only on designated routes including one new trail segment at Looney Creek to connect between roads 4200-430 and 4200-440.
3. Amend standards and guidelines that apply to Old Growth Management Area (OG-D2-11) near Chamberlin Spring to allow motorized recreation only on designated routes including one trail segment on existing disturbance (closed road 4250-700) to connect between roads 4250-610 and 1200-440.

4. Amend standards and guidelines that apply to Old Growth Management Area (OG-D2-02) near Deep Creek to allow motorized recreation only on designated routes including one new trail segment.

As described in the Ochoco Forest Plan (page 4-48), there are about 19,570 acres of old growth mixed conifer and ponderosa pine stands identified as Old Growth Management Areas located on the Ochoco National Forest.

Management Emphasis in OGMA: To provide habitat for wildlife species dependent upon old growth stands.

Desired Condition: The Forest Plan indicates that old growth stands in OGMAs are not expected to change significantly in the 10-50 years following publication of the Plan (1989), barring a natural catastrophe. The desired condition is for the OGMAs to continue to provide habitat for dependent wildlife species including pileated and white-headed woodpeckers and flying squirrels, and non-dependent species such as deer and elk. Management activities and roads will generally not be evident.

Standards and Guidelines and Reasons for Amending

Forest-wide and management area Standards and Guidelines relevant to this project include the following: LRMP 4 -178 describes MA-F6 Old Growth as within the Recreation Opportunity Spectrum of Semiprimitive Nonmotorized, except snowmobiles operating on adequate snow base between December 1 and May 1; LRMP 4-188-189 states "no motorized or mechanized use allowed on trails" in MA-F6; LRMP 4-232 states "Constant service roads will remain open. Use on all other roads across the management areas will be eliminated;" LRMP 4-234 states "Motorized use restricted to over-snow use only.

The amendments would allow the authorization of:

1. Class I and III (50" tread for ATV and motorcycles) to cross through OG-D1-08 (Indian Butte) on one designated route (all action alternatives; see Figure 7);
2. Class III (24" tread for motorcycles only) to cross through OG-D1-12 (East Porter) on one designated route (all action alternatives; see Figure 8);
3. Class III (24" tread for motorcycles only) to cross through OG-D2-11 (Chamberlin Spring) on one designated route (Alternatives 2 and 4 only; see Figure 9)
4. Class III (24" tread for motorcycles only) to cross through OG-D2-02 (Deep Creek) on one designated route (all action alternatives; see Figure 10).

The proposed amendments are site-specific and apply only to the proposed segments of connecter trail. They are proposed in order to allow orderly and logical trail system design by linking existing roads that are proposed to be part of the designated trail system in each action alternative.

Effects of the Action Alternatives

The proposed trail segments in OGMAs are all within habitat blocks that are bordered by well-travelled existing open roads and all each proposed trail segment is in proximity to existing open roads; therefore the change in area within the allocation that is in proximity to motorized routes would be negligible. Each proposed trail segment would cross a linear timbered feature, less than ½ mile in width and surrounded by open areas; no proposed segment would cross a large block of interior forest habitat. Each proposed trail segment is limited to a specific tread width (3 segments would be 24" and one would be 50"); therefore the anticipated change in interior forest habitat within the allocation would be negligible. Effects of the proposed alternatives to OGMAs are also discussed in the "Wildlife" section in Chapter 3 of this final EIS. The estimate for clearing for new trails would

range from 0.76 acres for Alternative 3 to 0.84 acres for Alternative 2. The remaining miles of proposed trails within OGMA are on existing road beds.

The Recreation Opportunity Spectrum (ROS) would be affected within these OGMAs in proximity to the proposed trails, as analyzed and disclosed in the Recreation section of this FEIS (Table 45). A change in non-motorized visitation in these areas as a result of the proposed trail segments is unlikely; however, the trails would be available for use for other types of recreation, including mountain biking, hiking or horseback riding.

Scabland Forest Plan Amendments

There are 41,296 acres within the project area identified as shrub-scabland habitat (see Table 127). As described in Chapter 2 of this FEIS, all action alternatives include project-specific Forest Plan amendments to standards and guidelines that apply to scabland habitats. One amendment of the Forest Plan is proposed to make it possible to allow crossing of scablands on designated routes primarily on existing disturbance (old road beds).

Standards and Guidelines and Reasons for Amending

Forest-wide Standard and Guidelines for Recreation state "ORV use on scablands will be limited to snowmobiles operating on an adequate snow base" (LRMP 4-177).

The proposed amendments are site-specific and apply only to proposed segments of connecter trail, most of which are located on existing disturbance. These trail segments are proposed in order to allow orderly and logical trail system design by linking existing roads that are proposed to be part of the designated trail system in each action alternative.

Effects of the Action Alternatives

Potential impacts to scablands are analyzed and disclosed in the "Special Plant Habitats" section of this FEIS. Project Design Criteria for trails crossing scablands are included in Chapter 2 of this document. The project also includes monitoring, education and enforcement, which will help to ensure that riders stay on designated routes when crossing scablands.

Effects to shrub-scabland, including biological soil crust, would be long-term to permanent, but small in magnitude, with the most potential impact occurring near gathering areas. Acreage-wise there would be little scabland area affected, 39 acres, 16.4 acres and 42.5 acres for Alternatives 2, 3, and 4 respectively, out of 47,193 acres present within the project area.

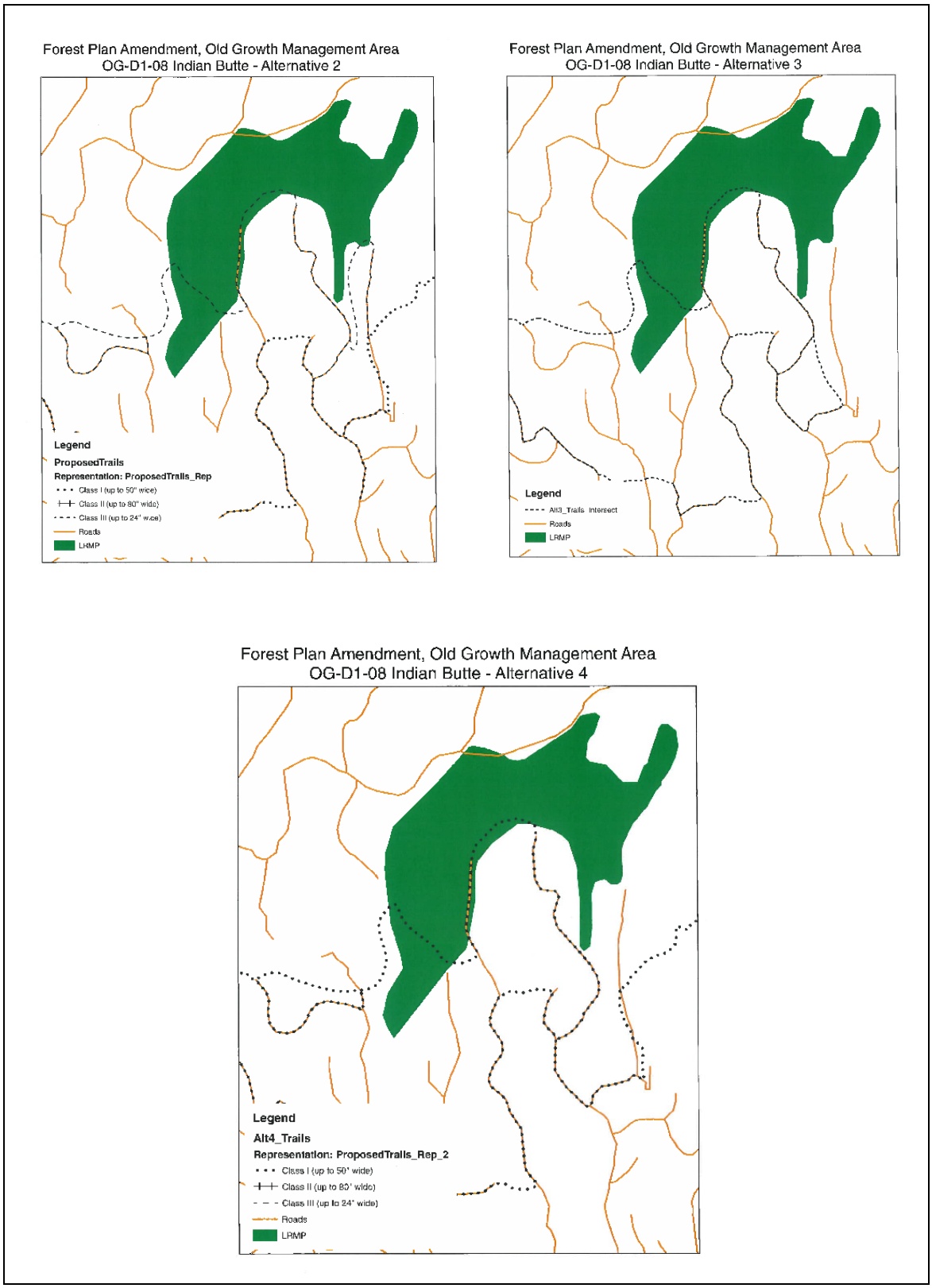


Figure 9. Proposed OHV trail in and in the vicinity of OG-D1-08, by alternative.

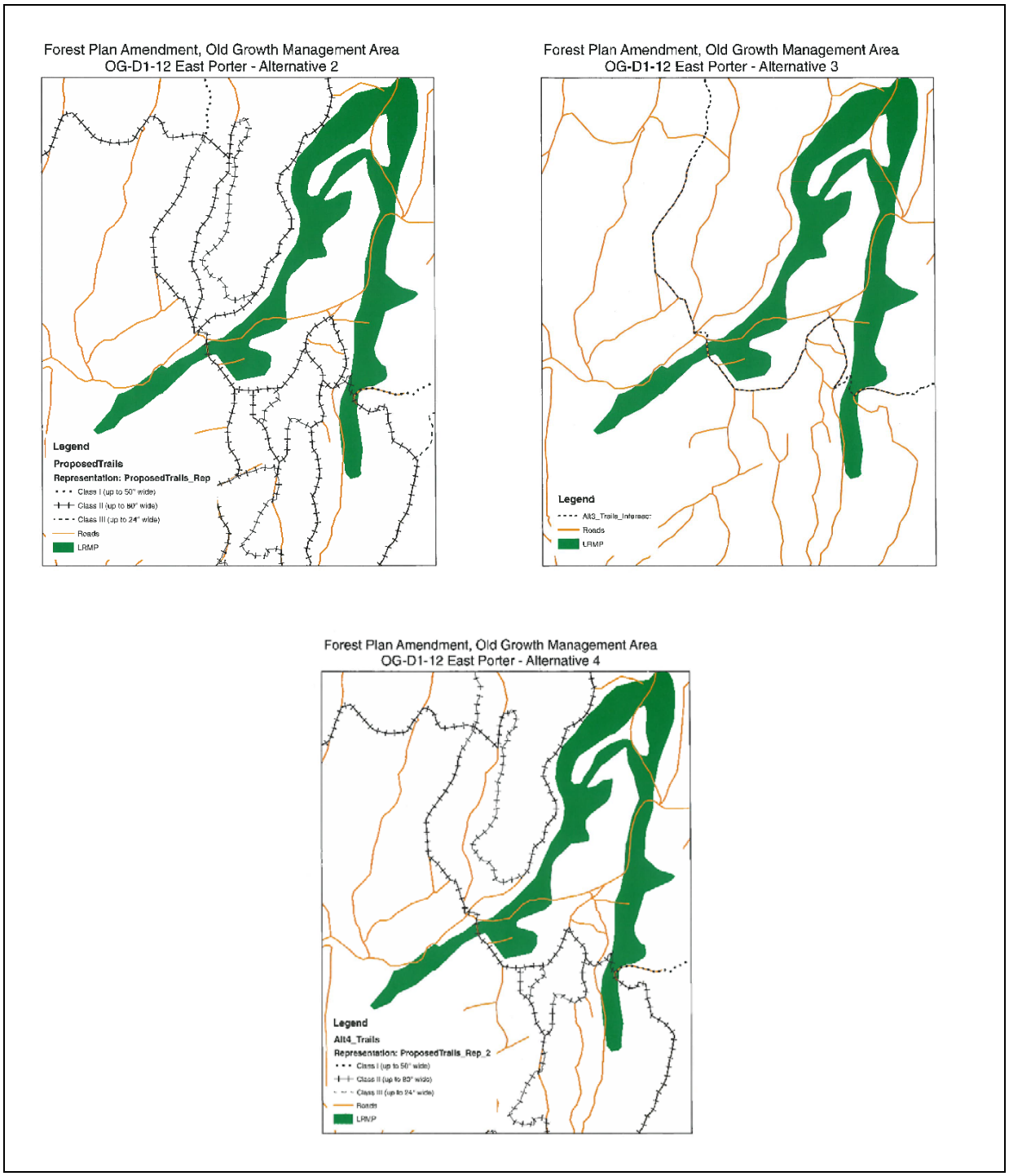


Figure 10. Proposed OHV trail in and in the vicinity of OG-D1-12, by alternative.

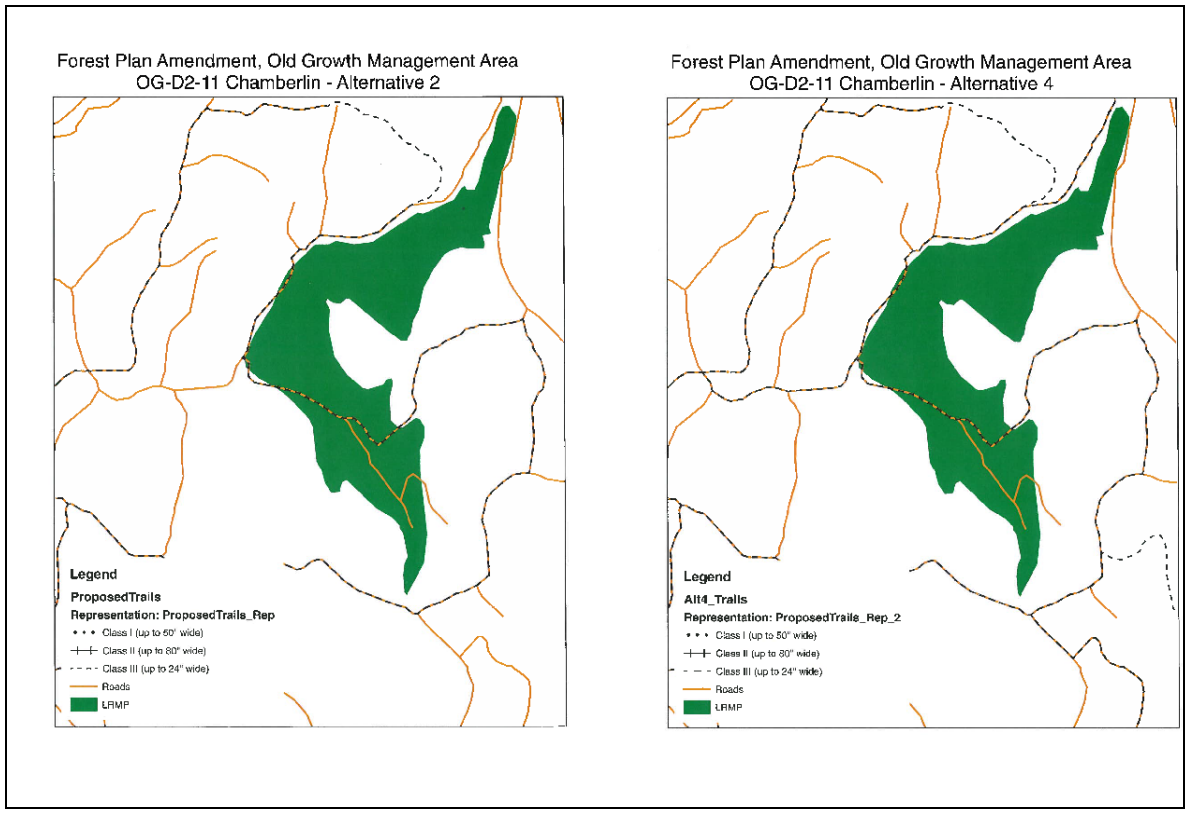


Figure 11. Proposed OHV trail in and in the vicinity of OG-D2-11, by alternative.

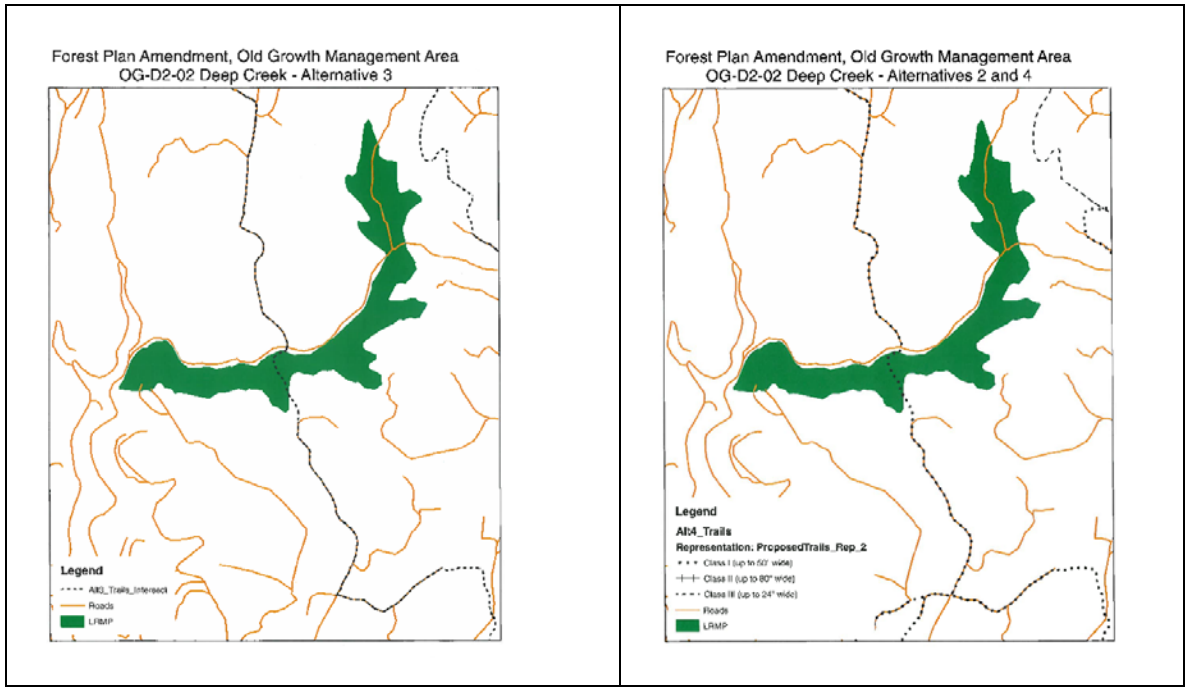


Figure 12. Proposed OHV trail in and in the vicinity of OG-D2-02, all action alternatives.

Civil Rights and Environmental Justice

Civil Rights legislations, especially the Civil Rights Act (CR) of 1964, Title VI, prohibit discrimination in Forest Service program delivery. The underlying principal behind the Civil Rights Act is that no activity shall negatively affect minorities, woman, or persons with disabilities by virtue of their race, color, sex, national origin, religion, age, disability, or material or familial status.

Environmental Justice, Executive Order 12898, demands the fair treatment and meaningful involvement of all people. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from the execution of our actions. Environmental Justice focuses on minority, low income groups, and subsistence lifestyles (including Native American Tribes). The purpose of involving these groups and analyzing the effects upon them is to determine whether adverse civil rights impacts are anticipated, or whether disparate or disproportionate impacts associated with the alternatives is anticipated on any of these groups.

With this project, there is no known potential for disparate or disproportionate effects, or to discriminate against or negatively impact any individual or subset of the population described above.

The reinforcement of existing road closures, given the nature of the project area and its extensive system of open roads, would not impede access throughout the project area. The actions proposed under Alternatives 2, 3 and 4 would not have any measurable impacts on Tribal rights (ceded lands) or Tribal traditional uses. The project is not located in a minority community nor would it affect residents of low or moderate income. Potential impacts would not affect any specific subset of the American population at a disproportionately higher rate than others.

The effects of this project on the social and economic context of these groups are within those described in the Forest Plan. The benefits and risks associated with implementation of the proposed action are provided to all members of the public. Therefore, the project would not pose disproportionately high or adverse effects to minority communities or to low income groups. As a result, no formal Civil Rights Impact or Environmental Justice Analysis was undertaken.

Short-term Uses and Long-term Productivity

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

The action alternatives propose development and designation of a trail system for motorized recreation. Much of the proposed trail in each alternative is located on existing disturbance; however, there would be some degree of new trail construction associated with each alternative. Once completed, the trail system would be expected to exist as a long-term recreation opportunity.

Recent trends of uncontrolled motorized recreation may not be sustainable over the long term. Proposed alternatives are intended to move conditions toward a balance of managed motorized recreation and sustainable vegetative, soil and watershed conditions. Soil and Water are two key factors in ecosystem productivity and protection of these resources is provided by the design criteria discussed in Chapter 2. Sustainable wildlife habitat, water quality and other resources depend on maintaining the long-term soil productivity upon which vegetation relies. No long-term effects to water resources are anticipated as a result of developing and designating a motorized trail system. All

alternatives provide fish and wildlife habitat at levels necessary to maintain viable populations of the species within the project area.

Unavoidable Adverse Effects

NEPA requires disclosure of "… any adverse environmental effects which cannot be avoided should the project be implemented…" (40 CFR 1502.16).

All of the alternatives considered result in some adverse effects. Many of these adverse effects would be minimized through implementation of design criteria and resource protection measures identified in Chapter 2 or through mitigation measures. Even with implementing these measures, there would still be adverse effects that cannot be avoided.

Soils

Additional detrimental soil conditions are expected as a result of implementing Alterative 2, 3 or 4. The use of ground-based trail construction equipment would result in additional compaction and displacement. Use of OHV equipment and traffic by other users would keep the surface of the designated trail in a disturbed condition. Implementation of the design criteria and monitoring described in Chapter 2 would minimize these adverse effects. Proposed season of use is limited in order to reduce impacts to soils. The alternatives were designed to limit the amount of detrimental soil conditions consistent with R6 Supplement 2500-98-1 (Regional Guidelines), effective August 24, 1998 by focusing proposed trail location on existing disturbance where it is available. New trail construction is proposed on segments needed to connect between segments that are on existing disturbance.

Staging area and/or trail head construction would also result in adverse effects on soils. Parking area and road construction results in soil compaction and displacement. Development of campsites, toilets, picnic areas and signboards can also result in soil displacement, compaction and impacts to of vegetative cover. On closed and decommissioned roads and user created trails where reinforcement of existing closures, rehabilitation and/or concealment are proposed, the soil surface can be revegetated, but soil productivity may remain reduced due to compaction. See the Soils section for more details on potential impacts to soil resources.

Invasive Plants

The potential for introduction and spread of invasive plants exists under every alternative considered, including no action. A risk assessment concluded that the potential for introducing and spreading invasive plants cannot be completely avoided. All action alternatives create conditions that are conducive to the introduction and spread of invasive plants. Use of OHV equipment and traffic by other users would keep the designated trail surface in a non-vegetated condition, which would be vulnerable to introduction and spread of invasive plants. Implementation of design criteria and monitoring as described in Chapter 2 would minimize these adverse effects.

Proposed activities such as trail, staging area or trailhead construction, campsite and picnic area development, and reinforcement of closures on unwanted routes could result in conditions conducive to the introduction and spread of invasive plants. Under proposed action alternatives invasive plant spread would be monitored and new sites would be proposed for treatment with an early detection rapid response strategy under the 2012 Invasive Plant Treatments EIS. See the Botany section for more details on potential impacts from invasive plant species.

Sedimentation/Turbidity

All action alternatives propose new OHV routes, staging areas or trailheads, and public use areas such as campsites and picnic areas. Use of OHV equipment and traffic by other users would keep the

designated trail surface in a non-vegetated condition and would be a potential source of sediment. Most sediment delivered to streams would come from stream crossings, trail drainage close to streams and closure and rehabilitation of unwanted routes adjacent to Class IV streams and in ephemeral draws. Implementation of design criteria and monitoring as described in Chapter 2 would minimize these adverse effects.

Proposed activities such as trail, staging area or trailhead construction, campsite and picnic area development, and decommissioning of unwanted routes could result in conditions conducive to the release of sediment. Proposed season of use for OHVs on the trail system is limited in order to reduce potential for sediment release and transport. See the Hydrology section for more details on potential impacts to water quality.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

Irreversible commitments: Where over-sized materials (boulders) are removed from mineral sources and installed within the proposed trail network, they would be irreversibly committed to use for the purpose of development of this project, and they would no longer be available for other projects or for blasting and crushing to produce other aggregate materials such as riprap or gravel. Uses for such rock materials under this project would be as barriers to prevent travel on unwanted routes, width controlling devices to ensure trail use by appropriate vehicle class, obstacles to promote slow speed and improve technical challenge, constructed boulder crawls, trail surface hardening at selected locations, or as devices for defining campsites. Removing aggregate (gravel) from mineral material sources would result in an irreversible commitment of resources. Once aggregate is removed from material source sites and used in development of the proposed trail system, it cannot be renewed except over long periods of time. Use of materials such as gravel and riprap would occur at selected sites for the following purposes: selected hardening of the trail surface, construction of armored dips and fords, hardening of trailer parking areas or camp site parking, construction of bridge approaches, installation of culverts, installation of vault toilets, and hardening of areas with high foot traffic such as walkways at signboards, restrooms, and picnic sites.

Irretrievable commitments: Alternatives 2, 3 and 4 propose trail construction and development of supporting areas and facilities. Construction of trails and stream crossings is an irreversible action as it involves construction of features in portions of the landscape where they do not currently exist. This results in forgone opportunities to provide primitive access to the specific locations where the features are constructed and during the time in which the features are in use, and a commitment of land to a non-vegetative state (on trail surfaces and at staging areas, parking areas and campsites) until such time that the trail system is abandoned and the disturbed sites returned back to productive capacity. Though some of these trails and facilities are already in place, some of them would be changes from the existing condition and would thus represent an irretrievable commitment of the sites to use under a designated OHV trail system during the proposed season of use. The areas and routes would be available to other uses year round, but the time that they would not be utilized by OHVs would be limited to the season when use by OHVs is prohibited. Refer to Chapter 2 for proposed season of use under each of the action alternatives.

The action alternatives would designate some mineral material sources as staging areas and/or play areas, but some of these areas have already been committed to extractive use (rock material source) by past actions. Some of these mineral material sources are no longer in use for extraction. Refer to the Geology section for more details on mineral material sources. In some cases, such as with Six

Corners, the area proposed for development of the staging area is separate from the area currently in use for mineral material extraction. In the active material sources, use of the area is primarily for mineral material sources, and motorized used proposed by this project is secondary. Thus, when extraction is occurring at a specific proposed staging area, the portions of that staging area needed for extraction, processing, loading and hauling would be closed to OHV use during the active period.

Incomplete and Unavailable Information

The Council on Environmental Quality's implementing regulations for NEPA require that an agency disclose information that is incomplete or unavailable when analyzing effects of activities in an environmental impact statement (40 CFR 1502.22).

Current estimates of OHV users are reliable using anecdotal data from riders, and from agency and law enforcement personnel. Assumptions on number of riders over time on the Ochoco Summit trail system is based on the number of riders using the area now, State of Oregon data, and anecdotal information from a similar designated trail system on the Willamette National Forest.

What is unknown is how implementation of the Travel Management Rule will affect local and regional OHV use, and in particular, if local use will be reduced or will become concentrated into the smaller areas where such use will be permitted. Under the previous travel plan Ochoco National Forest was open to cross-country travel unless designated closed. This may have attracted riders from other areas. It is unknown whether implementation of the Travel Management Rule across all Forests in the Region will alter the destinations to which OHV users travel or the distribution of OHV use across the areas where OHV opportunities are being developed across the region.

Motorized recreation opportunities, uses and trends in the Ochoco Summit trail system project area that have been summarized and disclosed in this EIS provide sufficient information about both motorized and non-motorized future uses for the decision-maker to reasonably distinguish between the alternatives.

Energy Requirements

Motorized recreation in particular, as well as recreation in general, results in the consumption of energy. For environmental impact statements, NEPA requires a discussion of the energy requirements and conservation potential of proposed alternatives and mitigation measures [40 CFR 1502.18(e)].

Many people travel in and through the Ochoco National Forest every year, to access recreation opportunities, commute and/or work, transport goods and livestock, or on their way to other destinations. Almost all visitors to Ochoco National Forest utilize some type of motorized vehicle to access the Forest. While there is no quantifiable estimate, motor vehicle use in and through the Forest is increasing, and therefore associated energy use is also increasing.

Energy-consuming activities associated with recreation use in the Ochoco Summit OHV Trail project area include motor vehicle use to transport OHVs to staging areas, use of power generators at camp sites, driving for pleasure on Forest roads, and use of OHVs themselves on and off trail systems. Additional energy-consuming activities associated with any of the action alternatives would include use of vehicles, on and off-road, to transport Forest workers, volunteers and law enforcement officers, and motorized equipment used for trail construction, development of staging areas, installation of sign boards, and reinforcement of existing closures at crossings with unauthorized and unwanted routes.

The action alternatives include designating a trail system on which OHVs may be used in an area where they were previously permitted to be driven cross-country, and are currently allowed to drive on 659 miles of mixed use roads. This change is unlikely to affect the energy consumption within the

project area. There are no irregular energy requirements involved in implementation of any action alternatives.

Implementation of the Travel Management Rule prohibits motorized recreation from occurring anywhere but on designated routes. This may displace some motorized recreation to other areas, and may focus use onto existing mixed use roads and trails, as well as onto any trail system implemented through the action alternatives analyzed in this EIS. The effects on energy consumption from these possible changes in use patterns are not expected to be measurable.

Effects on Laws, Regulations, Plans, Policies, and Procedures

The National Environmental Policy Act at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders." This section includes a brief summary of those laws, policies, and executive orders that are relevant to the proposed actions considered in this EIS.

The National Environmental Policy Act (NEPA)

NEPA establishes the format and content requirements of environmental analysis and documentation as well as requirements for public involvement and disclosure. The entire process of preparing this environmental impact statement was undertaken to comply with NEPA.

National Forest Management Act

The National Forest Management Act (NFMA) directs all action taken on National Forests to be consistent with the Forest Land and Resource Management Plans prepared in accordance with the regulations of the NFMA. The regulations in this subpart set forth a process for developing, adopting, and revising land and resource management plans for the national Forest System as required by the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended. These regulations prescribe how land and resource management planning is conducted on National Forest System lands. The resulting plans shall provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes the long-term net public benefits in an environmentally sound manner. Guidelines for modification of management areas or prescriptions are provided in the LRMP (4-47 and Chapter 5).

Forest Plan Consistency- Ochoco National Forest

Federal regulations (36 CFR 219.10(e)) require that permits, contracts, cooperative agreements, and other activities carried out on the Ochoco National Forest be consistent with the Ochoco National Forest Land and Resource Management Plan, as amended (see FEIS page 260). Alternatives presented in this document are consistent with the long term objectives as discussed in the Forest Plan as amended except as discussed below in the section titled "Forest Plan Amendments."

The Ochoco National Forest Plan has a variety of Standards and Guidelines that restrict some or all motorized access within certain Management Areas. In the past, this guidance was translated into Travel Plan maps that were published for summer and winter. The Motor Vehicle Use Map (MVUM) published after the release of the Record of Decision for the Travel Management Rule functions as the new Travel Map for the Ochoco National Forest. Separate trail system maps would be published after the Record of Decision has been signed for the Ochoco Summit Trail System project.

Non-Significant Forest Plan Amendments

Old Growth Management Areas: There are three site specific amendments to the Ochoco Land and Resource Management Plan for Alternatives 2, 3, and 4 and one additional amendment that applies only to Alternatives 2 and 4. All of these are related to designation of motorized crossings in Old Growth Management Areas (MA-F6) allocated in the 1989 LRMP other than on constant service roads (4-232, 4-234):

- Old Growth Management Area (OG-D1-08) at Indian Butte to include motorized recreation only on designated routes including one new crossing to connect between roads 2200-306 and 2200-309. This amendment applies to Alternatives 2, 3 and 4.
- Old Growth Management Area (OG-D1-12) at East Porter to include motorized recreation only on designated routes including one new crossing at Looney Creek to connect between roads 4200-430 and 4200-440. This amendment applies to Alternatives 2, 3 and 4.
- Old Growth Management Area (OG-D2-11) near Chamberlin Spring to include motorized recreation only on designated routes including one crossing on closed road 4250-700 to connect between roads 4250-610 and 1200-440. This amendment applies to Alternatives 2 and 4.
- Old Growth Management Area (OG-D2-02) near Deep Creek to include motorized recreation only on designated routes including one new crossing. This amendment applies to Alternatives 2, 3 and 4.

Scablands: One additional amendment would apply to all action alternatives, and would amend Forest Plan standards and guidelines that preclude motorized vehicle use on scablands.

Determination of Significance

The Secretary of Agriculture's implementing regulation indicates the determination of significance is to be "[b]ased on an analysis of the objectives, guidelines, and other contents of the forest plan" (36 CFR 219.8). The Forest Service has issued guidance for Plan amendments when using planning regulations in effect before November 9, 2000. This guidance, in Forest Service Manual (FSM) 1926.51 describes non- significant amendments as:

1. Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management;
2. Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management;
3. Minor changes in standards and guidelines; and/or
4. Opportunities for additional projects or activities that will contribute to achievement of the management prescriptions.

Each of these proposed amendments represents a minor change in the Forest Plan standards and guidelines that preclude motorized recreation in Old Growth Management Areas or scablands. These amendments would not alter the multiple use goals and objectives for long term land and resource management. See the section titled "Effects of Forest Plan Amendments" in Chapter 3 of this FEIS for analysis and disclosure of the effects of these proposed amendments.

Four additional factors were considered in this analysis: timing; location and size; goals, objectives, and outputs; and management prescriptions. An analysis of these four factors is presented below.

***Timing*:** The Forest Service Planning Handbook (1909.12, 5.32) indicates that a change is less likely to result in a significant plan amendment if the change is likely to take place after the plan period (the first decade).

All five of these plan amendments would take place in or after the 25th year of the Forest Plan, would take place within the timeframe of project implementation, and are specific to this project.

***Location and size*:** This factor takes into account the location and size of the area involved in the change and the affected area's relationship to the overall planning area. Generally, the smaller the area affected, the less likely the change is to be a significant change in the Forest Plan.

All five amendments relate to new disturbance on short trail segments that would be constructed to connect existing roads. The acreage of new disturbance varies between alternatives but is extremely small, especially when compared to the project area as a whole; new disturbance in OGMAs would range from .76 to .84 acres, while disturbance in scablands would range from 16.4 acres to 42.5 acres, depending on alternative (see the section titled "Effects of Forest Plan Amendments" in Chapter 3 of this FEIS).

***Goals, Objectives and Outputs*:** This factor examines whether the change alters long-term relationships between the levels of goods and services projected by the Forest Plan. In most cases, changes in outputs are not likely to be a significant change in the Forest Plan unless the change would forego the opportunity to achieve an output in later years.

None of the proposed amendments would alter the multiple-use goals and objectives for long-term land and resource management.

***Management Prescriptions*:** This factor accounts for whether the change in a management prescription is only for a specific situation or whether it would apply to future decisions throughout the planning. It evaluates how the change alters the desired condition of the land and resources or the anticipated goods and services to be produced.

These five amendments are being proposed to allow construction of short trail segments to connect existing roads, in order to develop a logical trail system to meet the purpose and need of this project. They would apply only to implementation of the Ochoco Summit project and would not allow similar actions in the future. These amendments to the Ochoco Land and Resource Management Plan standards and guidelines would not change the desired future condition for land and resources or anticipated goods and services from what is described in the existing management direction in the Land and Resource Management Plan.

Part 212-Travel Management

Subpart A- Administration of the Forest Transportation System

212.5(b) Identification of the Road System

The responsible official has identified the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest Lands. The interdiscplinary team and responsible official assessed roads within the project area on a route-by-route basis. A roads analysis for the Ochoco Summit OHV project area was compiled, utilizing information from other projects that overlap the analysis area to the extent there were available, and then completing the roads analysis process for potentially affected watersheds for which a roads analysis was not available. Through an interdisciplinary process, a minimum system was identified that meets applicable statutory and regulatory requirements and reflects long-term funding expectations. This system was analyzed at the appropriate scale and is reflected in the identified routes and road closure reinforcement sites proposed in each alternative. An appropriate discussion for each resource identifies the potential adverse and beneficial environmental effects associated each road segment and overall recommendations for route designation, closure, decommissioning or maintenance are included in the roads analysis.

Subpart B- Designation of Roads, Trails, and Areas for Motor Vehicle Use

212.55 (a) and (b)Criteria for Designation of Roads, Trails and Areas

(1)Damage to soil, watershed, vegetation, and other forest resources

Chapter 3 of this document displays the effects in detail to specific resources. In summary:

Soil: Activities associated with route designation (including new trail construction) and staging areas will have an effect on the soil resource by focusing soil disturbance on a designated network that will be designed, constructed, monitored and maintained in accordance to project design criteria intended to minimize adverse effects. This will cause negative effects at the location where new trails are constructed. However, the trail design also places the trail in more ecologically suitable locations and closes unauthorized and unwanted routes that intersect the designated system, allowing natural and management-induced processes to lower the overall footprint of detrimental soil conditions across the project area. Additional detrimental soil conditions as a result of creation of new trails is limited in scope from 50-81 miles dependent upon the alternative selected. The remainder of the routes is on existing disturbance so that utilizing them as trails would not result in additional disturbance. In some cases the width of area impacted by detrimental soil conditions may be reduced in the long-run where existing compacted roads are converted to narrower trails. All alternatives have potential impacts to soil resources which are described in detail in the Soils section of this EIS.

Watershed: Key Issue #3 specifically responds to the designation of a motorized trail system that could potentially impact water quality and fish habitat. In response to this key issue Alternative 3 was developed. The overall design of the trail system is to pull motorized access away from aquatic resources compared to the existing pattern of disturbance and unauthorized routes that often run parallel to streams or through sensitive riparian areas. All action alternatives would reinforce closures of unauthorized routes that intersect the trail system. Where these unauthorized routes impact riparian areas, action alternatives may facilitate improvement of impacted areas compared to the existing condition. However, all alternatives have potential negative impacts to water resources which are described in detail in the Hydrology section of this EIS.

Vegetation: The Botany section of this EIS discloses the effects of development and use of an OHV trail system on rare plants, invasive plants (weeds) and special plant habitats. The analysis concluded the trail system and reinforcement of road closures may have a negative effect to rare and sensitive vegetation and to the risk of introduction and spread of invasive plants in the project area. In addition, action alternatives would potentially increase costs of future timber management in some circumstances because of the possible need to reuse road beds that get closure reinforcement or road-to-trail conversion. Since the majority of the area where the designated trails system is proposed has been recently managed for vegetation and fuels (Spears, Canyon, HEJ, Zane and Jackson), it would likely be more than ten years before these areas are revisited as a timber sale project. Where these projects are ongoing, or where a new project is being planned (Wolf) any potential road-to-trail conversions involving roads accessing active or planned harvest treatment units would not be implemented until affected harvest activity is completed. Also, due to the Project Design Features and objective of designing trails that are narrow and winding, removal of trees would be the exception rather than the standard and development of any of the proposed action alternatives would have a negligible impact on forested cover at the landscape scale.

Cultural Resources: Following guidelines in a 2003 Regional Programmatic Agreement (PA) among USDA-Forest Service, the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Office (SHPO), a finding of "*No Adverse Effect*" (No Historic Properties Affected) was recommended under Stipulation III (B) 5 of the Programmatic Agreement. The Forest finds that there are historic properties but the undertaking would have no adverse effect on them as defined by 36 CFR 800.16(i). Any potentially meaningful information that could contribute to the importance of a

site that might otherwise be lost would due to project implementation would be documented and reported to the SHPO. This finding is based on Project Design Features and mitigation measures that have been incorporated into the EIS to assure that no sites eligible to the National Register would be impacted by trail or staging area construction.

The Historic Summit trail (FS Road 2630 in the analysis area) has been evaluated and found to be eligible to the National Register of Historic Places (NRHP). The Ochoco Land and Resource Management Plan (LRMP) provides direction for the Historic Summit Trail, which includes maintaining the existing historic integrity. Segments of the proposed OHV trail system on or crossing over FS Road 2630 are on existing open road segments, but all development associated with alternatives would still be designed for consistency with emphasis and desired conditions for the Historic Summit Trail (LRMP 4-61, 4-125, 4-180, 4-182, 4-190, 4-192 and 4-193). Monitoring of this site is included in the EIS (Chapter 2) and in the SHPO report. For those cultural sites that were evaluated and not found eligible for NRHP, protection is not required.

Harassment of Wildlife and significant disruption of wildlife habitats: Chapter 3 discloses the effects of motorized use on a myriad of wildlife and their individual habitats. Key Issue #2 specifically responds to the designation of a motorized trail system that could potentially impact big game habitat. In response to this key issue Alternative 3 was developed. Development of additional motorized routes and effective closure of unauthorized and unwanted routes work in opposing ways, and may alter reproductive success, mortality, availability of habitat or habitat quality. The effects may stem from changes in access for predators and people, fragmentation of habitat, behavioral changes in response to human use, impacts due to noise, or physical alteration of habitat. Generally new routes that are in close proximity to existing open motorized routes have a less detrimental impact on wildlife than routes that are far away from existing open motorized routes. This is because the amount of habitat that has a low level of human disturbance (as measured by motorized access) is retained over more area if new routes are planned in areas that are already disturbed, rather than when they are built into areas that are currently undisturbed. Refer to the Wildlife section for a detailed discussion of disturbance bands and other effects analysis related to proposed alternatives and wildlife.

Conflicts between motor vehicle use and existing or proposed recreational uses of the National Forest System lands or neighboring Federal Lands: Key Issue #4 specifically responds to the designation of a motorized trail system that could potentially cause conflict between motorized and non-motorized recreation. Designation of a motorized trail system would contribute to the separation of uses and provide areas for quiet recreation away from the designated system, while reducing the quality of quiet recreation in proximity to the designated system. A noiseband analysis using projected noise levels of >45 bd as an indicator of where the sound of OHVs on the proposed trail system was conducted to determine if various recreational values would be affected. There would be no effect from any of the action alternatives on following developed recreation sites and trails: Walton Lake CG, Biggs Spring CG, Big Spring CG, Deep Creek CG, Cottonwood CG, Wolf Creek CG, Sugar Creek CG, Barnhouse CG, Wildwood CG, Walton Lake Trail, Lookout Mountain Recreation Area Trail Systems, Round Mountain National Recreation Trail, Ochoco Mt. Trail, Barnhouse Trail, Cold Springs Rental Cabin, Crystal Springs Organization Camp, Marks Creek Sledding Hill. There would also be no effect on Bridge Creek Wilderness, North Fork Wild and Scenic River corridor, Lookout Mountain Recreation Area, 50 miles of trails managed exclusively for non-motorized use within the project area (except for a maximum of 0.03 miles of Keeton Trail). There is also potential for competition for sites to camp or picnic. However, all action alternatives include some level of supporting areas associated with the trail system, which would help reduce conflict with existing dispersed recreation sites. Reference the Recreation section for a discussion on the types of uses that occur on the Ochoco National Forest and how they are affected by this project.

Conflict among different classes of motor vehicle uses on National Forest System lands or neighboring Federal lands: User conflict happens when a person's expectations for his or her

recreational experience are not met due to contact with another user or through disturbance from the sound or physical evidence left by another user. The potential for conflict exists among all user groups, and even within a user group. All three action alternatives were designed to provide some separation of the different classes of motor vehicles. However, all alternatives, including no action, incorporate use of OHVs on open mixed-use roads, so there is potential for conflict between OHV riders and standard motor vehicle drivers. Not all motorized conflicts on the National Forest are entirely recreation-based; the National Forest System provides a wide array of resource-based opportunities such as timber harvest, livestock grazing and mining all of which involve people traveling in motor vehicles. Reference the Recreation section for a discussion on the types of uses that occur on the Ochoco National Forest and how they are affected by this project.

*Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factor*s: The project area is not located near populated areas. Nonetheless, analysis included sound and air quality (see Recreation and Air Quality sections in Chapter 3 of this document).

Public Safety: The analysis disclosed fugitive dust as a potential to affect health, although it would be localized and temporary. Trail construction would be engineered for curvilinear design to abate driver speed. Barriers, signs, and other trail delineators would be employed to reduce rider confusion. Crossings at highway-legal roads, and shared segments of open mixed use roads would be posted to alert drivers on the road of crossing or merging OHV traffic. Such intersections would also be posted with “STOP” signs and approaches that allow visibility of the cross traffic in both directions on the road for riders entering the road from either direction on the trail. Increasing use of the mixed-use routes over time would require monitoring of those routes to identify and address issues related to user safety.

Provision of Recreational Opportunities: As a result of implementation of the Travel Management Rule, this project develops a trail system and staging areas specifically for OHV enthusiasts and to provide a riding experience they have requested. This proposal would provide between 101 and 212 miles of designated interlinking trails and roads that would vary in skill level and density to provide an opportunity for beginner through advanced riders. The analysis also discloses the balance of motorized and non-motorized recreational opportunities, including the potential effect of noise on quiet recreation such as hiking in wilderness or inventoried roadless area. Designation of a motorized trail system should benefit the non-motorized user in portions of the landscape distant from the proposed motorized routes as it separates uses and provides an area for motorized use that is concentrated and managed rather than scattered and uncontrolled.

Access Needs: Section 504 of the Rehabilitation Act of 1973 says that no qualified individual with a disability can be denied participation in a Federal program that is available to all other people solely because of his or her disability. In conformance with section 504, wheelchairs or mobility devices are welcome on all NFS lands that are open to foot travel and they are specifically exempted from definition as a motor vehicle in section 212.1 of Travel Management Rule (36CFR 212.1). There is no legal requirement to allow persons with disabilities use of motor vehicles on roads, trails, or other areas that are closed to motor vehicles. Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory. This concern has already been decided by law.

Conflicts among Uses of National Forest System Lands: Chapter 3 of the EIS as a whole has a robust display of the tradeoffs associated with designation of a motorized trail system. For each resource area, there are potential conflicts as it is the nature of multiple use in the National Forest System. Key Issues drove alternatives to address the most notable conflicts and concerns. These issues include motorized use and its effect on big game habitat, water quality and fish habitat, potential conflict between motorized and non-motorized recreation and quality and quantity of recreational opportunities for OHV riders. For other conflicts among uses such as potential incursion into adjacent

sensitive plant habitat or wet areas, impacts to cultural sites eligible for the National Register, project design criteria, mitigations and monitoring are included in the EIS (Chapter 2) to reduce adverse effects and to ensure that the trail system is properly designed, constructed, maintained and operated to reduce these potential conflicts.

The Need for Maintenance and Administration of Roads, Trails, and Areas that would arise if the Uses under Consideration are designated; and The Availability of Resources for that Maintenance and Administration: The project design criteria (PDC) in Chapter 2 include design, construction and maintenance guidelines. Safety played a key role in the development of the trail design and maintenance standards. Education and enforcement are also addressed in the OHV Trail Design PDCs. and in the Recreation section of the EIS. Enforcement will be led by COHVOPS in cooperation with local law enforcement officers and volunteer patrols. Maintenance and monitoring will be conducted in accordance with all of the PDCs and will be led by COHVOPS in cooperation with local resource specialists, OHV groups and/or other interested agencies, groups or individuals. The mission of COHVOPS is to provide consistent, quality off-highway vehicle recreation opportunities that are focused on customer service and resource protection. COHVOPS manages the central Oregon OHV trail systems for the Deschutes and Ochoco National Forests and the Prineville BLM. The team implements existing OHV management plans, identifies future needs, recommends actions to management, and assists in future OHV planning efforts. COHVOPS is funded through a combination of direct support from the Forest Service, the BLM, and grant funding from the State of Oregon derived from the ATV Allocation Funds derived from the ATV Permit program and a portion of gas tax revenue.

212.55(c) Specific Criteria for Designation of Roads

(1) Speed, volume and composition on roads; and (2) Compatibility of vehicle class with road geometry and road surfacing: As part of implementation of the Travel Management Rule on the Ochoco National Forest, motorized mixed use analysis has been performed to establish the suitability of allowing motorized mixed use on roads in the context of their current setting in terms of alignment, width, typical user speed, and presence or absence of traffic control devices. Supplemental analysis has been performed on certain designated motorized mixed-use roads in the Analysis Area that have been determined to be unsuitable for a mixture of non-highway legal and highway-legal vehicles because of either their current setting or their designation as roads maintained for passenger car use (on which non-highway-legal vehicle use is prohibited). In particular, this supplemental Engineering Analysis was done on Rd 2200-150, Rd 2630 (to Indian Prairie), Rd 2630 (Scott's Camp for 2 miles west), Rd 4250, Rd 4270, Rd 4200-740, Rd 38, Rd 3810 and Rd 4276 to determine what mitigations would be necessary to reduce the crash probability and severity on these motorized mixed use roads to an acceptable level. It was disclosed that these routes would not be appropriate for mixed use due to safety concerns without modifications to alleviate those hazards. For this analysis those road segments along with all of the Maintenance Level 3, 4 and 5 roads were considered to be not available for designation as OHV routes and are not included in the proposed alternatives except a crossings of the trail over highway-legal roads. A sign plan would be developed that would include posting of all shared use routes within the Ochoco Summit OHV Trail designated OHV system with confirmation signing for the presence of OHVs as well as signs alerting traffic on highway-legal roads to the presence of OHV crossings.

No valid existing right-of-ways would be affected by the action alternatives. There has been no change or designation of motorized use in wilderness or primitive areas per CFR 212.6(b).

The National Historic Preservation Act

A cultural resource inventory was conducted in the project area. The Ochoco National Forest completed the "Project Review for Heritage Resources under the Terms of the 2004 Programmatic Agreement" with the Oregon State Historic Preservation Office (SHPO). The activities in the

selected alternative have been designed to have no effect to cultural resource sites through both protection and avoidance (see "Cultural Resources," Chapter 3 in this document). A finding of No Historic Propoerties Adversely Affected has been made for this project and the SHPO concurred with this finding on January 24, 2013. The project is compliant with SHPO regulations.

Endangered Species Act

Effects to Threatened, Endangered species are evaluated in the Aquatic Species, Botanical Resources, and Wildlife sections of Chapter 3 of this EIS. The Endangered Species Act of 1973 requires that actions of federal agencies do not jeopardize or adversely modify critical habitat of federally-listed species. The purposes of this Act are to "provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered and threatened species, and to take such steps as may be appropriate to achieve the purpose of the treaties and conventions set forth in subsection (a) of this section." The Act also states "It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

There are no federally listed Threatened or Endangered fish, wildlife or native plant species on the Ochoco National Forest. There are two federal Candidates that have been found by USFWS to be "warranted but precluded" for listing as threatened under ESA. These are the greater sage-grouse and the California wolverine. These species are addressed in the Wildlife section.

Clean Water Act

The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of all waters to protect the beneficial uses as documented according to Oregon Department of Environmental Quality (ODEQ) criteria. A beneficial use is a resource or activity that would be directly affected by a change in water quality or quantity and are defined on a basin Action alternatives follow State of Oregon requirements in accordance with the Clean Water Act for protection of waters. Application of Best Management Practices (BMPs) are selected and designed on site-specific conditions for waters potentially affected in the Ochoco Summit OHV project area. The interdisciplinary team has reviewed and incorporated applicable BMP water quality objectives in the design of alternatives and their mitigation measures. Standards and Guidelines for the Inland Native Fish Strategy where developed (in part) to maintain and restore aquatic ecosystems for dependent species (Chapter 3, Aquatic Species and Hydrology). These standards and guidelines afford the same or greater protection of stream courses as direction found in the 1988 USDA publication *General Water Quality – Best Management Practices.* Project design criteria for water quality and aquatic species are listed in Chapter 2.

Under Section 319 of the 1987 Clean Water Act Amendments, states are required to determine those waters that would not meet the goals of the Clean Water Act, determine those non-point source activities that are contributing pollution, and develop a process on how to reduce such pollution to the "maximum extent practicable." Section 303(d) of the Clean Water Act requires that a list be developed of all impaired or threatened waters within each state. The ODEQ is responsible for compiling the 303(d) list, assessing data, and submitting the 303(d) list to the Environmental Protection Agency (EPA) for federal approval.

Within the project area there are several streams with assessed water quality impairments related to summer water temperature. These include Double Corral Creek, Fox Creek, Happy Camp Creek, Howard Creek, Indian Creek, Jackson Creek, Little Summit Creek, Marks Creek, North Wolf Creek, Ochoco Creek, Peterson Creek, Porter Creek, and Toggle Creek. These streams are on Oregon's 2004/2006 Section 303(d) List of "Water Quality Limited Waterbodies." The Oregon State Water Quality Standards states that the seven-day-average maximum temperature of a stream identified as

having salmon and trout rearing and migration use, which describes some streams within the project area, may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit). No measurable increase in water temperature from management practices is allowed in these streams.

All activities within the Ochoco Summit OHV project area would not change the 303(d) parameters for which Double Corral Creek, Fox Creek, Happy Camp Creek, Howard Creek, Indian Creek, Jackson Creek, Little Summit Creek, Marks Creek, North Wolf Creek, Ochoco Creek, Peterson Creek, Porter Creek, and Toggle Creek are listed. Reference the Hydrology section (Chapter 3 of this document) for more detail.

The Clean Air Act

All action alternatives comply with the Clean Air Act. The Act prescribes air quality to be regulated by each individual state. Effects to air quality are as described in the "Air Quality" section in Chapter 3 of this FEIS; while localized air impairments may occur, any localized impairment would be diluted to a scale that would be impractical to measure and negligible at the scale of airsheds. A projected 2 to 5 percent yearly increase in riders would not change this condition.

Executive Orders

11644 of February 8, 1972

Use of Off-road Vehicles on the Public Lands

Sec. 3. *Zones of Use*. (a) Each respective agency head shall develop and issue regulations and administrative instructions, within six months of the date of this order, to provide for administrative designation of the specific areas and trails on public lands on which the use of off-road vehicles may be permitted, and areas in which the use of off-road vehicles may not be permitted, and set a date by which such designation of all public lands shall be completed. Those regulations shall direct that the designation of such areas and trails will be based upon the protection of the resources of the public lands, promotion of the safety of all users of those lands, and minimization of conflicts among the various uses of those lands. The regulations shall further require that the designation of such areas and trails shall be in accordance with the following--

(1) Areas and trails shall be located to minimize damage to soil, watershed, vegetation, or other resources of the public lands.

Chapter 3 of this document displays the effects in detail to these specific resources. Also, see response to the Travel Management Rule CFR 255(a) and (b) in this section.

(2) Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats.

Chapter 3 discloses the effects of motorized use on wildlife and their individual habitats. Significant Issue #2 specifically responds to the designation of a motorized trail system that could potentially alter effectiveness big game habitat. Alternative 3 responds to this Significant Issue.

(3) Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.

All three action alternative provide for some degree of separation of use. Alternatives 2 and 4 would offer opportunities for all three classes of vehicles (ATVs, jeeps and 4-wheel drive vehicles, motorcycles). Alternative 3 would specifically provide opportunities for ATVs and motorcycles; jeeps and 4x4s would still have access to all mixed-use roads.

(4) Areas and trails shall not be located in officially designated Wilderness Areas or Primitive Areas. Areas and trails shall be located in areas of the National Park system, Natural Areas, or National Wildlife Refuges and Game Ranges only if the respective agency head determines that off-road vehicle use in such locations will not adversely affect their natural, aesthetic, or scenic values.

There are no trails located in Wilderness, Inventoried Roadless, or Potential Wilderness Areas. See the Recreation, the Visual Quality, and the Wilderness, Inventoried Roadless Area and Unroaded Area sections in Chapter 3 for more details.

(b) The respective agency head shall ensure adequate opportunity for public participation in the promulgation of such regulations and in the designation of areas and trails under this section.

The public participation process is outlined in Chapter 1 of this document.

(c) The limitations on off-road vehicle use imposed under this section shall not apply to official use.

Maintenance Level 1 roads would remain closed to the public; however administrative use is maintained.

11988 & 11990 of May 24, 1977

Protection of Floodplains and Wetlands

Executive Order 11988 requires the Forest Service to provide leadership and to take action to (1) minimize adverse impacts associated with occupancy and modification of floodplains and reduce risks of flood loss, (2) minimize impacts of floods on human safety, health, and welfare, and (3) restore and preserve the natural and beneficial values served by floodplains. Executive Order 11990 requires the Forest Service to take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

Hydrology: The Forest Service is proposing to designate where and what types of motorized access would be allowed within the riparian influence zone in every alternative except Alternative 1, in which motorized access would be allowed in areas currently authorized by the Travel Management Plan. All action alternatives include design criteria for trail construction and monitoring within riparian areas.

Aquatic Biota: All alternatives comply with the intent of Executive Order 11990 and USDA Departmental Regulation 9500-3 by either not designating trail in riparian areas (Alternative 1) or providing a properly constructed designated trail system within riparian areas (Alternatives 2-4). See discussions related to this topic in Hydrology, Aquatic Species, and Soils resource sections in Chapter 3 for more information.

13186 of January 10, 2001, and the Migratory Bird Treaty Act of 1918

The purpose of the Migratory Bird Treaty Act is to establish an international framework for the protection and conservation of migratory birds. The Act makes it illegal, unless permitted by regulations, to “pursue, hunt, take, capture, deliver for shipment, ship, cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, including in this Convention…for the protection of migratory birds…or any part, nest, or egg of any such bird” (16USC 703). The original 1918 statute implemented the 1916 Convention between the United States and Great Britain (for Canada). Later amendments implemented treaties between the Unites States and Mexico, Japan, and the Soviet Union (now Russia).

Executive Order 13186, signed January 10, 2001, directs federal agencies to protect migratory birds by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practical, adverse impacts on migratory birds’ resources when conducting agency actions. This order directs agencies to further comply with the Migratory Bird

Treaty Act, the Bald and Golden Eagle Protection Act, and other pertinent statutes. This analysis is compliant with the National Memorandum of Understanding between the USDA Forest Service and the U.S. FWS to promote the conservation of migratory birds (USDA 2008g).

For a more detailed analysis see the Wildlife section in Chapter 3.

13443 of August 16, 2007

Facilitation of Hunting Heritage and Wildlife Conservation

This order directs federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

This EIS has considered the management of wildlife habitats trends in and effects on hunting opportunities, and economic and recreational values of hunting. Resource specialists have considered the programs and plans of other state and federal wildlife agencies, have worked collaboratively with them in their professional roles, and have coordinated with them in development of Ochoco Summit OHV project. These other agencies have been kept abreast of these proposed actions. The Ochoco National Forest currently has in place various cooperative seasonal motorized use closures, including winter range motorized closure areas, a year-round Cooperative Travel Management area (South Boundary) and the "Green Dot" hunting season road closures (Rager Travel Management Area). Proposed alternatives were developed with consideration of these areas and seasons.

12898 of February 11, 1994

Environmental Justice in Minority Populations and Low-income Populations

Executive Order 12898 directs the agency to identify and address, "...as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations...." The intent of the order is to assure the fair treatment and meaningful involvement and consideration of all people. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from the execution of a federal actions. Outreach and public involvement for this project has been extensive and at various scales within various communities of interest.

In order to identify and address environmental justice concerns, the EO states that each agency shall analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority populations, low-income populations, and native Americans as part of the NEPA process.

Two distinct populations fall into the categories identified by EO 12898. One population is the harvesters, most of whom are members of the Asian minority. In Environmental Justice analyses, Census data is often used to illustrate the percentage of the population that belongs to an ethnic minority in the study area. Data usually come from sources similar to those presented in the Social and Economic section.

As a result of outreach and scoping (public involvement) processes, there were no potentially disproportionately high and adverse human-health, environmental, or social effects to minority or low-income populations identified. Based on the Social and Economic analysis presented in Chapter 3, there is no known potential for disparate or disproportionate effects on minority or low-income populations.

USDA Civil Rights Policy

The Civil Rights Policy for the USDA, Departmental Regulation 4300-4 dated May 30, 2003, states that the following are among the civil rights strategic goals; (1) managers, supervisors, and other

employees are held accountable for ensuring that USDA customers are treated fairly and equitably, with dignity and respect; and (2) equal access is assured and equal treatment is provided in the delivery of USDA programs and services for all customers. This is the standard for service to all customers regardless of race, sex, national origin, age, or disabilities.

The project alternatives, given the size of potential social and economic effects, are not likely to result in civil rights impacts to Forest Service employees or customers of its program.

Persons with Disabilities

Some comments received during the Ochoco Summit OHV planning process expressed concern that changes to motorized access would prevent future access to National Forest system lands for those with disabilities. In response to these comments, a review of the project alternatives has been conducted to ensure that they apply equally to all groups. Therefore, the Ochoco Summit OHV project is not discriminatory towards persons with disabilities, because it applies equally to all groups.

Under section 504 of the Rehabilitation Act of 1973, no person with a disability can be denied participation in a Federal program that is available to all other people solely because of his or her disability. There is no legal requirement to allow people with disabilities use of motor vehicles on roads, trails, or other areas that are closed to motor vehicles. Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory.

Prime Farmland, Rangeland, and Forest Land

The Secretary of Agriculture issued memorandum 1827 which is intended to protect prime farm lands and rangelands. The Ochoco Summit OHV project area does not contain any prime farmlands or rangelands. Prime Forest Land, as defined in the memorandum, is not applicable to lands within the National Forest System.

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Glossary

A

Access Management- Management of the ingress and egress of people on National Forest System lands. Generally used to describe motorized use allowed.

Adaptive Management- A type of natural resource management that implies making decisions as part of an on-going process. Monitoring the results of actions would provide flow of information that may indicate the need to change a curse of action. Scientific findings and the needs of society may also indicate the need to adapt resource management to the new information.

Administrative Use - Motorized use of a road, trail or area for limited administrative use by the Forest Service; use of any fire, military, emergency or law enforcement vehicle for emergency purposes. Authorized use of any combat or combat support vehicles for national defense purposes; Law enforcement response to violations of the law, including pursuit; and, Permitted use and occupancy of National Forest System lands (USDA- Forest Service. 2004. 36 CFR part 212, 251, 261, and 295).

Advanced Regeneration - Small trees, usually less than one inch in diameter, that are growing under mature trees prior to planned harvest activities.

Affected Environment - The natural environment that exists at the present time in an area being analyzed.

Air Shed- A geographical area that, because of topography, meteorology and climate, shares the same air.

All-terrain Vehicle (ATV) - Any motorized, off-highway vehicle 50 inches or less in width, having a dry weight of 600 pounds or less that travels on three or more low-pressure tires with a seat designated to be straddled by the operator. Low-pressure tires are 6 inches or more in width and designed for use on wheel rim diameters of 12 inches or less, utilizing an operating pressure of 10 pounds per square inch (psi) or less as recommended by the vehicle manufacturer (FSH 2309.18). In this document ATV trail is often used to discuss a motorized trail that can be used for motorcycles also.

The Forest Service does not classify as ATVs the new ‘golf cart’ sized light off-road utility vehicles as they usually have a wider track and overall length than ATVs.

Alternative- One of several policies, plans or projects proposed for the decision-making.

Aquatic Ecosystem-The stream channel, lake or estuary bed, water, biotic communities and the habitat features that occur within.

Archaeological- A term used to describe any cultural resources deposited on or in soil strata from past human activities. However, these cultural deposits generally must be at least 50 years old to be considered archaeological.

Area- A discrete, specifically delineated space that is smaller, and in most cases much smaller, than a Ranger District.

Arterial Road- A forest road that provides service to large land areas and usually connects with other arterial roads or public highways. (FSH 7709.54 – Forest Transportation Terminology Handbook, no longer in print).

B

Best Management Practices (BMP)- Practices designed to prevent or reduce water pollution. Also referred to as Soil and Water Conservation Practices (SWCPs).

Big Game- Those species of large mammals normally managed for sport hunting.

Biological Diversity- The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems and ecological processes that connect everything in a common environment.

Borrow Source- An area from which sand, gravel or stone is taken for use in another area.

Bridge- A road or trail structure, including supports, erected over a depression or obstruction such as water, a road, trail or railway and having a deck for carrying traffic or other loads.

C

Canopy- the upper most spreading branchy layer of a forest.

Canopy Base Height- The height above the ground of the first canopy layer where the density of the crown mass within the layer is high enough to support vertical movement of a fire. Low canopy base heights have been shown to initiate crown fire behavior.

Capability- The potential of an area of land to produce resources, supply goods and services and to allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends on current conditions and site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fire, insects and disease.

Chain- A standard measurement for rate of fire spread (approximately 66')

Classified Road- Road wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including State roads, county roads, privately owned roads, national Forest System roads and other roads authorized for motor vehicle use pursuant to 36 CFR 212.51 on a Motor Vehicle Use Map (MVUM). (36 CFR 212.1, FSM 7705 - Transportation System). A road under Forest Service jurisdiction.

Clean Air Act -(42 U. S. C. 7609). Section 309 provides authority for the Environmental Protection Agency to review other agency environmental impact statements.

Closed Roads- Roads on the Forest Transportation system available for motorized administrative or emergency use, but not open to public motorized use. Also called long-term intermittent and is classified as a Maintenance Level I road.

Collector Road- A forest road that serves smaller land areas than an arterial road. Usually connects forest arterial roads to local forest roads or terminal (FSH 7709.54- Forest Transportation Terminology Handbook, no longer in print).

Concern- (Also management concern). An issue, problem or condition which constrains the range of management practices identified by the Forest Service in the planning process.

Concentrated Use – The Forest Plan page 4-135 under Intensive Recreation defines concentrated use as: "Generally, high concentrations of visitors will occur around developments."

Condition Classes- A function of the degree of departure from historical fire regimes. Condition Class I is within or near historical conditions; Class III is significantly altered from historical regimes.

Connectivity (of habitats)- The linkage of similar but separated vegetation stands by patches, corridors or 'stepping stone' of like vegetation. This term can also refer to the degree to which similar habitats are linked.

Corridor- Elements of the landscape that connect similar areas. Streamside vegetation may create a corridor of willows and hardwoods between meadows where wildlife feed.

Council of Environmental Quality (CEQ)- The Council issues regulations binding all federal agencies, to implement the procedural provisions of the national Environmental Quality Act (NEPA). The regulations address the administration of the NEPA process, including the preparation of Environmental Impact Statements (EIS) for major federal actions which significantly affect the quality of the human environment.

Cover- Any feature that conceals wildlife or fish. Cover may be dead or live vegetation, boulders or undercut streambanks. Animals use cover to escape from predators, rest or feed.

Cross-country Travel- Travel over terrain not on designated roads and/or trails.

Cultural Resource- An umbrella term used to describe a variety of resources, including archaeological or historic remains, folklore and oral traditions and geographic areas traditionally ascribed to have historical significance to a given culture.

Cumulative Effects or Impacts- The impact on the environment that results from incremental impact of an action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other action. Cumulative effects or impacts can result from individual minor but collectively significant actions taking place over a period of time.

D

Draft Environmental Impact Statement (DEIS) - The draft version of the Environmental Impact Statement that is released to the public and other agencies for review and comment.

Designated road, trail or area- A National Forest System road, a National Forest System trail, or an area on National Forest System lands that is designated for motor vehicle use pursuant to §212.51 on a motor vehicle use map.

Detrimental Soil Disturbance- Compacted, displaced, eroded or burned soil conditions incurred by management, recreational or natural activities that are capable of reducing the productivity of the soil resource.

Developed Recreation- Recreation that requires facilities that, in turn, result in concentrated use of the area. The Forest Plan on page G-4 defines developed recreation: “Recreation use that occurs within a site or facility specifically established and constructed for public recreation purposes. Activities commonly included are camping, picnicking, resort use, downhill skiing, but also include parking areas, trailheads, boat launching sites, etc.

Difficulty Level - The degree of challenge a trail presents to an average user's physical ability and skill, based on trail condition and route location factors such as alignment, steepness of grades, gain and loss of elevation, and amount and kind of natural barriers that must be crossed, and which may temporarily change due to weather. (FSM 2353.05):

a. Easiest. A trail requiring limited physical ability and skill to travel.

b. More Difficult. A trail requiring some physical ability and skill to travel.

c. Most Difficult. A trail requiring a high degree of physical ability and skill to travel.

Dispersed Recreation- Recreation with few developed amenities such as structures, developed campsites or toilets. Dispersed recreation is generally less directly constrained by management controls on movement or by enforcement activities, but must comply with posted orders or restrictions for areas under management. Dispersed campers for instance, can choose to camp in places that are underdeveloped, so long as they meet the general posted rules for site protection. The

term dispersed recreation usually implies lower visitor use densities. Dispersed recreation may be motorized or non-motorized and that is defined in the Forest Plan on page 4-4: "Activities which disperse recreation throughout the forest include Nordic skiing, river rafting, mountain bicycling, and off-highwau use." Page G-4 of the Forest Plan defines dispersed recreation as "Recreation use outside of developed recreation site, ranging from scenic driving to backpacking."

Disturbance- Events that such as a forest fire or insect infestation that alters stand structure composition or function of an ecosystem.

Dual Sport-Class III (motorcycle) ATV specificially designed to be street legal and used off road.

E

Early Seral- Plants which inhabit a disturbed site within the first few years subsequent to the disturbance.

Ecosystem- An arrangement of living and nonliving things and the forces that move among them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildfire are two of the forces that act within ecosystems.

Effects- Environmental consequences as a result of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate and related effects on air, water and other natural systems including ecosystems.

Emergency Need- An urgent maintenance need that may result in injury, illness, or loss of life, natural resource or property; and must be satisfied immediately. Emergency needs generally require a declaration of emergency or disaster, or a finding by a line office that an emergency exists.

Endangered Species-Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior and endangered in accordance with the 1973 Endangered Species Act.

Endangered Species Act- The Act which requires consultation with U.S. Fish and Wildlife Service if practices on National Forest System lands may impact a threatened or endangered plant or animal species.

Engineering Analysis- An analysis and evaluation conducted by a qualified engineer or under the supervision of a qualified engineer of a NFS road, road segment or road being considered for mixed motorized use. The analysis and evaluation may include recommended mitigation measures. The analysis may simply be simply documentation of engineering judgment or maybe a more complex engineering report that includes many factors related to mixed motorized use.

Environmental Analysis- An analysis of alternative actions and their predictable long and short-term effects. Environmental analysis include physical, biological, social and economic factors.

Environmental Impact Statement (EIS)- A statement of the environmental effects of a proposed action and alternatives to it. It is required for major federal actions under Section 102 of the National Environmental Policy Act (NEPA) of 1969 and released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, the Council for Environmental Quality (CEQ) guidelines and directives of the agency responsible for the project proposal.

F

Facilities- Transportation planning, road management and operation, fleet equipment and engineering services (for example: administrative buildings, water and sanitation systems, sanitary landfills, dams, bridges and communication systems).

Fauna- The animal life of an area.

Fugitive Dust- Dust generated from open sources is termed 'fugitive' because it is not discharged to the atmosphere in a confined flow stream.

Fire Management- All activities required for the protection of resources from fire and the use of fire to meet land management goals and objectives.

Fire regime- A function of the historical frequency of fire and the degree of severity of those fires.

Flood Plain- A lowland adjoining a watercourse. At a minimum the area is subject to a 1% or greater chance of flooding in a given year.

Forage- All browse and non-woody plants that are eaten by wildlife or livestock.

Forb- A broadleaf plant that has little or no woody material in it.

Forest Road or Trail- A road or trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.

Forest Supervisor- The official responsible for administering National Forest lands on an administrative unit, usually consisting of one or more Ranger Districts which comprise the National Forest. The Forest Supervisor reports to the Regional Forester.

Fuels- Vegetative matter, dead or alive, that burns in a fire. It is broadly categorized by the following categories:

Surface or ground fuels are within a foot of the ground.
Ladder fuels exist when you have a continuous vertical arrangement of fuel that easily allows fire to go from ground level into the tree canopy.
Crown fuels are the tree limbs and leaves that can burn with enough heat and/or wind.
Live fuels are the green (live) herbs and shrubs.

Fuel Models- Fuel models are a tool used to standardize discussion of fuel conditions on a landscape.

Fuel conditions, defined by quantity and arrangement, have been categorized into 40 standard descriptive fuel models (Scott and Burgan 2005).

Fuel Treatment- Manipulation or removal of fuels to reduce the likelihood of ignition and/or lessen potential damage and resistance to control (e.g. lopping, pruning, chipping, crushing, mastication, piling and burning).

G

Game Species- Any species of wildlife or fish that is harvested according to prescribed limits and seasons.

Geographical Information Systems (GIS)- GIS is a computer technology that uses a geographic information system as an analytic framework for managing and integrating date, solving a problem or understanding a past, present or future situation.

H

Habitat- The area where a plant or animal lives and grows under natural conditions.

Habitat Capacity- The ability of a land area or plant community to support a given species of wildlife.

Hiding Cover- The vegetation that would hide ninety percent of an elk from the view of a human at a distance of 200 feet or less. The distance which the animal is essentially hidden is called sight distance.

High Clearance Vehicle- Generally a truck, pickup truck, SUV or ATV with a road clearance that allows travel on low standard roads without vehicle damage. Usually greater clearance than a standard passenger vehicle.

Highway Legal Vehicle- Any motor vehicle that is licensed or certified under state law for general operation on all public roads in the state. Operators of highway-legal vehicles are subject to state traffic law including requirements for operating licensing.

Historic Property- Any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion in, the National Register for Historic Places. This term includes artifacts, records and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register for Historic Places criteria.

Hydrology- The science of dealing with the study of water on the surface of the land, in the soil and underlying rocks and in the atmosphere.

I

Initial Attack- The fire suppression effort that takes place as soon as possible following a wildland fire report.

Interdisciplinary Team- A team of individuals with skills from different disciplines that focuses on the same task or project.

Intermittent Stream- A stream that goes dry at some point each year but flows continuously at least 30 days a year when it received water, usually from a seasonal groundwater, but may also include some surface source more persistent than a rainstorm, such as melting snow.

Invasive Species- A plant species moving into areas outside of its former range.

Inventoried Roadless Area- (West of the 100th meridian). An area which meets the statutory definition of wilderness, does not contain improved roads maintained for travel by standard passenger type vehicle and meets one or more of the following criteria:

Contains 5,000 acres or more

Contains less than 5,000 acres but:

Due to physiography or vegetation, is manageable in a natural condition

Is a self-contained ecosystem such as an island

Is contiguous to existing wilderness, primitive area, Administration-endorsed wilderness or roadless area in other Federal ownership, regardless of size.

Irretrievable- Applies to losses of production, harvest or commitment of renewable natural resources. For example, some of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use I changed, the timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

Irreversible- Applies primarily to the use of non-renewable resources, such as minerals or cultural resources or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options.

Issue- A point, matter or question of public discussion or interest to be addressed or decided through the planning process. *Preliminary issue* is an issue identified early in the scoping phase and is sometimes referred to as a tentative issue. *Significant issue* is an issue within the scope of the proposed action which is used to formulate alternatives in an Environmental Assessment (EA) or Environmental Impact Statement (EIS).

L

Ladder Fuels - Fuels that provide vertical continuity between the ground fuels and tree crowns, thus creating a pathway for the surface fire to move into the overstory tree crowns.

Legal Notice- A notice of a decision which can be appealed that is published in the Federal Register or in the legal notice section of a newspaper or general circulation.

Lek- An area used habitually by grouse species where the males display for the females each spring. Number of males are counted on the lek each spring to estimate general population trends.

M

Maintenance Level- Defines the level of service provided by and maintenance required for a specific road, consistent with road management objectives and maintenance criteria. (FSH 7709.58, Sec 12.3-Transportation System Maintenance Handbook).

Maintenance Level 1- Assigned to intermittent service roads during times they are closed to vehicular traffic. The closure period must exceed one year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic maintenance strategies are ‘prohibit’ and ‘eliminate’. Roads receiving level 1 maintenance may be of any type, class or construction standard and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but maybe open and suitable for non-motorized uses.

Maintenance Level 2- Assigned to roads open for se by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either: 1) discourage or prohibit passenger cars or 2) accept or discourage high clearance vehicles.

Maintenance Level 3- Assigned to roads open and maintained for travel by prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either ‘encourage’ or ‘accept’. ‘Discourage’ or ‘prohibit’ strategies maybe employed for certain class of vehicles or users.

Maintenance Level 4- Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surface. However, some roads maybe single lane. Some roads maybe paved and/or dust abated. The most appropriate traffic management strategy is ‘encourage’. However, ‘prohibit’ strategy may be apply to specific classes of vehicles or users at certain times.

Maintenance Level 5- Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double lane, paved facilities. Some maybe aggregate surfaced and dust abated. The most appropriate traffic management strategy is 'encourage'.

Mitigation Measures- Modifications of actions taken to:

Avoid impacts by not taking a certain action or parts of an action,

Minimize impacts by limiting the degree or magnitude of the action and its implementation;

Rectify impacts by repairing, rehabilitating or restoring the affected environment;

Reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or,

Compensate for impacts by replacing or providing substitute resources or environments.

Mixed Use – Roads on which both highway legal and non-highway legal vehicles are operating.

Monitoring- A process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

Motor vehicle - Any vehicle which is self-propelled, other than: (1) a vehicle operated on rails; and (2) any wheelchair or mobility device, including one that is batter-powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area.

Motor vehicle use map (MVUM)- A map reflecting designated roads, trails, and areas on an administrative unit or a Ranger District of the National Forest System.

Motorized Mixed Use- Designation of a national Forest System (NFS) road for use by both highway-legal and non-highway legal motor vehicles (FSM Engineering 7700-30).

Motorized Trail-A route over 50 inches in width or a route over 50 inches wide that is identified and managed as a trail.

N

National Environmental Policy Act (NEPA)- An Act passed in 1969 to declare a national policy that encourages productive and enjoyable harmony between humankind and the environment, promotes efforts that prevent or eliminate damage to the environment and biosphere, stimulates the health and welfare of humanity, enriches the understanding of the ecological systems and natural resources important to the nation, establishes a Council on Environmental Quality.

National Forest Management Act- A law passed in 1976as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring preparation of Forest Plans and the preparation of regulations to guide that development.

National Forest System- All National Forest land reserved or withdrawn from the public domain of the U.S.; all National Forest lands acquired through purchase, exchange, donation or other means; the national Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act; and all other lands. Waters, interests therein that are administered by the Forest Service or are designated for administration though the Forest Service as part of the system (36 CFR 212.1).

National Forest System Road- A forest road other than a road which has been authorized by a legally documented right-of-way held by State, county or other local public road authority.

National Historic Preservation Act- Legislation intended to preserve historical and archaeological sites in the United States of America. Signed into law October 15, 1966.

National Survey on Recreation and the Environment (NSRE) - Part of the National Recreation Survey (NRS) program that was started in 1960

National Forest Visitor Use Monitoring (NUVM) - A permanent, ongoing sampling system which measures national forest visitor demographics, experiences, preferences and impressions. A stratified random sample is done for 25% of the national Forest system each year according to a national research protocol. NVUM responds to the need to better understand the use and importance, satisfaction with, national forest recreation opportunities.

National Register of Historic Places- A register of districts, sites, buildings, structures and objects significant in American history, architecture, archaeology and culture. The register was established by the National Historic Preservation Act of 1966 and is maintained by the Secretary of the Interior.

Native Species- With respect to a particular ecosystem, a species that other than as a result of introduction, historically occurred or currently occurs in that ecosystem (Executive Order 13122, 2/3/99).

Non-Motorized Travel- Modes of travel include hiking, equestrian and mountain bikes and exclude all motorized use.

Noxious Weeds (Invasive species)- Non-native plants listed by the State that generally have either economic or ecosystem impacts, or are poisonous to wildlife and/or livestock. They aggressively invade disturbed areas such as fires, road slides, landslides and construction areas.

O

Off-highway vehicle (OHV) - Any motor vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain.

Off-road Vehicle (ORV) - Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, snow, ice or other natural terrain.

Operation Permit - Sticker placed on an OHV that allows access to public lands in designated areas in the State of Oregon.

Over-snow vehicle - A motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow.

P

Perennial - A plant species having a life span of more than two years.

Percentile Weather- The weather conditions that can be expected of X% of days during the fire season. The standard percents are Low (0%-15%), Moderate (16%-89%), High (90%- 96%) and Extreme (97% +). So low percentile weather is the average suite of weather conditions that would occur less than 15% of the time.

Play Area – limited area allowing for cross-country travel.

Prescribed Fire - Fire which is planned and used as a tool to meet specific management objectives.

Problem Fire- problem fires are wildfires that, because of extreme fire behavior, present a high risk to human safety and loss of forest resources

Project Design Criteria (PDC)- A set of required, implementation design criteria applied to projects to ensure that the project is done according to environmental standards ad adverse effects are within the scope of those predicted in this environmental impact statement.

Proposed Species- Any plant or animal species that is proposed by the Fish and Wildlife Service or NOAA Fisheries in the *Federal Register* notice to be listed as threatened or endangered.

R

Ranger District- An administrative subdivision of a national forest, supervised by a district ranger who reports to the forest supervisor.

Reserved Rights- Rights tribes kept, or reserved during the treaty-making out of a greater number of rights they already owned.

Resolved Issue- Significant issues identified by the public that have been fully mitigated during the development of alternatives or project design criteria.

Restoration- Ecological restoration is the process of assisting the recovery and management of ecological integrity. Ecological integrity includes a critical range of variability in biodiversity ecological processes and structures, regional and historical context and sustainable cultural practices.

Revegetation- The re-establishment of plants on a site. The term does not imply native or nonnative; does not imply that the site can ever support any other types of plants or species and is not at all concerned with how the site 'functions' as an ecosystem.

Rill - A narrow and shallow incision into soil resulting from erosion by overland flow that has been focused into a thin thread by soil surface roughness.

Right-of-Way- An accurately located strip of land with defined width, beginning of point and point of ending. It is the area within which the user has the authority to conduct operations approved or granted by the landowner in an authorizing document, such as a permit, easement, lease, license or Memorandum of Understanding (MOU).

Riparian Area- A geographic area containing an aquatic ecosystem and adjacent upland areas that directly affect it.

Road - A motor vehicle route over 50 inches wide, unless identified and managed as a trail.

Road Maintenance- Maintaining or keeping an existing constructed road in an acceptable condition so as to continue to provide acceptable service and achieve its expected life (FSM 7712.3).

Road Maintenance Objective- defines the intended purpose of an individual road based on management area direction and access management objectives, Road management objectives contain design criteria, operations criteria and maintenance criteria (FSH 7709.55 Sec 33- Transportation Planning Handbook).

Road-to-Trail Conversion – Previous road, modified and managed as a trail; this includes width controlling devices and installation of roughness and obstacles to increase technical challenge and provide a trail experience.

Rock Crawler – Class II ATV (jeeps, other 4-wheel drive vehicles) specifically designed to climb over rocks and boulders.

S

Saddle Time- Total time spend riding by an OHV recreationist- usually in one day.

Scenic- Of or relating to landscape scenery; pertaining to natural or natural-appearing scenery; constituting or affording pleasant views of natural landscape attributes or positive cultural elements.

Scenic Integrity- State of naturalness, or conversely, the state of disturbance created by human activities or alteration. Integrity is stated in degrees of deviation from existing landscape character in a National Forest.

Scenic Quality- the essential attributes of landscape that when viewed by people elicit psychological and physiological benefits to individuals and society as a whole.

Scenic River- A classification within the national Wild and Scenic River System. Scenic rivers are those rivers, or sections of rivers, that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible by roads.

Seasonal Closures- A route or area closed part of the year. The season of closure is defined by the reason for the closure (e.g. winter range, snow etc.).

Sediment- Any material carried in suspension by water that would ultimately settle to the bottom. Sediment has two main sources: from the channel area itself and from disturbed sites.

Sensitive Species- Species identified by the Regional Forester for which population variability is a concern, as evidenced by significant current or predicted downward trend in population numbers or density; or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Seral Stages- Seral stages describe the phase of development of a plant community. Early seral species are those species you would expect to find on a site soon after a major disturbance, like fire. These are species such as pines, Douglas-fir, snowbrush, fireweed etc. They are generally shade intolerant species. Late seral are the species under a fully developed vegetative canopy, such as true firs, prince's pine, lichens etc.

Shared use- Shared use roads are those roads on which both highway legal and non-highway legal vehicles are operating and have been specifically identified and designated in the Ochoco Summit OHV trail system.

Silviculture- The theory and practice of directing forest establishment, composition and growth for the production of forest resources to meet specific management objectives.

Site- A specific location where management activity is considered, planned or operating.

Site preparation- The removing or rearranging of vegetation or woody debris to meet specific management objectives. Most often it is used to describe the process(s) used to expose mineral soil areas suitable for planting or seeding desirable species of plants.

State Historic Preservation Office- Established in 1967 to manage and administer programs for the protection of the state's historic and cultural resources.

T

Trail - A route of specified width that is identified and managed as a trail.

Trail Definitions by Width –

Single track motorcycle trail- width of 6-24 inches

ATV Trail – width of 50 inches or less

Jeep Trail – width of 80 inches or less

Trail Difficulty Level- The degree of challenge a trail presents to an average user's physical ability and skill, based on trail condition and route location factors such as alignment, steepness of grades, gain and elevation, and amount and kind of natural barriers that must be crossed, and which may temporarily change due to weather.

Easiest: A trail requiring limited physical ability and skill to travel.

More Difficult: A trail requiring some physical ability and skill to travel.

Most Difficult: A trail requiring a high degree of physical ability and skill to travel.

Travel Management Rule of 11/2/2005 (36 CFR parts 212, 251, 261 and 295)- Regulations that directs each national forest in the country to designate roads, trails and areas that would be open to motor vehicle use by vehicle class. The result of this process would be a standardized map which designates roads and trails that are open to motorized use. After a map is produced all other areas are closed to motorized use. The map would be updated annually.

Tribe- term used to designate a federally-recognized group of American Indians and their governing body. Tribes may be comprised of one or more Band.

Tribal and Treaty Rights- Native American treaty or other rights or interests recognized by treaties, statutes, laws, executive orders, or other government action, or federal court decisions.

Treaty- A contract or compact between nations. It is an agreement that is binding upon nations that sign the treaty.

U

Unauthorized Road or Trail- A road or trail that is not a Forest System road or trail or a temporary road or trail and that is not included in a Forest Transportation Atlas (36 CFR 212.1). The term 'unclassified' was used in some of the earlier project file documentation that predated the Travel Management Rule.

Undesignated Road or Trail- Roads and trails that have not yet gone through site-specific travel planning to determine if they should be open, closed or restricted to motorized vehicle use, or roads and trails that have gone through travel planning and determined that motorized vehicle use is not appropriate and is not allowed.

U.S. Fish and Wildlife Service (USFWS)- The federal agency that is the listing authority for species other than marine mammals and anadromous fish under the ESA.

U.S. Forest Service (USDA FS or USFS)- The federal agency responsible for management of the nation's National Forest lands.

Underburn- Using prescribed fire under the canopy of an existing stand of trees.

V

Viability- Ability of a wildlife or plant population to maintain sufficient size to persist over time in spite of normal fluctuations in numbers**,** usually expressed as a probability of maintaining a specific population for a specified period.

Viable Population- A wildlife or plant population that contains an adequate number of reproductive individuals appropriately distributed on a planning area to ensure long-term existence of the species.

Viewshed- Total visible area from a single observer position, or total visible area from multiple observer positions. Viewsheds are accumulated seen-areas from highways, trails, campgrounds, towns, cities or other viewer locations. Examples are: corridor, feature or basin Viewsheds.

Visual Quality Objective- A desired level of excellence based on physical and sociological characteristics of an area. Refers to the degree of acceptable alteration of the characteristic landscape.

W

Watershed- A land area that contributes all its water to one drainage system, basin, stream or river. Watersheds can be described at multiple levels.

Wetland- An area that is regularly saturated by surface or ground water and subsequently is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. Examples include: swamps, bogs, fens, marshes and estuaries.

Wild and Scenic River System- The Wild and Scenic Rivers Act of 1968 established a system of selected rivers in the United States, which possess outstanding remarkable values, to be preserved in a free-flowing condition. Within the national system of rivers, three classifications define the general character of designated rivers: Wild, Scenic and Recreational. Classifications reflect levels of development and natural conditions along a stretch of river. Classifications are used to help develop management goals for the river.

Wilderness- Areas designated by Congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation; including at least 5,000 acres, or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecological and geologic interest.

Wildland Fire- Any non-structure fire that occurs in the wildland. There are three types of wildland fire: wildfire, wildland fire use and prescribed fire.

Wildfire- An unplanned, unwanted wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland ire where the objective is to put the fire out.

Winter Range- A range, usually at lower elevation, used by migratory deer and elk during the winter months; usually better defined and smaller than summer range.

Woody Debris- Dead pieces of woody vegetation such as stems, limbs or leaves which are on a site.

X

Xeric- A soil moisture regime in which soil is dry for 45 or more consecutive days in the 4 months following the summer solstice, and moist for 45 or more consecutive days in the 4 months following the winter solstice.

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APPENDIX A – RESPONSE TO COMMENTS

The Ochoco National Forest received 235 individual comment letters and emails. Table 138 lists the commenters on the draft EIS, and where relevant identifies the organization that the commenter represents. Each comment communication was assigned a unique number (see the first column in Table 138).

Each comment within each communication was given a unique number. Many comments were non-substantive and expressed support for one alternative or another. Although all comments were read and considered by the project ID team and the responsible official, only the substantive comments were responded to in this appendix. Many substantive comments are included verbatim along with responses. However, due to the unusually large number of comments submitted during the comment period and when a large number of comments expressed the same or similar concerns, the comments were summarized or comment numbers were listed after one representative comment. In all cases, the unique comment numbers are provided and the project file may be referenced for original comment letters.

Table 138. List of commenters on the draft Environmental Impact Statement for the Ochoco Summit Trail System project.

#	Name	Organization	City	St	Date	# of pages
1	Dale Conlee		Prineville	OR	2/6/2013	1
2	Jean Public			NJ	2/8/2013	1
3	Stan Rodgers			OR	2/8/2013	1
4	Arthur M. Waugh	Wolfpack 4x4s, Pacific Northwest 4 Wheel Drive Association	Lebanon	OR	2/13/2013	1
5	Don Bedient				2/14/2013	1
6	Lori Starr-Desjardins			OR	2/26/2013	1
7	Jim Putman	Pacific Northwest 4 Wheel Drive Association			2/27/2013	1
8	Arlene Brooks	Outdoor Recreationists	Auburn	WA	3/1/2013	1
9	Matt Reddig		Battle Ground	WA	3/4/2013	1
10	Donald C. Wood		Prineville	OR	3/5/2013	1
11	Craig Woodward	Woodward Companies	Prineville	OR	3/6/2013	2
12	Scott Dickinson		Prineville	OR	3/13/2013	1
13	Virginia Dickinson		Prineville	OR	3/13/2013	1
14	Maxwell Fahlgren		Prineville	OR	3/13/2013	1
15	Daniel Haak		Burns	OR	3/13/2013	1
16	Stephen Henderson		Prineville	OR	3/13/2013	1
17	Bob Lever	Ochoco Trail Riders	Bend	OR	3/13/2013	1
18	Jason Miller		Powell Butte	OR	3/13/2013	1
19	Tom Niemela	Oregon Motorcycle Riders Assn.	Hillsboro	OR	3/13/2013	1
20	Shawn Smith				3/13/2013	1
21	Larry East, Jr.	Four Runners of Klamath Falls; PNW4WDA Region 6	Klamath Falls	OR	3/14/2013	1
22	John Gary and Mary S. Isaacson, Jean Edwards		Prineville	OR	3/15/2013	1
23	Alan Paulson		Roseburg	OR	3/15/2013	1
24	Mark A. Bunn, Jr.				3/16/2013	1
25	Paul Norman	Strawberry Hill 4 Wheelers	Philomath	OR	3/16/2013	1
26	Bill Sargent	Umpqua Valley Timber Cruisers			3/16/2013	1

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#	Name	Organization	City	St	Date	# of pages
27	Doug Abelin Don Gordon Ken Salo George Wirt	Capital Trail Vehicle Association	Helena	MT	3/17/2013	36
28	Clarence Anderson		Portland	OR	3/17/2013	1
29	Jodi Knutson		Aumsville	OR	3/17/2013	1
30	Kim McCarrel	Central Oregon Chapter, Oregon Equestrian Trails			3/17/2013	2
31	Rod				3/17/2013	1
32	Todd Wilson				3/17/2013	1
33	John Younger				3/17/2013	1
34	Curtis Cramer	Umpqua Valley Timber Cruisers			3/18/2013	1
35	Mona Drake	Pacific Northwest 4 Wheel Drive Deschutes County Wheel Drive South Eastern Oregon Resource Advisory Committee	Bend	OR	3/18/2013	4
36	Mehdi Salari		Bend	OR	3/18/2013	1
37	Diane Cross		Prineville	OR	3/19/2013	2
38	Ron & Sally Jackson				3/19/2013	1
39	Andy Pleune				3/19/2013	1
40	Slim Stout		Bend	OR	3/19/2013	2
41	Mike Gerdes Amy Stuart Geoff Gerdes			OR	3/20/2013	5
42	Rick Hall	Ponderosa Ranch Association	Prineville	OR	3/20/2013	2
43	Ryan Reusser	Bri & Bub Off-Road			3/20/2013	2
44	Peter Dorsett					1
45	Doug Heiken	Oregon Wild	Eugene	OR	3/21/2013	2
46	Gayle Hunt	Wild Horse Coalition			3/21/2013	3
47	Carol Jensen		Longview	WA	3/21/2013	1
48	Maureen Jondahl		Ridgefield	WA	3/21/2013	1
49	Ryan Jones		Amity	OR	3/21/2013	1
50	Peter C. Mayer		Bend	OR	3/21/2013	5
51	Spencer Miles				3/21/2013	1
52	Roger Norris					1
53	Kathleen Reynolds		Camp Sherman	OR	3/21/2013	1
54	Ed Sink		Bend	OR	3/21/2013	1
55	Michael W. Templeton		Prineville	OR	3/21/2013	3
56	John R. Anderson		Bend	OR	3/22/2013	1
57	Al Avey				3/22/2013	1
58	Connie Baker		Prineville	OR	3/22/2013	2
59	Lucinda Baker				3/22/2013	1
60	Bill Bodden				3/22/2013	1
61	John M. Brinkley		Eugene	OR	3/22/2013	1
62	Diana		Bend	OR	3/22/2013	1
63	Randall Drake	Pacific Northwest 4 Wheel Drive Association	Bend	OR	3/22/2013	9
64	Michael Ellis				3/22/2013	1
65	Alice and Cal Elshoff		Bend	OR	3/22/2013	1
66	Earl Freimuth		Vancouver	WA	3/22/2013	1
67	Ronda Fullenwider		Bend	OR	3/22/2013	1

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#	Name	Organization	City	St	Date	# of pages
68	Jean Harkin				3/22/2013	1
69	Jerry Jackson					3
70	Kirk Jacobsen		Sisters	OR	3/22/2013	1
71	Cathy Jones	Crystal Springs Org. Camp		OR	3/22/2013	4
72	Thiel Larson				3/22/2013	2
73	Joe McCormic				3/22/2013	1
74	Irene Olivieri		Bend	OR	3/22/2013	1
75	Larry & Irene Rinne		La Pine		3/22/2013	1
76	Irene Schoppy		Corvallis	OR	3/22/2013	1
77	Marcia Shapiro				3/22/2013	1
78	David Stowe	The Ardell Group	Bend	OR	3/22/2013	1
79	Amy Stuart	Oregon Dept. Fish and Wildlife	Bend	OR	3/22/2013	15
80	James Valentine	Ochoco Snow Sports	Prineville	OR	3/22/2013	1
81	H. Tom Davis, PE		Sisters	OR	3/23/2013	2
82	Paul Dewey	Attorney at Law	Bend	OR	3/23/2013	1
83	Bob Flint		Redmond	OR	3/23/2013	2
84	Jeffry Gottfried, Ph.D.		Portland	OR	3/23/2013	1
85	Ron Grace		Redmond	OR	3/23/2013	1
86	Catherine and Daniel Gumtow- Farrior		Prineville	OR	3/23/2013	2
87	Debra Higbee-Sudyka		Corvallis		3/23/2013	2
88	Roy Lambert				3/23/2013	1
89	Robert E. McFarland		Aurora	OR	3/23/2013	1
90	Steve Miller		Prineville	OR	3/23/2013	1
91	Norm Park				3/23/2013	2
92	Scott Staats Wayne Elmore Chuck Gates Jason Schweitzer Jerry & Rosie Honl Terry and Judy Neill Jason Schweitzer Michele Platz Steve Miller	Friends of McKay	Prineville	OR	3/23/2013	8
93	Cyndi Waggoner		Redmond	OR	3/23/2013	2
94	Kyle Wiebold	PNW4WDA			3/23/2013	1
95	George Wuerthner		Bend	OR	3/23/2013	1
96	Charley Engel		Bend	OR	3/24/2013	6
97	Paul Engelmeyer		Yachats	OR	3/24/2013	1
98	Allyson A. Hamilton				3/24/2013	1
99	Andrew S. Johnson	Cummins Northwest, LLC	Portland	OR	3/24/2013	2
100	Eric Kangas		Battle Ground	WA	3/24/2013	2
101	Deborah L. Krause and Edward J. Honton		Prineville	OR	3/24/2013	1
102	Keith Lund		Powell Butte	OR	3/24/2013	2
103	Lance Seaber				3/24/2013	1
104	Janice Staats				3/24/3013	2
105	Brandon Wright		Bend	OR	3/24/2013	1
106	Gary Young	Blue Mountain Ranch	Paulina	OR	3/24/2013	1
107	Jared Achepohl	Emerald Trail Riders Association				1
108	Francis Baby		Bend	OR	3/25/2013	1
109	Marsha Chinn				3/25/2013	1
110	Bill Crager				3/25/2013	1

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#	Name	Organization	City	St	Date	# of pages
111	Diane M. Cross		Prineville	OR	3/25/2013	1
112	Paul Cuddy				3/25/2013	1
113	Meriel Darzen and Gretchen Valido	Sierra Club			3/25/2013	4
114	Marion Davidson		Bend	OR	3/25/2013	1
115	Gay Demmer		Terrebonne	OR	3/25/2013	1
116	Carl and Marlee Dutli		Prineville	OR	3/25/2013	1
117	Jack Ely		Terrebonne	OR	3/25/2013	1
118	Charley Engel		Bend	OR	3/24/2013	15
119	Chuck Forslund		Prineville	OR	3/25/2013	1
120	Chuck Gates				3/25/2013	3
121	Krista Gerdes				3/25/2013	2
122	Ann Hanus		Salem	OR	3/25/2013	1
123	Kenna Hoyser	East Cascade Chapter - Back Country Horsemen of Oregon	Powell Butte	OR	3/25/2013	4
124	Debra Joy				3/25/2013	1
125	Carol Kirch				3/25/2013	1
126	Kay Limbaugh		Terrebonne	OR	3/25/2013	1
127	Kellly Lyster		Bend	OR	3/25/2013	2
128	Carol McReynolds		Crooked River Ranch	OR	3/25/2013	1
129	Mike Morris		Bend	OR	3/25/2013	17
130	Linda Nolte				3/25/2013	1
131	Allison O'Brien	Dept. of the Interior; Office of Environmental Policy and Compliance	Portland	OR	3/25/2013	1
132	Mike Ogle		Bend	OR	3/25/2013	1
133	Lynn Putnam		Bend	OR	3/25/2013	3
134	Christine B. Reichgott	Environmental Review and Sediment Management Unit, EPA Region 10	Seattle	WA		3
135	Jason D. Schweitzer				3/25/2013	1
136	Mia Sheppard	Theodore Roosevelt Conservation Partnership	Brightwood	OR	3/25/2013	3
137	Shaun Slowik	Trask Mountain Ridge Runners	Amity	OR	3/25/2013	2
138	Steve Sprague				3/25/2013	1
139	Darek Staab	Trout Unlimited	Bend	OR	3/25/2013	3
140	Stuart A. Steinberg		Terrebonne	OR	3/25/2013	1
141	Ron and Karen Tamminga		Bend	OR	3/25/2013	3
142	Larry Ulrich				3/25/2013	3
143	David D. Wiley		Sublimity	OR	3/25/2013	3
144	Krista Gerdes				3/26/2013	2
145	Ramona Steinberg				3/26/2013	1
146	Dan Fouts		Prineville	OR	3/30/2013	2
147	Michael Whitney Dale Conlee	Bend Chapter OHA Prineville Chapter OHA	Bend Prineville	OR OR	3/2013	3
148	Amos Madison				4/1/2013	2
149	Dana Engel					1
150	Merrianne Metzger					1
151	Anonymous				4/5/2013	1
152	Dawn				4/5/2013	1
153	Karl Findling	Oregon Pack Works LLC			4/5/2013	1
154	Robb Hayden	Northwest Benefits Group	Bend	OR	4/5/2013	1
155	William Herrick		Bend	OR	4/5/2013	2
156	Donald H. James				4/5/2013	2

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#	Name	Organization	City	St	Date	# of pages
157	Kristi Jett				4/5/2013	1
158	Bob Lever		Bend	OR	4/5/2013	1
159	Mike McBride		Terrebonne	OR	4/5/2013	1
160	Roberta McBride		Terrebonne	OR	4/5/2013	1
161	Duane Ralston		Prineville	OR	4/5/2013	1
162	Chris Scranton		Madras	OR	4/5/2013	1
163	Broc and Judy Stenman		Bend	OR	4/5/2013	1
164	Ron and Karen Tamminga		Bend	OR	4/5/2013	1
165	Glenn Wrede		Bend	OR	4/5/2013	1
166	Frances Allen				4/6/2013	1
167	Annie				4/6/2013	1
168	Martha Bibb				4/6/2013	1
169	Paul Borcherding				4/6/2013	1
170	Donna M. Harris				4/6/2013	1
171	George J. Krause	Juniper Group – Oregon Sierra Club			4/6/2013	1
172	Darlene Davenport				4/7/2013	1
173	Mary E. Fay		Bend	OR	4/7/2013	2
174	Madeleine Landis				4/7/2013	1
175	Terry and Cathy Luther				4/7/2013	1
176	Troy Waite				4/7/2013	2
177	Dwane K. Williams				4/7/2013	2
178	Mike Wolff				4/7/2013	1
179	George Wuerthner		Bend	OR	4/7/2013	2
180	Jill Wyatt				4/7/2013	1
181	Mark Amberson	Awbrey Glen Golf Club			4/8/2013	1
182	Anonymous		Bend	OR	4/8/2013	2
183	Marie Christoffersen				4/8/2013	1
184	Mike Goodman		Springville	UT	4/8/2013	1
185	Nelson Heckman		Canyon City	OR	4/8/2013	1
186	Beth Hoover		Bend	OR	4/8/2013	2
187	Sarah E. Hoover		Bend	OR	4/8/2013	1
188	Tyler Risenmay		Estacada	OR	4/8/2013	1
189	Jess Risenmay		Bend	OR	4/8/2013	1
190	Bill Rhoads		Madras	OR	4/8/2013	1
191	Roger Stanley				4/8/2013	1
192	Norris Thomlinson		Pahoa	HI	4/8/2013	5
193	Tom Brakefield		Bend	OR	4/9/2013	2
194	Jim Fisher		Sisters	OR	4/9/2013	2
195	Larry Friesen				4/9/2013	1
196	Wade B. McDonald	Redmond Chapter – OHA	Redmond	OR	4/9/2013	1
197	Michele Penner				4/9/2013	1
198	Henry Burwell		Bend	OR	4/10/2013	2
199	Rick Dethman				4/10/2013	1
200	Charles Hoyt		Prineville	OR	4/10/2013	1
201	Joe Kvortek				4/10/2013	1
202	Tony Lewis				4/10/2013	1
203	Robert J. Riecke	The Pape Group	Eugene	OR	4/10/2013	2
204	Annie				4/11/2013	1
205	Rod Carlile		Springfield	OR	4/11/2013	1
206	Jane Jenkens				4/11/2013	1
207	Kim Kambak		Prineville	OR	4/11/2013	1
208	Jay Kemble		Salem	OR	4/11/2013	1
209	Lewis Tulare		Bend	OR	4/11/2013	2
210	Ann M. Winstead				4/11/2013	4

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#	Name	Organization	City	St	Date	# of pages
211	Tim VanDomelen		Powell Butte	OR	4/11/2013	1
212	Bill Phillips				4/12/2013	1
213	Don Bedient				4/13/2013	1
214	John Coffey		Salem	OR	4/13/2013	1
215	Sarah Mowry		Bend	OR	4/13/2013	1
216	Rod Adams				4/14/2013	1
217	Tony M. Lewis				4/14/2013	1
218	Lyle E. Rilling		Prineville	OR	4/14/2013	2
219	Gordon Tolton				4/14/2013	1
220	Lewis Tulare				4/14/2013	1
221	David A. Vick		Terrebonne	OR	4/14/2013	2
222	Phil and Janet White		Bend	OR	4/14/2013	1
223	Neil Wrede		Bend	OR	4/14/2013	1
224	Kirk and Paige Winebarger	Gutierrez Cattle Company			4/14/2013	2
225	Tom Crabtree		Bend	OR	4/15/2013	1
226	Diane Cross		Prineville	OR	4/15/2013	1
227	Paul Cuddy				4/15/2013	1
228	Lydia Garvey		Clinton	OK	4/15/2013	1
229	Joel Geier		Corvallis	OR	4/15/2013	3
230	Deborah L. Krause and E.J. Honton		Prineville	OR	4/15/2013	3
231	Ted Lyster				4/15/2013	1
232	Sarah Peters	Wildlands CPR	Eugene	OR	4/15/2013	9
233	Bob Rock		Baker City	OR	4/15/2013	5
234	Karen Coulter	Blue Mountains Biodiversity Project	Fossil	OR	4/15/2013	96
235	Dave Jordan		Madras	OR	4/5/2013	1

NEPA, Purpose and Need, Range of Alternatives, Forest Plan Consistency

Scoping; Public Outreach

Comment: 325 million people own this site. all americans pay into mgt at this site. it is not just locals who need to be considered nor is i just other govt agencies that should be decidiing on what is done with ochoco. It is every citizen in teh usa. you have made a half hearted, lax attempt to involve the peopler of this county to comment on your plans. calling in fellow govt employees is not responding to the citizens of the usa. it does not qualify. *Comment 2-1*

> **Response:** Pursuant to the Code of Federal Regulations, availability of the draft EIS was announced nationally via a Notice of Availability published in the Federal Register. In addition, the Ochoco National Forest announced the availability of the draft EIS for public review by sending letters and/or emails to a mailing list of almost 400 people. Documents were mailed to people who requested them, and the draft EIS was also available electronically on the Ochoco's website. About 235 individual comment letters and emails were received in response to the draft EIS. Therefore, the Forest does not agree that it made a lax attempt to involve the people of the United States of America.

Comment: The most recent information I've received regarding the proposed OHV trail did not include an alternative #1. Was that option eliminated prior to going public? What were the points of that option? *Comment 11-1*

Response: Alternative 1 (the no action alternative) has been analyzed; documentation is included in the draft and final EIS.

Comment: It has been brought to my attention that a motorcycle/four wheeler trail system has been suggested in the Ochocos. How can this be considered without the feedback from the folks who live up there and ride horseback up there through the whole spring/summer season. Motorcycles/four wheelers and horses are an uncompatible combination for any trail system. The trails in the Ochocos have always been available to the riders who live in the area. Please consider this before any decision is made and also please make sure all of us that live and/or ride in this area are given consideration. *Comment 98-1*

Response: The DEIS (pages 7-8) describes the public involvement that took place prior to developing a proposed action. On pages 8-11, the DEIS describes how public input during the scoping phase of the project led to the development of issues and alternatives. The FEIS (Chapter 1) describes additional public involvement, including public meetings and the comment period on the DEIS, that took place before the FEIS was completed and prior to drafting the Record of Decision for the project.

Purpose & Need

Comments: The selection of Alternative 3 does not meet the need or purpose of this project: It fails to provide any trail mileage or opportunity for Class II (4x4), or Class IV (side by side) OHV's. They will be limited to existing open roads, which do not provide the experience you list in the document that the users have told you are required for a meaningful experience. *Comment 4-1; also reflects comments 4-2, 4-3*

Response: It is important to note that no selection of an alternative has been made; the Responsible Official will not decide upon an alternative without thoroughly reviewing the final EIS and project file. However, we recognize that the preferred alternative (Alternative 3) limits Class II vehicles to the established open road system only and would not construct or designate new trail for Class II vehicles. At the time of selection of the preferred alternative, the Responsible Official felt that Alternative 3 best represented the trade-offs inherent in providing a motorized trail system and meeting the needs of other resources and other types of recreationists on the Ochoco National Forest.

Comment: The majority of this document should have changed that and created a true OHV trail system including miles of trail for Class II. Instead this document down talks OHV users to lower than a snake belly by ever writer pounding a nail in our coffin. This is wrong! Ever contributing writer should have spent equal positive time writing in support of OHVs. If nothing could have been added positive towards this OHV trail system then their words should not have been included. The Responsible Official should have made sure this document for an OHV trail system was written favoring the subject of the trail system which hopefully will be OHV trails. Is this not the subject of this document to enlighten the public positively concerning OHVs? *Comment 63-31*

Response: The intent of the Ochoco Summit Trail System project is not to "enlighten the public positively concerning OHVs," but rather to objectively analyze the effects of alternative actions that would meet the project's purpose and need, as described in the draft EIS (pages 2-3).

Comments: Given the potential negative impacts to fish and wildlife and to recreation uses associated with those resources and the lack of a genuine need where there are already so many OHV recreation opportunities, we don't believe the DEIS has established an adequate Purpose and Need or an adequate environmental analysis. *Comment 82-4; also reflected by comments 112-4, 129-1c, 129-2, 129-5, 129-6, 143-4, 186-2, 194-3, 229-3, 232-2, 234-161*

Response: The discussion of the project background and Purpose and Need has been modified for clarity in Chapter 2 of the final EIS. The purpose for proposing to develop a designated trail system for motorized recreation is based on the reduction in opportunity for OHV recreation following implementation of the 2011 Travel Management decision on the Deschutes and Ochoco National Forests.

Comment: The Department thinks the DEIS first project purpose (DEIS iii) and ORV objective (DEIS vii) are high bars to achieve and we do not think any of the action alternatives achieve either of these measures. Our rationale is based on DEIS analysis showing action alternatives will increase impacts on hydrology, motorized routes will increase, motorized intensity and frequency will increase, and OHV noise will increase. *Comment 79-11*

Response: The Purpose and Need and Forest Plan objectives are not, in and of themselves, measures; rather, they are goals that drive the creation of proposed actions. All action alternatives in the Ochoco Summit project are intended to address the Purpose and Need; due to tradeoffs based on issues and public comment, each alternative meets the Purpose and Need to a different degree.

Range of Alternatives

Comment: I understand as the Supervisor you chose Alternative #3. #3 has less total miles and no loops. Loop trails are a foundation of any off-road riding opportunity. #3 also has the system cut in half with the motorcycle section on the extreme East side. #3 also eliminates Class II. Why is that? *Comment 19-2*

Response: No alternative had been selected at the time that the draft EIS was made available for public comment. However, the Responsible Official makes a decision based upon consideration of a number of factors, as described on DEIS page 6.

Comments: Because of the significant number of motorized visits to the forest and significant issues associated with motorized closures (both points are documented in our comments and the comments of other motorized recreationists), the preferred alternative must not reduce motorized opportunities. Moreover, in order to address the issues and needs of the public, a reasonable preferred alternative would provide for an increase in motorized opportunities. *Comment 27-14; also reflects comments 27-83, 27-89*

Response: Each action alternative, including the preferred alternative identified in the draft EIS, increases the opportunity for motorized recreation beyond the current condition. That is, each action alternative would create a motorized trail system intended for use by motorized recreationists.

Comment: The scope of the project must address both existing routes and new construction. This is necessary and reasonable because a certain percentage of the existing routes are likely to be closed. Putting a sideboard on the project scope that prevents the evaluation and creation of any new trail segments also eliminates the opportunity to mitigate the overall level of motorized closures. This approach, if pursued, would preclude the evaluation of a reasonable alternative and also preclude any opportunity for mitigation and enhancement. Therefore, limiting scoping of the project to existing routes only would produce a significant built-in disadvantage for motorized recreationists, i.e., the overall number of motorized routes are destined to be reduced and nothing can be considered to enhance existing routes and to mitigate the overall loss to motorized recreationists. We are concerned that the process will not provide motorized recreationists with an equal opportunity (50/50 sharing of motorized to non-motorized trails) in the outcome and we are only destined to lose. We would appreciate an independent evaluation of this situation as soon as possible so that the proper scoping direction can be corrected early in the process. *Comment 27-76*

Response: Only Alternative 1 (the no action alternative) limits OHV use to existing, designated routes. All three action alternatives represent a combination of existing designated routes, trail construction on existing disturbance (for instance, closed roads), and new trail construction. There is no "sideboard on the project scope" that prevents the evaluation and creation of new trail segments.

Comment: In reviewing the draft it was noted that Alternative 2 was the proposed action and later in the document labeled as the preferred alternative. I do not see it explained why the Responsible Official has chosen Alternative 3. It might be worthwhile hearing what the reasoning behind that choice might be. *Comment 37-2*

Response: There are three references to the "preferred alternative" in the Draft EIS; each describes Alternative 3 as being the alternative selected by the Responsible Official as preferred. The Responsible Official is required to select and disclose a preferred alternative prior to public review of the draft EIS, and does so based on a review of the draft EIS, the effects analysis, and how well each alternative meets the purpose and need.

Comment: No alternative was analyzed in detail that would designate a motorized trail system that had a smaller geographic footprint, or that added less than 87 miles of motorized route to the system and envisioned a trail system of less than 100 miles. No alternative was considered that decommissioned more than a small number of system roads, even though many of these roads are likely causing environmental harm and would be found to be unnecessary, if they were subjected to a full analysis. *Comment 232-5; also reflects comment 232-6*

Response: The Ochoco Summit planning team did not have a minimum or maximum number of miles as an objective when designing the proposed action and the alternatives; rather, the objective was to provide a well-designed trail that would meet the needs of motorized recreationists while minimizing impacts to resources in the project area. It should be noted that with development of the final EIS, the planning team recommended designating “implementation areas” within which OHV grant money could be used to rehabilitate any user-created road or other resource damage attributed to motorized use.

Comment: There’s an inadequate range of action alternatives for this project as all of them apparently would violate the Forest Plan, the Travel Management Plan, and the Deep Creek Restoration Plan, and all would fail to reduce already excessive road density, adequately avoid impacts in RHCAs, avoid stream crossings and sediment delivery to streams, and impacts to wet meadows, seeps, springs, and hydrologic flows. *Comment 234-33(1);*

Response: All action alternatives are consistent with the Travel Management Plan and with the Ochoco Forest Plan (site-specific and non-significant Forest Plan amendments would be needed for implementation of short trail segments in 3 or 4 locations, depending on the alternative). The project design criteria described on DEIS pages 24 – 32 are intended to reduce or eliminate impacts to a variety of resources, including those mentioned by the commenter. In addition, Alternative 3 modified drops or relocates all segments of trail identified in DEIS Table 83 as hydrologic concerns.

Suggesting a New Alternative or Combination of Alternatives

Comment: Based on these comments, I would urge that the Class II and Class IV trail system (48 miles total, 20 miles trail) from Alternative 2 be included in the selected alternative, so that all classes of OHV users will have a trail experience to enjoy. The bare minimum would be the Class II and Class IV system from Alternative 4 be added to the selected alternative. *Comment 4-6*

Response: Alternative 3 modified (see Appendix B in this FEIS) was developed, in part, to address these concerns and suggestions.

Comment: I would recommend the cross over between Both East and west ends above big Summit Prairie. *Comment 14-3; also reflects comments 17-2, 18-2, 184-4, 188-4, 189-4*

> **Response:** Alternative 3 modified (see Appendix B in this FEIS) was developed, in part, to address these concerns and suggestions.

Comment: All roads to be closed to full-size vehicles should be converted to atv routes. This is a reasonable alternative for all existing roads. *Comment 27-54*

> **Response:** Alternatives for a designated motorized trail system needed to be consistent with Forest Plan management areas, other Forest uses, and maintenance and protection of sensitive areas, wildlife habitat, and fisheries. Converting all closed roads to OHV routes would not be consistent with other Forest objectives; see section titled "Alternatives Considered but Eliminated from Detailed Study" in this FEIS.

Comment: In my experience, designating trails in certain areas leads to more damage. My preference would have been dispersed ATV recreation on the whole Forest and keeping the ATVs on existing roads and not concentrated at confined areas. *Comment 55-2*

> **Response:** The Record of Decision for the Deschutes and Ochoco Travel Management Project (2011) authorized motorized use on designated routes only and prohibited cross-country motorized travel (except where specifically allowed). Changing this Forest-wide decision is not within the scope of the Ochoco Summit project.

Comment: Of the four options analyzed in the DEIS we must completely object to Option 1, Option 2 - Proposed and Option 4. Those are unacceptable. We would propose an Option 5 as we will explain below, but we would support Option 3, the preferred option as identified by the Responsible Official, IF some alterations would be made that would decrease the potential for user conflict and retain a historic area of heavy usage by equestrians. Our description of these changes is outlined below.

1. We have very strong objections to the proximity to Corral Flat of the proposed ATV trail along the 2630-150 road. This proposed trail creates several loop opportunities for ATV and motorcycle riders, and is likely to get a great deal of use. Placing it only ¼ mile from the most heavily used equestrian camping area in the Ochoco forest is likely to lead to user conflicts. We prefer to have this ATV connector trail either eliminated or moved west to the vicinity of the 2630-020 road instead.

2. We are concerned that the proposed ATV trail running east and west about ¾ of a mile south of Corral Flat completes a loop that creates a racetrack around Corral Flat and Man Camp. It crosses the equestrian endurance trails in several places, leading to likely user conflicts. We would prefer to see this trail re-routed farther south, which would shift some of the ATV use farther away from the horse camping and riding areas.

3. The proposed ATV trail that runs east and west on the north side of Corral Flat appears to intersect with the 630-302 road. We are very concerned that this connection will encourage ATV users to camp in the vicinity of Man Camp, which in turn would generate a great deal of ATV activity in that area and lead to user conflicts. We suggest routing the ATV track so it runs north of the 302 road rather than intersecting with it, and/or taking other steps to prevent the Man Camp area from becoming a focal point for ATV users.

4. The proposed ATV trail runs very near the junction of Roads 2630 and 2210. The 10-mile and 30-mile equestrian endurance trails also run adjacent to this junction, as do the equestrian trails to Indian Prairie, the Old Stock Road loop, and Walton Lake. We hope that the proposed ATV trail will be physically separated from the equestrian trails in this area. *Comments 30-4 – 30-8*

Comment: I'd like to thank the rangers of the Ochoco National Forest Service for their efforts and request that Alternative 3 of the Ochoco Summit Trail System by modified by moving Off Road

Motor Vehicle us farther from the private lands that border the forest. *Comment 22-6; also reflects comments 36-1, 36-8, 38-9, 38-10, 38-11, 42-3, 55-11, 58-9, 69-6, 69-8, 69-10, 69-12, 96-1, 116-6, 122-2, 123-6, 123-8, 123-12, 127-3, 128-1, 130-1, 145-3, 146-4*

> **Response:** Alternative 3 modified (see Appendix B in this FEIS) was developed, in part, to address these concerns and suggestions.

Comment: Since you are already planning some new construction at Walton Lake Sno Park would it make sense to complete the analysis to include the possibility in the future of adding a warming hut to the staging area/Sno-Park on the West end? This may prevent the need to complete an analysis at a later date if a proposal comes in to add a warming shelter. It would be nice to not have to reinvent the wheel.

Ochoco Snow Sports has been growing rapidly and several members have been recently inquiring about the possibility of a new warming shelter being built on the West End of the Sno-Park. So we would like to have the Ochoco National Forest consider the option of a warming shelter be it for OHV's or other multiple use recreationalist to be constructed in the future in your current Environmental Impact Statement. This way, if funding and the opportunity come together to construct such a facility the planning will already have been completed and no delays would occur. *Comment 8-2*

> **Response:** Unfortunately, proposing a new warming shelter at Walton Sno-Park would be outside the scope of this proposed action, as it would not related to the purpose and need for the Ochoco Summit Trail System project. Selection and implementation of any action alternative considered in this analysis would not preclude the ability of the Ochoco National Forest to consider a new warming shelter or other changes at Walton Sno-Park in the future.

Comment: Implement at the start of the project ALL of the road closures approved in various ongoing vegetation management projects within the Project area, Deep Creek, Jackson, Spears and Howard, Elliott, Johnson. *Comment 129-46*

> **Response:** Implementing road closures approved in past decisions is not within the scope of this project. However, reinforcing closures and rehabilitating closed roads are part of every action alternative.

Comment: Please consider alternative 1--or, at the maximum, less than 60 miles of ATV/off-hwy. Vehicle trails. Most of the Ochoco N.F. is not the right place. *Comment 153-1*

> **Response:** The Ochoco Summit project area represents only a portion of the Ochoco National Forest; most of the Forest is not in the project area. The commenter did not explain why less than 60 miles of trail would be preferable; however, it should be noted that the preferred alternative includes about 88 miles of trail (50 miles of which would be new trail); the remainder of the 101 miles that are proposed to be designated as OHV trail under alternative 3 are on mixed-use road and would be available for OHV access under any alternative (see DEIS page 37).

Comments: I would prefer an alternative that address clean-up and remediation of damage from the existing ORV use, without increasing ORV traffic. *Comment 192-2; also reflects comments 234-33(2); 243-142, 234-143, 234-151*

> **Response:** An action alternative that would not designate a motorized trail system on the Ochoco National Forest (such as a "restoration only" alternative) would not meet the Purpose and Need of the project.
>
> Oregon State Parks and Recreation Grants are divided among several focus areas: planning; development; operations and maintenance; education and enforcement. When a designated OHV system is planned or established, then ATV Grant Program money can be applied for.

Repair of damage to or associated with a designated OHV trail system would be eligible for funding as part of an operations and maintenance program associated with a designated OHV trail or area. If a restoration project is not associated with a designated OHV trail or area, then it would not qualify for funding under the ATV Grant Program; therefore, a "restoration only" alternative would not qualify for funding.

Comments: A number of commenters expressed desire for an alternative to include many more miles of Class II trail. *Comments 24-2, 25-1, 35-4, 48-1, 49-2, 63-14, 63-19, 63-22, 63-23, 63-26, 66-3, 94-2, 137-2, 222-6*

Other comments expressed a desire for all existing single-track trail in the project area to be designated for Class III vehicles. *Comments 27-56, 27-73*

Response: The section titled "Alternatives Considered but Eliminated from Detailed Study" (draft EIS pages 36-37) discloses proposals that were examined during the development of alternatives but were ultimately not fully analyzed. These proposals included more extensive trail systems and more miles of trail. The Ochoco Summit Trail System project area includes a diverse array of resources and recreational opportunities; as described on DEIS page 36, many potential trail routes were not brought forward to an alternative because of conflicts with sensitive resources and/or previously established uses (including recreation).

Comment: Right now there is only 13% of the project area that is more than ½ mile from a road. That is pathetic. Whether you're a big game animal like a deer or elk, or a Forest user trying to enjoy a quiet recreational experience, there are precious little areas left on the Ochoco Forest to escape motorized vehicles, and especially OHVs. The Forest should be restoring more and larger blocks of unfragmented habitat, not less. The few areas left are primarily the postage stamp sized blocs such as Lookout Mountain and Bridge Creek Wilderness. *Comment 41-5*

Response: Restoring unfragmented habitat is outside the scope of this proposed action.

Comment: Just like you manage other users of the forest service lands, maybe you should try closing the OHV use all together in certain areas of the public grounds in question and see what the actual impact of OHV use really is. This would give you data on impacts like compaction, noxious weeds, wildlife, etc… and would also give you an idea if these OHV users could actually follow the rules and stay off of areas not designated for their use. When you have data from current rules, regulations and impact under control and enforced, then maybe you could consider adding to their areas of use. We can certainly think of a lot of other public lands in Central Oregon that are not so pristine and could be designated for OHV use. *Comment 224-10*

Response: Currently, the Ochoco National Forest is closed to OHV use except where designated open; designated open areas include mixed-use roads and very few play areas, as displayed on the MVUM. The commenter is essentially suggesting Alternative 1.

Opposed to Trail Closure

Comments: In order to be legally defensible the following two tests must be used to identify any proposed motorized route closures: 1) the proposed closure of a motorized route must be based on site specific data and documentation of actual significant impacts caused by motorized recreation, and 2) the documented impacts from motorized recreation must be substantially more significant than naturally occurring events.

Because of the significant negative cumulative impact of all motorized closures and if the two tests outline above are met, then a reasonable alternative that must be included for public input is a trade of the closed motorized route for a motorized route of equal opportunity and value in a different location. *Comment 27-15; also reflects comments 27-51, 27-60, 27-67, 63-33, 99-1*

Response: The Ochoco Summit project is not proposing to close any route currently open to motorized recreation. Conversely, the all action alternatives include the development of a designated trail system for motorized recreation.

Comment: In order to be responsive to the needs of motorized recreationists, the plan should specifically allow for amendments as required to create new trails, connect trails to create motorized loops, extend trails, make minor boundary adjustments to allow a motorized trail, etc. *Comment 27-95*

Response: Each action alternative includes Forest Plan amendments to allow designation of trail segments in Forest Plan allocations that do not currently allow trails.

Comment: The Forest Service has only addressed less motorized access and less motorized recreational opportunities. The alternatives formulation and decision-making must adequately recognize and address the fact that the majority of the public visiting the project area want more motorized access and motorized recreational opportunities.

The existing level of motorized access and recreation cannot be dismissed because it is only associated with the No Action Alternative. The existing level of motorized access and recreation is reasonable alternative and an alternative other than No Action must be built around it.

Response: The no-action alternative includes the least amount of motorized recreation, as OHV use would be limited to existing designated mixed-use roads. Each action alternative builds off the mixed-use road system, but also includes construction and designation of an OHV trail system that would increase the opportunity for motorized recreation over the existing condition.

Comments: One of the basic requirements of NEPA is to "achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities" (Public Law 91-190, Title I, Section 101 (b) (5)). The wording of NEPA was carefully chosen and was intended to produce a balance between the natural and human environment. NEPA was not intended to be used to destroy the human environment. However, the agency is using NEPA to seriously impact the human environment through a series of travel plan decisions aimed at removing the motorized public from public lands. This trend is not right and must be corrected by implementing a pro-recreation alternative as part of this action. *Comment 27-128*

Response: All three action alternatives include development of a trail system intended for use by motorized recreationists. The "no action" alternative does not included development of a new trail system, but would still accommodate motorized use of all designated travel routes (including access for OHVs on mixed-use roads). Therefore none of the alternatives considered in the Ochoco Summit Trail System project would remove the motorized public from the Ochoco National Forest.

Comment: In reviewing the Draft Environmental Impact Statement for the Ochoco Summit Trail System it is noted that there are four alternatives for the proposed project, which in effect amounts to three alternatives. *Comment 37-1*

Response: The Draft EIS described four alternatives, including the no action alternative and three action alternatives; alternatives that were considered but ultimately eliminated from detailed study were also described (see pages 12 - 37 in the draft EIS).

Comment: The scope of the project must address both existing routes and new construction. This is necessary and reasonable because a certain percentage of the existing routes are likely to be closed. Putting a sideboard on the project scope that prevents the evaluation and creation of any new trail segments also eliminates the opportunity to mitigate the overall level of motorized closures. This approach, if pursued, would preclude the evaluation of a reasonable alternative and also preclude any

opportunity for mitigation and enhancement. Therefore, limiting scoping of the project to existing routes only would produce a significant built-in disadvantage for motorized recreationists, i.e., the overall number of motorized routes are destined to be reduced and nothing can be considered to enhance existing routes and to mitigate the overall loss to motorized recreationists. We are concerned that the process will not provide motorized recreationists with an equal opportunity (50/50 sharing of motorized to non-motorized trails) in the outcome and we are only destined to lose. We would appreciate an independent evaluation of this situation as soon as possible so that the proper scoping direction can be corrected early in the process.

> **Response:** Only Alternative 1 (the no action alternative) limits OHV use to existing, designated routes. All three action alternatives represent a combination of existing designated routes, trail construction on existing disturbance (for instance, closed roads), and new trail construction. There is no "sideboard on the project scope" that prevents the evaluation and creation of new trail segments.

Forest Plan Consistency; Forest Service Policy; Ochoco Policy; Consistency with Other Laws

Comment: Ironically, the wildlife section in the DEIS seems to imply that the newly implemented Travel Plan will not be effective without implementation of any DEIS action alternative. So the contradiction is the Forest already made a decision to commit to implementing closing overland travel to OHVs but thinks it needs an OHV area to make that possible. *Comment 41-10*

"Alternative I would most likely retain the current pattern of disturbance ..." is stated as the status quo even though this type of use would be in violation of the TM ROD that instructs managers to close the Forest to cross-country travel. If the Forest is not able to meet the TM ROD direction, then we question the Forest's ability to meet the proposed DEIS criteria addressed in the bullets below. It is contradictory that the Forest TM ROD states that cross-country travel will be closed through its implementation, while the DEIS implies that this will only happen through implementation of one of the DEIS action alternatives. *Comment 79-65*

These comments also reflect comments 79-69, 129-17, 129-18, 143-7, 147-2.

> **Response:** The commenters appear to have misunderstood the discussion in the wildlife section of the draft EIS. The entire sentence quoted in comment 79-65 is, "Alternative 1 would be most likely to retain the current pattern of disturbance from unregulated cross-country motor vehicle access, user-created trails, and use of closed roads because no closure of unauthorized routes would be implemented under this alternative." The point here is that disturbance created by unauthorized access (whether or not it still occurs after implementation of the Travel Management project Record of Decision) still remains on the landscape. The Forest Service anticipates that education and enforcement associated with the Travel Management project, via the MVUM, will be successful in reducing the incidence of unauthorized cross-country motorized travel, regardless of the Ochoco Summit project. The action alternatives proposed in the Ochoco Summit project, however, include rehabilitating unauthorized routes and other resource damage associated with unregulated motorized access, and provide for increased monitoring, education and enforcement within the designated trail system. Thus it is expected that implementation of the Ochoco Summit project would, together with the Travel Management project, would result in an overall reduction in resource damage associated with unregulated, off-road motorized use.

Comment: Under Effects on Laws, Regulations, Plans, Policies, and Procedures, the Wild and Free Roaming Wild Horse and Burro Act of 1971, which mandates Government responsibility for establishing and maintaining secure habitat for wild horses, receives no mention. This Federal law

preceded many of the current land use practices, and the inception of the off-road vehicle as we know it today.

Why was the Wild and Free Roaming Wild Horse and Burro Act of 1971 neither mentioned under Effects on Laws, Regulations, Plans, Policies, and Procedures nor seriously addressed in this planning process? *Comment 46-11*

> **Response:** The Wild and Free Roaming Wild Horse and Burro Act of 1971 was not mentioned because it has no direct application to the Ochoco Summit Trail System project. The Wild Horse Herd Management Area within the project area boundary was specifically avoided when designing each action alternative, and no motorized trails were proposed within the Herd Management Area. Also see response to comment 46-3.

Comment: It is illegal for US Forest Service land managers to extend the wilderness boundaries by creating additional buffer zones (Removing existent roads and creating Roadless areas) around an existing wilderness to create additional noise free zones. This is printed in the CFRs. *Comment 63-28*

> **Response:** The Ochoco Summit Trail System project does not include any proposal to extend wilderness boundaries, remove existing roads or create roadless areas.

Comment: The Double Standard- Horse and Bicycle trails have been built on this forest and adjacent areas without NEPA requirements and have been ignored by managers and agency personnel. User created motorized trails have been deemed resource damage and not considered as viable trails when some of them meet the need and requirements for inclusion in a trail system. *Comment 85-7*

> **Response:** Where appropriate, user-created OHV trails have been included in the proposals for a designated trail system. There are some locations where user-created OHV trails have contributed to resource damage; these trails have not been included in the proposed trail system.

Comment: Page 378 – You should have included Sec. 9 of Executive Order 11644:

Sec. 9. Special Protection of the Public Lands. (a) Notwithstanding the provisions of Section 3 of this Order, the respective agency head shall, whenever he determines that the use of off-road vehicles will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources of particular areas or trails of the public lands, immediately close such areas or trails to the type of off-road vehicle causing such effects, until such time as he determines that such adverse effects have been eliminated and that measures have been implemented to prevent future recurrence. (b) Each respective agency head is authorized to adopt the policy that portions of the public lands within his jurisdiction shall be closed to use by off-road vehicles except those areas or trails which are suitable and specifically designated as open to such use pursuant to Section 3 of this Order. *Comment 92-35*

> **Response:** The section of Executive Order 11644 to which the commenter refers does not directly apply to the designation of a new motorized trail system. Section 9 authorizes the "agency head" to close areas where off-road vehicles are causing "considerable adverse effects" to natural resources, as determined by the agency head; because the proposed trail system has not been built, it would be premature to attempt to demonstrate consistency with Section 9 of Executive Order 11644. In addition, the Forest Service feels confident that because of project design features, monitoring, education and enforcement (as described in the draft and final EIS) Section 9 will not need to be invoked for damage resulting from use of the Ochoco Summit Trail System.

Comment: Failure to Minimize Damage - Executive Orders 11644 and 11989 require that the Forest Service, when designating off-road vehicle trails and areas, minimize damage to forest resources

(including soil, watersheds, vegetation, or other resources of the public lands), minimize disruption of wildlife and wildlife habitat, and minimize user conflicts. The Travel Management Rule (TMR) at 36 CFR 212.55(b) echoes this minimization requirement. Multiple district courts have found that the Executive Orders and the TMR require the Forest Service to demonstrate that it minimized — not just considered -- impacts when designating ORV trails and areas. The Deschutes [sic] must show how the designation of this trail system has minimized the impacts from motorized recreation to these forest resources. This DEIS fails to satisfy that legal requirement. *Comment 113-7; also reflects comments 118-4, 230-18, 231-1, 232-10, 232-11*

> **Response:** The Forest Service feels that the draft EIS adequately demonstrates the strategy for minimizing or avoiding damage to forest resources, disruption of wildlife and wildlife habitat, and user conflicts (see "Project Design Criteria Common to All Action Alternatives," DEIS pages 24 – 32; and "Mitigation Measures Common to All Action Alternatives," DEIS pages 32 – 33).

Comment: Contrary to Executive Order 11989. The Ochoco NF has not, in the past, taken ANY discernible action to deter natural resource damage or mitigate user group conflicts in regards to OHV use in this area or forest-wide. This inaction despite being provided direct evidence of such damage and having been presented with written and oral complaints from other user groups. *Comment 118-3; also reflects comment 118-4*

> **Response:** The Ochoco National Forest does not agree that it has not taken any action to deter natural resource damage from OHV use. Beginning in November of 2007, the Ochoco National Forest Supervisor responded to public and internal concern about resource damage related to OHV use by closing a portion of the McKay Creek subwatershed to motorized travel off of designated routes. The temporary closure subsequently became permanent, and this closure remained in place until the 2011 Travel Management decision rendered it unnecessary.

Comment: [Referring to DEIS page 281] "All action alternatives would develop a designated OHV trail system to replace the current unregulated use that is presently occurring." This statement is false. There is currently no unregulated use occurring within the project area. *Comment 129-25*

> **Response:** The commenter is correct that the statement is an error. The final EIS has been edited to read, "All action alternatives would develop a designated OHV trail system to replace the unregulated use that occurred prior to the Travel Management project Record of Decision."

Comment: I believe the Draft EIS for this project demonstrates beyond a reasonable doubt that none of the proposed action alternatives complies with the Ochoco National Forest LRMP for the following reasons:

• The Ochoco NF LRMP clearly states, "Off road vehicle use and trail construction, will be allowed where they are not in conflict with other resource objectives." (LRMP, 4-23)(DEIS, vii)

• Both the Ochoco NF Land and Resource Management Plan and the DEIS specifically recognize Rocky Mountain Elk and mule deer as a wildlife resources, and identifies both species as Management Indicator Species (LRMP, 4-245 and DEIS, 255). The LRMP throughout establishes various Goals, Objectives, Standards and Guidelines for management of Rocky Mountain Elk habitat, and many if not most of these are violated by the all of the proposed action alternatives.

• The Draft EIS for this project, particularly the analysis of impacts on Big Game-Deer and Elk beginning on DEIS 262 clearly indicates any of the proposed action Alternatives 2, 3 or 4 cause increased adverse impacts to mule deer and particularly Rocky Mountain Elk.

• The Draft EIS acknowledges conflict is likely - "All action alternatives may decrease habitat effectiveness for big game (elk and mule deer)." (DEIS, xvi) *Comment 143-3*

> **Response:** The draft EIS (page 283) describes how effects document in the Big Game section of the document would be localized, and "may result in a small negative trend particularly in proximity to routes that are more than ½-mile from existing open roads." The draft EIS goes on to explain that this effect would become immeasurable beyond one mile from any motorized trail. Furthermore, the DEIS asserts that the continued viability of mule deer and elk is expected to occur on the Ochoco National Forest. Nowhere in the DEIS does the phrase "conflict is likely" occur, and the Ochoco National Forest disagrees that the wildlife analysis supports this conclusion.

Comments: [Executive Order 13443] directs federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat."

Staff lists a number of collaborations and cooperative agreements they have done with other agencies regarding wildlife, apparently believing that doing that is sufficient to meet the requirements of this Presidential Order. In fact, the relevant information, that this project is opposed by the Oregon Department of Fish and Wildlife, should have been included in the discussion. As previously discussed, this project as proposed under Alternative 2, 3 and 4 will add to the ongoing negative impacts of current Ochoco National Forest practices, especially for elk. There is no data or information provided that would in any way lead one to conclude that this project would "facilitate the expansion and enhancement of hunting opportunities" as required by the order. In fact, there is clear and convincing data that shows that hunting opportunities have been dramatically reduced over the past 15 years. The data on road densities, security cover, and human disturbance issues make it clear that this project will result in a continuing decrease in hunting opportunities within both the project area and the Ochoco National Forest as a whole.

The project as proposed does not comply with this Presidential Order. Given that, the Forest Service must either select Alternative 1, or withdraw the project from consideration. *Comments 129-32, 129-33; also expressed in comment 143-20*

> **Response:** The Forest Service disagrees that the Ochoco Summit Trail System project does not comply with Executive Order 13443. As described on draft EIS page 380, the Ochoco National Forest works with State and Federal wildlife management agencies to maintain cooperative seasonal closures to motorized access, with which the Ochoco Summit Trail System is consistent.

Comment: The Ochoco cannot simply rely on blanket assumptions that the proposed project will improve the overall situation by restoring user created routes or closing existing system routes, in an attempt to evade its duty under NEPA to fully analyze and disclose the impacts of adding motorized trails to the system. *Comment 232-12*

It is inappropriate to assume that illegal trails will disappear once a travel plan is implemented, and that illegal use will magically stop. The impacts from both existing illegal trails and continued illegal use must be fully analyzed and disclosed before making a decision that affects travel management on the forest. *Comment 232-13*

> **Response:** The Ochoco National Forest disagrees that the draft EIS represented a "blanket assumption" that the proposed alternatives would improve the overall situation. Rather, the Ochoco asserts that the analysis was site-specific enough to identify specific locations where the proposed alternatives would lead to unwanted effects to resources (see, for instance, DEIS Table 83). However, the draft EIS also discloses that without funding associated with a

designated trail system, rehabilitation and restoration activities proposed in each alternative would not be possible.

The draft EIS does not indicate that illegal trails and illegal use would stop with the implementation of an action alternative. However, monitoring, education and enforcement that would accompany a designated trail system would provide the opportunity for better management of motorized use on the Ochoco than is possible at present (see the section titled "Safety, Education and Law Enforcement" in Chapter 2 of this final EIS).

Comment: Minimum Road System Determination Arbitrary and Capricious. It is not clear how the Selected Alternative, which the Forest Service indicates is the minimum road system, meets the regulatory requirements of Subpart A, and the travel analysis to support this assertion were not available to the public for review before this statement was made, as required by 36 C.F.R. 212.5(b). This should be remedied by posting the travel analysis on-line before the FEIS is published, and in the FEIS make a clear presentation about how this determination meets the applicable regulation, rather than a one paragraph summary. The FEIS should fully explain how this decision represents the minimum road system needed by the Ochoco. *Comment 232-18*

Response: At the time that the draft EIS was published, there was no selected alternative. Additionally, the Forest Service has not indicated a minimum road system during the course of the Ochoco Summit project. Since the Ochoco Summit analysis made no determination of minimum road system, the Ochoco National Forest disagrees that an arbitrary and capricious determination was made. Also see response to comment 79-33.

Comment: In the 1989 Ochoco Forest Plan, the old growth areas Standard and Guidelines are very specific in the compatible uses: constructing motorized trails and encouraging use is not compatible based the Forest Plan. With the number so Standards and Guidelines that are being proposed to be altered is more than an insignificant amendment in my opinion. *Comment 233-7*

Response: As described in the draft EIS (page 376), in order to be considered "non-significant," a proposed Forest Plan amendment must meet four criteria; none of these criteria relate to a maximum number of standards and guidelines that may be altered under a Forest Plan amendment. The proposed amendments are site-specific and apply only to the proposed segments of connecter trail. For Alternative 3 modified, the actual length and tread area of trail within each OGMA is as follows: Indian Butte OG-D1-08, 0.32 mile (0.2 acres) of new trail; Porter Creek OG-D1-12, 0.1 mile (0.02 acres) of new trail; and Deep Creek OG-D2-02, 0.31 mile (0.08 acres) of new trail. Due to the short length and small scale of these incursions we do not expect these crossings to substantially alter the ability of these Old Growth Management Areas to meet the intended emphasis of providing habitat for wildlife species dependent on old growth stands for the following reasons:1) these habitat blocks are currently all bordered by well-travelled existing open roads and all of the proposed crossings are in direct proximity to existing open roads, therefore the change in area within the allocation in proximity of motorized routes will be negligible; 2) all of these areas are linear timbered features surrounded by open areas, rather than in blocks of interior forest habitat, and the proposed crossings are all limited to 50" or 24" tread width, therefore the anticipated change in interior forest habitat within the allocation will be negligible.

Comment: Standard and Guidelines Limit erosion to a rate that approximates natural processes. Soil compaction should not exceed limits that prevent plant establishment. Applicable Management Area MA-F6 Old Growth Won't a trail prevent plant establishment? *Comment 233-12*

Response: Generally speaking, yes, a trail would prevent plant establishment. Because of the total area that would be affected by the proposed trail segments in Old Growth Management Areas (about .3 acres; see response to comment 233-7), the Ochoco National

Forest did not expect the trail segments to substantially change the potential for plant establishment in Old Growth Management Areas.

Comment: Standard and Guideline Vegetative management (except prescribed livestock use) will not be allowed, until further research is available on the needs of the dependent species. Applicable Management Area MA-F6 Old Growth Has the research on trails been completed? *Comment 233-15*

Response: The proposed trail segments do not constitute vegetation management; therefore, the standard and guideline cited by the commenter does not apply.

Comment: Standard and Guideline Hazard tree felling is permitted for public safety. Applicable Management Area MA-F6 Old Growth There appears to be a conflict with maintaining 100% snag level and rider safety *Comment 233-16*

Response: The proposed alternatives are not expected to affect snag distribution across the landscape (see response to comment 234-185). Nonetheless, the amount of area within Old Growth Management Areas that would be affected by the proposed alternatives is extremely small (.3 acres).

Comment: Standard and Guideline Avoid construction of new roads, except where analysis results in no other reasonable alternatives Applicable Management Area MA-F6 Old Growth Connective motorized trails break this standard. *Comment 233-17*

Response: The Ochoco National Forest disagrees that constructing .3 acres of motorized trail within Old Growth Management Areas is analogous to constructing new roads. Also see response to comment 233-7.

Comment: Standard and Guideline Constant service roads will remain open. Use on all other roads across the management areas will be eliminated. Applicable Management Area MA-F6 Old Growth No Demonstrated Need: With about 700 miles of designated OHV routes, Central Oregon already has more mileage of OHV trails than most places in the nation (East Fort Rock , Millican trails, Henderson Flats). There is no demonstrated need other than a push by vocal minority and the natural resource damage they are creating that new trails are needed. *Comment 233-18*

Response: The purpose and need for the Ochoco Summit project was described on pages 2-3 of the draft EIS; the discussion was expanded in the final EIS.

Comment: What Forest Service policy calls for providing a diversity of rds & trails for OHVs? *Comment 234-48*

Response: Forest Service Manual (2353.03(2)) states under the heading "Policy:"

Provide a variety of trail opportunities, settings, and modes of travel consistent with the applicable land management plan.

Therefore, it is Forest Service policy to consider recreational opportunities for all recreationists, provided that use is consistent with the current Forest Plan.

Comment: Why do OHV users get such deference at the expense of cultural heritage, goshawks, elk, nest trees, snags, aspen, cottonwoods, springs, seeps, etc. when other projects mandate avoiding impacts to these values? *Comment 234-83*

Response: Implementation of any of the action alternatives described in the Ochoco Summit Trail System draft EIS would include project design criteria as described on DEIS pages 24 - 32; as with all other projects implemented on the Ochoco National Forest, these design criteria are intended as resource protection measures and would minimize or eliminate the risk of unwanted effects to resources.

Comment: There are obvious INFISH/Forest Plan violations throughout these plans. *Comment 234-124*

> **Response:** The Forest Service disagrees that the Forest Plan or INFISH are violated by the proposed alternatives. See the sections titled "Hydrology and Aquatic Species" and "Forest Plan Consistency" in this FEIS.

Comment: [Referring to DEIS page 277 "Open road densities would exceed Forest Plan guidelines…"] – This is a clear violation of the Forest Plan as only 2 of these subwatersheds currently exceed Forest Plan guidelines. *Comment 234-205*

> **Response:** The text to which the commenter is referring is part of the analysis of the effects of Alternative 4. These effects were considered by the Responsible Official prior to her selection of Alternative 3 as the preferred alternative.

Comment: A "properly constructed trail system" for OHVs through riparian areas still does not minimize destruction of wetlands as much as possible and does not "preserve and enhance the natural and beneficial values of wetlands" as per Executive Order 11990. *Comment 234-240*

> **Response:** The Ochoco National Forest does not agree that the executive orders cited by the commenter require an agency to "minimize destruction of wetlands as much as possible." The executive orders are intended to guide management activities with the objective of minimizing destruction, loss or degradation of and maintaining the natural and beneficial values of wetlands. The Ochoco National Forest believes that the Ochoco Summit project is consistent with Executive Orders 11988 and 11990, as described on DEIS page 379.

Recreation

General

Comment: Including class II only in multi use road systems excludes non street legal class II users. *Comment 26-4; also reflects comments 48-2, 63-11, 63-15*

> **Response:** Alternative 3 does not include a designated trail system for class II vehicles. During development of the final EIS, the project's planning team developed a proposal for a alternative 3 modified that would include a designated trail system for class II vehicles.

Comment: The DEIS did not look at the proposed OHV system relative to the need to provide additional OHV opportunities and experiences OHV users are seeking compared to what other Region 6 Forests are already providing, nor relative to what the extensive central Oregon OHV system of 938 miles of approved and designated roads and trails by OHV class is providing. *Comment 79-42; also reflects comments 129-3, 143-5, 232-3, 233-2, 234-32, 234-42, 234-91*

> **Response:** An analysis of cumulative effects to recreation has been completed and is incorporated into the final EIS for the Ochoco Summit project.

Comment: The Recreation analysis section does not address the lost hunting opportunity that a reasonable person would expect to occur and the Wildlife analysis indicates is likely. *Comment 143-13; also reflects comment 153-2*

> **Response:** The EIS does address impacts to non-motorized recreation. This includes hunting by people who are on foot or on horseback. With the exception of archery season, the majority of hunting season is outside of the proposed open season for the OHV trail system. Also see response to comment 226-7.

Conflicts between Recreation Uses

Comment: A commenter expressed concern about increased noise in the Walton Lake basin due to implementation of any action alternative. *Comment 3-5*

> **Response:** The legal decibel noise level is 99 decibels (dB) as measured from 20 inches of the tail pipe of a motorized vehicle. Noise less than 45 dB is not audible in a natural setting. When compared from the legal dB of 99 the distance needed to dissipate to non-audible 45dB is .89 miles. Walton Lake is more than .89 mile to the nearest designated route or staging area. Regardless of all alternatives, existing and legal use of motorized vehicles will continue at Walton Lake campground and mixed use roads.

Comment: I am opposed to all action alternatives, especially the proposed trail from the area of the 2210 across above the Walton Lake area. This area gets used by thousands of visitors each summer from campers at Crystal Springs Organization Camp, Walton Lake C.G., dispersed site campers and people just coming up for a day in the woods. This area is unique in that it has open pine stands dispersed with meadows that make it very easy for people of all ages to walk through it and enjoy the peace and quiet along with the wildflowers and wildlife. The development of off-highway vehicle (OHV) trails through this area would destroy this recreation value for many. *Comment 10-1; also reflected by Comments 106-6, 143-6, 194-7, 210-13, 214-5, 228-5, 231-5, 232-9*

Noise from more OHV's will negatively impact the rest of us who make up 99.8% of forest users. Only 13% of the project area is more than a half mile from a road, so hikers will have a hard time escaping the intensity and frequency of noisy motors. *Comments 62-8, 72-6, 87-6, 113-10; also reflected in Comments 61-3, 62-2, 72-2, 79-5, 79-41, 79-44, 79-48, 79-54, 79-60, 112-2, 135-1, 161-4, 185-2*

> **Response:** See response to comment 3-5. Depending on the location of the forest visitor, sound from vehicles on the proposed trail system may be audible. Other activities such as motorized use on open roads, timber harvest, grazing, special use events and general forest use by other visitors are also allowed in the vicinity described by the commenter. Visitor expectation is a significant factor in satisfaction. "Quiet" recreation will continue to be available in the vicinity but may require adjustments depending on location or timing of other uses. It should be noted that OHV use is currently authorized on all mixed use roads in the project area, and this would be the case regardless of the selected alternative.
>
> Pages 79-80 in the DEIS identify the areas within the Ochoco Summit project area that would NOT be affected by noise associated with the action alternatives; these include 17 developed campgrounds and trail systems, 5,400 acres of designated wilderness, the North Fork Wild and Scenic River corridor, the majority of the Lookout Mountain Recreation Area, and about 50 miles of non-motorized trails.

Comment: Note that non-motorized recreationists can use routes that are both open and closed to motorized recreationists including roads and the evaluation of the opportunities available to non-motorized recreationists must be based on the total of all existing roads and trails. Additionally non-motorized recreationists can use an infinite amount of cross-country opportunity and motorized recreationists can not. A reasonable evaluation of this condition will conclude that motorized recreationists are already squeezed into insignificant and inadequate system of routes. This point must be adequately considered in the allocation of recreation resources. *Comment 27-77; this comment reflects concerns raised in Comments 27-80, 27-82, 27-84, 27-85, 27-86, 27-87, 27-111, 27-113, 27-114, 27-115, 27-122*

> **Response:** The inadequacy of existing OHV opportunities on the Ochoco National Forest is addressed in the description of Purpose and Need (Chapter 2 of the DEIS). The proposed action was developed to address the Purpose and Need.

Comment: We recognize the desire for a quiet experience in the forest as a legitimate value. To varying degrees, we all visit the forest to enjoy the natural sounds of streams, trees, and wildlife. Forest visitors who require an absolutely natural acoustic experience in the forest should be encouraged to use the portions of the forest which have been set aside for their exclusive benefit where they are guaranteed a quiet experience, i.e, wilderness areas. Given the demonstrated underutilization of existing wilderness areas, it is entirely reasonable to conclude that there is adequate wilderness area. Given that vast areas of our forests have been set aside for the exclusive benefit of this relatively small group of quiet visitors, it is not reasonable to set aside more areas and trails for their needs.

> **Response:** Setting aside more areas and trails for quiet (or nonmotorized) recreation is not part of any action alternative.

Comment: This is a historically horse use area since before white people arrived here. I am a trail rider and we are seeing more and more of our trails taken over by OHV's. OHV's and horses can not share trails, especially not in hilly challenging terrain like the Ochoco's. *Comment 29-2; this comment also reflects concerns expressed in Comments 36-6, 37-6, 42-4, 55-6, 58-2, 96-2, 96-4, 96-11, 109-1, 111-3, 116-3, 127-5, 149-1, 150-4, 210-10, 234-90*

> **Response:** Proposed motorized trails intersect with the Endurance Ride route as do existing open roads. Forest System non-motorized trails and user-created trails that have been authorized for use in the Bandit Springs Endurance Ride are not part of the proposed trails for motorized use; motorized use of these trails is not authorized and would not be authorized with any action alternative. Law enforcement and education would be a funded component of designation and maintenance of a new OHV trail system.

Comment: Some commenters expressed concern related to OHV use around locations that are favored by the equestrian community. Specific locations include Corral Flat, Man Camp, and Bandit Springs, as well as the user-created trails that are annually authorized for use for the Bandit Springs Endurance Ride. *Comments 30-4, 121-2, 123-5, 130-3, 140-1, 144-2, 146-3, 230-11*

> **Response:** Regardless of the Ochoco Summit Trail System project, the Motorized Vehicle Use Map (MVUM) allows OHV use to these sites via mixed-use roads. Also see response to comment 29-2.

Comment: We think the proposed OHV system contradicts the expected demand in recreational growth and will compromise virtually all other non-motorized recreational values. Your own DEIS analysis demonstrates that all action alternatives will increase motorized intensity and frequency and noise. *Comment 41-7; this comment also reflects concerns expressed in Comments 45-5, 58-5, 58-7, 64-2, 65-2, 76-2, 79-45*

> **Response:** Each action alternative includes a proposal to designate a motorized trail system within a specific project area. As disclosed in the Transportation section of Chapter 3 of the DEIS, the project area contains 659 miles of mixed use roads that are currently available to OHV use and would remain open to OHV use even if the No Action alternative were selected. While designation of an OHV trail system may lead to increased motorized use within that system, areas that are off-limits to OHVs (including designated wilderness and the Lookout Mountain Recreation Area) would remain off-limits to motorized use under any action alternative. The remainder of the Ochoco National Forest that is not within the project area would remain off-limits to OHV use, except where permitted on mixed-use roads as displayed on the MVUM. Therefore, non-motorized recreation would remain accessible to those Forest visitors who desire that opportunity at levels similar to the current condition.

Comment: The Purpose and Need states that “OHV riders have indicated a desire for additional motorized opportunities other than on mixed use roads”, but the DEIS does not compare or assess this

need relative to other recreational desires. Have you assessed the purpose and need of other recreational users who want more places like the Ochoco that have less development? Have you assessed the purpose and need of hikers, anglers, hunters, and wildlife viewers who really want less or no OHV use on the Forest? *Comment 41-7*

> **Response:** The Purpose and Need for the Ochoco Summit project is related to the reduction in opportunity for motorized recreation following implementation of the Travel Management Plan, and is consistent with the goals and objectives described in the Ochoco National Forest Land and Resource Management Plan. Effects to non-motorized recreation were analyzed and disclosed in Chapter 3 of the DEIS.

Comment: We find the comparison of alternatives and analysis not sufficiently comprehensive: The Forest did not analyze OHV noise impacts to non-motorized recreationists for levels greater than 45 decibels on the 659 miles of roads open to OHV travel that likely will see increased OHV activity. *Comment 41-17; also reflected in Comment 79-58*

> **Response:** The commenter is correct; noise analysis was conducted on the action alternatives, but was conducted only on the motorized trail and not on the mixed-use roads. OHV access to the mixed use roads is consistent between all three action alternatives as well as the no action alternative. The noise analysis for this EIS was conducted by using GIS to place buffers, or "noise bands" around proposed OHV trails to estimate the amount of area within which noise from OHVs might be heard; this area would not change on the mixed-use roads regardless of the selected alternative.

Comment: Noise is not a valid complaint within a motorized use area. There are millions of acres of wilderness, national monuments, national parks where noise from OHVs are never heard within Oregon. For non-noise seekers to visit where motorized use is allowed has no justifiable nor legal standing against OHV noise. Their complaint should not be considered within these pages other than where OHVs are not allowed for them to go within the Ochoco National Forest. This document should have direct them where they can seek solitude not criticize motorize vehicles use. This document should of pointed this out in great detail that nonmotorizes user should consider using another area that has noise restriction already in place and does not allow OHVs. These noise activists are against all motorized use within public lands and their complaints are not valid per the CFRs. It should have printed in great detail that our trails are legal on national forest lands per the CFR within feet of the Non-motorized areas. It should have been printed in this document that all OHV will meet the standards per the decibel levels as stated in the CFRs and the Oregon OHV guide. The writers of this document should of pointed out that motorized machinery make noise and there is already national areas set aside for non-motorize use that are quiet zones. Motorized use areas have noise in them just as hiker trails has hikers hollering back and forth to each other. Our use is legitimate and within the Ochoco National Forest. There is wilderness that motorized activity is not allowed in within the Ochoco National Forest and it is OHV noise free environment however all air traffic is still allowed and it is noisy. *Comment 63-27*

> **Response:** The noise analysis disclosed in Chapter 3 of the DEIS was used to compare the effects of the action alternatives on quiet recreation. Also see responses to Comments 3-5, 10-1 and 62-8.

Comment: There is already a major set (several hundred miles) of OHV trails available to OHV riders in the Ochocos and we do not need more trails to create more noise that disturbs wildlife and various human users of the forest. *Comment 77-3*

I request that the FS set up trails for walking, biking and bird watching. As I understand, our forest has over 1,000 miles for motorized off roaders in this forest. This fails the many of us in favor for the

few. This has every appearance of picking which uses you cater to, and off roaders are not the majority and have everything already, so why more? *Comment 86-2*

We feel the Forest Service is making this entire project area a single-use area since this use is not compatible with any other use on the forest. *Comment 92-7; also reflected in Comments 86-11, 87-2, 92-10, 92-21, 92-23, 102, 113-2, 114-3, 119-2, 120-4, 120-13, 120-15, 132-1, 133-5, 133-13, 133-15, 185-1, 190-4, 199-2, 234-92*

> **Response:** As disclosed in the DEIS (page 70), there are currently 8.5 miles of OHV trail on the Ochoco National Forest, with an additional 18 miles on the Crooked River National Grassland; neither trail area is open to Class II vehicles. Conversely, there are 50 miles of trails managed exclusively for non-motorized use in the project area (DEIS page 80), as well as a 5,400-acre wilderness area and the majority of the Lookout Mountain Recreation Area (DEIS page 80). In addition, non-motorized recreation may take place anywhere on the Ochoco National Forest where it's not specifically prohibited. Because motorized recreation is restricted to designated routes on the Ochoco National Forest, it is incorrect to state that off roaders "have everything" or to indicate that the project area would become a single–use area.

Comment: Moreover, it doesn't consider how this system would affect projected non-motorized activities the Forest is positioned to provide in the future with implementation of the TM ROD including fishing and wildlife viewing. *Comment 79-43*

The proposed OHV trails and Walton Lake staging area will negatively affect potential development and use of the existing Nordic ski trails and surrounding areas as a year round non-motorized trail system. The DEIS is silent regarding these impacts. The DEIS should be supplemented (SDEIS) and alternatives developed that avoid all impacts to the potential for the existing Nordic trails being developed for year-round non-motorized use. The impacts of all alternatives on this potential use should be disclosed in the SDEIS. *Comment 227-3*

> **Response:** Potential future development is speculative and dependent upon many factors, including funding; it is not possible to conduct an effects analysis on potential projects. At this time there is no proposal to develop fishing and wildlife viewing opportunities; nor is there a proposal to develop the Nordic ski trails on the Ochoco National Forest as a year-round non-motorized trail system. If such proposals are made in the future, they would be analyzed cumulatively with the Ochoco Summit project and design measures would be developed to address possible conflicts between motorized and non-motorized users.

Comment: The Department recommends an analysis of the proposed OHV system be conducted to understand the Forest's role to provide another designated OHV trail system experience for riders, by OHV class, from outside the area as well as for local riders. Part of this assessment is the need to determine the effects this system would have on other Recreational Opportunity Spectrum activities (DEIS 72/73) that the Ochoco National Forest can provide, such as elk hunting and finding one's own special place, that other local and Region 6 forests are more challenged to provide today, which could be due to past decisions including designation of an OHV system. In other words, an assessment is needed to determine if implementation of any of the action alternatives would significantly affect other recreational activities that are in greater need or demand that the Ochoco National Forest is more suited to provide in the long-term. As noted in the DEIS "...it is predicted that in the next 10 years, the activities with the greatest growth (in terms of total participants multiplied by percent change) would be wildlife/birds, general relaxing, viewing other features, hiking/walking, fishing and driving for pleasure. The activities with the least growth are predicted to be backpacking, cross-country skiing, snowmobiling, horseback riding, and other motorized activities (USDA Forest Service 2005)" (DEIS 72). *Comment 79-59*

Response: An analysis like the commenter suggests would be appropriate during a Forest Planning analysis, but is not appropriate at the project level. Project-level NEPA analysis implements the Forest Plan; in this case, the Ochoco Forest Plan permits motorized travel on designated routes (DEIS page 61). Also see responses to comments 92-7 and 79-43.

Comment: According to the DEIS you place higher priority on OHVs, a very damaging special interest with few users, than on numerous less damaging uses such as fishing that have many more users. *Comment 81-3*

Response: The DEIS does not include a prioritization of recreational uses on the Ochoco National Forest.

Comment: To further amplify this argument I believe that the Draft EIS has significantly under-reported the use of this region by horseback riding visitors. Since the early 1970s there have been yearly endurance races held out of the Corral Flat area (Bandit Springs) right in the heart of the proposed OHV trail system. Since that time thousands of riders have ridden and horse camped out of this spot on the well-established 20 & 30 mile endurance trails that were established for the races. This brought the area to the attention of many other thousands of horseback riders who discovered that the Ochoco Highlands contains some of the finest horseback riding & camping opportunities in the entire state of Oregon. On any given weekend from early July through the first snows of winter there are a large number of horseback riders and campers present. The three or four principle camping spots used by horse campers are in the Bandit Springs/Corral Flat area, in the heart of the proposed trail system. *Comment 118-5*

Response: Other than citing data from the 2008 National Visitor Use Monitoring (DEIS page 63), the DEIS did not estimate use of the Ochoco National Forest by equestrians. Nonetheless, the Bandit Springs Endurance Ride Special Use Permit area was considered in the development of the proposed action and the action alternatives. Also see response to comment 29-2.

Safety and Fire Danger

Comment: There is no cell service in the proposed area. Accidents are a given. I feel that at a minimum, there must be a cell tower, and heli-vac site as part of any alternative chosen. *Comment 11-3*

Response: Construction of a new communication site and a heli-vac site are outside the scope of this analysis.

Comment: Several commenters expressed concerns related to fire danger and expressed the opinion that motorized use on the proposed OHV trail system would increase the risk of starting a wildfire. One commenter wondered who would be responsible for damages if a fire was started by an OHV on the trail system and then spread to private land. *Comments 11-4, 36-3, 62-10, 72-8, 87-8, 88-4, 88-6, 113-13, 147-7, 194-9, 203-5, 213-5*

Response: Implementation of any alternative would not change state and federal requirements. Certified spark arrestors are required on all OHV mufflers. Motorized vehicles are prohibited on native surface roads containing vegetation during Public Use Restrictions. There is no clear evidence that OHVs contribute to more wildfires when used on appropriately maintained designated trails and use of motorized vehicles on designated motorized trails is generally not restricted; however, the Forest Service retains the authority to restrict use as conditions warrant for resource protection and public safety. As with any human-caused wildfire, if it can be determined who ignited the fire, that person is held responsible for associated costs of fire suppression and resource damage.

Comments: Several commenters expressed concern that designation of an OHV trail system would create unsafe conditions for non-motorized users, including equestrians, mountain bikers and hikers. *Comments 29-5, 30-9, 69-16, 123-13, 146-11, 164-4, 198-3, 198-4, 206-3, 231-4, 230-12*

> **Response:** The OHV trail systems and play areas proposed in the action alternatives would be posted with signs that identify travel routes and the allowed modes of travel; additionally, routes not intended for motorized travel that cross designated OHV routes would be identified at all crossings so that they would be easily identified as not being part of the motorized trail system (see Project Design Criteria, DEIS page 26). While non-motorized recreationists would not be specifically prohibited from using the motorized trail system, signage would make them aware that they were using a trail intended for use by motorized vehicles; non-motorized users who choose to use motorized trails would need to accept the risk of choosing to share trails with motorized users.

Transportation; Roads; Road Density; General OHV Access

Comment: Road reduction The Forest Service has been on a mission to eliminate roads from the forest. Does it make sense to add 100 miles of roads, too narrow to be used for fire suppression or industrial use, while at the same time obliterating roads that may be needed in the future? Why not modify existing roads within the forest that are to be abandoned anyhow and use them for the OHV's? *Comment 11-6*

> **Response:** In all action alternatives, a portion of the proposed trail system is located on decommissioned roads (see description of alternatives in Chapter 2 of the DEIS and associated maps in Appendix A). No roads that are identified as necessary for future use are proposed to be obliterated under any action alternative.

Comment: Analysis shows increased motorized route density in 9 of 30 6th field sub watersheds in the analysis area but does not relate the alternatives to open road densities by management area or at the landscape level. LRMP standards and guidelines state open road densities are to be 3 miles per square mile or less depending upon time of year. Current open road densities exceed this standard. The Forest needs to compare the propose action measures with stated LRMP measures for a direct comparison of project impacts. *Comment 41-19*

> **Response:** The Transportation section in the draft EIS discloses the change in operational road density by watershed by alternative, and lists watersheds under each alternative that would be at or above Forest Plan standards and guidelines with each alternative (DEIS pages 56 – 61). The Ochoco National Forest believes this is sufficient disclosure regarding road density.

Comment: The analysis states that 50 new miles of trails will be constructed but does not disclose how many miles of decommissioned/closed roads would be left opened for motorized access. Are using these decommissioned/closed roads via the Travel Management EIS an easy way of not closing these roads? Why is the Forest continuing to increase open road densities rather than try to meet the stated desired conditions of the LRMP? *Comment 41-20*

> **Response:** The draft EIS discloses how many miles of closed/decommissioned road would be converted to motorized trail in the description of each action alternative (DEIS Chapter 2). Also see response to comment 79-33.

Comment: The FS must address the cumulative impacts of the existing roads system, and try to more toward reduced impacts and reduced density of motorized road/trails, instead of increased density and increased impacts. *Comment 45-8*

Response: Cumulative effects were disclosed by resource throughout Chapter 3 of this EIS; the existing road system was included where appropriate. Reducing road density is outside the scope of this proposed action.

Comment: The DEIS did not assess how implementation of this project will change OHV and other motorized use on roads open to OHV travel (659 miles) within the project area, let alone adjacent to and across the forest. The DEIS did not analyze if this project would shift or increase OHV use in central Oregon to the proposed area or the associated fish and wildlife impacts that could result from a shift/increase in OHV use. *Comment 79-3*

Response: OHV use has been present (and increasing) on the Ochoco National Forest for many years prior to the initiation of this project. The use of OHVs on open, mixed-use roads is currently authorized and is expected to continue regardless of which alternative is selected, as was stated in many places throughout Chapter 3 of this EIS. Effects of the alternatives on fish and wildlife were analyzed and were disclosed in Chapter 3.

Comment: DEIS 104 Alt. 1 (with similar %s for Alts 2, 3, & 4) states "OHV use on existing roads is only 5.5 percent of the total 1,820 miles (3,312 acres = 1.1 percent) of road in the approximately 301,000 acre analysis area." What does this refer to since DEIS 47 identifies 659 miles of shared use road in the project area of 1,738 miles of roads? Using figures from page 47, the percent of roads used by OHVs would be 37.9 percent, which if correct would call for a new project impact analysis. *Comment 79-74*

Response: The commenter discovered an error in the disclosure of cumulative effects of Alternative 1 in the Soils discussion of the draft EIS. The 5.5% referred to is the percentage of total road beds on which the proposed action would designate system trails; the disclosure for Alternative 1 should not have included the reference to "OHV use on existing roads" because no OHV trail would be designated under Alternative 1. Furthermore, the road mileage reported in DEIS Table 7 is for system roads (with a total of 1.738 miles), whereas the soils analysis includes user created trails that are not part of the road system. The error has been removed from the Alternative 1 discussion.

Comment: I have a number of concerns regarding the subject DEIS. There are numerous inconsistencies between at least two of your Forest plans and all four of the alternatives. These plans include the Land and Resource Management Plan (LRMP) and the Travel Management Plan (TMP). Most importantly, none of the alternatives reduce the very high existing road density you acknowledge, which is of critical importance for many reasons. So you need another alternative. No Action is the best you present but to reduce the damage to stream, fish and wetland health a fifth alternative is essential and should be selected. It must emphasize major reductions in road density and OHV use. *Comment 81-1*

Response: An alternative that reduces road density and OHV use would not meet the Purpose and Need for the Ochoco Summit project.

Comment: The Ochoco National Forest has an exceptionally high road density that exceeds seven miles per square mile in some areas. The LRMP implied that reducing that density to three miles per square mile was desireable. That's not enough, but it would be a good start. The preferred alternative in the DEIS increases the density. *Comment 81-7*

Response: The cumulative effects discussion in the Transportation analysis (DEIS pages 56 – 61) disclose operational road densities under all alternatives (in combination with other projects). No watershed has a road density as high as 7 mi/mi^2.

Comment: This trail will cater to a certain few, where the roads will serve everyone and they are already there. *Comment 88-2*

Response: No action alternative would change access provided by the existing road system, as described on the MVUM. Alternative 3 modified proposes changing road designation from highway legal to mixed use on one portion of a road.

Comment: The USFS has closed and decommissioned roads now proposed for conversion to OHV trails. These trails were generally closed or decommissioned for good reasons, such as reducing disturbance to wildlife, eliminating hydrological connections of roads to streams, stopping impacts to streams such as sedimentation, preventing invasive plant dispersal, etc.—and should remain closed or decommissioned. I am opposed to any new trail construction except for very short segments connecting open system roads. Administrative closed roads were also often closed to increase wildlife security from hunting, stop illegal firewood cutting of snags, and other good reasons mentioned above. *Comment 173-11; also reflects comments 179-3, 228-1, 234-9, 234-22, 234-123*

Response: Roads are closed and decommissioned for a variety of reasons, as the commenter suggests, including closure because the road simply isn't needed for access any longer. Sensitive areas and high-quality wildlife habitat areas (as identified by ODFW) were avoided in development of the action alternatives. In addition, some segments of trail that were in areas of particular concern were dropped during the development of Alternative 3 modified. Reinforcement of road closures and rehabilitation of closed/decommissioned roads is part of every action alternative.

Comment: Regardless of the reasons, the fact is that the current on the ground road system within the Ochoco Summit project area far exceeds the Ochoco National Forest Plan requirement of 3.0 miles road/square mile. The failure of staff to disclose this represents a substantial violation of the requirements of the NEPA act. Given that, the only options open to the Forest Service are to withdraw the proposed project, or select Alternative 1, the no action alternative. *Comment 129-15*

Response: The analysis of open road density for the Ochoco Summit project was completed in accordance with the Forest Plan.

Comment: There are already over 3,000 miles of roads on the Ochoco forest, many in need of repair or closing. Adding more is unwarranted! *Comment 175-4*

Response: The Ochoco Summit project does not propose to add roads to the Ochoco National Forest road system.

Comment: As a native of Central Oregon and a lifelong resident of Bend, I am writing to express my concern and dismay over the proposed 100+ miles of off-highway vehicle trails being planned for the Ochocos. I am appalled the U.S. Forest Service would propose such a huge increase in usage by off-road vehicles (motorcycles, ATVS, jeeps and other four-wheel recreational vehicles) for the Ochoco Forest. *Comment 186-1; also reflects comment 79-46, 234-11, 234-207*

Response: Until the 2011 Record of Decision for the Travel Management project, the Ochoco National Forest was open to cross-country motorized travel. For this reason, the Ochoco National Forest does not agree that it's proposing a "huge increase in usage by off-road vehicles" with the Ochoco Summit project. In addition, regardless of the alternative selected, all mixed-use roads throughout the Ochoco National Forest would be available for use by OHVs. The proposed alternatives represent a designated and logical system of trails that would provide a manageable area for a use that is already occurring and is expected to continue to occur on the Ochoco.

Comment: What about all the mixed use roads already available? These should be counted as part of the total mileage already available to OHV users. *Comment 234-40*

Response: The project analysis has always considered the availability of mixed-use roads to OHV recreation; this has been clarified (see the Recreation section in Chapter 3 of this FEIS).

Natural Resources

Resource Damage

Comment: The Ochoco's are a wet area that has already been getting much road damage from 4x4's, it will get worse with OHV use. During the wet times of the year it is not safe to ride horses there because of the sink holes and should be avoided anyway to keep the trails in good shape. During the dry times of the year if the OHV's are there horses will not be able to be there and the trails will be deeply rutted, muddy and in poor condition. *Comment 29-3*

> **Response:** Design criteria, including an authorized season of use, are intended to prevent or minimize damage to soils. The Responsible Official would retain the authority to delay opening trails or close trails if wet conditions would lead to resource damage from motorized use.

Comment: A number of comments expressed a general concern about impacts to big game habitat, streams, riparian areas, quiet recreation, fish, and "natural resources." *Comments 41-6, 41-28, 51-1, 68-1, 76-4, 84-2, 86-7, 90-1, 136-5, 175-2*

> **Response:** Effects of the proposed alternatives to natural resources in the project area were thoroughly analyzed and the analysis was documented in Chapter 3 of the DEIS and FEIS for the Ochoco Summit project.

Comment: A number of comments expressed concern about resource damage resulting from unmanaged OHV use; specifically identified were effects to soils (compaction, rutting, increased erosion) and wet areas. *Comments 45-1, 96-12, 118-6, 140-3, 141-2, 141-4, 141-6, 141-8, 141-10, 149-3, 150-2, 155-2, 159-3, 162-1, 164-3, 170-2, 170-4, 177-2, 177-3, 198-8, 200-1, 206-4, 210-2, 210-5, 210-12, 211-4, 214-2, 221-2, 223-2, 224-4, 234-113*.

> **Response:** The Ochoco National Forest recognizes that unmanaged recreation in general, and unmanaged OHV use has led to unwanted effects including, in some cases, resource damage. These effects are discussed in the Purpose and Need for Action (draft EIS page 2). The intent of the action alternatives is to create a designated system of properly-designed and monitored OHV trails where motorized recreation can take place without resulting in resource damage.

Comment: Several commenters referred to the unmanaged OHV use that took place in the McKay subwatershed, the effects of which led to the drainage being closed to cross-country motorized travel; commenters expressed concern that the proposed motorized trail system would result in similar effects. *Comments 92-41, 92-44, 102-7, 120-1, 120-6, 133-2, 133-7, 156-2, 156-3.*

> **Response:** It's important to remember that prior to the 2011 Travel Management decision, cross-country motorized travel was legal across the Ochoco National Forest, including the McKay drainage. The disproportionately high recreation use that the McKay area receives is probably due to its proximity (about 11 miles) to the City of Prineville. The fact that this high level of unmanaged OHV use led to unwanted effects to resources in the McKay subwatershed supports the need for a properly-designed, monitored OHV trail system that directs OHV use away from sensitive landscape features.

Botany

Threatened and Endangered Plants

Comment: …and at one point the Forest Service was considering making a horse camp there, just back in the trees, I don't know whatever happened to that plan, other than another horseman and I went out there with Forest Service representatives, including a plant biologist, and the plant biologist

found an endangered lily at one end of the meadow, and I think that derailed that plan for the horse camp. I am sure that lily is long gone now. Has the proposed OHV trail also been checked for endangered plants? *Comment 58-6*

> **Response:** Portions of the proposed trail have been surveyed for both sensitive plants and non-native invasive plants. Though the general corridor for the trail has been identified, the specific locations for segments requiring new trail construction have not been designated on the ground. These areas would be surveyed for sensitive plants, and construction would be designed to avoid sensitive plants or impacts would be mitigated to acceptable levels as determined by the Responsible Official in consultation with the district botanist.

Invasive Plants

Comment: Will the OHV's need to be inspected for weeds, and be washed before using the new trails? *Comment 88-5*

> **Response:** Currently, there is no requirement for inspection or cleaning of OHVs (or other recreational vehicles) before entering the National Forest.

Comment: ORV use will also spread weeds which is probably one of the greatest threats posed by expanded machine use. The miles that an ORV can travel in a day will ensure the spread of weeds and new infections throughout the trail system, and make it more difficult to control weeds. The best way to prevent weed invasion is to prevent activities that cause disturbance like ORVs, and activities that transport seeds--like ORVs. *Comment 179-7; also reflects comments 173-5, 230-13*

> **Response:** The DEIS acknowledges increased risk for introduction on non-native invasive plants by ORVs.

Comment: [Referring to Project Design Criteria on DEIS page 26: "Minerals and Geology. Avoid or minimize disturbance…"] This will require fencing and gates to prevent invasive plant dispersal. *Comment 234-63*

> **Response:** As described in the design criterion referenced by the commenter, each material source open to OHVs would be evaluated for the necessity of fencing, gates, or other means as a way of controlling use.

Threatened, Endangered and Sensitive Species; Management Indicator Species

Comment: We have supported ODFW's monitoring effort to track the health of the redband population across the Deep Creek drainage, since redbands are a state and federal sensitive species. Through our survey work, we know redband populations in the Deep Creek area have not rebounded yet with our restoration work, and the species is still vulnerable to changes in climate and lack of habitat which is still fragmented. We cannot justify further elements across the drainage, which will keep habitat fragmented and degraded. *Comment 139-8*

> **Response:** The development of Alternative 3 Modified addresses concerns with water quality in the Deep Creek Watershed. Also see response to comments 79-27 and 92-42.

Comment: Species that could be driven out into less suitable habitat, threatening the viability of disturbance-sensitive species, include Pileated woodpeckers, lynx, Northern goshawks, wolverines, elk, Pacific fisher, and potentially other species, such as Pronghorns, marten, and various Neotropical migratory songbirds, —all of which are o+B205f federal and state listed species and Management Indicator species. *Comment 176-16*

> **Response:** For wildlife in general and disturbance sensitive species refer to response to comments 41-15, 120-5, 120-14, 173-12, 214-4 and 225-3. For pileated woodpeckers refer to

response to comments 233-6, 234-17 and 234-184 to 234-189. For goshawks refer to response to comments 233-6 and 234-77. Additionally use on an established trail, whether motorized or non-motorized, is less disruptive if the pattern of travel is consistent than if the activity is irregular, unpredictable and includes starts and stops (see Effects to Raptors in the EIS). For neotropical songbirds refer to response to comments 120-14. Two Candidate species are known or suspected to occur on Ochoco National Forest, the California wolverine (*Gulo gulo*) and the greater sage-grouse (*Centrocercus urophasianus*). Ochoco National Forest is within the range for which the "warranted" finding applies. These species are considered to be sensitive species on Ochoco National Forest and they are addressed in the EIS in the TES section along with the other TES species. Pacific fisher and Canada lynx are not known or suspected to exist within the project area in persistent or reproducing populations. For this reason they are not listed on the Regional Forester's TES list for Ochoco National Forest. MIS species are also discussed in the EIS.

Comment: We are also concerned that apparently there have been no population studies to determine population status and viability thresholds for Columbia spotted frog, Redband trout, and other listed or Management Indicator species, and thus there is no adequate analysis of actual effects to these species from foreseeable OHV use and other project-related activity impacts. This makes it impossible to determine that these species will not likely be subject to up-listing or local extirpation. *Comment 234-35*

Response: Effects to management indicator species, sensitive species, and federally listed species are disclosed in Chapter 3 of this document. Also see response to comments 234-110 and 234-121.

Comment: **[**Referring to DEIS page 248: "Wolverines occupy habitat in a high elevation band…"] How does this account for their huge home range territories & wolverine sightings much lower in elevation? *Comment 234-172*

Response: This sentence fragment is taken out of context. The remainder of the paragraph in the EIS from which this quote was taken, and the following page detail the variety of settings in which wolverine have been recorded, as well as a discussion of home range.

Comment: **[**Referring to DEIS page 249: "Existing Conditions: District records list multiple wolverine sightings…"] – Reasons for avoiding trail & staging area construction & use in the Lookout Mt. area, Peterson Point area, & any other areas listed as potentially suitable natal denning habitat – esp. as wolverine are now proposed for uplisting, and "the most critical and limiting habitat for wolverines seems to be acceptable natal denning habitat" (DEIS p. 248) which is available in the project area as per DEIS p. 249 above, par. 3. *Comment 234-173*

Response: There are no new trails proposed under any action alternative in the Lookout Mountain area. There are no new trails proposed in the Peterson Point area under the preferred alternative. See also response to comments 173-12, 173-16, 233-6 and 234-17.

Comment: [Referring to DEIS page 249: "The selection of any action alternative would have no effect on potential wolverine denning…"] – What about natal denning? *Comment 234-174*

Response: There is no evidence of natal denning by wolverine within the project area. The reasons that this area has low potential as reproductive habitat by this species are described in the same paragraph from which this quote was taken.

Comment: We have seen wolverine tracks and a definite wolverine (day sighting) in the Southern Malheur. Less suitable habitat than the Ochoco NF. *Comment 234-175*

Response: Wolverine are known to travel over great distances across habitat that is not suitable for denning when they are dispersing or are on a foraging foray. This is especially

true of male wolverines who sport a home range averaging 588 square miles. Both of these points are noted in the EIS. Wolverine are occasionally spotted or trapped while crossing through areas that are not suitable for long term occupancy by wolverine. In the case of wolverines sighted in Southern Malheur County or trapped in Drewsey, these animals were likely making their way around a home range radiating out from mountainous areas within the region, were exploring outward in search of food supply, or were dispersing. Such areas are not an appropriate measure of habitat suitability.

Comment: We remain concerned re: potential impacts to Wolverine from this project. *Comment 234-177*

Response: As described in the EIS, wolverine tend to select for high elevation alpine wilderness areas during the summer. Alpine habitats do not occur in proximity to any proposed trails under the preferred alternative; therefore, potential for impact to wolverine during the season of use (June 1 to September 30) is low. See response to comments 173-16 and 179-6.

Comment: More reason to not locate OHV trails near "special habitat" wet meadows, wetlands, etc. Butterflies don't stand a chance against OHVs! *Comment 234-178; also reflects comments 234-179 – 234-181*

Response: This species is strongly associated with bog or fen habitat in the transition zone between forested edges and the open meadow systems, and open riparian areas and marshes containing large amounts of Salix and larval food plants (Warren 2005). This is the zone in which this species was found to be present during surveys conducted between 1995 and 1998. None of the areas where this species was confirmed to be present during those field surveys are within a mile of any proposed OHV route. Wet meadows and wetlands were avoided during planning for trail placement, particularly for the preferred alternative. In addition, the development of Alternative 3 modified involved reduction of the number of stream crossings and adjacent forested area. Threats to the species include habitat succession and drying which have put many populations under stress (Pyle 2002), conifer encroachment and pesticides. This project does not contribute to any of these threats, nor does it propose routes across any area with a known population of this species or any bogs, marshes or expansive wet meadow areas. Also refer to response to comment 179-6.

Comment: [The proposed alternatives] could contribute to a trend toward federal listing for Wolverine, Silver-bordered Fritillary butterfly, & Peregrine falcon based on our assessment of the information presented in this DEIS & other information regarding these species. Species of most concern re: impacts from this OHV trail project: American Peregrine Falcon, California Wolverine, and Silver-Bordered Fritillary. *Comment 234-182*

Response: Given that there are no known or suspected denning sites or reproductive populations of wolverine, no known occupied habitat of silverbordered fritillary butterfly, and no known reproductive territories for peregrine falcon within a mile of any proposed OHV trail, and that no habitat for any of these species would be modified by this project, this project would not contribute to a trend toward federal listing of any of these species. Rationale for this determination is presented in the Wildlife, TES section of the EIS.

Comment: We want any new or closed rd trail construction or interior OGMA & PFA trails dropped. In our experience, Pileated woodpeckers are actually very sensitive to human disturbance – just someone walking toward them, let alone OHV traffic – and Blackbacked woodpeckers & others are somewhat less sensitive to disturbance. *Comment 234-184*

Response: It does not have to be motorized activity in order to disrupt breeding activity. It is true that a person walking directly toward a bird, especially in a nest grove and especially

during the breeding season, can be very disturbing. In fact, raptors and other disturbance sensitive birds have been known to abandon breeding sites or nests where non-motorized human activity has occurred. That is why protocols are developed to prevent excessive disturbance when monitoring avian breeding sites. In fact studies have shown that a person walking straight toward an animal or travelling off-trail is more disruptive than people passing by on a tangent to the animal (see General Effects to Wildlife, Behavioral changes in response to human use in the EIS). Refer to response to comments 233-6 and 234-17 for OGMA.

Comment: We are concerned by Cumulative Impacts to Pileated & other woodpeckers & PCEs – esp. Blackbacked woodpeckers. Why doesn't this DEIS admit that the effect would be less snags, less snag recruitment, & smaller snags? "Improved forest health" translates to the negative ecological effects of trying to reduce or prevent natural disturbances which perpetuate biodiversity. *Comment 234-185; also reflects comment 234-186*

Response: The DEIS (page 259) acknowledges that snag abundance along open roads may be reduced over time, but that dead and defective tree habitat and log habitat would continue to be well-distributed across the landscape. The Ochoco Summit project is not expected to change the distribution of snags and logs on the landscape, and is therefore not expected to contribute to cumulative effects to species that require these habitats.

Water Quality, Aquatic Species

Comment: There are also many miles of new construction from Hwy 26 to the Rd. 22 – 150 spur. This will result in more soil disturbance and soil erosion. Once these trails become established and used, it will be very difficult to stop it no matter how bad the erosion problem becomes. *Comment 10-2*

Response: See the Sediment/Turbidity environmental effects analysis discussion in the Upper Marks Creek Subwatershed for each alternative and the cumulative effects section in the Hydrology section of Chapter 3 of the report.

Comment: Discussions of impacts on water quality describe a potential for higher run volumes for East Fork Howard Creek as a result of off-road trail construction and use. Obviously, the undesirable impact could be downstream erosion, resulting in loss of riparian vegetation and in turn, decreased flow through the Wild Horse Territory. The cumulative effects of climate change, human activity, sheep grazing, and upstream degradation will be water scarcity within the Wild Horse Territory. While there may be plenty of water remaining under the current situation, the relative scarcity affects the dispersion of horse, sheep, and wildlife populations, increasing localized resource damage. This is already evident, and we are concerned that an additional stress on the watershed could have severe impacts on the horses and other wildlife. To a lesser extent, the Ochoco Creek Watershed could be similarly impacted.

What analysis was performed to measure direct and cumulative impacts of the proposed Ochoco Summit Trail System on water quantity and quality within the Wild Horse Territory? *Comment 46-9*

Response: Within the Howard Creek Subwatershed, only the headwaters of the South Fork of Howard Creek are located within the area designated as the Wild Horse and Burro Territory. Direct and cumulative effects analysis of flow and sediment regimes, as well as sediment and turbidity for the South Fork of Howard Creek are included in the Howard Creek Subwatershed sections of the Hydrology report.

Comment: Dust and Soil Damage: OHV's create ruts in trails, compact the soil and send up clouds of dust. Fragile soil systems will be destroyed, causing loss of moisture and damage to the microbial ecosystem. *Comments 62-11, 72-9, 87-9; also reflects comment 113-15*

Response: The potential effects of OHVs on soils are disclosed in the Ochoco Summit Soils report on pages 9 to 12 and 15 to 17. Wind erosion and dust effects are discussed on pages 10 and 16. See Project Design criteria common to all action alternatives, water quality, aquatic organisms and soils. See discussion of site productivity, organic matter and microbiotic crusts on page 15.

Comment: Erosion: Erosion of this Mazama Ash type soil is inevitable with OHV usage. We've all seen trails spoiled by OHV abuse. Eroded soils wash into streams, harming fish habitat. *Comments 62-12, 72-10, 87-10; also reflects comment 113-6*

Response: The Hydrology section of the report discloses effects to water quality from each of the alternatives and includes an analysis of the slope erosion hazard. The slope erosion hazard is based on the Forest Soil Resource Inventory, a layer indicating landslide terrain, and slope from a digital elevation model. To minimize sediment delivery, project design criteria were established that would discourage channelized flow down trails. See Project Design Criteria Common to All Action Alternatives, Water Quality and Aquatic Organisms, as well as Soils. In addition, see the Hydrology effects analysis for each alternative for sediment/turbidity to streams in the project area. Effects to water quality will not exceed Forest Plan Water Quality Standards and Guidelines.

Comment: New Trails: The proposed trail system is 101 miles and includes 50 miles of new trails with 27 class 1 and 2 stream crossings. OHV stream crossings equal damage to fish and stream banks, as well as important plant life that provides cover and food. Roughing up streambeds on OHV's happens all too frequently. *Comments 62-7, 72-5, 87-5; also reflects comment 41-25, 45-11, 81-4, 81-9, 92-11, 113-9*

Response: See Project Design Criteria Common to All Action Alternatives, Water Quality and Aquatic Organisms, as well as Soils. In addition, see the Hydrology effects analysis for each alternative for sediment/turbidity to streams in the project area. The discussion in the Hydrology section of the DEIS indicates that, because of trail placement and design criteria, the majority of trail segments and stream crossings would not create unwanted effects to water quality and riparian areas. Table 83 (DEIS page 184) displays the locations where construction and use of OHV trails would create a concern from a hydrologic perspective. In preparing the final EIS, the planning team proposed modifications to Alternative 3 that would remove trail segments from all of the areas of concern identified in Table 83.

Comment: Our rationale that the above purpose and objective were not met is based on the following:

The Hydrology section (DEIS 105-232) describes how any of the action alternatives will have more impacts on watershed conditions (i.e., flow and sediment regime, sediment/turbidity) than the no action alternative assuming the TM ROD is implemented as described. However, it is important to note that this assessment is based on existing conditions rather than correlating the assessment with efforts underway to move the system towards desired "excellent" conditions. *Comment 79-13*

Response: All alternatives include implementation of the project design criteria and would result in the water quality standards and guidelines described in the Forest Plan being met. An overall cumulative improvement is anticipated once existing user-created trails revegetate

Comment: Furthermore, the described project impacts are cumulative effects on top of a road system exhibiting road densities within 300 feet of perennial and intermittent streams within the Ochoco Summit project area subwatersheds ranging from 4.3 to 8.2 miles per square mile (DEIS 120); existing road densities within springs and wetlands and their associated Riparian Habitat Conservation Areas that are between 2.8 and 9.9 miles per square mile (DEIS 120); and existing road

stream crossings per subwatershed that range from 1.8 to 5.0 crossings per square mile (DEIS 121). In other words, significant water quality impacts are currently occurring. *Comment 79-14*

> **Response:** There are no Forest Plan Standards and Guidelines for road densities within RHCAs or number of stream crossings per subwatershed. Current effects to water quality were disclosed in the Hydrology section of the DEIS.

Comment: A misleading assessment is the Forest's ranking of the above ranges as being low, moderate, or high when one realizes these rankings are arbitrarily based on existing conditions with no relevance to healthy ecological functions or efforts being made to create desired conditions. The density of roads/trails within 300 feet of perennial and intermittent streams and the density of roads in Groundwater Dependent Ecosystems and associated Riparian Habitat Conservation Areas were ranked low (< 6 miles/square mile), moderate (6-7 mi/sq mile) or high (>7 mi/sq mile) but the Forest doesn't explain where this ranking system originated. The ranking does not appear to be scientifically based that demonstrates conditions that are conducive to good ecological health but rather an arbitrary system based on current densities. The overall density of roads within a subwatershed was ranked low (< 3.5 mi/sq mi), moderate (3.5-4 mi/sq mi) or high (>4 mi/sq mi) by taking all of the current densities and ranking the lowest 1/3 as low, the middle 1/3 as moderate and the upper 1/3 as high. This is an arbitrary ranking system that gives no indication if densities are conducive to healthy ecosystems. Of particular interest is that the DEIS states the current road/trail densities range from 3.0-4.6 (pg 120), which are all at or over the Land and Resource Management Plan (LRMP) standard. The same way of ranking drainage density and stream crossing density was used basing the ranking on general road density. If an existing condition is already degraded and the difference from the action alternative is small, a false conclusion could be made that there will be no too little impact from the alternative; where in reality, the impact will be cumulative to the degradation that is already occurring. *Comment 79-15*

> **Response:** The LRMP road density standard is for open road densities. The road densities used in the Flow and Sediment Regime analysis also included closed roads, since the road bed is still present and they still have the potential to affect the flow and sediment regime.

Comment: The Department also disagrees with how the Forest analyzed bank stability. The Forest only looked at the percent of cutbanks on a stream and didn't take into account lateral stability. The Forest's assumption was there would be an increase in peak flow if the connectivity between the trails and streams increased due to an increase in road/trail density. There are other factors that influence bank stability besides peak flow like the amount and type of plant communities found in the riparian zone, whether the bank is vegetated or unvegetated, amount of rock on the bank and the amount of bank alterations from other management practices including grazing, logging and user-created trails/crossings. *Comment 79-19*

> **Response:** Lateral stability is accounted for in the Hydrology analysis by factoring in the channel sensitivity and recovery potential. Channel sensitivity and recovery potential for each surveyed stream reach were determined based on Rosgen Channel Types, which are based on multiple geomorphic variables effecting a stream channel's senstivity to disturbance and recovery potential. Cumulative effects from other management activities were analysed in the cumulative effects section of the Hydrology report**.**

Comment: The DEIS (116) states "Roads have the potential to increase the drainage density of a stream network by intercepting runoff at stream crossings or by channelizing flow that would otherwise be sheet flow or groundwater flow (Wemple at al. 1996; Jones et al. 2000; Takken et al. 2008). By increasing the drainage density and providing a more direct route to stream channels, roads in effect can decrease the time it takes for the precipitation, in the form of runoff, to enter the stream channel and potentially resulting in increased peak flows (La March and Lettenmaier 2001; Storck et al. 1998; Waldie et al. 2009). In addition, since erosion risk from ATV trails has been shown to

potentially equal that of a forest road network, it can be expected that trails have the potential to increase drainage densities and peak flows similar to forest roads (Meadows et al., 2008). Areas with high road densities, high drainage densities, and a high density of stream crossings typically result in higher connectivity of the road and stream network. The effects of roads (or trails) on increased peak flows is expected to be greatest downstream of areas with a high density of stream crossings (Jones et al., 2000)" The Department acknowledges the Forest's research in collecting information relevant to the contribution of roads and ATV trails on sediment delivery to streams. However, we are dismayed the Forest acknowledges these impacts and yet asserts that each of the action alternatives will not have significant impact to sediment delivery and sediment load in streams. *Comment 79-22*

> **Response:** The Hydrology analysis described in the DEIS does not assert that "each of the action alternatives will not have significant impact to sediment delivery and sediment load in streams." Summaries by alternative in the environmental effects analysis in the Hydrology section of the DEIS describe the overall effects to flow and sediment regimes and sediment/turbidity in both the short-term and long-term. More specific effects to streams and subwatersheds are disclosed by subwatershed.

Comment: The DEIS evaluates the potential for sediment from the different alternatives based on average precipitation patterns and modest hydrologic events. However, the greatest potential for sediment contribution to streams frequently occurs during the unusual event of high magnitude. These occur in the project area on an infrequent but regular basis as either rain on snow or summer thunderstorm events. Typically these are of short duration but their impacts in terms of sediment delivery in areas with disturbed soils, including roads and trails, can be severe and long lasting. *Comment 79-23*

> **Response:** To minimize sediment delivery, project design criteria were established that would discourage channelized flow down trails. See Project Design Criteria Common to All Action Alternatives, Water Quality and Aquatic Organisms, as well as Soils. In addition, see the Hydrology effects analysis for each alternative for sediment/turbidity to streams in the project area.

Comment: The 1st bullet DEIS 232 is contradictory to the entire fish section and the 3rd bullet below it. The entire section talks about sediment getting into the stream which will fill in the pools and interstitial spaces in the substrate which will impact spawning and macroinvertebrate distribution and community yet then the DEIS say in the first bullet that there will be no measurable effects. *Comment 79-24*

> **Response:** The first bullet on DEIS 232 does state that, in general, the project would not create measurable effects to aquatic habitats or to redband trout. To clarify this statement, the project would not create measurable effects long-term to aquatic habitat or to redband trout. The effects to aquatic species section has been rewritten and clarified for the FEIS, and is now incorporated into the Water Quality and Aquatic Species section.

Comment: The DEIS (178) states "Essentially, there are no measurable increased cumulative effects beyond those effects described in the "Direct and Indirect Effects" section relative to the flow and sediment regimes within the watersheds that overlap the Ochoco Summit project area". The Department disagrees with this determination. Redband trout populations currently are vulnerable due to impacts from livestock grazing. Trout productivity is limited by excessive sediment load in streams from unstable banks reducing spawning success and limiting macroinvertebrate production. This condition will be exacerbated by additional sediment resulting from construction and use of trails in each of the action alternatives. *Comment 79-20*

> **Response:** Livestock grazing occurs across the Ochoco Summit project area. Recently, improvements to grazing management were made, as described in the Marks Creek Allotment

Management Plan (see page 178 of the DEIS). Implementation of this plan should improve grazing impacts to streams. Based on estimated negligible increases in the overall road/trail densities in the sediment delivery zone of streams and in GDE RHCAs in the watersheds with future and ongoing projects, cumulative effects from future and ongoing projects to the sediment delivery and turbidity increases are anticipated to be negligible (page 178).

Comment: The DEIS (186) states "By following the Project Design Criteria, the proposed trail May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend towards Federal Listing or Cause a Loss of Viability to the Population or Species". The Department asserts this is a highly conjectural statement and specifically identifies monitoring as inadequate to effectively evaluate if project implementation is reducing viability of redband trout populations. *Comment 79-21*

Response: In terms of redband trout, the determination of "May Impact Individuals of Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" was made for project activities. The DEIS acknowledges in the Aquatic Species Section that there will be impacts (mostly short-term) to redband trout populations and habitat due to increases in sedimentation. However, compared to existing conditions, there may be improvement somewhat in bank stability and sediment delivery in the long-term relative to past cross-country travel due to better trail locations and implementaiton of Resource Protection Measures and water quality best management practices (see Chapter 2 of the DEIS). A monitoring plan for water quality is included on page 33-34 of the DEIS. The monitoring plan includes implementation monitoring that would evaluate the effectiveness of BMPs and INFISH standards and guidelines, drainage effectiveness before and after opening, and selected reaches of stream would be monitored to evaluate changes in sediment. This will help evaluate stream habitat conditions and if the project activities are reducing the viability of redband trout populations in the project area.

Comment: The 1st bullet DEIS 232 is contradictory to the entire fish section and the 3rd bullet below it. The entire section talks about sediment getting into the stream which will fill in the pools and interstitial spaces in the substrate which will impact spawning and macroinvertebrate distribution and community yet then the DEIS say in the first bullet that there will be no measurable effects. *79-24*

Response: The first bullet on DEIS 232 does state that, in general, the project would not create measurable effects to aquatic habitats or to redband trout. To clarify this statement, the project would not create measurable effects long-term to aquatic habitat or to redband trout. This discussion is clarified in the FEIS.

Comment: When analyzing the cumulative effects of the Deep Creek Watershed Restoration (DEIS 174), it states that, "Most proposed activities are located within RHCA's and were designed to move the watershed towards meeting interim RMOs." This tells the Department that the FS doesn't consider the Deep Creek area to be in good ecological condition yet, each action alternative mentions sediment and turbidity will increase in Deep Creek. If this area is not meeting RMO's then why does the Forest want to degrade it further with this project? *Comment 79-25; also reflects comments 139-2, 139-3, 139-4, 139-6, 139-9*

Response: During the development of the final EIS for the Ochoco Summit project, the project's planning team developed recommended modifications to the preferred alternative (Alternative 3). These modifications included changes to the proposed trail system to respond to concerns related to restoration in the Deep Creek watershed.

Comment: The majority of streams within the identified project area are inhabited by interior Columbia redband trout, a State and Federal sensitive species. Genetic analysis conducted by Currens in 1994 indicated the population of redband trout in the Crooked River subbasin is genetically distinct

from other populations. As such, viability of Crooked River redband trout is important to the long term conservation of the species. Due to past and current anthropogenic influences redband trout populations in the Crooked River subbasin are characterized as fragmented and depressed (ODFW 1996, Stuart et al 2007). The streams within the Ochoco National Forest represent the most extensive area of suitable redband trout habitat remaining in the subbasin. Other areas of the Crooked River watershed are highly degraded and the few strong redband populations are isolated. Habitat within the National Forest provides the best opportunity for persistence of the species.

While Forest habitat is essential for Crooked River redband trout conservation, many populations in streams within the ONF are depressed and vulnerable to stochastic and deterministic perturbations. The Department has been engaged with ONF staff in excess of 15 years regarding the impacts of livestock grazing on aquatic habitat and redband trout populations within the Forest. Most streams within the project area are on the Oregon Department of Environmental Quality 303d list for excessive temperatures. Many streams fail to meet the riparian management objectives identified in the LRMP and INFISH standard and guidelines. This is largely due to impacts from past and current livestock grazing practices. Interagency discussions regarding livestock grazing have been productive and the Department appreciates the Forest's recognition that additional monitoring is required to ensure current management is contributing to desired future conditions. However, implementation of monitoring plans has been limited at best and many streams and aquatic habitats fail to provide conditions to support robust redband trout populations. *Comment 79-27; also reflects comments 79-28, 79-29*

> **Response:** Livestock grazing occurs across the Ochoco Summit project area. Recently, improvements to grazing management were made, as described in the Marks Creek Allotment Management Plan (see page 178 of the DEIS). Implementation of this plan should improve grazing impacts to streams. A monitoring plan for water quality is included on page 33-34 of the DEIS. The monitoring plan includes implementation monitoring that would evaluate the effectiveness of BMPs and INFISH standards and guidelines, drainage effectiveness before and after opening, and selected reaches of stream would be monitored to evaluate changes in sediment. This will help evaluate stream habitat conditions and if the project activities are reducing the viability of redband trout populations in the project area. Also see response to comments 79-25, 79-49.

Comment: Of great concern to the Department is the affect any increase in motorized use will have on water quality and big game populations on the Ochoco National Forest. Case in point, the Forest has an extensive system of springs, streams and riparian habitat that is negatively affected by motorized roads and trails that will increase with implementation of any of the action alternatives (DEIS 131 - 174). *Comment 79-49*

> **Response:** Effects to water quality are anticipated in the short-term; however, long-term effects relative to existing condition vary by alternative. These effects to water quality are discussed in the Hydrology Environmental Effects and Cumulative Effects section of the report. Effects to Groundwater-Dependent Ecosystems, including springs, were analyzed and are disclosed in the Hydrology section of the report as well. Refer to the Wildlife section of the report for effects to big game populations. These effects would not, however, result in exceeding Forest Plan Water Quality Standards and Guidelines.

Comment: Likewise, we think the proposed OHV system will significantly affect water quality, fish populations, and fishing opportunity. *Comment 79-53*

> **Response:** A thorough discussion and analysis on the effects of the Ochoco Summit Project to water quality and fish populations are found in the hydrology and aquatic species sections of the DEIS. In general, all action alternatives would have short-term effects to water quality and fish populations, but would either maintain the current condition or slightly improve the

condition of water quality over the long term, based on implementation of design criteria and water quality best management practices (see Water Quality and Aquatic Organism and Soils section under the Resource Protection Measures in Chapter 2 of the DEIS). In terms of fishing opportunity, the commenter does not identify the effect the Ochoco Summit Project would have on fishing opportunity. Fishing opportunity would not be affected by implementation of any action alternative.

Comment: The erosion, sediment delivery and damage to spawning gravel, eggs and alevins from OHVs are severe, based on recent Forest Service research. It must be greatly reduced, not increased. *Comment 81-2*

Response: It is unclear what Forest Service research the commenter is referencing. On page 195 of the DEIS, there is discussion of the risks and effects that ATV/OHV trails have on aquatic habitat and species. Project design criteria were created (see Chapter 2 of the DEIS) to minimize effects to aquatic species. A thorough analysis was completed (see Aquatic Species section) and it was determined that implementation of the Ochoco Summit project would have minor negative effects on redband trout and Columbia spotted frog, but would not likely contribute towards federal listing of either species.

Comment: The following graph of erosion was created from data in the listed research by the Forest Service Research Station. The study was conducted on six forests chosen to represent the range of forests in various regions. It's clear the ATVs/OHVs are one of the most damaging uses and seriously impact streams and fish habitat, particularly the spawning-rearing gravel. I urge you to review the paper! Data Source - "Erosion From All Terrain Vehicle (ATV) Trails on National Forest Lands" Randy B. Foltz, Research Engineer, PhD USDA Forest Service, Rocky Mountain Research Station http://forest.moscowfsl.wsu.edu/engr/library/Foltz/Foltz2006e/ASABE2006e.pdf. *Comment 81-5*

Response: The literature cited by the commenter was reviewed by the project fisheries biologist. A key piece to this article is that it is specifically talking about unmanaged ATV use on National Forest lands. Where the Ochoco Summit Project deviates from the findings of this article is that the Ochoco Summit Project would be managed ATV use, which would require monitoring, implementation of design criteria and best management practices to ensure that damage to natural resources is minimized or prevented. Implementation of the Ochoco Summit Project would help better manage illegal ATV use in the area and help deter unmanaged ATV use from occurring in the area in the future.

Comment: We are particularly concerned about the cumulative impacts of this project on fish and wildlife resources of the area. The substantial motorized travel impacts are not adequately assessed, including erosion impacts on fisheries and fragmentation impacts on wildlife. *Comment 82-2*

Response: An analysis of cumulative effects for aquatic species was completed for the Ochoco Summit Project (pages 227-229). It was determined that all alternatives may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or loss of viability to the population or species. However, the proposed trail would still have negative effects to fish and frogs and their habitat in specific sites identified in the effects section. A detailed sediment analysis is included in the hydrology section of the Ochoco Summit DEIS. From a sedimentation standpoint, the action alternatives would produce short-term sediment for 2-3 years, but would at least return to existing condition levels after this time period based on implementation of design criteria and water quality best management practices, as well as revegetation of existing user-created trails over time. Refer to response to comments 41-15, 79-56, 173-12, 190-7 and 214-4.

Comment: Redband trout spawn between March and the end of June. They will be spawning during trail use and they and their eggs could be covered by sediment. *Comment 92-30*

Response: The potential for sediment delivery and the associated effects to aquatic species were described and disclosed in Chapter 3 of the draft EIS. Table 83 in the DEIS listed site-specific locations of hydrologic concern due the the elevated risk of sediment delivery. Alternative 3 Modified alleviates concerns at all of the locations identified in Table 83.

Comment: The proposed trail system is totally unacceptable, even to an untrained eye one can see that there are existing trails damaged by OHV use creating eroding soils that wash sediments in the streams harming fish habitat. *Comment 97-3*

Response: Existing user-created OHV trails exist on the Ochoco National Forest. These trails were created by users and were not properly designed to minimize resource damage; therefore, some trails have resulted in eroding soils and caused sedimentation into streams. However, trails constructed under the Ochoco Summit project would include design criteria and water quality best management practices (see Water Quality and Aquatic Organism and Soils section under the Resource Protection Measures in Chapter 2 of the DEIS) that would minimize effects due to OHV use. Some user-created trails would be rehabilitated under the Ochoco Summit project; others would revegetate over time on their own, leading to an overall reduction in fine sediment production.

Comment: While we believe that effective implementation and administration of project design criteria and monitoring substantially minimizes potential effects, we remain concerned about the action alternatives' potential unavoidable adverse effects - such as reduced water quality from increased sedimentation and turbidity. We are especially concerned about increased sediment delivery from trails less than 300 feet from a stream channel. *Comment 134-4*

Response: Sediment delivery was estimated and is disclosed in the Hydrology and Aquatic Species sections of the DEIS. These environmental effects of sediment delivery would not exceed the Forest Plan Standards and Guidelines relative to the existing condition.

Comment: Locally, we have been supporting restoration work in Deep Creek, bringing funding and volunteers onto the forest to fix degraded streams and habitat. As Project Manager of the Upper Deschutes Home Rivers Initiative in the region, I am currently working with the Ochoco National Forest as a requested partner, where we together have raised hundreds of thousands of dollars for stream restoration projects in the Deep Creek watershed. Because of my commitment to stewardship in Deep Creek and meeting goals with staff from the Forest, we cannot support the proposed actions, and we only would support Alternative 1 at this time. *139-1*

Response: During preparation of the final EIS, the project planning team developed a modified alternative (working from Alternative 3, the preferred alternative) that eliminates all trail segments identified in DEIS Table 83, thus eliminating all areas of hydrologic concern identified in the DEIS. Several trail segments were moved or eliminated in the Deep Creek drainage to alleviate concerns in this location.

Comment: It is time to focus on better management of our water and streams, and the ecological services they provide. As I have shared, many of these streams have been identified on the 303 (d) list for temperature and must be legally studied and improved, yet temperature will not come down without shade, protected springs, and deep pools. The road system already allows for too much access into the riparian areas, and thus additional trail segments will add to a loss of vegetation and a strong chance for additional erosion. As a partner, we want to support restoration projects that are aligned realistically with a more reasonable travel management plan and proper monitoring and enforcement. *Comment 139-11*

Response: In order to address potential stream temperature effects from trail construction, project design criteria were included that prevent the removal of shade producing trees on streams on the 303(d) list for water temperatures. Any exceptions will be reviewed on a case-

by-case basis by a fisheries biologist or hydrologist. In addition, Project design criteria were developed to reduce the amount of sediment delivered to the stream. See Project Design Criteria Common to All Action Alternatives, Water Quality and Aquatic Organisms, as well as Soils. In addition, see the Hydrology effects analysis for each alternative for sediment/turbidity to streams in the project area. Actions would still meet Forest Plan water quality standards and guidelines. The Water Quality and Aquatic Organisms Project Design Criteria, Bullet 8 provides for maintenance of drainage features and adaptive management of them, if rutting, rilling, or gullying occur, "if rutting, rilling, and gullying do occur, the affected trails (or areas) will be shut down until rehabilitated or until reconstructed to alleviate erosion at affected sites."

Comment: [Referring to DEIS Page 90]. "The Mazama Ash component of the soils provides an erosive potential for the system, especially when on grade." Repetitive use by ATVs will, during dry conditions, create a dust cloud that will cover vegetation making it unpalatable to wildlife and may kill it. Page 99 "Typically, trail degradation follows one of two pathways: surface erosion or surface failure." "Either pathway can lead to environmental impacts that are extremely difficult to stabilize or reverse." The soils in the proposed project have demonstrated degradation of this type, increased use will have a negative effect. Water quality will be affected. *Comment 147-8*

Response: The Hydrology section of the report discloses effects to water quality from each of the alternatives and includes an analysis of the slope erosion hazard. The slope erosion hazard is based on the Forest Soil Resource Inventory, a layer indicating landslide terrain, and slope from a digital elevation model. To minimize sediment delivery, project design criteria were established that would discourage channelized flow down trails. See Project Design Criteria Common to All Action Alternatives, Water Quality and Aquatic Organisms, as well as Soils. In addition, see the Hydrology effects analysis for each alternative for sediment/turbidity to streams in the project area. Effects to water quality will not exceed Forest Plan Water Quality Standards and Guidelines.

Comment: OHV Trail system activity will increase sedimentation from erosion in the watershed, which could impact the ranch irrigation systems and some of Papé's grant projects. *Comment 203-4*

Response: Project design criteria were developed to reduce the amount of sediment delivered to the stream. See Project Design Criteria Common to All Action Alternatives, Water Quality and Aquatic Organisms, as well as Soils. In addition, see the Hydrology effects analysis for each alternative for sediment/turbidity to streams in the project area.

Comment: This area includes many streams, springs, wetlands and is part of the wild and scenic North Fork of the Crooked River. Riparian systems are sensitive to damage and should not be put at risk. Current OHV use already damages these fragile system leaving tracks, destroying native plants, and reducing water quality. *Comment 215-2; also reflects comment 234-34*

Response: Motorized access is allowed only on designated routes. This project would designate allowed routes and user-created trails would no longer be used, most of which would ultimately revegetate. In the long-term, with the implementation of the Project Design Criteria, overall water quality and riparian systems should see improvement relative to the existing condition and even more so, relative to previous cross-country OHV travel conditions. See the effects analysis in the Hydrology section of the report for more detailed effects to streams, springs, and wetlands relative to water quality. See the effects analysis in the Botany section of the report for more detailed effects to native plants.

Comment: DEIS page 3: "In 1995, the Inland Native Fish Strategy Decision Notice…" – Any OHV road & trail network must stay out of INFISH riparian buffers and not set back the attainment of INFISH RMOs. *Comment 234-49*

Response: Standard RM-1 in INFISH states "Design, construct, and operate recreation facilities, including trails and dispersed sites, in a manner that does not retard or prevent attainment of the Riparian Management Objectives and avoids adverse effects on inland native fish" (see page 6 of the DEIS). Analysis indicated that some trail locations would not retard or "set back" attainment of RMOs. However, on page 229, the project biologist specifically states that "there are specific sites in each Alternative where building a trail would slow the rate of recovery below the near natural rate of recovery if no additional human caused disturbance was placed on the system. The DEIS acknowledges that there will be some trails that are not consistent with INFISH. During preparation of the final EIS, the project planning team developed a modified alternative (working from Alternative 3, the preferred alternative) that eliminates all trail segments identified in DEIS Table 83, thus eliminating all areas of hydrologic concern identified in the DEIS.

Comment: DEIS page 5: "INFISH": OHV use is incompatible with these management goals for RHCAs. *Comment 234-50*

Response: There is nothing in INFISH that says OHV use in incompatible with the management goals for RHCAs. Standards for recreation management state that recreation facilities, including trails, must be constructed and designed in a manner that does not retard or prevent attainment of RMOs. Page 229 of the DEIS does acknowledge that some specific trails will be inconsistent with INFISH because they will retard or prevent attainment of RMOs. During preparation of the final EIS, the project planning team developed a modified alternative (working from Alternative 3, the preferred alternative) that eliminates all trail segments identified in DEIS Table 83, thus eliminating all areas of hydrologic concern identified in the DEIS.

Comment: DEIS page 6: It is very well documented that OHV use in riparian areas will cause significant long-term ecological impacts. These foreseeable impacts & their documentation make it necessary to avoid the impacts occurring by keeping OHVs completely out of riparian areas & RHCAs, not waiting until the damage is done to try to restore sites, which would be contrary to INFISH RMOs. *Comment 234-51*

Response: It is unclear what Forest Service research the commenter is actually referring to in this comment. On page 195 of the DEIS, there is discussion of the risks and effects that ATV/OHV trails have on aquatic habitat and species. Project design criteria were created (see Chapter 2 of the DEIS) to minimize effects to aquatic species. A thorough analysis was completed (see Aquatic Species section) and it was determined that all alternatives are consistent with INFISH over the majority of the project area, but that there are specific sites in each alternative where building a trail would "slow the rate of recovery below the near natural rate of recovery if non additional human cause disturbance was placed on the system" (see page 229). During preparation of the final EIS, the project planning team developed a modified alternative (working from Alternative 3, the preferred alternative) that eliminates all trail segments identified in DEIS Table 83, thus eliminating all areas of hydrologic concern identified in the DEIS.

Comment: DEIS page 6: "RM-1. Design, construct, and operate…" - At the time of INFISH design, "trails" would have been understood to be nonmotorized. *Comment 234-52*

Response: There is nothing in INFISH standard RM-1 that makes the distinction between motorized and non-motorized trails. Our interpretation is that "trails" implies either motorized or non-motorized.

Comment: So will all stream crossings be over bridges? This is unclear. *Comment 234-68*

Response: New stream trail crossings on fish-bearing or perennial streams will consist of either bridges or culverts. If the stream class is a I or II, which means fish-bearing, then the bridge or culvert will have to provide for fish passage based on our regional guidelines.

Comment: Don't allow OHV trails to slope into the gorge of the stream. *Comment 234-107*

Response: The effects of constructing trails that slope into the inner gorge of the stream were assessed (see page 196). The DEIS acknowledges that trails constructed within the inner gorge would have the potential to contribute sediment to the stream and may affect fish and frog habitat. However, project design criteria for hardening approaches would minimize effects of sediment reaching streams. The effects of constructing trails that slope into the inner gorge are considered in the direct, indirect, and cumulative effects to aquatic species portion of the DEIS, and were determined to "May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species."

Comment: Don't allow any OHV trails to be within the 300 foot sediment delivery zone or anywhere near Class I & II streams. *Comment 234-108*

Response: New trail construction is proposed to varying degrees in project subwatersheds, including new stream crossings within 300 feet of Class I and II streams. There is the potential for an increased in sediment delivery to streams and unstable banks and site-specific locations, which is disclosed in the DEIS. However, in comparison to the existing condition, sedimentation and bank stability may improve somewhat in the project area long-term relative to past cross-country travel due to better trail locations and implementation of Resource Protection Measures (see Chapter 2 of the DEIS).

Comment: So what would be the effects to existing Redband trout & Columbia spotted frog population & to other aquatic life known to be in the project area? Why are direct, indirect, & cumulative impacts to species not addressed directly? *Comment 234-110*

Response: The effects to existing redband trout and Columbia spotted frog populations from Alternative 2 are located on page 229, where it specifically states that "All alternatives may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or loss of viability to the population or species". A detailed analysis of effects by project subwatershed are located in the Aquatic Species section of the DEIS. An analysis of cumulative effects for aquatic species was completed for the Ochoco Summit Project (pages 227-229) and for hydrology (pages 174-180).

Comment: Sedimentation from OHV traffic in these areas could be expected to continue with use past construction. Drop trail segments running parallel to streams. Drop trails overlapping roads w/hydrological connections. Drop trail segments within 300 feet of any stream; drop stream crossings. Any off trail OHV use could result in plants not reestablishing. *Comment 234-114*

Response: On page 199 of the DEIS, it clearly states that site-specific locations within the sediment delivery zone, there is the potential to increase sediment delivery to streams (also see Hydrology section in Chapter 3 of this document). Increased sediment at these locations has the potential to reduce spawning success of redband trout and reproductive success of spotted frogs. The effects in Elliot Creek described on page 199 were considered in the direct, indirect and cumulative effects of the Ochoco Summit project. The project would not lead to the listing of sensitive species nor lead to detrimental water quality impairments.

Comment: [Referring to DEIS page 200: "Field trips to the site during the summer of 2011 indicated that Allen Creek…"] – Why is such contradictory sacrifice of a high quality fish bearing stream already decided for restoration even considered? *Comment 234-119*

Response: The crossing structure on Allen Creek was removed for rehabilitation following the Maxwell Fire in 2006. The crossing that was previously in place was not properly sized so it was determined that removing it would be the best course of action in response to increased flows and debris coming down Allen Creek following the fire. The Ochoco Summit project proposes to reexstablish this crossing, but a culvert or bridge that is properly sized would be installed. There would be short-term increases in sediment due to installation of the crossing, but long-term conditions would return to existing condition levels. Crossings will meet the Regional (PNW) Aquatic Organism Passage Guidelines (sized for the 100-year flood and pass all aquatic organisms) (see Project Design Criteria on page 27).

Comment: So OHV use in new stream crossings & new trails adjacent to streams would add sediment to streams for at least 10-15 years during authorized use. *Comment 234-120*

Response: The Hydrology and Aquatic Species section of the DEIS address sediment delivery to project watersheds by alternative. In some instances, there will be long-term inputs of sediment at specific locations that may not be mitigated by project design criteria. The effects are disclosed in the direct, indirect and cumulative effects section of each resource area. The project was determined to not lead to the listing of sensitive species nor lead to detrimental water quality impairments.

Comment: DEIS page 202: "Establishing a Class I (OHV) trail on a decommissioned road…" – So– threatening the viability & uplisting of Redband trout & Columbia spotted frogs, not just affecting individuals. *Comment 234-121*

DEIS page 203: "Class I or Class II trail on FS3000-930…" – Another threat to fish & frog viability – including listed species. *Comment 234-125*

Response: The project fisheries biologist clearly states on DEIS pages 202 and 203 that establishing an OHV trail at this location would increase fines in the substrate, and that there would be an effect on fish and frog habitat. Cumulatively, the project biologist determined that the project "May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend towards Federal Listing or Cause a Loss of Viability to the Population or Species." This determination was made through a thorough analysis as documented in the aquatic species section of the DEIS.

Comment: What about cumulative impacts of the Jackson timber sale w/new OHV trails & stream effects in the Jackson & Deep Creek subwatersheds? *Comment 234-122*

Response: DEIS pages 227-229 (Aquatic Species) and pages 174-184 (Hydrology) describe cumulative effects for the Ochoco Summit project, which includes the Jackson Fuels and Vegetation Management Project. Based on estimated negligible increases in the overall road/trail densities in the sediment delivery zone of streams and in GDE RHCAs in the watershed with future and ongoing projects, cumulative effects from future and ongoing projects to the sediment delivery and turbidity are anticipated to be negligible (DEIS page 180).

Comment: DEIS page 203: "Approximately 1.6 miles of trail will be added within 300 feet…" – There are obvious INFISH/Forest Plan violations throughout these plans. *Comment 234-124*

DEIS page 229: "…however, there are specific sites in each Alternative…" – So isn't this an INFISH violation? *Comment 234-154*

Response: This is not in violation of INFISH or Forest Plan Standards. Standard RM-1 in INFISH states "Design, construct, and operate recreation facilities, including trails and dispersed sites, in a manner that does not retard or prevent attainment of the Riparian Management Objectives and avoids adverse effects on inland native fish" (see page 6 of the

DEIS). Recreation facilities, including trails, can be constructed within RHCAs as long as they do not retard or prevent attainment of RMOs. There are site-specific locations that the DEIS acknowledges would retard or prevent attainment of RMOs. During preparation of the final EIS, the project planning team developed a modified alternative (working from Alternative 3, the preferred alternative) that eliminates all trail segments identified in DEIS Table 83, thus eliminating all areas of hydrologic concern identified in the DEIS.

Comment: DEIS page 209: "If the trail location is beyond 50 feet…" – So is trail location beyond 50 ft of Crosswhite Cr.? *Comment 234-139*

Response: Because the proposed trail crosses Crosswhite Creek, the trail would be within 50 feet of the stream for a short distance (approximately 200 feet). Anything beyond 50 feet was determined to have no measurable sediment delivery impacts. The trail within 50 feet of Crosswhite Creek was analyzed in the sediment analysis for this project and incorporated in the effects of the project.

Terrestrial Wildlife

Wildlife – General

Comment: The wildlife, especially elk and deer are hardly seen in the last few years in our travels around the Ochocos. Once in a while an antelope is spotted in the grant meadows area, and birds still seem to be around in normal numbers. *Comment 38-2*

Response: Deer and elk populations and trends are discussed in the Management Indicator Species section of the EIS, while pronghorn antelope are disclosed in the EIS in the Other Wildlife Species section. As noted in Table 101, mule deer populations have been consistently below the Management Objective established by ODFW for the Ochoco Wildlife Management Unit since 2007 (based on ODFW's spring population estimates). Likewise, as displayed in Table 103, the winter population estimates for elk have been consistently below the Management Objective between 2007 and 2011 (based on ODFW's winter population estimates). As described in the EIS the 2012 elk population estimate (based on a different method - sightability) was at 90% of the M.O. As noted in the EIS, population declines in Central Oregon may be due to a combination of factors such as residential development, poaching, predation, hunting season mortality and increased recreation, both motorized and non-motorized. As the human population increases, the level of some of these factors increases too. Since big game hunting is a commonly practiced activity in the Ochoco Mountains, animals in the area learn to hide or avoid humans especially with the coming of the summer archery season and the fall rifle seasons. This can make it difficult for the casual observer to view them, especially in areas that are frequently travelled by people and where hunting is conducted on a regular basis.

Comment: We question how the Forest hopes to achieve protecting public values such as wildlife resources when each proposed project or action drops the issue of assessing the existing motorized system to better protect fish and wildlife habitat. The Forest had an opportunity to evaluate impacts of the current road system when the Travel Management Plan was done, but it was delayed to be part of the OHV project analysis. Now, the Forest proposes a new action with the proposed OHV system, but once again drops a full accounting of the existing motorized system and how it affects habitat and further fragments blocks of habitat. When does it all end? When do you deal with the real issues of fragmenting what's left on the Forest and why would you add more motorized recreation? *Comment 41-15; also reflects comments 41-4, 92-19,*

Response: The existing motorized system density was included in the analysis for this project (refer to the draft EIS MIS section and elk disturbance discussion and DEIS Tables 104 and 105). Fragmentation of non-motorized habitat blocks was included in the analysis

for this project (refer to the MIS section and elk security habitat discussion and DEIS Tables 106 and 111). Note that the DEIS preferred alternative has the least overall impact on motorized route density and elk security habitat (refer to DEIS Tables 106, 107, 108 and 109). In addition, in preparing the FEIS, the project planning team recommended modifications to the preferred alternative that include establishment of an OHV Management Area within which closure, rehabilitation, restoration or concealment of unwanted and unauthorized routes would be the focus. This area would extend beyond the Implementation Areas, where trail development and management would be a focus along with closure, rehabilitation, restoration or concealment of unwanted and unauthorized routes. Also see response to comments 79-33, 129-16 and 234-166.

Comment: We are very concerned about the effects of new trails on snag habitat. Safety consideration will likely require the FS to fell valuable habitat trees along many miles of new trails. This is a long-term impact covering thousands of acres of potential habitat. Snags are already in short supply and building more linear "snag-exclusion zones" will make a bad situation worse. How will the FS meet the Eastside Screens goal for restoring 100% potential population (or current best science) for snag associated wildlife when more trails means snags will need to be cut? *Comment 45-9; also reflects comment 234-78*

Response: As stated in the EIS, the falling of trees and hazard tree abatement would be minimal along trail corridors as guided by the Project Design Criteria listed in Chapter 2 (see Snags/Down Logs on pages 30-31) and as described in Chapter 3 (see Widlife, MIS, Primary Cavity Excavators). The increase in need for hazard tree removal at staging areas would be negligible under alternative 3 as all staging areas and the one trail head are in existing developed recreation areas, active rock pits or open rocky areas.

Comment: Motorized recreation is more noisy and fast-paced and has relatively more significant impacts on wildlife compared to quiet nonmotorized and slower recreation, such as hiking. Studies show that wildlife tend to be more disturbed and keep greater distance away from OHVs compared to hikers. See for instance:

- Gaines, W. L., P. H. Singleton, and R. C. Ross. 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee National Forests. U.S. Department of Agriculture, Forest Service, General Technical Report PNW-GTR-586, Portland, Oregon. http://www.fs.fed.us/pnw/pubs/gtr586.pdf
- University of Alberta researchers discovered that elk are more frequently and more easily disturbed by human behaviour such as ATV drivers than by their natural predators like bears and wolves. Ciuti S, Northrup JM, Muhly TB, Simi S, Musiani M, et al.(2012) Effects of Humans on Behaviour of Wildlife Exceed Those of Natural Predators in a Landscape of Fear. PLoS ONE 7(11): e50611. doi:10.1371/journal.pone.0050611 http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0050611
- Cole, D., P. Landres. 1995. Indirect Effects of Recreation on Wildlife. Wildlife and Recreationists— Coexistence through Management and Research. Washington, DC: Island Press: Chapter 11, 183-202. http://www.fs.fed.us/rm/pubs_other/rmrs_1995_cole_d002.pdf
- Cole, D. 2004. Environmental Impacts of Outdoor Recreation in Wildlands. http://leopold.wilderness.net/research/fprojects/docs12/issrmchapter.pdf
- Jordan, M. 2000. Ecological Impacts of Recreational Use of Trails: A Literature Review. The Nature Conservancy. New York http://www.parks.ca.gov/pages/1324/files/ecological%20impacts%20of%20recreational%20users.pdf
- Miller, S., R. Knight. 1998. Influence of Recreational Trails on Breeding Bird Communities. City of Boulder Open Space. http://www.bouldercolorado.gov/files/openspace/pdf_gis/IndependentResearchReports/4428_Miller_Scott_Influence.pdf

• Snetsinger, S., K. White. 2009. Recreation and Trail Impacts on Wildlife Species of Interest in Mount Spokane State Park. Pacific Biodiversity Institute, Winthrop, Washington. 60 p. http://www.pacificbio.org/publications/vegetation/state_parks/wa_east/Mt_Spokane_Trails_PBI_report.pdf *Comment 45-10*

> **Response:** Refer to response to comments 38-2, 55-10, 93-11, 113-11, 120-5, 129-16, 154-2, 173-12, 189-3, 190-7, 214-4 and 234-166. References cited by the commenter were reviewed, but were not found to add new information or insights that are not consistent with the analysis disclosed in this EIS.

Comment: Deer, elk, antelope and wild horses are in the same area, especially on Coyle Butte and Hamilton Butte. There is a heard of Antelope on top and to the south of Hamilton Butte. They calve there in May and June. With ATV use, that concentrated, would probably drive them out of the area. *Comment 55-10*

> **Response:** If there are wild horses on Hamilton Butte, they are outside of the Wild Horse Herd Management Area. The preferred alternative limits routes near Coyle Butte to the north side of the butte outside of the Wild Horse Herd Management Area. In addition, some of the routes originally planned near Hamilton and Grant Buttes have been dropped out of the modified alternative developed by the project's planning team in response to public concerns. Under the modified alternative there would be one route across the south flank of Hamilton Butte connecting between two existing open roads. The entirety of this route is within 1/2 mile of existing open roads that are already available to use by OHV (mixed use roads under MVUM), so it is not expected that establishing one connector trail through this area would drive animals out of the area. However, they may shift their distribution or pattern of use within the area as described in the EIS, avoiding areas in close proximity to the route when it is in use. The season of use for OHVs on this trail system would begin on June 1. Disturbance from human presence prior to June 1 would be from non-motorized use of the route or non-motorized off-trail use, which can cause more disturbance than one or more OHV passing by along an established trail system (refer to the Wildlife section, Behavioral Changes in Response to Human Use; and Effects of Motorized Access to Big Game, Disturbance).

Comment: We have observed lots of wildlife that hang between the residents and Grant Butte while hiking and horseback riding. ATV and motorcycles would have an adverse impact on the wildlife and possibly on the cattle that graze in that area. *Comment 69-5*

> **Response:** Refer to response to comment 55-10. The route between Grant Butte and the private land along Marks Creek have been dropped from the alternative 3 modified. Potential effects to cattle have been disclosed in the EIS and Design Criteria are included specifically to minimize impacts to livestock allotments.

Comment: Case in point, the existing blocks of habitat greater than ½ mile from an open road3 constitute 16% of the acres within the project area (distribution of these acres was not presented). With each action alternative this amount decreases slightly (i.e., 15% or 14% for ≥250 acres blocks) (DEIS xv), yet the real issue is that only 16% of the 300,000 acre project provides security cover for elk greater than ½ mile from an open road. Furthermore, implementation of any of the action alternatives will result in increased route intensity (i.e., noise) along with more frequent OHV and other motorized use. If the intent of the Forest is to help meet the public derived elk management objectives in the long-term (as implied by EO 13443), then the amount of habitat greater than ½ mile from a road or trail used by a motor vehicle should increase, not decrease. Hillis (1991) recommends 30% of the analysis area be in this condition for elk escapement during hunting season, Montgomery (2013) describes male and female elk avoidance of open roads seasonally, while Preisler (2013) describes a strong avoidance of elk to all- terrain vehicles detected up to one kilometer from the

disturbance. This research points to the need for more security cover if the intent is to retain elk hunting opportunities on the Ochoco National Forest in the long-term. Likewise, given the existing extensive road density and crossings throughout the subwatersheds (DEIS 120/121), increasing motorized routes in 11 of 30 for Alternative 2, 9 of 30 for Alternative 3, and 13 of 30 for Alternative 4 (DEIS xv) cumulatively adds impacts to the existing system. *Comment 79-37*

> **Response:** Refer to response to comments # 41-15 and 173-12. Within the OHV Management Aread developed in the FEIS, roads identfied for closure under projects described in detail in the Transportation Section of the EIS would be targeted for physical closure, reinforcement of existing closures, restoration, rehabilitation and/or concealment. By having a designated trail system and an OHV Management Area the Forest cas seek funding under the Oregon State Parks grant program to close unwanted and unauthorized routes within the OHV Management Area. Without a designated trail system, these funds are not available. Maps of the elk security areas were presented at the public meeting and are included in the project record. They are available upon request at Lookout Mountain Ranger District.

Comment: The impacts are not only on local wildlife but also on wildlife that travel through the Ochocos, such as from the Blue Mountains to the east to the Cascades to the west. The use of the Ochocos as a migration corridor between these areas, and also to and from the Grasslands, has simply not been adequately assessed in the DEIS. The cumulative impacts of this project and other projects in these connected areas also have not been addressed. *Comment 82-3*

> **Response:** This project area lies largely within the Columbia Basin Ecological Reporting Unit (ERU) (refer to the Interior Columbia Basin Ecosystems Management Project), which in our area is sandwiched in between the Blue Mountains and the Southern Cascades ERUs. As such the Ochoco National Forest and surrounding forest land (BLM and private ownership) represent a forested extension of the Blue Mountains that could serve as a migration corridor for some wide ranging wildlife species. However, this potential corridor is not a contiguous forested corridor. There are significant expanses of open country between the forested zone along the western and southern edges of the Ochoco and Maury Mountains and the forested zone of the Cascades farther to the west. In the project area, the acres potentially affected by the proposed trail system are in a lengthwise arrangement within this wide forested corridor and are situated in an area that has relatively high existing road density. There are broad areas within the landscape both to the north and to the south of the proposed trail system that would not be affected by this project and that are in areas with lower existing road density. These include the vast area to the south of Big Summit Prairie, leading toward Lookout Mountain and the Maury Mountains (then on to Pine Mountain, Newberry Caldera and Glass Buttes); as well as the relatively remote north slope areas of the Forest which drain into the John Day River Basin. For these reasons this project is not expected to interrupt large scale connectivity, or limit the ability of wide ranging species to move between the Blue Mountains and the Cascades.

Comment: Page 87- More ATVs mean more noise. How can every ATV be monitored to make sure the machine is meeting state law? We are concerned with the amount of noise that will be produced by ORVs using this trail system and the impact it will have on wildlife. The document doesn't address what the combined noise of dozens of ORVs operating at once on the trails will have on wildlife and other forest users. *Comment 92-27; also reflects comments 143-11, 147-6*

> **Response:** State laws apply to all classes of OHVs that operate on public land. The state laws (ORS467.030; OAR 340-035-0030) require mufflers on OHVs to meet the 99dba or less requirement in order to obtain a permit which is required on all designated trails on public lands (lower limits in some areas). Operating OHVs without an off-road permit or required

equipment is punishable as a Class C traffic violation. Compliance patrols are a feature of a managed designated OHV trail system, and are coordinated by COHVOPS (See Recreation, Introduction). The Sherriff's Offices, COHVOPS Forest Protection Officers (FPO) and USFS Law Enforcement Officers (LEO) all have sound testing equipment and are trained to use it when conducting compliance checks. These groups of enforcement officers conduct compliance patrols routinely on designated trail systems, and saturation patrols are conducted periodically, especially in newly established OHV areas. The potential impact on wildlife from increased motorized routes, human presence and noise from OHV related recreation is addressed in the EIS (refer to General Effects to Wildlife: Access for Predators and People, Behavioral Change in Response to Human Use and Impacts due to Noise). As is disclosed on page 238 and displayed in Table 93, the action alternatives reduce the area in which noise drops to the ambient level by 0.1% across the project area. About 368 acres more would be within 1 mile of routes open to motor vehicles than in the current condition under any of the action alternatives, and therefore potential for disturbance due to noise is increased above the current level on those acres. The remaining 10,411 acres within the project area that more than 1 mile from an open motorized route would remain that way. Outside of those areas, as disclosed in the EIS, disturbance associated with motorized routes is greatest within the road effect zone (200 m each side), and lessens as distance from the road or trail increases. The changes in the distance bands displayed in Table 92 represent the distribution of area within various disturbance levels based on distance from the route. An open route is considered to be a potential source of disturbance regardless of the frequency and volume of traffic. And as explained in reponse to comments #93-11 and 189-3, the response of wildlife to human presence, including motorized traffic, can actually decrease as animals are exposed to consistent, repetitive, predictable traffic patterns (habituation).

Comment: Forests are places where wildlife live. I have watched deer babies separated from their moms because of the absolute terror of OHV noise, constant and unbearable for me even, from ceaseless, careening children on OHV's. Is this making forests safe for wildlife? *Comment 86-4; also reflects comment 213-2*

Response: A designed and managed OHV trail system would include features to reduce speed, education to guide good trail behavior and safety, and patrols and enforcement to correct inappropriate behavior. A designated trail system qualifies for funding for monitoring, education and enforcement of trail rules, as well as for maintenance of the trails and staging areas, and closure of unauthorized routes. Without a designated system, patterns of use and behavior remain unmanaged and potentially unsafe.

In addition, there are specific rules pertaining to the use of ATVs during hunting. The establishment of a designated OHV system provides opportunities to secure funding to patrol and enforce these rules that would not otherwise be available without a designated trail system. Refer to the 2014 Oregon OHV Guide (Oregon State Parks).

Comment: Will the trails be closed during the Elk Calving season, Bird nesting season? *Comment 88-7*

Response: Refer to response to comment 55-10.

Comment: Closing the trails due to animal impact is not necessary. Based on several studies (OHM&ATV Guidelines, pg 51) done over a period of time, it has been proven that animals WILL ACCLIMATE to changes in their environment without negative consequences. One study indicated that Elk responded in a more alarmed manner to people WALKING than they did to motorized vehicles passing them at a distance of 15 feet away. *Comment 93-11*

Response: Refer to response to comment 55-10. It is acknowledged that the pattern and predictability of human use does contribute to how animals respond to the presence of human activity. It is disclosed in the EIS that slow moving, start and stop activity, such as walking through the woods, can elicit a much stronger flight response than an established predictable pattern of use such as OHVs passing by on a trail without stopping or getting off the vehicle (General Effects to Wildlife, Behavioral Changes in Response to Human Use). This can be especially true for animals that are hunted (see Big Game, Effects of Motorized Vehicle Assess discussion on Disturbance).

Comment: Habitat Impacts: The new trail system will result in habitat fragmentation, snag and vegetative cover reduction and noise disturbance, all of which will negatively impact wildlife including big game and raptors. *Comment 113-8*

Response: Vegetative cover reduction is discussed in the EIS (see General Effects to Wildlife, Physical Alteration of Habitat). Effective cover for big game is also assessed in the EIS (see MIS section, Cumulative Effects Big Game and Table 110). Refer also to response to comments 41-15 (fragmentation); 234-79 and 225-3 (snags); 229-6 (bird habitat); and 113-11 (noise).

Comment: The noise will affect and displace wildlife, which has more sensitive hearing than humans. *Comment 113-11*

Response: Potential impacts to wildlife from noise are disclosed in the EIS (see General Effects to Wildlife, Impacts Due to Noise and Table 93). Also note that a sound effect analysis was done for the project alternatives and is disclosed in the section on Recreation (see The Experience of Non-motorized Recreationists). Oregon OHV laws require that all OHVs have a maximum sound production of 99dba (less in some areas). As described in the Project Design Criteria (EIS, Chapter 2) compliance and education patrols will be conducted on a regular basis throughout the season of use and intermittently during closed periods. These patrols include periodic sound testing. As shown in Table 45, the preferred alternative has the lowest noise impact of the three action alternatives. See also response to comment 224-3.

Comment: OHVs create clouds of dust in dry conditions that settles on vegetation, inhibiting growth and removing it from food supply for wildlife. *Comment 113-14; also reflects comment 147-9*

Response: Fugitive dust was discussed in the EIS in the section on Air Quality. As discussed there the heavier, larger particles travel a shorter distance and stay close to the ground compared to ultra-fine particles. It is these larger particles that would settle on vegetation close to the trails. Where the designated route is on existing open mixed use roads, the change in dust associated with designation of a trail system is likely to be negligible compared to that released by larger faster moving vehicles sharing the same route. However, where the trail system is on closed roads or on new trail segments that are not on roads dust would likely develop above the ambient levels currently caused by wildlife, wind and livestock. Effects of dust on native vegetation are also discussed in the Botany section of the EIS (see Direct and Indirect Effects to TES Plants) in in General Effects to Wildlife (see Physical Alteration of Habitat). It is acknowledged that trail-side dust may alter the quality of forage immediately adjacent to the trails, but given that the area of anticipated dust accumulation is relatively small when considered at the landscape scale, the impact to food supply is expected to be very small and localized.

Comment: This area is used by many hikers, fisherman, hunters, photographers and others who would be seriously impacted by OHV use because… fishing and wildlife will be seriously impacted. *Comment 119-4*

Response: Potential impacts to wildlife, fish, and recreation are analyzed and disclosed in detail in the EIS. The analysis did not indicate that "serious impacts" would result from any alternative.

Comment: I'm concerned that the wildlife management part of the plan is very emaciated and naïve. *Comments 120-5, 133-6*

Response: Refer to comment 38-2. The Forest Service is a land management agency, not a wildlife management agency. ODFW is the wildlife management agency within the State of Oregon. This project has been responsive to concerns brought forward by ODFW. We have dropped the routes originally planned in Winter Range and have avoided areas with known concentration of elk (based on ODFW telemetry data) and have avoided or minimized areas listed in the Mitigation Policy Habitat Categories including Bald eagle nests and BEMAs (HC1); riparian, meadows, springs, seeps and aspen (HC1 and HC2); mule deer and elk habitat south of Big Summit Prairie and FS Rd 42 between Dec 1 and March 31 (HC1 and HC2); elk, deer and antelope calving, fawning, kidding and rearing) south of Big Summit Prairie and south of FS Road 42 between May 1 and July 15 (HC2); mule deer and elk in Rager TMA within restriction period (HC2); mule deer and elk with RMEF project areas (HC2); mule deer and elk hunting area popularity (HC2); goshawk nest 30 acre nest stands and 0.25 mile on construction, maintenance and decommissioning March 1 to August 31 (HC2); and Columbia spotted frog habitat (HC2).

Comment: Being stewards of the land means being stewards of the wildlife that occupies that land. Please constantly remind yourselves of that as you go through the decision making process. *Comments 120-9, 133-10*

Response: Refer to response to comment 120-5.

Comment: The section on the impacts on wildlife contain a number of misstatements of fact. In some ways this is understandable, since this project has been ongoing for a number of years, and I assume at least some of the evaluation was done prior to the adoption of the travel management plan in 2011. *Comment 129-16*

Response: We acknowledge that the Travel Management Plan for Deschutes and Ochoco National Forests has now been implemented. Many of the statements in the Wildlife section do state "when fully implemented" which acknowledges that even though the decision has been signed, some roads are not physically closed and the public is in the process of learning how to use the MVUM maps. When fully implemented the public will know and understand the MVUM maps, existing closures will be reinforced as necessary, vegetation will become established on closed roads and the pattern of motorized human use will be approximately the same as displayed on the MVUM maps and in the GIS Operational Maintenance level.

Comment: The same principle applies to the "temporary road" issue. Page 280 states that temporary roads MAY be built, and current closed roads will be utilized by the projects. It also states that these increased road densities will occur for several years. Finally, it states that the four projects contain some commitments to close some currently open roads. Given that all of these projects are going to take place, all of this information should have been detailed, and included in the basic analysis of the four Alternatives. Roads that are open for "several years" are certainly not temporary in their impact on big game populations. Depending on the timing of project implementation, and how many open roads might actually be closed during implementation, it is possible that open road densities could eventually be lower than what is outlined in the EIS document, but there is no question that in the first few years, open road densities will be substantially higher than what has been stated in the EIS document. *Comment 129-22*

Response: The discussion on page 280 is in the Cumulative Effects section, where the effects of other projects that overlap in space and time are discussed. The temporary roads described in this paragraph are associated with those other projects for which this paragraph is describing the effects of. As stated in the first two sentences of this paragraph, these projects (Canyon, Spears, Howard Elliot Johnson and Jackson) include management in areas that overlap Ochoco Summit OHV project area. There are no temporary roads proposed in this project under any alternative.

Comment: We recognize motorized travel as an important recreational opportunity and maintain that opportunities for it should be developed in places that do not impact habitat for mule deer, elk, pronghorn and redband trout. The proposed Ochoco Trail System encompasses 301,000 acres of unfragmented habitat that is crucial for big game and trout and deserves special consideration for conservation. (See attached map) (map titled "Fish and Wildlife Distribution Data in the Proposed Ochoco Trail System" attached to original document). *Comment 136-1*

Response: The Forest Service disagrees that the 301,575-acre project area encompasses 301,000 acres of unfragmented habitat; the project area contains 1,820 miles of existing road system (see DEIS page 44), as well as many developed recreation sites and trails and a myriad of user-created trails (both motorized and non-motorized; see DEIS Recreation analysis). The map attached to the comment letter does not include a reference to data that supports its assertion of "critical habitat," and is not consistent with habitat information provided to the Forest Service by ODFW, nor with habitat information in the Ochoco National Forest's files. ODFW is the wildlife management agency within the State of Oregon. This project has been responsive to concerns brought forward by ODFW. We have dropped the routes originally planned in Winter Range and have avoided areas with known concentration of elk (based on ODFW telemetry data) and have avoided or minimized areas listed in the Mitigation Policy Habitat Categories including Bald eagle nests and BEMAs (HC1); riparian, meadows, springs, seeps and aspen (HC1 and HC2); mule deer and elk habitat south of Big Summit Prairie and FS Rd 42 between Dec 1 and March 31 (HC1 and HC2); elk, deer and antelope calving, fawning, kidding and rearing) south of Big Summit Prairie and south of FS Road 42 between May 1 and July 15 (HC2); mule deer and elk in Rager TMA within restriction period (HC2); mule deer and elk with RMEF project areas (HC2); mule deer and elk hunting area popularity (HC2); goshawk nest 30 acre nest stands and 0.25 mile on construction, maintenance and decommissioning March 1 to August 31 (HC2); and Columbia spotted frog habitat (HC2).

Comment: ODFW survey revealed that fish and wildlife activities generated 2.5 billion dollars of revenue for the state of Oregon. Over $12 million in Crook county alone, and would be much higher withhigher mule deer and elk populations. ODFW has expressed its concern that that the Forest would not be able to adequately administer, maintains, or enforces a developed OHV system, resulting in fish and wildlife impacts and loss of recreational opportunity. We share that concern. Oregon Hunters association members have contributed many thousands of dollars and many thousands of volunteer hours to preserve and improve wildlife habitat. *Comment 147-15*

Response: Refer to response to comments 38-2, 41-15 and 120-5. We acknowledge the economic importance of hunting and wildlife viewing (refer to the DEIS Wildlife MIS section, Big Game - Deer and Elk, see Tables 98 and 99). Potential impacts to big game are discussed in detail in the EIS (see Direct and Indirect Effects - Big Game and Cumulative Effects - Big Game). Note that the preferred alternative in the DEIS has the lowest potential impact of the three action alternatives (refer to DEIS Table 111 for a comparison of numerous key indicators for Big Game).

Comment: Why would a land management agency consider allowing an OHV trail system in some of the most critical wildlife habitat an area has to offer. The alteration of the Forest by building a trail system for OHV riders will displace wildlife and degrade the natural beauty and serenity that can be found in the forest now. *Comment 148-3; also reflects comments 11-7, 176-5, 187-3, 197-2, 198-5, 209-5, 213-7, 226-1, 226-3, 234-43*

> **Response:** As discussed in the EIS (see Chapter 1, Background) this project is being considered as a site-specific analysis under the umbrella of the Travel Management Rule because it is largely in an area that was identified as a Community Support Area by the Deschutes Basin Provincial Advisory Committee (PAC) Travel Management Working Group as an area within which to consider development of an OHV trail system.

Comment: NOISE IMPACTS: Ninety-six per cent of the Ochoco National Forest acreage is within 1mile of a proposed trail. The DEIS waxes eloquent on how noise affects wildlife but focuses primarily on birds. This boilerplate language suggests that a 45 dB limit should be maintained at 600' away from the trails. Has the effect of noise on elk calving, fawning deer and antelope really been considered? The DEIS tends to gloss over expected impacts of noise disturbances on the full spectrum of wildlife species. *Comment 230-6*

> **Response:** The data in DEIS Table 93 have been taken out of context in this comment. The figure is for acreage within 1 mile of a motorized route. The majority of that area is due to the existing network of open roads. The difference between the acreage shown for Alternative 1 and the other alternatives is what is associated with proposed trails that are not on open roads. The difference associated with the action alternatives is 368 acres or 0.1% of the project area. The other 96.4 % is associated with existing open roads. Potential effects of human presence and associated noise on big game are considered in the EIS. The disclosures in General Effects to Wildlife, Impacts due to Noise applies to a wide range of wildlife species, not just birds and the discussion in that section includes a variety of wildlife from invertebrates to large mammals. The distance banding analysis was used to predict and compare action alternatives against each other and against the existing condition (refer to Tables 92 and 93). Further discussion is contained the MIS section under the headings Effects of Motorized Access to Big Game and Direct and Indirect Effects - Big Game. In that section an analysis of impacts to security cover is used to assess the impact of human presence. It is interesting that big game response to human disturbance was not clearly limited to noise producing human activity such as motorized use. In fact Stankowich (2008) found that humans on foot were more likely to evoke a response than other stimuli (vehicles, noises). Also refer to response to comment #92-27. Potential effects to elk calving and deer fawning habitat were addressed in the EIS for each alternative (See MIS, Direct and Indirect Effects - Big Game and Table 111). Effects to pronghorn are addressed separately (see Other Wildlife Species, Antelope).

Comment: Impacts to elk, lynx, Gray wolves, and other disturbance-sensitive wildlife of the proposed re-opening of closed and decommissioned roads and the building of new trails for motorized vehicles into the interior of the forest off the existing road system must be considered. *Comment 173-12; also reflects comment 234-10*

> **Response:** During planning of this project, areas with the highest concentration of elk telemetry points and all areas within winter range allocations were avoided when locating potential OHV trail networks. In addition, an effort was made to position routes in areas that were already impacted by a network of roads, rather than placing them in unroaded areas. The project analysis included a disturbance banding exercise which estimated the extent of elk security habitat based on research from Starkey Experimental Station (greater than ½ mile from motorized routes). Currently, considerable motorized and unregulated use is occurring

across the project area. The designation of a trail system is expected to concentrate motorized use within the implementation areas and lessen the impact of motorized use outside of the implementation areas. Within Implementation areas there is potential for increased disturbance, and a disruption in daily activity patterns for wildlife species, however disturbance is expected to decrease outside of the implementation areas where telemetry has demonstrated that elk use is highest. Of the action alternatives analyzed in detail in the EIS, Alternative 3 had the least impact on elk security habitat (as defined by proximity to open motorized routes). Though the security habitat analysis conducted for this project was based on elk behavior, the potential effect of motorized routes on secure habitat also applies to other disturbance sensitive species as well as those that are vulnerable to hunting or poaching.

Comment: The real issue for me, however, is the resource damage that will occur. ORV use will likely damage streams, wet meadows and riparian areas. These are extremely important areas for wildlife. The loss of security cover for larger animals like elk, bear, and deer will be compromised by the mere presence of machines, and of course, if this creates new access for hunters, than it has an even worse impact. Already the Ochoco Forest has far too many roads, and limited security habitat for huntable species. *Comment 179-6; also reflects comments 162-4, 173-4, 190-7*

Response: The season of use for this alternative is one month less on each end of the operating season compared to Alternatives 2 and 4, opening June 1 and closing September 30, except in the Rager TMA where it closes with the Rager restriction start date and remains closed until the following June. Thus this alternative provides a higher level of security in the fall, winter and spring than the other action alternatives, as well as better assurance of dry soil conditions during the operating season. See also response to comments 41-15, 93-11, 113-8, 120-5 and 173-12.

Comment: I am very disappointed in the BCOHA for even suggesting that this would disturb the wildlife habitat. The wildlife is already very accustomed to motorized vehicles. The hunting community on their motorcycles, quads and 4 wheel drives and other outdoor people who travel in the forests have already acclimated the wild life to it. *Comments 184-3, 188-3, 189-3*

Response: The habituation of wildlife to repeated, predictable and consistent patterns of human use is acknowledged in the EIS. Refer to the General Effects to Wildlife section under Behavioral changes in response to human use and under Impacts due to noise (habituation), and to the MIS section, Effects of Motorized Vehicle Access to Big Game under Disturbance. Also refer to response to comments 93-11 and 154-2.

Comment: There certainly will be an impact to wildlife from an off-road trail system of this magnitude based on my experiences of watching wildlife react to any vehicle. Regardless of what off-road vehicle operators state. because I drive a Jeep in a responsible manner more for winter driving and traveling on poorly maintained public roads. I know what the noise of any standard vehicles does to wildlife. Then imagine the impact of the louder noise of ATVs and dirt bikes on wildlife. (For the record I am not a member of the Oregon Hunters Association). *Comment 194-5; also reflects comments 198-6, 201-3*

Response: Effects of vehicle noise on wildlife were analyzed and disclosed in the DEIS. Refer to responses to comment #s 38-2, 86-4, 93-11, 113-11, 173-12, 184-3 and 190-7.

Comment: In order to develop a piece of land there has to be many studies performed. What has been done to assess the impact on the deer, elk, bear, turkey and other wildlife that inhabit this area? *Comment 209-6*

Response: Potential impacts to wildlife are analyzed and disclosed in detail in the EIS.

Comment: You are proposing to gut the entire center of the Ochoco prime spring, summer and fall winter range for mule deer, rocky mountain elk, pronghorn antelope, wild turkeys, grouse, and listed sensitive species on the fringe of both mountain quail and sage grouse! *Comment 211-1; also reflected by comment 211-3*

> **Response:** Potential impacts to wildlife are analyzed and disclosed in detail in the EIS (see Chapter 3 Wildlife). Sensitive wildlife species are not federally listed, but they are discussed in detail in the EIS under Threatened, Endangered and Sensitive Species (TES). As noted in this section and displayed in Table 96, there would be no impact to sage-grouse. Mountain quail are not on the sensitive species list for Ochoco National Forest. All the other species are addressed in the EIS either under the General Effects to Wildlife, TES, Management Indicator Species (MIS), or Other Wildlife Species. Note that the implementation areas for the selected alternative (those acres within 1/2 mile of any proposed trail system route, including open roads) amounts to 47,475 acres. This is approximately 15.75% of the analysis area, and 5.58 % of the total acres of Ochoco National Forest. Of course the direct effect on habitat is much less, as the trails range from 24 inches wide to 80 inches wide, while the mapped implementation area is 1 mile wide (1/2 mile each side of the route). See response to comment 41-15.

Comment: The Ochocos are a rearing area for elk, mule deer, antelope and other animals. They need some refuge from public presence. Introduction of more motorcycles, quads and off-road vehicles and their echoing unmuffled exhausts will significantly diminish this refuge and adversely impact populations. *Comment 214-4*

> **Response:** The analysis for this project took into consideration the existing road area effect. The highest level of disturbance for a wide range of wildlife species falls within a road effect zone with a width of approximately 200 meters on either side of an open road. The combination of this existing affected area the potential 200 meter each side affected area of the proposed trail route was analyzed and is discussed and displayed in the EIS (see Table 92). The potential reduction in habitat availability for elk associated with this road effect zone was discussed in detail for each alternative in the EIS (see Direct and Indirect Effects - Big Game). Alternative 3 would increase the road effect zone within the project area by about 7% due to the designation of trails that fall outside of the road effect zone for existing open roads. This number is relatively small because much of the proposed trail already falls within existing road effect areas for USFS system roads. Beyond one mile from an existing open motorized route the potential for disturbance drops to approximately zero as discussed in the EIS (see Table 93). Alternative 3 would reduce the area more than one mile from a motorized route by 0.1%. As described in the big game analysis (see Table 106), secure habitat more than 1/2 mile from a motorized route is decreased by 10% while secure habitat in blocks greater than 250 acres in size would be reduced by 11%. These effects are described and disclosed in the EIS. Of all the action alternatives the preferred alternative has the lowest potential to cause disturbance as measured by the distance banding analysis. Incidentally, Oregon law requires muffling of OHV equipment to a maximum sound emission of 99 dba.

Comment: …the Starkey Experimental Forest/Wildlife study proved that ATV's are 12 times more likely to displace wildlife than even a vehicle! *Comment 215-5; also reflects comments 1-4, 86-8, 233-3, 234-193*

> **Response:** See response to comments 41-15, 55-10, 93-11 and 189-3. The Starkey Project synthesis of long-term studies of elk and mule deer indicate that Wisdom et. al. found that elk responded substantially (probability of flight response and rate of movement) to all four types of off-road human activity tested (ATV, mountain bike, hikers and horse riders), while mule

deer showed little measurable response. We acknowledge that the movement rate and probability of flight response was higher for ATVs and mountain bikes in an off-road setting than those for hikers and horse riders. However, elk reacted to all four of these modes of travel, and the responses vary with time of day, seasonally, between sexes and with distance from the source of the disturbance (the human). The author suggests management strategies that focus ATV use into some areas, while limiting off-road recreation to hiking and equestrian use in other areas; or restricting each recreational activity to specified roads and trails. The author also suggested using distance banding to analyze effects. Both of these strategies for OHV management and the distance banding method of analysis are included in this project (refer to response to comments 211-1 and 214-4).

Comment: As permittees on the forest and private land owners we know that there is already an issue with wildlife being pressured on the public grounds and being forced to private grounds from uncontrolled use on the public grounds in question. *Comment 224-3*

Response: Analysis of potential impact on cover blocks in proximity to private lands was used to estimate potential for displacement of big game from public land onto private land. This was a key indicator for impacts to big game and is described in the EIS and displayed in Table 111 (acres of secure cover within 2 miles of private land). As shown in this table, secure cover within 2 miles of private land would be reduced by 2.9 % under the preferred alternative within the analysis area. This could result in a small increase in potential for displacement across the project area, but it is likely to be localized to within areas where new trail is proposed within 1/2 mile of private land.

Comment: What about wildlife and other resource concerns? Certain areas within the project area are being avoided due to existing concerns, such as old growth, wild horse or bald eagle management areas, wet meadows or wetlands, big game winter range, roadless areas, research natural area and Walton Lake Basin. Wildflower and wildlife viewing at Big Summit Prairie is a popular attraction on paved route 42 on the south side of the prairie. The area being considered for motorized trails includes the north and east sides of the prairie, avoiding the west and south sides. Existing seasonal closures for wildlife would be adopted and enforced on the affected portions of the proposed trail system.

The Summit Trail proposal is one of the highest elk calving areas on the Ochoco National Forest (25 year of personal experience). By increasing more motorized use, especially in Old growth areas, will lead to elk movement off forest lands and onto private lands as is already occurring. With less elk there will be less viewing and hunting opportunities. *Comment 233-6; also reflects comment 234-17*

Response: Refer to response to comments #120-5 and 224-5. Potential impacts to Old Growth Management Areas (OGMA, LRMP MA-F6) associated with the proposed OHV trail system is limited to one crossing in each of three OGMAs. For Alternative 3 modified, the actual length and tread area of trail within each OGMA is as follows: Indian Butte OG-D1-08, 0.32 mile (0.2 acres) of new trail; Porter Creek OG-D1-12, 0.1 mile (0.02 acres) of new trail; and Deep Creek OG-D2-02, 0.31 mile (0.08 acres) of new trail. Due to the short length and small scale of these incursions we do not expect these crossings to substantially alter the ability of these Old Growth Management Areas to meet the intended emphasis of providing habitat for wildlife species dependent on old growth stands for the following reasons:1) these habitat blocks are currently all bordered by well-travelled existing open roads and all of the proposed crossings are in direct proximity to existing open roads, therefore the change in area within the allocation in proximity of motorized routes will be negligible; 2) all of these areas are linear timbered features surrounded by open areas, rather than in blocks of interior forest habitat, and the proposed crossings are all limited to 50” or 24” tread width, therefore the anticipated change in interior forest habitat within the allocation will be negligible. Note that

the preferred alternative has the lowest potential impact on OGMA as described in Chapter 2 and displayed on Table 5.

Comment: [It] is questionable to assume any positive effects to wildlife from OHV use! *Comment 234-160; also reflected by comment 234-162*

Response: Some examples of positive effects are described on DEIS pages 233 and 293-294. There are other examples such as the use of trails as travel ways by a variety of animals and the use of linear canopy gaps as flyways by avian species such as accipiter hawks. Outside of the OHV season of use and during days and hours of non-use, routes associated with the designated trail system may provide opportune features for some species of wildlife to travel, forage or disperse. Also see response to comment 179-6.

Comment: [referring to DEIS page 233, paragraph beginning with "Roads may act as barriers"] Wow, that's a stretch; you had to look hard to find any wildlife benefits! Notably these are all common or exotic species. *Comment 234-163*

Response: The parapraph to which the commenter refers was not intended to describe a wildlife benefit; rather, the paragraph objectively describes how different species might find a road to be a barrier to dispersal or a route for dispersal. The paragraph goes on to describe how access to trails may increase rates of predation and parasitizing by native and non-native species.

Comment: [referring to DEIS *page 234: "…which should ameliorate effects of human access…"*] Rehabilitation (partial) & existing road closures do not "ameliorate" the effects of new human access – especially not as now it comes with noisy, very high disturbance vehicles. *Comment 234-166*

Response: Webster defines "ameliorate" as "to make or become better; improve." Closure of unwanted and unauthorized routes whether on roads that are supposed to be closed, on user created routes within the OHV Management Area will ameliorate effects by reducing the extent and distribution of uncontrolled motorized access in inappropriate places. Designating and locating a system of properly constructed, monitored, and maintained trails and providing education and enforcement of rules will contribute to improving the situation that is currently unplanned and unmanaged. When it comes to disturbance, wild animals are not necessarily affected by the same things that people are annoyed by. For example studies have found that walking straight to a bird's nest (including raptors) is more disruptive than vehicle or OHV use. Refer to EIS, Effects to Raptors.

Comment: Deafness of these animals from OHVs could increase the risk of being hit. *Comment 234-168*

Response: The potential effect of sound on hearing is disclosed in the EIS (see General Effects to Wildlife, Impacts due to noise). Potential for increased collision with vehicles is discussed on DEIS page 235 (General Effects to Wildlife, Habitat Fragmentation). It may be possible that animals suffering from hearing loss could be more susceptible to collisions than animals without hearing loss. On the other hand animals may be less likely to bolt or take flight into a trail if they are less wary.

Comment: There's not a lot of difference between the alts re: disturbed habitat. The less, the better, but there needs to be an alt. with much less. *Comment 234-169*

Response: A range of alternative was considered and analyzed. The differences are summarized in Table 5. Among the three alternatives analyzed, the preferred alternative has the least impact on wildlife and other natural resources. If a trail system becomes too small to be effective in holding the interest of the riders it is intended to be for, it may not be

sustainable. Sustainability is a key element in the Purpose and Need for this project as described in Chapter 1 of the EIS.

Big Game

Comment: I am strongly against a trail system in this location. This location is a primary sight of Mule Deer, Rocky Mt. Elk and Antelope birthing areas within the boundaries of the Ochoco National Forest. Implementing this road system in this location would force these animals to leave their traditional fawning and calving area, most likely to the North onto private property or South onto Big Summit Prairie where the ranchers do not and cannot support these animals. This could result in these animals, especially elk, in never returning to the Forest resulting in fewer hunter opportunities, thus decreasing the recreational chances for hunters. *Comment 1-1; also reflects comments 1-3, 3-1, 3-2, 41-22, 62-9, 72-7, 79-7, 79-38, 79-70, 79-72, 79-73, 87-7, 129-29, 129-57, 136-2, 136-4, 143-15, 147-11, 151-2, 161-3, 176-2, 218-2, 218-6*

Response: Alternative 3, the preferred alternative, was developed using information provided in comments from ODFW and other sources. The selection of this alternative was based on consideration of concerns expressed by ODFW and others, and effectively limited or avoided potential impacts to ODFW Mitigation Policy Habitat Categories HC1 and HC2. The season of use under Alternative 3 is the shortest period considered among the action alternatives with only 4 months of each year open to use by motorized vehicles as noted in response to comment 179-6. Refer to responses to comments 38-2, 41-15, 55-10, 79-33, 86-4, 113-8, 113-11, 120-5, 129-16, 154-2, 173-12, 213-2, 214-4, 218-4, 224-3, 234-54 and 234-166.

Comment: ODFW has sent their comments on this proposal on at least two different dates, Dec. 8, 2009 and Dec. 21, 2009. Have you not read this? If not maybe you should. *Comment 1-2; also reflects comments 234-195, 234-196, 234-198*

Response: As described in the EIS and response to comments 120-5, 134-6, 173-12, 234-82, 234-173, 234-178 and 234-181, some areas were specifically avoided during planning of this project. Many of the areas avoided were areas that ODFW asked us to avoid. In fact, prior to scoping under NEPA in 2009, the proposed route was realigned in response to ODFW's input. Alternative 3, the preferred alternative, was developed using information provided in comments from ODFW and other sources. The selection of this alternative was based on consideration of concerns expressed by ODFW and others, and effectively limited or avoided potential impacts to ODFW Mitigation Policy Habitat Categories HC1 and HC2. The season of use under Alternative 3 is the shortest period considered among the action alternatives with only 4 months of each year open to use by motorized vehicles as noted in response to comment # 179-6. This season of use avoids ODFW winter seasonal concern (HC2, Item 1). In addition, the preferred alternative has only a short distance of proposed trails, predominantly on existing road beds, in the area of concern expressed by ODFW (south of Big Summit Prairie and south of Rd 42). The majority of the area in that category (HC2, Item 2) was avoided under all action alternatives. For Cooperative Travel Management Areas (TMA), South Boundary was avoided in its entirety, and the PDCs call for consistency with the green dot closure within Rager TMA (HC2, Item 3). Aspen stands, riparian restoration areas and other partnership project areas were avoided under Alternative 3, then further avoided during development of Alternative 3 Modified (HC2, Item 4). The preferred alternative has the lowest potential impact on elk security habitat (a measure that reflects high quality hunting opportunity); and all action alternatives avoid the most popular wildlife and wildflower viewing areas in the analysis area (HC2, Item 5). For these reasons we feel that ODFW's concerns have been adequately considered and addressed.

Comment: If you are trying to add diversity to the Forest then why are you trying to eliminate big game animals in an area as large as 160,000 acres? *Comment 1-5*

> **Response:** Neither adding diversity to the Forest nor elimination of big game animals is part of the proposed alternatives for the Ochoco Summit project.

Comment: At the open house, the maps showing elk habitat and elk calving habitat showed the proposed trail going right through a good part of it. The question of why, was answered by a Forest Service representative stating the elk calving season would be when the weather was cold and wet enough that the trail would just be lightly used. I am wondering if there was any consideration on how that was going to be monitored. Not only that, but after the calves are born, they, as well as fawns, are left alone while moms forage, sometimes a great distance away. I had an occasion to be riding up there and accidentally run across an elk calf, laying very still, and we quickly turned and left that area to not disturb the calf, but if noisy OHV's are constantly in the area, those calves and fawns are going to be disrupted. Elk calves and fawns should have three or more months without threatening noises and disturbances, if not more, so they can keep up with their moms if perceived danger presents itself. Again, in my opinion, this trail should not be going through elk calving habitat. *Comment 58-11; also reflects comments 69-9, 123-7, 143-10, 146-5, 234-80, 234-81, 234-199, 234-202*

> **Response:** The season of use for OHVs on this trail system would begin on June 1. Disturbance from human presence prior to June 1 would be from non-motorized use of the route or non-motorized off-trail use, which can cause more disturbance than one or more OHV passing by along an established trail system (refer to the Wildlife section, Behavioral Changes in Response to Human Use; and Effects of Motorized Access to Big Game, Disturbance). Refer to response to comments 1-2, 41-15, 55-10, 69-5, 86-4, 93-11, 113-8, 120-5, 129-16, 134-6, 173-12, 190-7, 233-6, 234-82, 234-160 and 234-166.

Comment: Instead of just moving towards the Forest Plan road density objective of 3 miles per square mile or less, a more strategic approach would be to minimally meet motorized access needs while increasing the number of 250 acre parcels ½ mile or further from a motorized route4 (DEIS 265). A sound decision would be to apply the new Blue Mountain Elk Nutrition and Habitat Models to the four alternatives to better understand existing conditions and actions the Forests could take to improve conditions to help meet elk management objectives prior to any decision being made for this project. *Comment 79-33; also reflects comments 41-2, 41-14, 79-30, 79-34, 79-36, 79-39, 79-40, 92-33, 234-45*

> **Response:** In a process that is separate from this project, the Forest is addressing a Minimum Roads Analysis to identify the roads needed for administrative access now and in the future in order to better align the road maintenance program with anticipated future funding levels. That analysis may guide future Travel Management at the forest-wide scale, but it is outside of the scope of this site specific analysis. Also refer to response to comments 143-12 and 148-3.

Comment: The Department thinks that implementation of the proposed OHV system will further reduce deer and elk populations, available big game habitat (DEIS xvi), and associated hunting opportunity. *Comment 79-52; also reflects comments 92-32, 129-26, 129-28, 129-31, 129-38, 143-8*

> **Response:** The Ochoco Wildlife Management Unit consists of 54% public lands (State and Federal lands). Of the federal land base the unit includes BOR, BLM and USFS managed lands. Of the 46% of the landbase in private ownership the dominant land uses are forestland, rangeland, grass hay production and intensive agriculture (predominantly alfalfa at this time). Irrigated pasture, grass hay and alfalfa fields are all attractants for big game. If there is a shift in animal distribution off of public lands and onto private lands it is likely due to a combination of factors. However disturbance from motorized recreation is one factor

that is known affect distribution of big game, particularly elk. Sine this project proposes to change the level and arrangement of motorized recreation, that is the factor that was analyzed under Direct and Indirect Effects. If there is a decline in deer and elk populations within the Wildlife Management Units it is also likely due to a combination of factors, most of which are outside the scope of this analysis (such as predation, poaching, hunting pressure, drought, vegetative succession, agricultural conversion, disease and interspecific competition for resources). As long as ODFW continues to determine that there is an adequate population to issue hunting tags (496 general bull tags, 269 cow tags and 100 either sex private land tags for 2014), we will continue to consider the population to have a demonstrated harvestable surplus and therefore a viable population. As stated in response to comment # 120-5, the Forest Service is a land and resource management agency and is not responsible for setting hunting seasons, tag distribution or limits on tag sales. ODFW sets tag limits and distribution based on their estimate of populations, demographics within each population and distribution of animals.

Some areas were specifically avoided during planning of this project. Many of the areas avoided were areas that ODFW asked us to avoid. In fact, prior to scoping under NEPA in 2009, the proposed route was realigned in response to ODFW's input. Alternative 3, the preferred alternative, was developed using information provided in comments from ODFW and other sources. The selection of this alternative was based on consideration of concerns expressed by ODFW and others, and effectively limited or avoided potential impacts to ODFW Mitigation Policy Habitat Categories HC1 and HC2. The season of use under Alternative 3 is the shortest period considered among the action alternatives with only 4 months of each year open to use by motorized vehicles as noted in response to comment # 179-6. This season of use avoids ODFW winter seasonal concern (HC2, Item 1). In addition, the preferred alternative has only a short distance of proposed trails, predominantly on existing road beds, in the area of concern expressed by ODFW (south of Big Summit Prairie and south of Rd 42). The majority of the area in that category (HC2, Item 2) was avoided under all action alternatives. For Cooperative Travel Management Areas (TMA), South Boundary was avoided in its entirety, and the PDCs call for consistency with the green dot closure within Rager TMA (HC2, Item 3). Aspen stands, riparian restoration areas and other partnership project areas were avoided under Alternative 3, then further avoided during development of Alternative 3 Modified (HC2, Item 4). The preferred alternative has the lowest potential impact on elk security habitat (a measure that reflects high quality hunting opportunity); and all action alternatives avoid the most popular wildlife and wildflower viewing areas in the analysis area (HC2, Item 5). For these reasons we feel that ODFW's concerns have been adequately considered and addressed. Also refer to response to comments 38-2, 41-15, 79-33, 120-5, 129-16, 173-12, 213-2, 218-4, 224-3, 234-54 and 234-166.

Comment: The DEIS provided information on projected changes to existing deer and elk habitat by alternative (DEIS 271 - 277) along with deer and elk species viability (DEIS 283), yet no assessment was made relative to impacts from the existing road system, nor projected changes in deer and elk recreational opportunities (i.e., EO 13443) with implementation of any of the action alternatives. *Comment 79-56*

Response: Refer to response to comments 41-15, 55-10, 173-12 and 214-4. Existing road length and density was included in the analysis (see DEIS Tables 91, 104 and 105). The distance banding analysis and resulting security habitat and security cover discussions are based on the combination of existing open roads and proposed trails (see Tables 92, 93 and 106 through 109). The conditions and effects described for Alternative 1 reflect the existing

network of open roads. As noted in response to comments 143-13 and 226-7, hunting is included in the non-motorized recreational experiences addressed in the DEIS (see Table 27).

Comment: On page 280, there is a discussion of the impact of various vegetation control projects (Canyon, Spears, Howard Elliott Johnson and Jackson) on road densities and reductions in big game hiding cover and increased human access. The discussion seems to indicate that these projects were NOT included in the basic analysis of these issues done for each Alternative. Since all four of these projects have been approved, and are being implemented, reductions in hiding cover should have been included in the full analysis. Under Alternative 2, for example, the project identifies 44,000 acres that would be more than ½ mile from an open road or trail. It identifies 42,000 acres that would be more than ½ mile from an open road or trail AND in blocks of at least 250 acres. The discussion on page 280 indicates that those numbers will be reduced by these projects. Since the projects are in implementation, the reductions in big game hiding cover should have been included in the calculations. *Comment 129-21; also reflects comments 129-23, 234-195, 234-196, 234-197, 234-198*

Response: Big game cover and security habitat was analyzed based on predicted impacts of alternatives in combination with the existing condition within the project area. Text was added to the related discussion in the final EIS, to improve clarity.

Comment: On page 281, the following statement occurs: "Implementation of the forest-level Travel Management Plan, in combination with closures and restoration proposed under this project would benefit mule deer and elk in the project area, because portions of this analysis area are heavily roaded with many closed or decommissioned roads that area still receiving motorized use, with relatively small percentages of elk security habitat. Refer to Table 104 and Table 106." With passage of the Travel Management Plan, there is no longer any motorized travel on closed or decommissioned roads. It appears that staff is trying to claim benefits for this project that in fact are the result of a previous project. This interpretation is supported by Table 104. Alternative 1 shows the current open road densities for all 9 5th field watersheds within the project area. On one of them, Lower North Fork Crooked River, there would be no change in road density under any of the alternatives. On the remaining 8 watersheds, there would be increases in road densities over current conditions. In total, road densities within the project area would increase 16% under this project. Rather than a benefit to deer and elk under this project, as stated above, there would be a strong negative impact, particularly on elk, were this project implemented. *Comment 129-24; also reflects comment 143-2*

Response: The paragraph to which the commenter is referring, on DEIS page 281, clearly states that implementation of the Travel Management <u>in combination with</u> road closures and restoration proposed under all action alternatives in the Ochoco Summit project would result in a benefit to deer and elk in the project area. Also see responses to comments 1-2, 41-15, 55-10, 79-33, 79-56, 93-11, 113-11, 129-16, 134-6, 173-12, 213-2, 214-4, 218-4, 234-54, 234-82, 234-166 and 234-204.

Comment: The new Blue Mountains Elk Nutrition and Habitat Selection Models released by the USFS Pacific Northwest Research Station for beta-testing should be applied to this DEIS analysis. The importance of elk nutrition is discussed only briefly in the DEIS and should be given full development. The period of OHV use is stated as May 1 through September 30 and that is when the elk (and deer) need to be foraging in order to acquire adequate body fat reserves. Body fat levels impact reproduction, and calf/fawn and adult winter survival (Cook et al 1996, 2005). The impact on elk (and deer) of losing foraging opportunity within the ½ mile band needs to be more fully addressed. *Comment 143-12*

Response: The Blue Mountains Elk Nutrition and Habitat Selection Model is in development and has not been released for general application. It is not required analysis at this time as it is being tested and is not approved for use yet. It is limited to predicting the availability of areas of high digestible energy during late summer (August). It does not

address other life needs of big game such as cover or wintering areas. Thus it has its limitations. Nonetheless, the Ochoco is in the process of running this model within the Ochoco Summit project area as part of the beta testing process coordinated by the Rocky Mountain Experiment Station. The results of this analysis will be provided to Rocky Mountain Experiment Station to assist them with the beta test for this model. Potential impact on elk within 1/2 mile of motorized routes is assessed in the EIS (See Effects of Motorized Vehicle Access to Big Game and DEIS Tables 106 and 110).

Comment: I disagree with the conclusion of the DEIS regarding the impact of the proposed project on elk and deer which substantially states they will exist somewhere else on the Ochoco NF. (DEIS 283) Using the DEIS ½ mile distance band, the project degrades or removes from availability one square mile (or 640 acres per mile) of elk habitat per mile of proposed OHV trail. The amount of habitat lost ranges 101 sq miles to 212 sq miles depending upon the alternative. This loss of elk (and) deer population carrying capacity is huge in terms of reduced elk and deer numbers, lost recreation (including but not limited to hunting), and lost economic benefit to the local economy. *Comment 143-18*

Response: The distance banding analysis recommended by recent research was utilized to assess potential disturbance of the alternatives in combination with the existing network of open roads. Most of the proposed trail routes are within existing open road disturbance bands. The difference between the action alternatives and Alternative 1 (existing condition) displayed in DEIS Tables 92, 106 and 110 is the effect of the action alternative above and beyond the effect of the existing road system. The analysis takes into consideration both proposed route length and the placement of it. When trails are in close proximity of open roads they have less of a disturbance impact than if they are far away from any open road. As can be seen from DEIS Table 106, the total amount of security habitat (defined as being more than 1/2 mile from an open motorized road or trail) is reduced by 5803 acres in Alt. 2 (9 square miles); by 5,029 acres in Alt. 3 (7.9 square miles); or by 7,092 acres in Alt. 4 (11 square miles). Note that the preferred alternative is the one with the least impact of all the action alternatives.

Comment: Keep in mind that the State Game people are managing this area for trophy animals and it takes four years to get a Elk tag. Imagine how a hunter would feel after planning for years and spending hundreds of dollars when his trip was spoiled by noisy, stinking off road riders going by at 50 MPH. *Comment 165-4*

Response: Elk rifle seasons in Central Oregon generally occur in October and November outside of the season of operation for the designated trail system. Conflict during this period is more likely be encounters between road hunters and OHVs on mixed use roads, or OHVs operating illegally (not on a designated route or during the legal season of use). Antlerless elk season does overlap with the season of use for the proposed trail system and if an archery hunter chooses to hunt on a designated OHV trail or open mixed use road he/she is likely to encounter someone on an OHV. High speed of travel is not likely to occur on the trail system as features are designed into a trail to purposefully limit speed and add difficulty. This is not true of open roads, the use on which is largely not subject to change under this project. Also refer to response to comments 86-4, 113-11, 179-6.

Comment: And it might make it easier for poachers to operate and you well know they are out there, read the stat's on deer and other animals are killed during season and poached. *Comment 191-2; also reflects comment 198-7*

Response: It is possible that poachers might attempt to use the OHV trails to access game, but it is more likely that they would use open roads that do not require separate equipment and that have more options to exit and escape law enforcement. It is also possible that

increased patrols in the area that come along with a designated trail system, and an increased number of watchful eyes educated about the ODFW T.I.P (Turn In Poachers) program might deter would-be poachers from using the area. T.I.P. materials would be made available at all staging areas and trailheads.

Comment: I Hunt and recreate in the Ochocos and would like to see option #4 (no new trails) be the plan chosen for the Ochocos. I see too much Habitat abuse already and would hate to see new trails through great Wildlife habitat fracture it more and cause Wildlife dispersion. *Comment 216-1*

Response: Alternative 4 had the most new trails, while Alternative 1 had no new trails. The preferred alternative has the lowest amount of new trail compared to the other action alternatives.

Comment: Some of the proposed trails are in the higher areas which are used by big game in the summer and early fall and these areas need to be carefully looked at.

Please apply what research has already documented regarding vehicle/human use in big game habitat. The Starkey Experimental Range (some 40 sq miles), some very good controlled research can guide decisions on this project. *Comment 218-4*

Response: Recent research from Starkey Experimental Station was reviewed along with other literature. Pertinent findings from that research are discussed in the EIS (see Big Game, Effects of Motorized Vehicle Access to Big Game). The preferred alternative has the lowest impact on the summer and fall habitat of all the action alternatives. All action alternatives avoided areas with high concentrations of elk (based on ODFW telemetry data) including much of the high elevation areas and relatively undisturbed areas such as Lookout Mountain, Round Mountain and the north slopes that drain into Bridge Creek and the John Day River system.

Comment: This is a premium elk bow hunting area. The introduction of continuous noise from the OHVs will certainly change an area of fine bow hunting. This may be an issue no matter where the project relocates. *Comment 226-7*

Response: Ochoco Unit bow hunting season does overlap with the season of use for the proposed trail system. If an archery hunter chooses to hunt on a designated OHV trail or open mixed use road he/she is likely to encounter someone on an OHV. Sound dissipates with distance and potential disturbance to elk also decreases with distance. The effect of the existing network of open roads and proposed trails on security habitat is disclosed in the EIS. Quality hunting experience, especially for elk, is expected to be higher in elk security areas (more than ½-mile from routes open to motorized use). Refer to analysis and disclosures in the EIS (Direct and Indirect Effects - Big Game). Archery hunting is one of the activities included in the analysis of effects to non-motorized recreation. See Experience of Non-motorized Recreationists for description of the noise analysis conducted for this project and disclosure of effects in Recreation Environmental Effects, Non-motorized Recreation Experience.

Comment: This is an excessive amount of new open road/trail density. *Comment 234-204*

Response: As is described in the EIS road/trail density may not be the best measure of disturbance to big game because density does not take into consideration the spatial distribution on the landscape. That is why the distance banding analysis recommended by recent research as utilized to assess potential disturbance of the alternatives (see Big Game, Effects of Motorized Vehicle Access to Big Game as well as General Effects to Wildlife, Fragmentation of Habitat Patches). The effects of the proposed alternatives based on

proposed route length and placement, in combination with the existing network of roads, are disclosed in each of these sections.

Comment: In other words, No motorized use would be the best; otherwise the less open rd. density & the less trails, & the further away from elk habitat, the better. *Comment 234-54*

Response: Since elk have been found to be sensitive to human disturbance, especially in hunted populations, the least amount of human access, whether motorized or non-motorized, would offer the least amount of disturbance. The trade-off of having less human access could be increased mortality due to other factors. Since this project proposes to change motorized human access, that is the potential disturbance factor that has been analyzed in this document.

Comment: [Referring to DEIS page 270: "The distribution pattern of open roads and motorized trails…"] Reasons for our wanting no OHV trails to leave proximity to open roads into interior forest habitat – cut out proposed loops that extend out away from roads. *Comment 234-194*

Response: Some routes that were not in proximity to open roads were dropped during development of Alternative 3 Modified. Also see response to comment 143-18.

Birds

Comment: Have there been recent surveys for goshawk and other raptor nests? *Comment* 92-20

Response: Goshawk surveys have been conducted through 2012 as described in the DEIS (pages 289-290) and as displayed in Table 114. Records of other raptor species as disclosed in the DEIS (pages 290-293).

Comment: My final concern is the most important concern for me. I fear that the ecosystem of that area will be irreparably damaged by this system. I have concerns about soil, fish, plants and all the other ecological ingredients of that system. Most of my concerns are relegated to simple worrying due to my lack of knowledge about most of the creatures in that area. However, I can speak intelligently about the avifauna in and around the proposed trail system. Although I've not read the entire EIS for this project, a cursory review of it finds that it mentions little about concerns for the bird life in the area. A few lines are dedicated to eagles and goshawks but nothing, or next to nothing, is said about the myriad of other bird species that will no doubt be impacted by this trail system. I did a quick count of the species in that area. Even if one discounts the species that use Summit Prairie and other smaller prairies in the area, I easily came up with a bird list of 115 species that will be impacted by this plan. If all the migrant species are removed from this list and only nesters are considered, the species total still exceeds 100. This is no trivial number and yet, nothing is in the plan to mitigate the damage that all of these species will incur with the addition of hundreds of constant combustion engines and off-trail miscreants. Where is the concern for the Dusky Grouse, Common Nighthawk or Williamson's Sapsucker? How will you mitigate the loss of nesting habitat for cavity nesters near the trails? Where will they all go? From what I gather from the EIS, it is just assumed that all these other species will simply ignore the roar of the motors or move to another part of the forest. The first part of that assumption is almost criminally naïve and the second part shows a short-sightedness that pervades every aspect of this proposal. I implore you to delay this project until a real and comprehensive survey of the impact on wildlife can be done. *Comments 120-14, 133-14*

Response: Bird life is not ignored in the DEIS as implied by this comment. Bird life is among the widlife community that is inclu+B30ded in the disclosure of potential impacts to wildlife in general in the DEIS (pages 232 - 240). Birds are also included in the portions of TES species section of the DEIS (pages 240 - 254) and the MIS section of the DEIS (pages 254 - 262 and 283 - 287), as well as raptors (pages 299). Separate from disclosures in the sections described above is the Land Birds section of the DEIS (pages 296 - 304). It is within this section that land birds in general are addressed using the Partners in Flight Land Bird

Conservation Strategy appropriate to the analysis area (Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington). This strategy addresses all species of landbirds using the focal species approach as described in the DEIS (page 296).

Comment: After examining all the proposals, the only one I can support is Alternative Number 1 – No action. I believe that each of the other alternatives would lead to irreparable harm to the wildlife of the forest. Each of the other alternatives would detrimentally impact bird populations in the forest and the ability of citizens to enjoy birdlife. Many of the species affected are species of critical concern – Northern Goshawk, Flammulated Owl, Blackbacked Woodpecker, White-headed Woodpecker, Swainson's Hawk, Long-billed Curlew, Pileated Woodpecker and Willow Flycatcher. I have recorded every one of those species on or near Summit Prairie – right in the midst of this ORV Trail System. *Comment 225-3*

Response: Effects to goshawks and other raptors (including the Swainson's hawk and flammulated owl) area disclosed in the DEIS (General Effects to Wildife and Other Wildlife Species - LRMP) and in the Wildlife Report which has been incorporated by reference. As noted in the DEIS the preferred alternative has the lowest potential impact to raptors of any of the action alternatives. Potential impacts to woodpeckers are also described in the DEIS (General Effects to Wildife, TES and MIS sections). As noted in the DEIS all action alternatives would have a negligible effect on snag distribution and abundance as well as physical alteration of woodpecker habitat, and that the woodpecker guild is not suseptible to recreational disturbance or increased nest predation as a result of the presence of recreational trails. Thus selection of the preferred alternative is not expected to impact members of the woodpecker guild. The long-billed curlew and the willow flycatcher are wet meadow and riparian woodland dependent. As noted in the DEIS these habitats have been largely avoided, especially under the preferred alternative (Refer to Table 130). Big Summit Prairie is not right in the midst of this ORV Trail system, it is south of it, and the closest point of the trail to Big Summit Prairie is more than 1/4 mile away.

Comment: All of the proposed alternatives, except for the "No Action" alternative, will negatively impact bird species of concern including Northern Goshawk, Flammulated Owl, Sandhill Crane, and Black-backed Woodpecker, and will also be detrimental to re-establishment of Upland Sandpiper on wet meadows of the Ochoco Mountains. All of these species preferentially select habitat with minimal human disturbance, so establishment of new trail routes through their habitat will result in reduced utilization of the available range. *Comment 229-6*

Response: Refer to response to comment #225-3. Upland sandpipers are addressed in the DEIS in the TES section. As noted in the DEIS, no action alternative would affect upland sandpipers or their habitat because no new trails, trailheads or staging areas would be within expansive prairie/grassland habitats or in proximity to any documented populations of this species. Also it is noteworthy that no area within the Ochoco Summit Trail Project analysis area has been identified as an Important Bird Area by the Audubon Society of Portland (source http://audubonportland.org/local-birding/iba/iba-map).

Comment: All of the proposed alternatives, except for the "No Action" alternative, will negatively impact bird monitoring work on the National Forest. As one example, Alternative 2 will bring ORV trails within half a mile or less of 22 of the 50 survey points (Stops 18 through 39) on the Barnhouse Breeding Bird Survey route. *Comment 229-7*

Response: See response to comment #229-10. The number of BBS stations within ½-mile of proposed routes under Alternative 2 is much lower that suggested in this comment. The actual number of BBS stations within 1/2 -mile of Alternative 2 is nine (Stops 21-24 and 32-36).

Comment: Monitoring of bird populations in the eastern part of the Ochoco range will be detrimentally impacted by OHV noise along an established USGS Breeding BirdSurvey route. If the Alternative 2 option is adopted, nearly half of the established Barnhouse BBS route (Stops 18 through 39, out of 50 stops) will be within ½ mile or less of an OHV trail. This is the only established USGS BBS route for monitoring bird populations in the eastern Ochocos. Excessive noise due to passing vehicles can be a cause for discounting date at any given stop. If this OHV trail system is established, it is foreseeable that this entire route might need to be abandoned due to excessive noise at nearly half of the stops. See detailed comments below for further information on this topic. *Comment 229-10*

> **Response:** Under the preferred alternative only five survey points are within ½-mile (Stops 32-36) and they are all on an open road. Stop 32 is on a high traffic volume road open to highway legal vehicles (FS 12) and in proximity to mixed use road FS 1250. Stops 33-36 are on an open mixed use road (FS 1250) which is already open to OHVs and highway legal vehicles (mixed use). Under the action alternatives a parallel trail would be constructed which should serve to pull the OHV use off of FS 1250 and thus place it farther away from the BBS Stops. It is however, acknowledged that noise from the Staging area at Cottonwood Pit and on the trail running paralell to FS 1250 may be heard from BBS Stops 32 to 36.

Comment: "According to p. 297. “The following species have not been documented to occur and there is no suitable habitat present in the project area: red-eyed vireo, gray-crowned rosy finch. One upland sandpiper was recorded on private land meadows within the project area in 1987. No subsequent records for this species were found for this project area.”

I agree that red-eyed vireo is not likely to be present in the project area.

Flocks of gray-crowned rosy-finch have been documented at least twice in the Mountain Creek basin within 5-10 miles north of the proposed trail network, within the past 20 years. It is doubtful that any serious effort has been made to survey for this species in the suitable habitats that exist on Mt. Pisgah, Spanish Peak, and Wolf Mtn. *Comment 229-11*

> **Response:** The gray-crowned rosy-finch is not listed in the Common Birds of the Ochoco Region (a source that lists all birds of the Ochoco Region except ultra rare and vagrant species). Neither Crook County, Wheeler County nor the Ochocos are mentioned in Birds of Oregon in the section on Oregon Distribution for this species. This species has not been listed in the detections during the Breeding Bird Surveys on the Barnhouse BBS route. These birds are known as high altitude breeding birds throughout most of their range, with Oregon populations associated with alpine and subalpine habitats in the Cascade Mtns, the Wallowa Mtns, the Strawberry Mtns and perhaps Steens Mtns. There is no alpine or tundra habitat associated with Mt Pisgah or Spanish Peak that is expected to provide breeding habitat for this species. Wolf Mountain is not in this project area. They are known to migrate into our area during the winter from breeding grounds in alpline or tundra habitats in Alaska or Canada, and they do sometimes show up on the Christmas Bird Count (source: http://www.mbr-pwrc.usgs.gov/id/framlst/i5240id.html). It is interesting that flocks of gray-crowned rosy-finch have been observed in the Mountain Creek drainage, and Ochoco National Forest would appreciate receiving copies of these records (inlcuding dates) so that they can be included in our data base."

Comment: Upland sandpiper has been documented as a nesting species in similar meadows in the Bear Valley area by the Grant County Bird Club, on a continuous basis until the past two or three years. This species has been nearly extirpated from Oregon, so a high value should be placed on preserving undisturbed habitat wherever the species has been observed in recent years. One potentially suitable meadow is found alongside FR 1250 at Barnhouse BBS Stop 33, which has hosted nesting Wilson's Phalaropes (a frequently associated species) in recent years. This meadow appears to be nearly directly on the path proposed for OHVs in Alternative 2. *Comment 229-12*

Response: Refer to response to comment #229-6.

Comment: Regarding MacGillivray's warbler, the DEIS (p. 301) states that "There are few records for this species on Ochoco National Forest." This is completely uninformed nonsense. This species nested nearly every year at Wildwood Campground (prior to management impacts on the spring area) plus at several nearby sites, in most years at Barnhouse campground, and regularly around the old Ochoco Ranger Station where it could be encountered in any casual stroll east of the campground. It is an uncommon but widespread nesting species throughout the Ochocos, and is regularly detected along the Barnhouse BBS route which will be impacted by this OHV proposal. Due to its habit of nesting in the shrub layer, it should be considered at risk for OHV impacts. *Comment 229-14*

Response: We acknowledge that this species has been recorded in very small numbers on some of the Barnhouse Breeding Bird Surveys and around the old Big Summit Ranger Station. We will make this correction to the EIS. We also acknowledge that the species is listed as common in the fall, spring and summer in the Common Birds of the Ochoco Region pamphlet. The DEIS noted that this species has been recorded in every county in Oregon and that it breeds throughout the Blue Mountains.

Comment: The DEIS (p 302) states that there are limited data for hermit thrush on the analysis area, but as stated above, 22 of the 50 stops for the Barnhouse Breeding Bird Survey are within the affected area for this plan. This survey regularly records hermit thrush at a high number of stops, often with 3 or more singing males at most of the stops in the areas that would be affected by this OHV plan. *Comment 229-15*

Response: We acknowledge that this species has been recorded in fairly high numbers on the Barnhouse Breeding Bird Surveys. We will make this correction to the EIS.

Comment: Impact of noise on bird detections has been recorded as standard practice on the Barnhouse BBS survey, and in the USGS database. OHVs have a high impact on bird detections as they produce excessive noise at distances of ¼ mile or more, both coming and going. Since the average time for a BBS stop is limited to about 6 minutes, a single OHV traveling at 20 mph can disrupt bird detections at multiple stops. *Comment 229-16*

Response: See response to comment 229-10.

Comment: New construction should not take place within ½ mile [of bald or golden eagle nests]. No exceptions! *Comment 234-74*

Response: Buffer distances described in the DEIS (page 30) are based on the standards and Guidelines in the Land and Resource Management Plan (LRMP page 4-248) and the Pacific States Bald Eagle Recovery Plan (USFWS, 1984). The distances included in the Project Design Criteria are greater than those included in the more recent National Bald Eagle Management Guidelines (USFWS, 2007) which calls for a bald eagle nest buffer of 330 feet for off-road vehicle use (Category D) and construction of trails (Category A), except in open areas where there is increased visibility and exposure to noise, then the buffer during nesting season is extended to 660 feet. As stated in the DEIS (page 30) the distance for golden eagles is 1/2 mile, this is regardless of visibility.

Comment: This [site specific measures if an active eagle nest is discovered during implementation] is inconsistent. *Comment 234-75*

Response: The bulleted statements indicated by the commenter apply to different categories of action. The first bullet refers to the actual placement of the tread and is specified to generally not be within 0.25 miles with exceptions only based on site specific circumstances. The second two bullets refer to activities associated with construction or maintenance of trails, or associated with closure, rehabilitation or restoration of unauthorized trails. The

reason the distance is further for these types of activities is because they tend to be stationary or slow moving, involving a lot of stopping and relatively longer duration of human presence in a specific location, and may involve motorized equipment that is other than what would ordinarily be present on the trail. These out of the ordinary circumstances are more likely to be noticed or cause disturbance than an activity that has become routine and ordinary (such as the periodic passing by of a vehicle or group of vehicles on an established trail). This is why the restriction distance is extended for construction, maintenance, closure and rehabilitation activities.

Comment: "Activities" that could disturb eagle nesting include motorized vehicles using the trails, not just construction. *Comment 234-76*

Response: There is potential for disturbance to occur from use of the trails as is disclosed in the DEIS (pages 236-237). There is also potential for habituation as described on page 238. The known bald and golden eagle territories within the analysis area are described in the DEIS (pages 244 and 284). As stated on page 244 all action alternatives exclude roads in proximity to known bald eagle nests and roosts from the designated OHV system of routes. The same is true of golden eagle nests.

Comment: This will not be enough to adequately protect goshawk. Goshawk don't just need undisturbed nesting, but undisturbed post-fledging areas, as well. No trail construction or use within or near PFAs! Do any proposed trail segments enter or run adjacent to or near PFAs? *Comment 234-77*

Response: Effects of alternatives on PFAs are disclosed in the DEIS (Table 5, page 38) based on the lengh of system within the PFA and within 1/4 mile of known nests (Table 115, page 295). Post fledging Areas are mapped as guided by the Regional Forest Plan Amendment #2 (USFS 1995), but the restrictions within that guidance are applicable to commercial timber harvest, not recreational use. As stated on page 293, sensitivity to human disturbance is highest near nest sites. The miles system miles within 1/4 mile of goshawk nests shown in Table 115 include 1.4 miles on existing open roads in Alt. 2, 0.3 miles on existing open roads in Alt. 3 and 1.0 miles on existing open roads in Alt. 4. The remaining mileage is on routes that are not currently open to motorized use under the current Travel Management Plan. Along the routes that are not currently open, effects from motorized use may be higher than the ambient level as is disclosed in the DEIS (pages 293 - 296). Along existing open roads the the level of impact is expected to be within the ambient level for routes that are already open for motorized travel.

Comment: No felling of active nest trees! *Comment 234-79*

Response: As stated in the Project Design Criteria (DEIS page 31), no felling of trees or snags with visible nests or cavities would occur from March 1 to August 15, this would be to ensure that nests are not active at the time of treatment. Exceptions would only be made if a Wildlife Biologist inspected the tree or snag and determined that any associated nest(s) are inactive at the time of treatment.

Comment: I saw a peregrine falcon is a stooping dive by Deep Creek in 2003 – positive sighting in daylight at close range. *Comment 234-170*

Response: As stated in the DEIS (page 242) there are no known eyries of peregrine falcon on Ochoco National Forest. A stooping dive does not constitute an eyrie. However, the Forest is always interested in receiving accurate records for rare or uncommon species and a sighting record with accurate coordinates or a pinpoint on a map with date, time, observer name and relevant notes would be a welcome record for our database. The record has been added to the existing condition statement in the FEIS.

Comment: The "No Impact" finding [page 242 of the DEIS] is unwarranted. What about impacts to riparian corridors & prey there? *Comment 234-171*

Response: The determination is based on scope and scale of potential impacts relative to the likely size and diversity of foraging area and capture style of the species in question. Peregrine falcons are fast moving birds that forage over a large area, often stooping from high above the canopy. This is an avian predator that is known to use a wide variety of prey species and foraging habitats. Changes in riparian cover associated with a limited number of perpendicular crossings of trails with a footprint ranging from 24 to 80 inches would occur in small patches, and at the scale of a peregrine falcon's likely foraging pattern, would have a negligible effect on prey availability or foraging behavior. This is in addition to the fact that peregrine falcons have not been documented to nest on Ochoco National Forest, or within this project area.

Comment: Avoid raptor nest buffer impacts. *Comment 234-208*

Response: As shown in Table 115 (DEIS page 295) two alternatives avoid the 660' nest buffer of raptors other than goshawks and osprey. As noted in the narrative on Action Alternatives on page 295, the .25 miles in the raptor nest buffer of Alternative 2 are on existing open roads. Thus, none of the alternatives increase the length of routes that are open to motor vehicle use within the 660' other raptor buffers. For osprey the miles of route within 1/4 mile of nests is divided among trail types with the majority being on existing road beds. Two of the alternatives avoid the osprey nest that is not immediately adjacent to an existing open road, while the other alternative utilizes an existing closed road through the area. All of the alternatives utilize existing roads in proximity to osprey nests. For information on goshawk nest buffers refer to the response to comment # 234-77.

Sensitive Areas; Soils; Unroaded Areas

Comment: There are ecologically significant unroaded areas that will be affected by this proposal. Please avoid building any new trails through or adjacent to these ecologically significant unroaded areas larger than 1,0000 acres (shown in green polygons on the map below). Unroaded areas should be conserved and protected because they provide exceptional resource values, including healthy soil, clean water, and good habitat for wildlife, including big game and snag associated species. *Comment 45-12*

Response: We evaluated the location of the DEIS Preferred Alternative as well as Alternative 3 Modified proposed routes against the map provided by the commenter. Based on that assessment the following routes fall within or adjacent to the areas included on the map:

- The northern side of the loop at Indian Butte skirts the edge of the southwestern most tip of the polygon that is shown across both sides of the county line near the top center of the map. The majority of this route is on existing old road beds, however there is a proposed trail crossing the peripheral extension of this polygon that connects between roads 2200-306, 307 and 309 in the vicinity of Indian Creek. All three of these roads are open year round under the 2011 Travel Management Plan and are displayed as open on the MVUM map. Therefore the character of this finger of the mapped polygon is not unroaded. The area in which this trail system loop is proposed is identified as a Recreation Opportunity Spectrum (ROS) of Roaded Modified.
- The largest polygons on the map at Lookout Mountain and Rock/Cottonwood are entirely avoided by all proposed system trails.

- The two smaller polygons south of Deep Creek (one along the North Fork of the Crooked River and the one south of Roba Butte sandwiched between private land and the 4260 road) are entirely avoided by all proposed system trails.
- All polygons south of Big Summit Prairie are entirely avoided by all proposed system trails.

For Alternatives 2 and 4 the overlap on the southwest finger of the mapped polygon that crosses the county line (north central part of the map provided) is the same as described for Alternative 3 and Alternative 3 Modified. However these alternatives include routes that continue eastward from Indian Butte across the south facing flank of Mt. Pisgah. Under both of these alternatives proposed routes are approximately along the southern exterior edge of the central lobe of this polygon. Alternative 4 continues along the eastern exterior edge of this same central lobe, while Alternative 2 pulls away from it. Continuing eastward, both of these alternatives travel along the edge of this polygon on open road 2630. Both alternatives then travel into the southeastern lobe of this polygon primarily on road 2630 and adjacent spurs, with two short connector trails between roads 2630-555 and 556 and between 2630-600 and 606. All of these roads are open year round and approved for mixed use (OHV legal) under the 2011 Travel Management Plan as displayed as such on the Motor Vehicle Use Maps (MVUM).

Alternatives 2, 3 Modified and 4 all propose class II trails in the peripheral tip of the finger at the southeast corner of this same northern polygon. These proposed trails are along ridges on and adjacent to road 3000-550 and connecting between roads 3000-550 and 3000-500. These routes are partially on existing road beds and partially on proposed new trails between existing road beds. Road 3000-550 and part of 500 are open year round and approved for mixed use.

No routes are proposed within any other polygon on the map provided under any action alternative.

Comment: Sensitive Areas will be destroyed. More trails equal more riders, more degradation of sensitive areas like streams, stream banks and wetlands. The plan proposes to allow motorized vehicles in the few remaining Old Growth areas, which threatens these sensitive areas. *Comments 61-2, 62-3, 72-3, 75-2, 87-3*

Response: Project design for the Ochoco Summit project incorporated measures to minimize effects to sensitive areas. Examples include the placement of trails within areas of existing disturbance such as on road beds (see DEIS Tables 42 through 44) and within road effect zones (see General Effects to Wildlife, Fragmentation of Habitat Patches); avoidance of special habitat features which include riparian areas (compare DEIS Table 129 to Table 130), avoiding other important habitat areas such as Lookout Mountain Recreation Area, Rock/Cottonwood Roadless Area, South Boundary, Research Natural Area, Eagle Roosting Area, Winter Range and General Forest Winter Range. In addition, the operating season under the preferred alternative is June 1 to September 30, leaving the designated trails excluded from motorized use 8 months of each year, except where they are on open mixed-use roads. In addition, within the OHV Management Area established in the FEIS, physical closure would occur on unwanted and unauthorized routes that are currently receiving use. These closures would off-set the development of new designated trails by physically limiting unauthorized motorized access on these routes. For these reasons we do not believe that compensatory mitigation is required. See also response to comments 1-2 and 120-5.

Comment: The DEIS states that soil effects will be "unmeasurable," (p.100), but the inability to measure impacts does not equate to no impact. In fact, the less measurable the impacts are, the less

likely the Forest Service will be able to adequately monitor resulting impacts as the project is implemented. *Comment 92-29*

> **Response:** Use of the word "unmeasurable" in the sentences on pages 100 and 101 of the DEIS refers to the amount of exposed soil resulting from construction disturbance that would remain after vegetation has become established and effective cover has developed in the long term. If the exposed soil cannot be found due to being covered with vegetation, then it cannot be measured. This does not mean that the impact did not occur. It simply means that it can no longer be measured.

Comment: While we have focused on the sensitivity of riparian areas, we believe compensatory mitigation could be applied to other sensitive areas as well - such as: wildlife habitat, areas with rare plants or high likelihood of increasing the spread or introduction of invasive species, areas with high potential for conflict with non-motorized recreationists, and areas with cultural resources and historic properties. *Comment 134-6 (includes comments 134-7 – 134-10)*

> **Response:** Compensatory mitigation is commonly applied to large scale development projects that involve filling of wetlands or destruction of habitat for TES species. In a nutshell, the development proponent pays for the protection, acquisition, restoration or improvement of some comparable habitat at some set ratio. For example a highway widening project that fills 2 acres of wetland may get permission to do so in exchange for protecting, creating or improving 10 acres of wetland somewhere else (a 5:1 ratio). In some cases they pay a land owner to not destroy the habitat (like paying rent or buying land that someone else owns in order to keep it in habitat) under a permanent conservation easement.
>
> Project design for the Ochoco Summit project incorporated measures to minimize effects to sensitive areas. Examples include the placement of trails within areas of existing disturbance such as on road beds (see DEIS Tables 42 through 44) and within road effect zones (see General Effects to Wildlife, Fragmentation of Habitat Patches); avoidance of special habitat features which include riparian areas (compare DEIS Table 129 to Table 130), avoiding other important habitat areas such as Lookout Mountain Recreation Area, Rock/Cottonwood Roadless Area, South Boundary, Research Natural Area, Eagle Roosting Area, Winter Range and General Forest Winter Range. In addition, the operating season under the preferred alternative is June 1 to September 30, leaving the designated trails excluded from motorized use 8 months of each year, except where they are on open mixed-use roads. In addition, within the OHV Management Area established in the FEIS, physical closure would occur on unwanted and unauthorized routes that are currently receiving use. These closures would off-set the development of new designated trails by physically limiting unauthorized motorized access on these routes. For these reasons we do not believe that compensatory mitigation is required. Also see response to comments 1-2 and 120-5.

Comment: I am concerned that there is nothing in the plan that would offer protection for Aspen groves that are located near to the trail system. These habitats themselves are rare and endangered in the Ochocos. They support many nesting species within their boundaries and need to be protected from Off-roaders. *Comment 225-4; also reflects comment 229-8*

> **Response:** Designation of a trail system would include a requirement for motorized users to stay on the trails. Trail design would include avoidance of sensitive areas (see response to comments 134-6 and 234-82). Implementation funding would include money for rehabilitation of damaged areas (within the implementation areas recommended in this FEIS), as well as education and enforcement. The Responsible Official would retain the authority to close any trail segments or other areas that are experiencing resource damage and/or unauthorized use.

Comment: Protection of Unroaded Areas. We could not find a definition for "Contiguous Unroaded Areas" in Forest Service Manual 7712.16a (DEIS p. 353). Please provide the definition and where it is located, and how the addition of these motorized trails impacts unroaded areas in the project area. In looking at an slightly outdated map of the forest road system that shows areas that are further than 1 mile from a system road (see attached) (Note: Original letter had a map included.), it would appear that several of the trails proposed would impact some of the few areas of the forest where an individual can be more than 1 mile from a motorized road or trail. *Comment 232-8*

> **Response:** The Forest Service Manual citation was incorrect and has been removed from the final EIS. We evaluated the polygons more than one mile for any open road on the map that the commenter provided against the action alternatives, including Alternative 3 Modified. Of the areas shown on the map as being more than 1 mile from an open road, only the small polygon in the area of Big Spring Creek (west of Little Summit Prairie) is directly involved with any proposed designated route. Alternatives 2, 3 and 4 all had a single proposed route on an existing closed road within close proximity to that polygon. Under Alternative 3 that route has been relocated to another closed road bed that is to the west of the polygon, yet in proximity to it. Though the route is not within the polygon under this alternative, it does affect it because at least a portion of the polygon is within 1 mile of the proposed route. It would therefore no longer be more than a mile from any motorized route. For a detailed analysis of impacts to areas more than 1 mile from open motorized routes, refer to EIS sections on General Effects to Wildlife (Table 91), and Big Game – Deer and Elk (Table 108).

Comment: Why isn't it "possible" for the FS to protect wet meadows, aspen stands, etc.? *Comment 234-82; also reflects comment 234-67*

> **Response:** Within this project area the underlying lithology limits infiltration which contributes to an abundance of overland flow. For this reason, drainages are numerous and they dissect all portions of the project area. During planning for placement of potential OHV trails stream crossings, wet meadows and riparian areas were avoided and trail placement on existing disturbance and in upland areas was a priority. However, given the underlying geology within the project area (which causes upland seeps and springs to be common across the landscape) it is impossible to cross through the area without crossing a drainage at some point. An attempt was made during planning to minimize impacts by purposefully avoiding areas with high densities of stream drainages, special habitats, and riparian zones, by minimizing trails parallel to streams and the number of stream crossings and by routing trails on high ground in between stream crossings. As can be seen on Table 5, the number of stream crossings is considerably less under the preferred alternative. Modifications included in the FEIS reduce the impact on riparian areas compared to the DEIS preferred alternative. Also refer to response to comments 120-5 and 234-178.

Comment: Understand that rutting, rilling, gullying, and erosion are likely and predictable with an OHV trail system. Continued violation and damaged conditions should trigger permanent closure & decommissioning of that trail segment or trail. Trails should not be routed through sensitive areas. *Comment 234-69*

> **Response:** The project design criteria provide for temporarily closing trails that exhibit rutting, rilling, and gullying until they are rehabilitated or reconstructed. In addition, the responsible official has authority to close trails if continued violations and damage become unmanageable.

Comment: Trail on grades >20% are asking for erosion damage. *Comment 234-70*

Response: Yes, steeper trails are always more susceptible to greater erosion than more gently sloping trails. Where sections of steeper trail are proposed they will be additional erosion control measures undertaken such as waterbarring or rolling dips. See Project Design Criteria in Chapter 2 of this document.

Comment: No trails should be routed across "scablands" – again, why are OHVers privileged over other users? Usually "scabland" crossings are avoided. *Comment 234-71; also reflects comment 234-104, 234-214*

Reponse: It is totally impractical to suggest that any transportation system would not have to cross some scabland in Scab/Stringer terrain. Project design criteria (Chapter 2 of this document) state "Where trails cross scablands treatments to prevent erosion will be implemented. Techniques may vary by trail type and may include but are not limited to rock surfacing or soil amendments."

Comment: Why are trails planned within riparian sensitive species habitat & perennial streams in the first place? Why is there no alternative that avoids these impacts? *Comment 234-212; also reflects comments 234-73, 234-210*

Response: The proposed trail system uses access points already in place, such as material sources and sno-parks, as well as existing roadbeds. In order to link existing features and create a logical trail network, new trail segments were proposed. New trail segments were proposed with careful consideration of sensitive habitats; however, in some cases streams, riparian areas, and other sensitive habitats could not be avoided. In these cases, project design criteria would be in place to minimize unwanted effects.

Range

Comment: The DEIS (178) acknowledges that cattle use of user-created trails would maintain existing connectivity of streams and user-created trails which would continue to introduce sediment to the streams, but it doesn't mention cattle use of DEIS created trails and the associated effects. *Comment 79-26*

Response: Cattle use of the new trail system (as proposed in the DEIS) would not add any incremental additional effects. Cattle use on user-created trails may not allow the trail to re-vegetate which may lead to maintenance of existing connectivity of streams and user-created trails and continue to introduce sediment to the streams. However, the new trail system would not be expected to re-vegetate because it would be maintained. Cattle use on the new trails would not be expected change re-vegetation or sediment production.

Comment: We have talked with ranchers who have allotments in the area and they are concerned that their cattle will be harassed and stressed which could lead to weight loss to the animals and money loss to the ranchers. They are also concerned that fences could be cut and invasive plant species could be introduced from bringing in ORVs from all over the Northwest. *Comment 92-36*

Response: Livestock grazing is one of many uses on public lands; because of multiple authorized uses, cattle may experience stress and/or harassment associated with a number of different activities. This is one of the factors considered when calculating the grazing fee equation for use of public lands. In addition, fences have consistently been cut on the Forest prior to the consideration of this project and it is expected that this activity will continue whether or not this project is implemented. Although fence cutting is illegal it continues to be a reality that must be contended with as part of managing livestock on public lands. There are five mitigation measures included in the design of the project (DEIS p. 31) that will minimize the harassment of livestock as well as fence conflicts. Alternative 3 has the lowest

risk of the spread and establishment of invasive plant species of all the action alternatives (DEIS p. 326).

Comment: I manage the White Butte Ranch out in Mitchell Oregon. The ranch has a 290 head cow-calf Forest grazing permit in the Ochoco National Forest. I feel the proposed OHV trail system would have the potential to do great harm to a very productive part of the Ochoco National Forest. *Comment 219-1*

Response: Of the 301,549 acres in the project area, only a total of 17.9 acres of suitable rangeland on new routes would be lost under the preferred alternative. The White Butte Ranch allotment would lose 1.33 acres of suitable rangeland on new routes out of the total 9,620 acres in the allotment and the current stocking rate would not change. Current stocking rates and management practices would remain the same (DEIS p. 346). Direct and indirect effects to livestock are addressed in the Range Resources section of the DEIS (DEIS pp.346-351).

Wild Horses

Comment: A primary discussion point between the Forest Service and the Central Oregon Wild Horse Coalition has been the re-writing of the outmoded 1975 Ochoco Wild and Free Roaming Horse Management Plan. Key to this discussion has been the potential for expansion of Wild Horse Territory boundaries drawn in 1975. It was acknowledged at the time of the writing of that plan that horses existed in both the Coyle Creek drainage and the Cup Spring area. Based on that acknowledgment the original boundaries should have included lands to the north and northwest of the current Wild Horse Territory. Horses are known to exist there now and it would be logical to re-draw boundaries to include those historic and important use areas. The establishment of motorized trails to both the north and northwest would preclude the ability to consider expansion in those two direction, which are also the only reasonable areas to integrate into any realistic new wild horse management plan.

How was the anticipated re-writing of the Ochoco Wild and Free Roaming Horse Management Plan reconciled to the construction of the Ochoco Summit Trail System, when it was known that the proposed motorized system would be located in the only available areas into which the Wild Horse Territory could be expanded? *Comment 46-3*

Response: The proposed trail system for the Ochoco Summit project avoids the established wild horse territory in all alternatives. The territory is not being considered for expansion at this time. The presence of a motorized trail system would not prevent studying the expansion of the territory in the future.

Comment: Much attention was given in the Recreation and Wildlife Impacts analysis to the impacts of noise from motorized use. These metrics could be somewhat scientifically applied to wildlife based on reproduction, stress, and co-habitation statistics. And, recreationists can speak and write. However, the wild horses do not so easily record responses. On several occasions, we have noticed once-wild Big Summit horses, now used as saddle horses, registering fear of distant off-road noise long before their riders are even aware. Though it can't be known whether the threat resulted from direct harassment or just an inherent reaction to an unnatural presence, it has been apparent that the wild horse alerts in a predictable way to the noise of off-road vehicles, far enough away as to escape notation in environmental documents. Since the horses are now surrounded by this noise element, they have had little choice but to adapt and co-exist with the motorized use that did not exist when the 1971 Wild Horse and Burro Act was passed. This could lead the observer to assume there would be no direct impact to the Big Summit wild horse herd when an extensive trail system is established to the north and northwest. Conversely, it is our observation that off-road noise does indeed contribute a significant additional level of stress to the horses."

What analysis was performed to show the noise impacts of the proposed Ochoco Summit Trail System on the wild horse herd? *Comment 46-4*

> **Response:** Noiseband analysis was conducted for each alternative for the proposed trail system. The analysis indicated that noise associated with the proposed trail system would not affect the Herd Management Area.

Comment: In partnership with and on behalf of the Ochoco National Forest, the Central Oregon Wild Horse Coalition has coordinated the annual census of the wild horse herd for the last 12 years. It has been vitally important to identify horses residing outside the Wild Horse Territory as well as those within assigned boundaries. To accomplish this, we have established camps and census routes where horses are known to exist. We are concerned that our camps and riders will be impacted by proposed off-road routes and staging areas. At this time, specific areas are: Sheep Corrals, High Horse, and upper Howard Creek.

Was consideration given to the necessary locations of these census units in relation to the proposed offroad trail system? *Comment 46-5*

> **Response:** The new OHV routes proposed under this project do not go through existing dispersed campsites and the only proposed staging area near a census unit would be at Walton Lake Sno-Park. The Walton Lake Sno-Park is near the High Horse census unit which may experience some noise-related impacts. No additional consideration was given for the census units, since the census units exist at dispersed campsites.

Comment: The Ochoco National Forest and the Central Oregon Wild Horse Coalition have jointly expressed concern over wild horses becoming stuck and subsequently suffering and dying in cattleguards. We have discussed mitigative measures, including the removal of cattleguards. Although existing cattleguards are outside of current Wild Horse Territory boundaries, we again refer to the potential for expansion of the Wild Horse Territory to the north, where these incidents have occurred, and to the northwest. Also, the horse is no less dead, following prolonged suffering, whether he was observant of boundary lines drawn on a map, or not. It has been stated that the creation of the off-road trail system would likely require the installation of additional cattleguards.

Was the current situation with the wild horses and cattleguards, and proposed mitigative measures, considered in the design and location of the proposed Ochoco Summit Trail System? *Comment 46-6*

> **Response:** Design criteria related to the management of livestock in the grazing allotments that are affected by proposed OHV trail include placing cattle guards rather than gates where the new routes intersect existing fences. The analysis for the Range report was completed on June 1, 2010. At that time there was only one known incident of wild horses stuck in a cattle guard on the Ochoco National Forest, since 2010, two more incidents have occurred. A wild horse friendly cattle guard modification would be considered for OHV trail cattle guard locations that have a higher probability of wild horse encounters.

Comment: Although the Big Summit Wild Horse Territory is not located within the Ochoco Summit Trail System planning area, it should have been mentioned, shown on the map, and addressed as an Established Management Area.

Why was the Big Summit Wild Horse Territory not identified as an Established Management Area? *Comment 46-7*

> **Response:** The Big Summit Wild Horse Territory is identified in the DEIS (p. 347) as a Management Area.

Comment: The impacts of the Ochoco Summit Trail System on the equestrian community were considered in detail in terms of encounters, noise, and established routes within the planning area. However, displacement issues that could impact wild horses received no mention. The Bandit Springs

Endurance Ride will likely continue with few or no route changes. A short distance of that ride currently passes through the Wild Horse Territory and interactions have been managed accordingly. But many other horseback riders also utilize the area now included in the Ochoco Summit Trail System planning area. We are concerned that many of these riders will not wish to continue riding in that area and will disperse to the prime riding terrain of the Wild Horse Territory. This will undoubtedly lead to increased negative interaction, increased risk to the public, and increased risk to the wild horses in terms of injury, harassment, desensitization, and disease.

What analysis was performed to determine where the displaced equestrian public would relocate, and potential impacts on the wild horse herd? *Comment 46-8*

> **Response:** Effects to non-motorized activities including horseback riding was addressed in the DEIS (DEIS pp. 88-89); displacement of horseback riders was not identified as a potential effect. Also see response to comments 29-2, 30-4, 45-5, and 92-7.

Comment: Projected forage loss within the Reservoir Sheep Allotment is estimated to be less than 4 acres. While this is not significant in and of itself, the potential exists for greater perceived forage loss, or altering grazing patterns which would likely result in increased grazing within the Wild Horse Territory. Again, this is a displacement effect, and could apply to both sheep and big game. Sheep grazing on the east side of Round Mountain is presently heavy and impactful, and loss of optimal grazing within the off-road planning area could significantly increase conflicts and resource damage.

Was adequate analysis performed to determine secondary impacts of forage loss on the Wild Horse Territory? *Comment 46-10*

> **Response:** Because there only would be a total of 3.7 acres of suitable range lost within the Reservoir Sheep allotment to trail construction with the preferred alternative, a substantial displacement of sheep use within the allotment is not anticipated. Current stocking rates for the sheep would not change nor would the annual operating instructions, which include the herding rotation that has been used since 1999. Herding rotation and movement is the primary factor affecting sheep use and distribution. The Ochoco National Forest does not agree that current levels of sheep grazing are “heavy and impactful” on the east side of Round Mountain, based on annual monitoring of range indicators.

Comment: Just one thought regarding the wild horses. If all the other campers, hikers and horse campers have to find some other place to camp, they very well could end up going into areas of the HMA more than they already are. That could, if pushed enough, cause the horses to be disrupted also, and look for different areas, and perhaps in doing that, leave the HMA, perhaps even ending up on private property, which no one wants. *Comment 58-12*

> **Response:** There are existing non-motorized trails in the Big Summit Wild Horse Territory that already receive use by hikers and horse riders. These trails are not heavily used by the wild horses and an increase in the use of these trails would not be expected to displace wild horses. In the Big Summit Wild Horse Territory, Travel and Access Management only authorizes camping in designated, defined or existing campsites which should limit the dispersed camping.

Comment: I also don't like motorcycles anywhere in this area north of Walton Lake. Last year, for the annual horse count, there was a band of 45 horses seen crossing over the sheep corrals meadow area which is another beautiful area that should be off limits to atv's. *Comment 145-4*

> **Response:** The area north of Walton Lake and the sheep corrals meadow area is outside of the Big Summit Wild Horse Territory. It is Forest Service policy to either relocate wild horses found outside of their Territory back into the Territory, or capture and transport them to holding.

Air Quality

Comments: Air pollution is also a problem with off roaders. Is the FS even measuring the impact on climate change this pollution causes to our planet and thus this forest? I think not. Try to picnic in an area OHV's rev all over, and they do rev...on and on and back and forth. I can show you the areas if you like. It is stinky and toxic in the air. *Comment 86-10; also reflects comments 37-8, 201-4*

> **Response:** Effects of the alternatives to air quality were analyzed by the project ID team and disclosed on pages 354-359 of the draft EIS. Effects related to fugitive dust and vehicle emissions were identified; however, it is expected that effects would be localized and not measurable on the scale of airsheds.

Special Management Areas

Comment: What about proposed trail in the Lookout Mt. Area? *Comment 234-225; also reflects comment 234-226*

I feel it would be a crime to allow new off road trails to be opened and used in the Lookout Mountain Wildlife Management Area. There are not many roadless areas this close to my community where I can have an expectation of finding some undisturbed wildlife, if I am fortunate enough to draw an Ochoco bow tag for elk. There are plenty of other areas where the OHVs can ride and do that are already torn up and the wildlife is disturbed. We do not have many roadless hunting areas where the wildlife is not constantly harassed by the OHV people! *Comment 235-1*

> **Response:** There are no OHV trails proposed within the Lookout Mountain Recreation Area (LRMP MA-F11) under any action alternative. This is one of many areas that were avoided when planning for the potential placement of OHV trails. See response to comment #173-12.

Funding, Grants, Partnerships and Volunteers

Comments: With USFS cutting expenses, how will this be funded especially monitoring, enforcement, maintenance, upkeep and camp sites? *Comment 3-4; also reflects comments 11-5, 27-71, 27-124, 38-7, 41-11, 41-12, 41-26, 58-13, 61-6, 62-6, 62-13, 72-11, 77-5, 77-6, 79-6, 79-61, 79-63, 79-64, 79-67, 87-11, 92-48, 92-49, 95-2, 95-3, 96-8, 104-5, 113-18, 114-2, 121-8, 130-8, 132-4, 144-8, 147-14, 148-5, 150-3, 161-5, 164-2, 164-6, 179-4, 179-5, 183-2, 191-3, 194-8, 196-4, 206-5, 210-11, 212-3, 213-4, 214-3, 218-7, 219-3, 228-2, 230-14, 232-14, 232-15, 232-16, 233-5, 234-14 , 234-39, and 234-61.*

> **Response:** Central Oregon Off-Highway Vehicle Operations (COHVOPS) will be in charge of construction, monitoring and maintenance of the trail system. COHVOPS is primarily funded through the Oregon Parks and Recreation Department ATV Grant Program. These state funds are collected through the sale of OHV permits and a fraction of the state gas tax. Unless there is a major change from the Oregon legislature about the administration of the ATV grant program, funding for expanded OHV trails, trail systems, maintenance, and enforcement should meet long-term funding expectations. Both COHVOPS and the State ATV Committee understand that if, or when, Ochoco Summit is implemented it will require additional funding to take on the maintenance and enforcement efforts that will be required of the new system. Planning and budget forecasting has addressed the additional personnel and resources needed to implement the plan. In addition, some of the labor would be provided by volunteers who have already voiced their interest in helping with implementation if an action alternative is selected. Also see response to Comment 79-31.

Comment: If implemented, get funding to deal with ATVs and damage on McKay, Foley and Trout. *Comment 3-7*

Response: These areas are not within the project area and are thus outside of the scope of this analysis.

Comment: Project should not be approved unless funded. *Comment 3-8*

Response: The planning process on any project funded, authorized or carried out by the federal government follows the National Environmental Policy Act (NEPA) process. The planning process is separate from the implementation process. If a project is authorized under the NEPA process, then steps can be taken to secure funding for implementation. As described in the response to comment 3-4, much of the funding for an ATV would come through the Oregon State Parks and Recreation ATV Grant Program. That program also separates funding for planning from funding for implementation (development or operations and maintenance). Some of the labor would be provided by volunteers who have already voiced their interest in helping with implementation if an action alternative is selected.

Comment: Because I try to compromise, I could be talked into the least invasive plan for motorized vehicles (alternative 3). However, I'm having a little trouble breathing due to the sticker shock. I would think that if the government can find these kinds of funds to put in a trail system for an overweight society to sit on a vehicle in order to "get back to nature," they should be able to find the funds to improve existing foot and horseback trails already in existence but hard to find. Say for instance the Potlid Trail. The trail head marker is easy to find and the trail can be picked up a few forest roads over. But it doesn't exist beyond the trail head sign. I know for a fact that isn't the only trail like that. *Comment 6-4; also reflects comments 88-8, 102-8*

Response: Funding for hiking or equestrian trails and Forest Service System roads is separate from funding for ATV trails. As noted in the response to Comment # 3-4, the majority of the funding would come through the State Parks and Recreation ATV Grant Program, which is funded through license fees and the gas tax. This funding source is not available for roads and trails that do not accommodate OHVs. Additionally the Potlid Trail is outside of the project area and therefore outside the scope of this analysis. Also see response to Comment 41-21

Comments: The ATV committee will not give any funds if all classes are not represented. *Comment 19-4; also reflects comments 35-3, 83-3, 85-2, 91-7, 93-5, 99-8, and 103-2.*

Response: Grant applications that do not contain opportunity for all OHV Classes will be less competitive than those that do. However, such projects may still gain enough points to receive full or partial funding.

Comment: In all of the alternatives you want to add a second vault toilet where you already have one - an extra expense not needed. You appear worried about the cost, but with ATV funds and our volunteer labor, your cost will be minimal. *Comment 19-5*

Response: Amenities proposed under each of the alternatives are described in detail in the draft EIS (pages 14-23). Alternatives 2 (pages 13-16) and 4 (pages 21-23) propose to retain the existing level of facilities at Ochoco Divide Snow Park and do not propose an additional toilet at Cottonwood Pit. Seven of the eight remaining staging areas do not currently have any toilet facilities; one additional toilet is proposed at Walton Snow Park. Alternative 3 (pages 18-19) proposes to retain the existing level of facilities at Ochoco Divide Snow Park, no additional toilet at Cottonwood pit, one vault toilet where there currently is none and one additional toilet at Walton Snow Park. The planning team will take into consideration the suggestion to not add a vault toilet to a location that already has at least one (Walton Snow Park). As noted in the response to comment 3-4, ATV Grants and labor provided by volunteers is anticipated, if an action alternative is selected.

Comment: Motorized recreationists keep trails open for all users including motorcycle single-track trail. This issue is especially important during this period of intense downfall from trees killed by beetle infestations. A once a year trail clearing by a Forest Service trail crew is no longer adequate to keep trails open. Past closures have proven that motorized trails that have been closed to motorized use have become impassable within 3 to 5 years. Examples include the Brooklyn Bridge route in the Helena National Forest and the Middle Fork of Rock Creek in the Beaverhead-Deerlodge National Forest. At the same time motorized recreationists have proven that they are willing to work to keep trails open so that all visitors are able to enjoy them. This ability to keep trails open for use by everyone is a significant advantage to designate all routes within the project area open for motorized use and this significant issue must be considered in the analysis. *Comment 27-36*

> **Response:** We recognize the value and importance of volunteer labor. Refer to response to comment #s 3-4, 3-8, and 120-12 with regard to OHV based volunteers. As stated in the DEIS (page 80) there are 50 miles of non-motorized trails in the analysis area. These trails are maintained by non-motorized volunteer groups. In 2013 trail maintenance targets were exceeded, largely due to the efforts of volunteers. The trails maintained represent a range of trails from non-motorized (hiking, horseback riding and mountain biking) to snowmobile and ATV trails. The volunteer groups involved with the trail maintenance also range from non-motorized to motorized. Some trails are also maintained under a long-standing partnership with Youth Conservation Corps. Thus, on Ochoco National Forest, it is not anticipated that trails will become impassable within 3 to 5 years if they are non-motorized given the current level of interest in volunteerism and partnership. This project does not propose to close any authorized OHV trail to motorized travel.

Comment: With respect to the position that there is not enough money to mitigate problems, motorized recreationists can work with the Forest Service as partners to obtain many different grants. *Comment 27-69*

> **Response:** The Forest Service recognizes the value and importance of volunteer labor. Refer to response to comment #s 3-4, 3-8 and 120-12. We also recognize that partners can contribute finincial support to development, monitoring, maintenance and operations of designated systems through their own fund raising effort or through grants from sponsors. Refer to response to comment # 88-3.

Comment: Education and patrolling of the area with state OHV funding to build and maintain this area and its surrounding offerings will be the key to the area's rural economic health and its recreational success. *Comment 35-21*

> **Response:** The importance of education, enforcement and monitoring is acknowledged in the DEIS (page 13, 25, 26, 33-36). A social and economic analysis is provided in the DEIS (pages 359-366). Though the Ochoco has not been a major provider of OHV recreational use in the past (page 365), seventy percent of OHV users of Central Oregon OHV trails visit overnight and average three days per trip (page 364). Thus development of a designated trail system does have potential to contribute to the local economy, particularly through businesses in the service industry (restaurants, motels, gas stations, grocery stores, etc.)

Comments: The Forest does not have enough funding or staff to currently manage the network of roads it currently has let alone 50 miles of new trails for motorized vehicles. *Comment 41-21; also reflects comme*nt *11-2, 45-6, 79-62*

> **Response:** Funding for road maintenance comes from a different source than funding for construction, operations and maintenance of a designated OHV trail system. Road maintenance funding comes from an allocated budget and lacks volunteer groups interested and capable of contributing in-kind labor. Designated OHV trails are eligible for special

funding under the Oregon State Parks and Recreation Department's ATV Grant Program. Also see response to Comment 3-4.

Comment: We understand the the forest gets funding and resources for OHV work, but we urge that those funds be used to mitigate OHV damage, rather than used to expand OHV impacts. *Comment 45-2*

Response: Oregon State Parks and Recreation Grants are divided among several focus areas: planning; development; operations and maintenance; education and enforcement. When a designated OHV system is planned or established, then ATV Grant Program money can be applied for. Repair of damage to or associated with a designated OHV trail system would be eligible for funding as part of an operations and maintenance program associated with a designated OHV trail or area. If a restoration project is not associated with a designated OHV trail or area, then it would not qualify for funding under the ATV Grant Program.

Comment: We disagree that the current road system is the sustainable minimum road system since the Forest's budgets, including the road budget, are declining and any money allocated to the OHV project will be competing with all other approved OHV projects in central Oregon and throughout Region 6. Additionally, COHVOPS, who will be the primary party responsible for the OHV system (DEIS 67), currently has responsibility for 938 miles of designated OHV system roads and trails across central Oregon (East Fort Rock 318 miles, Millican 256 miles, Cline Buttes 91 miles, Edison 25 miles, Three Trails 222 miles, Henderson Flat 18 miles, Green Mt. 8 miles). COHVOPs ability to obtain outside grants plus funding from Forest Service and Bureau of Land Management budgets to adequately meet the engineering, education, and enforcement needs of the existing trail systems gets harder every year let alone the additional funding, staff: and enforcement personnel that will be needed to adequately meet the DEIS project design criteria, mitigation, monitor, and other proposed features for development and more importantly for operations and maintenance. *Comment 79-31*

Estimated cost = $759,000. That's construction but what about the annual maintenance, monitoring, etc? At some point, this big ORV funding is going to dry up and when it does the Forest Service will not be able to do the maintenance, monitoring and enforcement necessary. *Comment 92-12*

Response: Competition for State ATV grant funds is challenging. COHVOPS has in the past been awarded nearly the entirety of grant funds requested to support OHV recreation in central Oregon. This is a result of the program's effectiveness at maintaining OHV riding opportunities. While it is reasonable to think this will continue in the future, there are no guarantees. It is possible the State could divert gasoline tax revenue (which composes the bulk of the ATV grant funds) towards other uses. It is possible the project could be funded, constructed and successfully managed in the future under a continuing ATV Grant Program. However, it is also possible that in the future operations and maintenance may require a larger investment by partners, sponsors and volunteers if State of Oregon grant dollars become limited. Also see response to Comment 3-4.

Comment: Cost estimates are overblown. No equipment will be needed for most of the system as has been proven by the 3 Trails System in Crescent. Only needed for benching and switchback areas of class 1 areas. Single track can be constructed by volunteer hand labor. Bridges if really needed can be made on-site with native materials by volunteers (Wernex,1993 Second Edition). Most stream crossings can be hardened to provide a good crossing. *Comment 85-6*

Response: Cost estimates are just that: estimates. If it costs less to accomplish the goal then adjustments will be made. The development process would occur in phases. Each phase is planned and budgeted according to the anticipated construction needs determined by field surveys and specialist assessments. Techniques, materials and equipment used will be specific to what is dictated by the terrain and available resources. What worked in Three

Trails may not be suitable on the Ochoco. The geology, terrain, hydrology and soils on the Ochoco are different than those in Three Trails, and as a result different design and techniques may be required in order to provide adequate resource protection and a sustainable trail system.

Comment: It is amazing to me that with all the government cut backs to our military, schools, white tours, I could go on and on! Your spending money to close down old forest service roads that can be used and spending money building a 100 miles OHV trails to be used by by a few. I can't count how many time I've ran into people in the Ochocos needing information or directions, because the forest service can't afford to keep someone stationed at the Ochoco Ranger Station. I guess you need to be a Government higher up to understand this way of thinking. *Comment 88-1*

Response: General federal budget reductions and closure of the Ochoco Ranger Station are outside the scope of this analysis. As for road closures, refer to the response to comment # 233-4. Many roads that have been closed are not suitable for use as OHV trails or to be included in a system of interconnected trails due to location (proximity to sensitive resources or conflicting management allocations, or isolation from an interconnected system of routes). However, many existing road segments have been included in the proposed trail system as is described in the DEIS for Alternative 2 (page 14). This is also true for Alternatives 3 and 4 (page18 and 21). The description for Alternatives 3 and 4 are being expanded to more clearly spell out the amount of proposed trail on and off roads in Chapter 2 of the FEIS. The details of each alternative including the distribution of routes on existing roads is fully displayed in the DEIS on pages 77 and 78. Conversion of existing roads to trails does require investments to ensure proper resource protection as outlined in the DEIS pages 24 to 32, as well as to discourage unintended and unauthorized use. In some cases constructing a new trail can be more cost effective than retrofitting an old road.

Comment: Obviously you will need new of road vehicles and staff to patrol this new tail. *Comment 88-3*

Response: The addition of a trail system in the Ochoco National Forest will require additional funding from the State ATV grant fund to increase COHVOPS' capacity. The success of these grant applications will be determined by the Forest and its partners and trail sponsors ability to provide matching funds or in-kind contributions and the grant committee's receptiveness to the request.

Comment: Bottom line surveys were conducted 1991-2001 and level II stream surveys between 1989-2011. I don't know where the newer surveys were conducted, but seeing reference to older surveys leads me to believe the Forest Service budget and work force are not able to deal with all this project should involve.

If the Forest was better able to monitor because of grazing allotments and other ongoing projects there would have been newer and more comprehensive data. If the federal budget is not allowing you to have a work force to take care of ongoing projects then more should not be taken on. *Comment 104-2*

Response: Bottom Line Survey and LII Stream Survey data were only used in the Hydrology Section of the document to assess one existing condition indicator, bank stability. Only the most recent Bottom Line Survey and LII Stream Survey data available for each stream within the project area were used. Since no major disturbances have occurred in the project area streams since the data was collected, it was assumed that these estimates have remained relatively consistent or possibly improved slightly. The remaining indicators for existing condition; however, were not based on these stream survey data and would not be affected.

Comment: One of the most frustrating parts of being involved in the McKay Creek disaster was the admission of the USFS that they simply could not provide the man power and resources needed to prevent and remedy the McKay Creek situation. We heard from several USFS officials that they were short on compliance officers, short on USFS staff that could monitor that area, and short on funding to create new positions. Having peeked at news recently, I am not confident that this situation is getting any better. The current level of animosity among the skins and shirts (Dems and Reps) in Washington makes even the most optimistic prognosticator skeptical that additional funding for the monitoring of this site will be available. If fact, it seems likely that there will be a reduction in future monitoring funds. Coupled with the remote location of this site, the large amount of usage predicted for this area has a large probability of spiraling into neglect and abuse. *Comment 120-10; Comment 133-11*

> **Response:** Refer to responses to Comments 3-4 and 79-31. A plan to establish a controlled, designed and designated system of routes in the McKay and Mill Creek watersheds was developed in 2008. At the request of the Provincial Advisory Committee (PAC), the McKay OHV Trail Project was abandoned and the OHV trail planning effort was moved to the Ochoco Summit planning area. The development process would occur in phases. Implementation of each phase is planned and budgeted separately. The first phase of any selected action alternative would likely involve the least remote and/or least expensive portions of the proposed system. Monitoring would be conducted as described in the DEIS pages 33-36 and as described in responses to comment #s 120-12 and 234-31. If it is determined trail condition has deteriorated, or resorce damage or unauthorized use has occurred, then actions would be taken to correct problems in order to meet the intent of the Project Design Criteria (DEIS pages 24-32). Refer to responses to Comments 27-70 and 92-22.

Comment: With the current impact on reducing or eliminating all federal agencies' budgets how were you able to fund the analysis on this proposal and how would you fund its implementation? What project work was canceled or deferred because of this effort? *Comment 194-12*

> **Response:** The Ochoco Summit Trail System project received funding through the Oregon State Parks and Recreation Department's ATV Grant Program during the planning phase. If an action alternative is selected then the Forest will apply for a separate grant through the ATV Grant Program for Development as well as to other potential sponsors. Once constructed, then funding would be requested under the programs Operations and Maintenance program. For more details on the State's ATV Grant Program visit the Oregon State Parks and Recreation Department web site. As described in the DEIS (page 1-3), this project analysis was born out of the Travel Management Planning process, which was in response to the Travel Management Rule (2005). The Travel Management Rule required all National Forests to designate roads, trails and areas that are open to motor vehicle use. This site specific analysis is piece of the response of the Forest to the Travel Management Rule's mandate to designate routes and areas open to motorized use. No other project work was cancelled of deferred because of the Ochoco Summit project; the project timeline for has been extended several times due to other projects taking priority. Also see responses to Comments 3-4, 3-8 and 88-1.

Comment: Even with the volunteer help of off-road drivers, this project will cost the Forest Service funds that would be better spent in maintaining existing developments of roads and campgrounds, such as Sugar Creek Campground and Day Use Area that you now close September 1, keeping out early fall campers, deer hunters, and elk hunters out. *Comment 194-13*

> **Response:** The seasonal closure of Sugar Creek Campground is outside the scope of this analysis. As for Forest Service funding and the ability to utilize OHV Trail planning money

to maintain existing roads and facilities, please refer to responses to Comments 3-4, 6-4 and 41-21.

Comment: This (the main gravel roads out of Mark's Creek area are becoming rough due to OHVs doing "cookies" in the roads) creates more time & money to taxpayers for grading the roads. *Comment 210-6*

Response: Inappropriate behavior on road beds can impact road condition. This is one example that demonstrates why education and enforcement are important. By educating people about appropriate behavior and appropriate locations for different styles of motorized use the incidence of this type of behavior should be reduced. By establishing a pattern of enforcement and violation reporting the incidence of this type of behavior should be reduced. Enforcement and Education can be funded through the ATV Grant Program if there is a designated trail system or area. If there is not a designated OHV trail or area, then these funds are not available.

Comment: With budget cuts it is unthinkable that the USFS would need to add any recreation upgrade at this time while not having any dollars in the budget for enforcement of the trail rules and the protection of wildlife in the area. Off trail use will explode and destroy pristine forest! *Comment 211-6*

Response: Enforcement and Education can be funded through the ATV Grant Program if there is a designated trail system or area. If there is not a designated OHV trail or area, then these funds are not available. Refer to responses to Comments 3-4, 79-68, 88-1, 234-21 and 234-31

Comment: As stated budgets are down and the tax payers want to decrease Government spending. This is not the time to spend more on projects that will not be managed to standard. One reason the existing road systems and trails are not being maintained, as in the past, is due to lower funding. The lack of maintenance due to lower budgets resulted in sediment and culvert failures and why roads were closed or taken to level 1 to reduce motorized use and impacts to the natural resources of the National Forest. *Comment 233-4*

Response: The majority of roads that are in the Maintenance Level 1 category were constructed and intended for administrative use – in particular vegetative management activities; as such, no consideration was given during design or construction to public use considerations on these roads and they are considered to be beyond what is needed for reasonable public access. The practice of designating such roads as closed to reduce the need for maintenance and to respond to LRMP standards and guidelines for open road density has been ongoing for many years and predates recent budgetary trends. Refer also to response to Comment 41-21.

Comment: Why do motorized recreationists get all this special attention when hiker trails are not maintained and natural values such as forest and stream integrity and wildlife and plant diversity are already not protected adequately? We are wary that this project is being driven in part by offered funding to the Forest Service by the huge off road vehicle recreation lobby groups and associated industry corporations poised to profit from such OHV trail system expansions. *Comment 234-15*

Response: Funding for maintenance of non-motorized trails is not funded through the Oregon State Parks and Recreation ATV Grant Program because non-motorized trail users do not pay license fees that are required for OHVs to utilize trails and roads on federal and state managed land. Because funding is available through the ATV grant program for planning, development, operations and maintenance of OHV trails financial support is available to support projects such as this. Refer to response to comment #s 3-4, 3-8, 6-4, 88-8.

Comment: Alteration of trailhead and dispersed camp sites should be limited, not continually expanded to accommodate increasing OHV traffic. We are greatly concerned by the industrialization and increasing privatization of our public lands. We are opposed to any use of private concessions to provide services to OHV users or to regulate and maintain their staging areas, camp sites, trail systems, and trail heads. *Comment 234-16*

> **Response:** No private concessions are proposed to be authorized under this project. Managment and regulation would remain under the control of COHVOPS. However, volunteers would be utilized during construction, monitoring, maintenance and patrols as directed by COHVOPS. These volunteers would include OHV users as well as other interested parties which may include equestrian clubs, hiking groups, mountain biking groups and individuals from the general public. Refer to response to comment #s 79-68 and 120-12. Dispersed campsites along open roads would be limited by the rules of the current Travel Management Plan. Camp sites associated with staging areas would be defined with boulders or other natural or constructed barriers to prevent proliferation and expansion beyond the designated area as described in the DEIS Alternative Descriptions (page 12-24). Defined camp sites will be added to the glossary in the FEIS.

Comment: "Providing a quality motorized experience" must take a back seat to protecting and restoring what little biodiversity and ecological integrity is left in our National Forests after a many decade onslaught of industrializing them for corporate profit. It needs to be disclosed that the motorized off road vehicle lobby is a well funded corporate lobby. *Comment 234-53*

> **Response:** As stated in the DEIS purpose and need (page 1-3), the designation of roads, trails and areas that will be open to motor vehicle use was mandated by the 2005 Travel Management Rule. The Need for Change items listed on page 3 were driven by the Travel Management Rule, the outcome of the two-forest-level Travel Management Plan and numerous public comments during the pre-scoping and scoping periods for this project, not by corporate interest. A wide variety of agencies, individuals and organizations responded during the pre-scoping and scoping period, as disclosed in the DEIS (pages 382-384). Recreation based business ventures, clubs and associations that commented on the project during scoping and after release of the DEIS represent many modes of recreation including OHV use, hiking, horseback riding, bird watching, hunting guides and other groups. Non-recreational corporate interests that offered comments on the proposed action and the DEIS included representatives from the timber and agricultural industries. During the comment period for this project's DEIS, comments were received from 235 sources representing a wide selection of stakeholders in the Ochoco National Forest. Whether or not the "motorized off road vehicle lobby is a well funded corporate lobby" is outside the scope of this analysis.

Comment: "Cost Estimates" – These are high costs per mile for a distinctly minority use of the Forest and an excessively ecologically damaging use. *Comment 234-230*

> **Response:** Non-motorized users would not be prohibited from using routes or facilities developed under any action alternative. Thus the use of the system may not be strictly for one user group. The Resource Protection Measures outlined in Chapter 2 (DEIS pages 24-36) were developed to ensure that the trail system would not be excessively damaging. A designated system with project design criteria incorporated in the construction, monitoring, maintenance and operations is likely to be far less damaging than an unauthorized user-created network that is not properly located, does not have project design criteria, is not properly monitored or maintained, and is uncontrolled. Refer to responses to comments 3-4 and 85-6.

Comment: "Alternative 3" – In this case, the less expense, the less damage as cost roughly equates to amount of new open rd/trail density & # of stream crossings. Page 366: "Table 139 Alternative 3

Total Cost Estimate" – Make it cheaper by making it smaller & less damaging ecologically. *Comment 234-231*

> **Response:** Site-specific concerns associated with cost and potential for resource damage have been and will continue to be considered by the project ID team and the Responsible Official during finalization of the EIS and selection of an alternative for implementation.

Miscellaneous

Bias in Analysis

Comments: It is very apparent the writers of this document and the staff of Ochoco National. Forest who participated in this document are very biased against Class II user on public lands. This is wrong. This technical document needs to be rewritten not allowing biased comments, professional biased opinions, non-motorized user groups who have but one goal and that is to remove all motorize user from public lands. To allow this and not allow the same amount of time to counter these bias statement, comments from men and women who favor OHVs on public lands renders this document void due to discrimination against motorized activities within the Ochoco Summit Trail System. This document needs to be rewritten not to down trod OHVs particularly Class II users. *Comment 63-4*

In addition to the above noted issue, it is imperative that users of these trails be involved in the development and implementation of the networks (OHM&ATV Guidelines, pg 5). It appears there are minimal, if any motorized vehicle users in the forestry department who are familiar with the needs of bikers and ATVs?? *Comment 93-8*

> **Response:** As disclosed on page 382 of the draft EIS, the ID team for the Ochoco Summit project includes a representative from COHVOPS and a recreation planner. In addition, as indicated on DEIS pages 383-384, numerous motorized vehicle user organizations have been involved in the planning process.

Comment: The majority of this document should have changed that and created a true OHV trail system including miles of trail for Class II. Instead this document down talks OHV users to lower than a snake belly by ever writer pounding a nail in our coffin. This is wrong! Ever contributing writer should have spent equal positive time writing in support of OHVs. If nothing could have been added positive towards this OHV trail system then their words should not have been included. The Responsible Official should have made sure this document for an OHV trail system was written favoring the subject of the trail system which hopefully will be OHV trails. Is this not the subject of this document to enlighten the public positively concerning OHVs? *Comment 63-31*

> **Response:** The intent of the Ochoco Summit Trail System project is not to "enlighten the public positively concerning OHVs," but rather to objectively analyze the effects of alternative actions that would meet the project's purpose and need, as described in the draft EIS (pages 2-3).

Comment: It is noted that they [OHV users] were included as ID TEAM MEMBERS, organizations that have concern for wildlife and their habitat were not. *Comment 147-5*

> **Response:** Interdisciplinary team (ID team) members were identified on page 382 of the draft EIS. All ID team members are employees of the Ochoco National Forest. Special interest groups do not participate on ID teams on the Ochoco National Forest. Organizations that participated in the project process (generally by attending public meetings and/or providing comments during opportunities for public input) are identified on draft EIS pages 383-384, and include a variety of groups representing a diverse range of interests.

Comment: The leaders of the Ochoco National Forest (and others) are guilty of a negative bias against Class II users and have not been fair in their endorsement of the preferred alternative. *Comment 222-7*

> **Response:** The Responsible Official's preferred alternative is the alternative that, based on analysis disclosed in the draft EIS, represents the best trade-off between meeting the Purpose and Need identified in Chapter 1 of the draft EIS, minimizing environmental effects, and addressing the concerns (including economic concerns) raised by the public and other agencies. The ID team and responsible official make every effort to conduct an unbiased analysis and decision-making process.

Forest Plan Amendments

Comment: We are opposed to management through Forest Plan amendments. We consider project- and site-specific amendments to the Forest Plan to be a misuse of the Forest Plan amendment process and a violation of the National Forest Management Act and the Forest Plan. The repeated and cumulative use of project-specific Forest Plan amendments in project after project across eastern Oregon National Forests effectively moots the standards and guidelines and the intent of the existing Forest Plans. *Comment 234-18*

> **Response:** Each action alternative includes site-specific, nonsignificant Forest Plan Amendments (five in alternatives 2 and 4; four in alternative 3). These alternatives would amend the Forest Plan within this project area at specific locations to allow short trail segments to be constructed and designated for motorized travel. Effects of these proposed amendments and a determination of non-significance are provided in Chapter 3 of this FEIS.

Monitoring, Implementation and Enforcement

Comment: Some commenters expressed concern that regardless of the alternative, unauthorized cross-country motorized use would occur. *Comments 38-4, 45-4, 58-1, 58-10, 62-14, 68-3, 72-12, 87-12, 92-5 92-6, 92-17, 92-31, 92-47, 96-6, 102-6, 104-4, 113-19, 119-3, 121-6, 130-6, 144-6, 154-3, 185-3, 191-1, 224-5, 225-5*

> **Response:** ATVs would be permitted on the designated trail system only during the open season. Regular patrols would attempt to identify use within closure periods and identify trespassers. Violation notices and education would be administered in the event the offender is located. Also see responses to comments 3-4 and 234-21.

Comment: The LRMP calls for monitoring of all resource areas, generally, on an annual basis. The Forest has a very poor record of providing that monitoring. So the question is how can the Forest adequately monitor compliance of this new OHV area when it cannot do its existing job of monitoring of Forest resources? *Comment 41-27; also reflects comment 92-14*

> **Response:** A portion of the monitoring that is described on DEIS pages xvii through xix is already occurring as part of the Forest's ongoing monitoring program (invasive plant, wildlife, range and road condition monitoring). Some of the monitoring described is specifically associated with proposed routes and areas. This additional monitoring workload would be shared between District and Forest personnel, COHVOPS personnel and volunteers, and would be funded at least in part by grant dollars. Also see response to comment s 3-4, 120-12 and 234-31.

Comment: A means of assessing the Forest’s ability to successfully implement this project could be a review of COHVOPS ability over time to adequately meet the needs of the existing 938 miles of motorized roads and trails under their oversight in addition to meeting the needs of any of the DEIS proposed systems. Currently, it appears that COHVOPS ability to provide adequate resources for

engineering, education, enforcement, monitoring, and system modifications based on monitoring results is inadequate for the designated road and trail systems they currently oversee (e.g., Henderson Flat, Green Mountain). *Comment 79-68*

> **Response:** COHVOPS has and will continue to fully meet the needs of the trails in our oversight and is not aware of "monitoring results" to the contrary. The addition of a trail system in the Ochoco National Forest will require additional funding to increase COHVOPS' capacity. This will be determined by the ability of the Forest, partners and trail sponsors to provide matching funds to grant applications to the State ATV fund and the fund committee's receptiveness to the request.

Comment: What steps [would be taken to close unauthorized routes]? *Comment 92-22*

> **Response:** Unapproved routes would be obliterated, camouflaged and/or barricaded as soon as feasible; initial restoration work would be part of project implementation and would take place as part of the phased implementation plan.

Comment: If the forest follows through with Alternative #3, we feel that trails should be constructed in increments such as 10 or 20 miles. Then it should be monitored and enforced closely. If there are violations, the trails are reclaimed and no further trails are created. Bad behavior should not be rewarded. *Comment 92-46*

> **Response:** As described in the Purpose and Need (DEIS page 3), we have an example of an OHV trail system that is not of sufficient length to provide a day of riding to an experienced rider. The outcome of inadequate length of travel is that riders are tempted to venture off the trail when they've finished with the short distance in the system. The purpose of this project is to provide a successful OHV trail system with adequate length, diversity, difficulty, loops, alternate routes and other features to provide a quality experience and to keep the use on the designated system. We would not open a trail in increments of 10 miles as that would not meet the purpose and need. The system, or portions thereof, would not be opened to public use until there is sufficient, length and complexity to meet the purpose and need for the project. Then the open portion(s) would be managed and monitored as described in the DEIS. Refer to the description of alternatives (DEIS pages 12-24), and to the Resource Protection Measures (DEIS pages 24-36). Also see response to comment # 234-21.

Comment: The EIS published by the USFS seems to indicate that a considerable part of the monitoring of trail abuse will be left up to OHV user groups like Ochoco Trail Riders. It baffles me to think that someone along the course of making this plan didn't stand up and question whether or not this was putting the foxes in charge of the chicken coop. REALLY? The very people who will cause the destruction are responsible for monitoring and reporting the destruction? That kind of sovereignty by a special interest group is one of the reasons people have such a low opinion of the government as a whole. I understand the value of their input in this process but to put them in charge of monitoring their own abuse seems designed to serve only the OHV community and to degrade every other aspect of this process. *Comments 120-12, 133-12; also reflects comment 148-4*

> **Response:** COHVOPS has developed effective relationships with the OHV user groups in central Oregon. These groups are an important part of the successful COHVOPS formula. However, volunteer user groups such as the Ochoco Trail Riders are not "in charge." COHVOPS is the representative organization for the land manager and takes the lead in all OHV management activities that occur within the OHV area. User groups are invited or request to participate and COHVOPS accepts and solicits their participation. Volunteer group members receive training and operate under the guidance of COHVOPS personnel. It is their commitment and sweat equity that helps keep riders on the trails by providing COHVOPS with labor in the form of work parties for maintenance and improvement projects

as well as additional sets of eyes and ears to help monitor conditions. Additionally, user groups like the Ochoco Trail riders are a valuable source of matching funds required by the State OHV grant committee. The match value of their volunteer labor when COHVOPS submits a grant application to the committee is essential. The Ochoco Trail Riders are important elements in maintaining and monitoring other COHVOPS-managed OHV areas such as the Green Mountain Trail and the Millican Plateau.

Comment: If you establish new trails the use will have to be severely controlled to prevent another McKay Creek mess. Some kind of permit system such as river permits on the Deschutes River, or Snake River in Hells Canyon NRA, where numbers and use days are controlled will have to be used. I don't believe you have the funds or personnel to control it. *Comment 156-4*

Response: Refer to response to comment # 92-46. The Green Mtn OHV trail in McKay and Mill Creek watersheds, at 8.2 miles long, is not of sufficient length to provide a full day of riding. Too short of a trail system can result in folks being tempted to find alternate routes. These user created routes are not properly designed, constructed or maintained. In addition, some of the previous ATV use was associated with other recreational use, such as hunting, and was not associated with the Green Mountain Trail at all. While most of the damage that occurred in the riparian terraces along McKay Creek (prior to the emergency closure going into effect) was the result of unauthorized and uncontrolled use of highway legal vehicles (four-wheel drive trucks and SUVs), not OHVs coming off a designated trail system. Therefore it is not fair to blame the trail-riding OHV folks for the portions of the damage done by four-wheel drive standard vehicles or others that are not in the area to use desigated trails. We do not anticipate the use of the proposed trail system to increase to the point of needing a permit system (such as those imposed on uses such as river permits on the Deschutes or Snake River). However, trail use would be monitored as outlined in the DEIS (page 35-36). With regard to funds and staffing refer to the response to comment #s 3-4, 88-3 and 211-6.

Comment: How and who would implement this project with the long-standing and very effective road closing system followed in the Paulina Ranger District each fall during the deer and elk hunting seasons. *Comment 194-10*

Response: The Rager Travel Management Area (TMA) is administered in partnership between USFS, ODFW and OSP. Implementation would not change that. Any routes within the Rager TMA would be subject to the same restrictions as the rest of the routes within the TMA (only green dot roads would remain open under the closure period). This is disclosed in the DEIS (page 13, 17 and 31.

Comment: Who is going to enforce vehicle and route restrictions, how, and with what funding? Any designated trail system needs to be kept small to limit ecological damage and allow for adequate maintenance, rehabilitation, and enforcement. *Comment 234-21; also reflects comments 41-26, 61-6, 62-6, 62-13, 72-11, 77-5, 79-64, 87-11, 92-48, 92-49, 92-51, 92-52, 95-3, 96-8, 96-12, 104-4, 113-18, 120-2, 121-8, 129-47, 129-56, 130-8, 132-4, 133-3, 141-9, 144-8, 147-3, 148-5, 150-3, 161-5, 164-6, 179-4, 194-8, 206-5, 210-11, 212-3, 214-3, 218-7, 219-3, 224-8, 229-4, 229-9, 230-14, 233-5, 234-44*

Response: The proposed trail system would be managed by COHVOPS. COHVOPS is a Service First program agreement between the Prineville BLM, Ochoco and Deschutes National Forest. COHVOPS' sole purpose is to provide management services to designated OHV areas within the participating agencies jurisdictions. Funding is supplied by gasoline taxes and OVH permit sales via the State of Oregon's Parks and Recreation Department. These funds are leveraged with volunteer labor commitments and Forest Service and BLM matching funds. Operations and Maintenance grant funds pay for patrols to ensure compliance with State and Forest OHV operator and equipment regulations; and trail

condition surveys and maintenance. Refer to response to comments 3-4, 45-2 and 211-6. The size of a trail system should be that which provides the trail user a satisfying trail experience. Too small and the land manager runs the risk of users creating unauthorized routes to obtain their desired trail experience leading to unwanted maintenance and rehab costs. Refer to response to comment 92-46. The recommendation of a relatively small scale trail system will be considered during development of the selected alternative.

Comment: Regarding monitoring, it's better to prevent impacts rather than monitor the demise of ecological integrity and biological diversity. It's also more cost effective to initially prevent impacts rather than to do restoration later. This is why we favor only a small trail network on existing open roads that is the least expensive, involves the least riparian areas, avoids Old Growth Management Areas, and stays closest to existing traffic and disturbance areas, involving very little and only short new trail construction if any, and no use of decommissioned roads or closed roads not maintained for administrative use. Then the proposed monitoring and mitigation measures (which we support) are more likely to result in acceptable conditions, reasonable levels of expense, more likely enforcement effectiveness, and an end to OHV cross country use and user-created trails. *Comment 234-30*

Response: Alternative 1 (the no action alternative) would maintain the existing condition, in which OHVs are authorized to use open, mixed-use roads.

Comment: Minimum annual reporting should include: type of ecological impacts and violations found, location and extent of violations and impacts, and what measures will be taken to correct these violations, prevent future such impacts, and rehabilitate or restore damaged areas. *Comment 234-31*

Response: COHVOPS documentation processes include: daily trail maintenance activity database which records maintenance, repair and rehab work. Trail condition surveys are conducted annually, at a minimum, to document deteriorating conditions and maintenance needs. Work plans are developed to correct situations and implement measures to avoid future occurrences. Visitor contacts are recorded in a patrol database. This is used to estimate annual visitor numbers and usage.

Comment: The Forest Service needs to maintain the authority and the will to change designated ORV roads if ecological damage exceeds acceptable levels or if use of certain routes is threatening the local viability of MIS, listed, or focal species, including N. goshawk, Pileated woodpecker, American marten, Canada Lynx, Gray Wolf, elk, Spotted frogs, & Redband trout. *Comment 234-38*

Response: The Responsible Official has the option to close any part of the Forest when necessary to address resource concerns and/or public safety. COHVOPS is the representative organization for the land manager and takes the lead in all OHV management activities that occur within a designated OHV area. If an action alternative is selected, the proposed trails and areas would be managed, maintained and if necessary reconstructed or closed as stated in the Project Design Criteria (DEIS pages 24-32).

Comment: The Forest Service would need to start with the most effective physical barriers for any degree of compliance & avoidance of impacts – this is obvious from widespread past & ongoing experience of ATV & motorcycle riders easily circumventing natural barriers – berms, rocks, down trees, etc. and even using trucks & winches to pull down metal gates or simply unbolting pole barriers. Effective barriers are expensive – the longer the trails, the more expensive to stop unauthorized trail & road creation. It will be too late for the fish, wildlife, or rare plants if less effective barriers are used first. *Comment 234-62*

Response: COHVOPS utilizes materials and techniques to obstruct unauthorized routes that are cost effective and suitable to the setting. Natural barriers are used when available and in areas where there is less opportunity for off trail use. Manufactured barriers are installed when natural material is either unavailable or insufficient to achieve the desired level of

control. COHVOPS attempts to curtail off trail activity whenever it is encountered and also tries to prevent it through trail design. A properly designed and constructed trail system is more attractive to users and will reduce the occurrence of cross country travel.

Other

Comment: A number of commenters were concerned about the proposed season of use for the motorized trail system. Some commenters found that the season was too long; others found that it was too short. *Comments 3-9, 19-1, 35-8, 43-2, 69-14, 83-6, 85-3, 91-6, 92-9, 93-10, 93-12, 99-7, 110-1, 137-1, 142-3, 213-6, 218-5, 222-2, 226-2, 230-8, 234-23, 234-191*

Response: Careful consideration was given by the project planning team when making recommendations regarding the best season of use for the motorized trail system. Natural resources, hunting season, the Rager closure season, and other recreational uses in the Ochoco National Forest were considered. The Responsible Official would have the authority to delay opening of the trail system or closing the system early in a given year if resource conditions warranted such an action. It should be noted that all mixed-use roads would remain available for OHV use year-round, except where seasonal closures already apply.

Comment: I am against option #3 as it would force more users on a smaller amount of trails therefore being more dangerous, and causing more wear and tear of the trails. *Comment 39-3*

Response: Effects related to safety and trail condition were part of the analysis and were disclosed in Chapter 3 of the draft EIS.

Comment: The 30 acres we lease are not shown on any of the maps. *Comment 71-4*

Response: The commenter refers to the 30-acre Crystal Springs Organization Camp. This site was accidentally omitted from the project maps. This oversight has been corrected.

Comment: On the maps you left out section lines and the scale isn't in 1-mile increments. Whether conveniently omitted or not, it doesn't give the real scale of the project or an easy way to see miles of trail per square mile. *Comment 92-3*

Response: All maps included with the draft EIS incorporate a scale bar. Miles of trail per square mile and how this measure would vary between alternatives is discussed in several places in the draft EIS (especially in the Hydrology, Aquatic Species, and Wildlife sections), and is summarized in Table 104 (DEIS page 271).

Comment: I see nothing in this section that discusses how this proposal went from a small amount of trails in a much smaller defined geographical area to, a ten-fold increase in trails over 2/3rds of the Forest. *Comment 112-1*

Response: A paragraph explaining how the project area boundary was developed has been added to the final EIS, in the section titled "Public and Intergovernmental Involvement."

Comment: We can understand the location of cultural sites not being disclosed, but why should site specific design elements to avoid damage to them be "FOIA exempt?" Native people in particular need to know how cultural sites would be protected. This should be public information and be made available for public comment. *Comment 234-84*

Response: Site-specific design elements are FOIA exempt because the actual locations of cultural sites are FOIA exempt in order to protect the integrity of each site. The public has access to the general design criteria (see Project Design Criteria in Chapter 2 of the draft EIS); these are similar to what would be applied on a site-specific basis.

Non-substantive Comments Supporting an Alternative _

The comments identified in this section are non-substantive, but support a particular alternative (as described in the draft EIS) or express an opinion. These comments did not require a response. Full text of the comments can be found in the project record.

The following comments encourage the selection of Alternative 1: *6-1, 11-1, 29-1, 29-7, 38-13, 41-1, 41-6, 41-28, 51-1, 53-1, 56-1, 57-1, 59-1, 61-1, 62-1, 64-1, 64-4, 67-1, 70-1, 72-1, 75-1, 76-1, 77-1, 78-1, 79-2, 79-10, 79-76, 82-1, 82-5, 86-1, 87-1, 92-1, 95-1, 96-9, 97-1, 102-1, 102-9, 104-1, 113-1, 113-21, 118-1, 119-1, 119-5, 120-16, 121-9, 125-1, 126-1, 128-1, 128-5, 130-1, 133-1, 133-16, 135-1, 136-5, 139-1, 139-5, 139-12, 143-1, 144-9, 147-1, 148-7, 151-1, 153-1, 154-1, 155-1, 156-1, 156-6, 159-1, 160-1, 162-7, 164-5, 165-1, 166-1, 169-1, 170-1, 171-1, 171-4, 172-1, 173-1, 173-3, 174-5, 175-2, 175-6, 176-1, 176-8, 177-1, 179-1, 179-9, 180-1, 181-1, 181-6, 186-6, 187-1, 187-4, 187-7, 194-1, 196-1, 197-1, 197-4, 199-1, 201-1, 201-6, 203-2, 206-1, 206-7, 209-1, 209-9, 210-1, 210-14, 212-4, 214-1, 215-1, 215-5, 219-4, 220-1, 221-1, 221-4, 224-9, 225-1, 229-2, 230-20, and 231-6.*

The following comments encourage the selection of Alternative 2: *14-1, 14-4, 15-1, 18-3, 22-7, 37-9, 100-6, 101-3, 122-3, and 145-2.*

The following comments encourage the selection of Alternative 3: *16-1, 30-3, 46-2, 71-2, 106-3, 106-5, 123-4, and 146-2.*

The following comments encourage the selection of Alternative 4: *12-1, 13-1, 17-1, 19-3, 19-6, 20-1, 28-1, 31-1, 32-1, 33-1, 39-1, 44-1, 47-2, 49-4, 50-1, 50-3, 52-1, 63-6, 66-1, 69-3, 73-1, 83-1, 83-8, 83-10, 89-1, 91-2, 91-15, 93-1, 93-15, 99-2, 100-3, 103-3, 103-6, 105-4, 107-3, 137-5, 138-1, 142-1, 142-2, 142-10, 142-7, 158-1, and 205-1.*

The following comments express a general opposition to a Class II trail system: *145-7, 173-14 and 234-12.*

The following comments express general support for the development of a Class II trail system without expressing a preference for an alternative: *4-8, 7-1, 48-3, 63-5, 63-8, 63-16, 94-5, 222-3, and 222-8.*

APPENDIX B – RECOMMENDED MODIFICATIONS TO ALTERNATIVE 3

Introduction

During the comment period on the draft EIS for the Ochoco Summit Trail System project, the project planning team read and analyzed comments provided in 235 comment letters (see Appendix A, Response to Comments). The comments helped the team to identify specific areas in which the proposed trail system created concerns for a variety of stakeholders. The team then went on to consider how the preferred alternative might be modified to alleviate as many specific public concerns as possible.

Consideration of Specific Concerns

- Routes in proximity to private land at the west end of the project area were of concern to private landowners; concerns were related to quality of life, safety, and enjoyment of quiet recreation.
- Routes in proximity to the Crystal Springs Organization Camp (Special Use Permit) were of concern to the special use permit holders; concerns related to quality of experience of guests at the camp facilities
- The equestrian community expressed concern about specific routes in proximity to Corral Flat (Special Use Permits), conflicts with traditional equestrian camps, staging for the annual endurance ride and other informal rides and camp events that occur at this site and on the non-system horse trails originating from this site: Mustang Loop and High Horse Loop.
- The Class II (jeep and 4x4) community expressed concern that the preferred alternative didn't include designated Class II trail; concerns related to the quality of experience for Class II recreationists on the Ochoco National Forest.
- A variety of commenters expressed concern about the specific areas of hydrologic concern identified in the draft EIS (DEIS Table 83), particularly in the Deep Creek Watershed.

In considering how to address these specific areas of concern, while maintaining a viable action alternative, the project planning team first looked at proposals from the other action alternatives in an effort to include proposals that had already received thorough analysis. The team made limited proposals for new trail segments (to create a logical trail system after removing some trail segments); these new trail segments were analyzed by resource specialists and specialists reports were updated or addenda to specialist reports were prepared (see the Project File, Ochoco National Forest, Prineville, OR).

Recommended Modifications to Alternative 3

Alternative 3 modified is displayed on FEIS Maps 1 – 4 (Appendix E). Alternative 3 modified includes the design criteria, monitoring and mitigation, and rehabilitation and restoration activities described in detail in Chapter 2 of the FEIS and development of a system of proposed motorized routes and areas as described in Chapter 2 under Alternative 3 with the following modifications:

- Deletion of routes proposed in proximity to private land along Marks Creek.

- Deletion of routes proposed in proximity to Crystal Springs Organization Camp (eliminates two new class 3 and two new class 4 stream crossings).
- Deletion of routes proposed in proximity to Corral Flat (eliminates one new class 2 stream crossing).
- Replacement of deleted west end trail miles and interconnected loops by adding selected routes proposed in Alternative 4 (stream crossings on existing road beds).
- Replacement of deleted west end trail miles and interconnected loops by creating two new trail segments that connect between the west end additions from Alternative 4 and existing mixed use roads FS 2610-150 and FS 2620 (no stream crossings).
- Realignment of proposed route crossing Crystal Creek.
- Addition of a trail route proposed in Alternative 4 to connect between the staging area at Walton Snow Park and the existing mixed use road system FS 2630-400 and associated spurs (no stream crossings).
- Inclusion of a change in status from "Roads Open to Highway Legal Vehicles" to "Roads Open to All Vehicles (mixed use allowed) on one segment of FS 2630 between its junctions with FS 2630-400 and 2630-450.
- Establish 20.1 miles of trail system designed for Class II users utilizing routes analyzed as part of Alternative 4, with one modification (stream crossings on existing road beds).
- Realignment of a proposed route crossing a tributary to Happy Camp Creek, placing it onto existing mixed use roads FS 3000-800 and 2630 (eliminates one new class 2 and one class 4 stream crossing).
- Realignment of a proposed route crossing Crazy Creek to be outside of recently constructed exclosure and to avoid stream restoration reaches and the decommissioned road crossing within the exclosure.
- Realignment of a proposed route parallel to Jackson Creek onto existing mixed use (FS 3000-900) and closed roads.
- Realignment of a proposed route crossing North Wolf Creek onto existing closed road beds (eliminates one new class 2 stream crossing).
- Realignment of a proposed route crossing and running parallel to a tributary to Little Summit Creek onto an upland alignment (eliminates a new class 4 stream crossing).
- Deletion of a trail segment in proximity to a tributary to Buck Hollow Creek (a short new trail segment required to connect between each side of this deletion).
- Realignment of a proposed route that crossed and ran parallel to Big Spring Creek onto existing road beds where available (eliminates one new class 2 stream crossing). This reroute requires a short segment of parallel trail adjacent to a highway-legal only segment of road FS 4250.
- The staging area at Six Corners Rock Pit would be a limited development trailhead instead of a fully developed staging area as was described for Alternative 3. Development would be limited to parking area, picnic tables and an informational kiosk. There would be directional signs and width control devices at the trail entry points from this trailhead. Dispersed camping would be allowed in accordance to the Motor Vehicle Use Map (MVUM).

Alternative 3 Modified Associated Actions

In order for Alternative 3 Modified to be implemented, the following associated activities are proposed:

- About 16.9 miles of currently closed Maintenance Level 1 roads would be opened and used for OHV routes for class I vehicles (50” in width or less).
- About 2.8 miles of currently closed Maintenance Level 1 roads would be opened and used for OHV routes for class II vehicles (80” in width or less).
- About 18.0 miles of currently closed Maintenance Level 1 roads would be opened and used for OHV routes for class III vehicles (24” in width or less).
- About 4.9 miles of roads previously planned to be decommissioned would be opened to a width of 50” and used as OHV routes for class I vehicles.
- About 1.2 miles of roads previously planned to be decommissioned would be opened to a width of 80” and used as OHV routes for class II vehicles.
- About 5.8 miles of roads previously planned to be decommissioned would be opened to a width of 24” and used as OHV routes for class III vehicles.
- About 8.4 miles of currently open Maintenance Level 2 roads would be utilized as OHV routes for class I vehicles. This would be shared use with standard (non-OHV) motor vehicles and would have directional and safety signing installed.
- About 8.3 miles of currently open Maintenance Level 2 roads would be utilized as OHV routes for class II vehicles. This would be shared use with standard (non-OHV) motor vehicles and would have directional and safety signing installed.
- About 12.5 miles of currently open Maintenance Level 2 roads would be utilized as OHV routes for class III vehicles. This would be shared use with standard (non-OHV) motor vehicles and would have directional and safety signing installed.
- Two existing Snow Parks (Ochoco Divide and Walton) would be utilized as staging areas for OHV during the season of operation of the OHV trail system (June 1 to Sept 30, except within the Rager TMA where restrictions would begin with the TMA restriction date each year and remain closed until the OHV system reopening date the following year (June 1).
- One existing developed recreation site (Cottonwood Pit) would be utilized as a staging area for class III vehicles during the season of operation (June 1 until the beginning of he Rager TMA closure period each year).
- User-created trails and other unauthorized routes that are located in inappropriate areas or that would cause confusion due to intersection with the proposed designated route, would be closed and rehabilitated or concealed, and directional signing installed as needed.
- Motorized and non-motorized uses would be separated as much as possible except where proposed motorized routes and non-system equestrian trails share open mixed use road segments. Signing would be used to encourage respectful behavior by all users and to ensure that designated motorized routes are consistently mapped and clearly marked on the ground with directional signage.
- An open rocky area near the top of Peterson Lava would be utilized as a staging area for class II vehicles. This site would be set back off of the 2630 road in order to maintain the current historic integrity of the Historic Summit Trail which is an aggregate surface Maintenance Level 2 road in this area. An informational sign would be developed and installed in the

vicinity of this site to share the historical background of the Historic Summit Trail and the surrounding area.

- Six Corners Material Source (gravel pit) is an active mineral material source. The trailhead and parking area for the class III system would be located so as to not interfere with safe operation of the mineral material source and the access and haul road associated with it.
- The Walton Snow Park is situated in the Walton Material Source (gravel pit) which is an active mineral material source. The staging area and associated amenities for the class I and III OHV trail system would be located so as to not interfere with safe operation of the mineral material source and the access and haul road associated with it.

The recommended implementation strategy for Alternative 3 Modified would include two levels of focus. First, an OHV Management Area boundary would be established that guides the area of focus for managing OHV recreation within the Ochoco Summit project area (see Map 3, Appendix E). Within the OHV Management Area a priority would be placed on education and enforcement of the OHV use regulations including the use of designated routes and restrictions against use off of designated routes. Within this area there would also be a focus on closure and rehabilitation of unauthorized routes being used by OHV vehicles. The OHV Management Area would be the boundary that would be utilized in seeking funding to support monitoring, maintenance, operations, education and enforcement of the OHV trail system. Secondly, two separate Trail Implementation Areas have been mapped within the OHV Management Area (see Maps 1-4, Appendix E). These generally represent the area within ½-mile of proposed designated trail system routes that fall within the recommended OHV Management Area. The recommended Trail Implementation Areas would serve as areas of focus for efforts on trail development, signing, monitoring and maintenance, as well as for management of unwanted routes that are not included in the designated trail network. These boundaries would also be utilized to focus efforts of volunteer groups involved in trail development, monitoring and maintenance, as well as those involved in monitoring of non-motorized routes and closure of unauthorized routes. Route closure could include physical closure, rehabilitation and/or concealment of routes that are not authorized for motorized use (closed, decommissioned or user created routes that are not part of the designated system of motorized routes).

Effects of Alternative 3 Modified

Supplementary analysis was conducted and addenda were prepared for specialists reports and the analysis disclosed in the DEIS, where appropriate, to analyze and disclose the effects of Alternative 3 Modified. In general, analysis indicated that the effects of Alternative 3 Modified would be within the range of effects already disclosed in Chapter 3 of this FEIS.

Addenda were not prepared for Air Quality, Visual Quality, Social and Economic Analysis, Climate Change discussions, because Alternative 3 Modified is very similar to Alternative 3 in terms of total trail system miles and largely represents a blend of Alternative 3 with some aspects of Alternative 4, the effects to these resources would be as described in Chapter 3 of this FEIS.

An addendum was not prepared for the Cultural Resources analysis; effects of Alternative 3 Modified would be as described in the “Cultural Resources” section in Chapter 3 of this FEIS. Any new routes or restoration areas not covered by existing surveys would require survey prior to implementation, as discussed in Project Design Criteria in Chapter 2 of this document.

An addendum was not prepared for the “Wilderness, Inventoried Roadless, and Unroaded Areas” analysis. Effects to wilderness, IRAs, potential wilderness, and other unroaded areas would be essentially the same as disclosed in Chapter 3 of this document. The proposed new trail segments would be in areas that are well-roaded and would not occur in wilderness or IRAs, and are not in any citizen-identified unroaded area.

Specific effects identified in the addenda or finalized specialist reports are as follows (the addenda and associated maps are located in the Ochoco Summit project record in Prineville, OR).

Transportation

An approximately 1.5 mile section of road 2630 that is designated as highway legal vehicles only in the Travel Management Project Record of Decision, August 2011 is proposed to be changed to allow mixed-use between OHV and highway legal vehicles. Measures to improve sight distance and/or reduce speed are also proposed, including signage and spot brushing.

Alternative 3 modified utilizes more existing road and reduces the amount of new trail, Table 139 displays costs associated with these modifications.

Table 139. Updated comparative costs for the Ochoco Summit Trail System project.

Description	Alternative 2	Alternative 3	Alternative 3 Modified	Alternative 4
Class 1 (ATV)	31.06 miles/$62,627	21.92 miles/$47,991	17.83 miles/$39,036	51.09 miles/$105,029
Class 2 (Jeep)	12.39 miles/$53,772		7.78 miles/$17,033	11.24 miles/$48,797
Class 3 (Motorcycle)	25.67 miles/$50,027	28.40 miles/$53,971	24.72 miles/$46,978	22.14 miles/$40,937
Trail Cost Estimate	$166,500	$101,961	$103,047	$194,762
Culverts	92 cmps at $92,000	27 cmps at $27,000	27 cmps at $27,000	111 cmps at $111,000
Bridges	16 at $720,000	14 at $630,000	9 at $405,000	17 at $765,000
Total Cost Estimate	**$978,500**	**$759,000**	**$535,047**	**$1,071,000**

Recreation

Because the length of new trail construction in Alternative 3 Modified is approximately equal to Alternative 3, which is fully analyzed in the FEIS, the potential direct effects to the abundance of primitive cross-country non-motorized opportunity were found to be comparable between the original alternative and the modified alternative.

Modifications to Alternative 3 result in few changes in the potential impacts to recreation sites compared to the original alternative which are displayed in Table 45 of this EIS. The net result is that potential impacts under Alternative 3 Modified are similar to those described for Alternative 3. The primary differences that the modifications make are as follows:

- One developed recreation site at Crystal Springs Organization Camp would be outside of the area affected by noise from OHVs using the designated system of trails.
- Big Springs Campground would be closer to a designated route but still outside of the area where noise exceeding 45 dba is expected to occur and therefore should remain outside of the area affected by noise from OHVs using the designated system of trails.
- A dispersed campsite west of Corral Flat would be outside of the area where noise from use of the designated system of trails is expected to be heard.
- Two dispersed campsites in the Happy Camp Creek drainage would be outside of the area where noise from the designated trail would be heard.

- Two dispersed campsites along the Road 2630 (an open mixed use road) above Happy Camp Creek could be impacted by increased noise associated with one realignment of the designated route.
- Five dispersed campsites adjacent to proposed Class II (jeep and other four-wheel-drive) routes could be impacted with increased noise from the designated trail system. These sites are near Stewart Spring, Packsaddle Reservoir, Jones Trough, Peterson Creek, Porter Creek and Peterson Lava.

It should be noted that all of these camp sites with potentially increased noise impacts are along open roads that are already legal for use by OHVs (mixed use roads) so the nature of the sound in these areas would not be changed, but the frequency of the sound could increase with increased volume of traffic associated with designation of a trail system. The camp sites that would have reduced noise impacts due to reroutes or route deletions are also along open roads, so they would still have motorized traffic noise, but not from the designated trail system.

The amount of area within the Recreation Opportunity Spectrum would be changed from that displayed in Table 45, but it would be within the range of the alternatives analyzed in detail. Specific changes are as follows:

- With proposed modifications to Alternative 3, the Class I (ATV) trail system would have sound effects over substantially less area in the Roaded Natural Recreation Opportunity Spectrum (ROS) due to the deletion of routes at Crystal Creek, Crystal Springs and Grant Butte. There are short segments of trail in Roaded Natural ROS associated with additions to Alternative 3 in an unnamed drainage north of Shamrock Creek, and near Ochoco Butte. However, the net result of these additions in combination with the deletions mentioned above result in an overall decrease in impacts to Road Natural ROS in the Class I trail system. The Class II (Jeeps and Four-wheel drives) trail system has no impact on Roaded Natural ROS. Reroutes proposed in the Class III (motorcycle) trail system include slight increases in impacts to Roaded Natural ROS: one segment (at Deep Creek) is a short distance and the overall effect on the ROS is not substantially more than in the original Alternative 3 at this location; one segment is within this ROS for a slightly longer distance (south of Little Summit Prairie); and one segment is on the existing open road 2630 where the potential for impact would be limited to frequency of occurrence of an already established and legal use of this road system which has been classified as Roaded Natural ROS.
- With proposed modifications to Alternative 3, the Class I (ATV) trail system would affect more area with sound in the Semiprimitive Non-motorized Recreation Opportunity Spectrum (ROS) due to : the addition of a route designation on open road 2620 which is just outside of an allocated Old Growth Management Area at Stewart Springs; the addition of a new trail route from Alternative 4 that is in proximity to an allocated Old Growth Management Area at Ochoco Butte; addition of a new trail route from Alternative 4 in proximity to an allocated Old Growth Management Area at Peterson Creek; and a slight increase in length of a crossing of allocated Old Growth at Deep Creek. One realignment reduces the noise impact in an allocated Old Growth Management Area at Indian Butte. The net result is a higher amount of acres of Semiprimitive Non-motorized ROS in the greater than 45 dba category than displayed in Table 45 for Alternative 3, but less than that displayed for Alternative 4.
- With proposed modifications to Alternative 3, the Class I (ATV) trail system would affect more area with sound in the Roaded Modified Recreation Opportunity Spectrum (ROS) since the majority of the routes that are being added are in areas that are already roaded and categorized as Roaded Modified. This is also true of the Class II (Jeeps and four-wheel drives) trail system where all of the routes added from Alternative 4 are in Roaded Modified ROS. In the Class III (motorcycle) trail system the modified alternative has comparable

effects in Roaded Modified ROS as some reroutes are longer that the original alternative's routes and some are shorter. Most of the rerouted trail segments are within the Roaded Modified ROS, and the net result is that acres within the sound band would be comparable between the original and the modified versions of Alternative 3.

The potential for user conflict between people using motorized equipment on the designated trail system and people utilizing the non-system horse trails (Mustang Loop and High Horse Loop) was also considered. The number of intersections between the proposed OHV trail and the non-system horse trails is higher under the modifications to Alternative 3 than the original, but the same as under Alternative 4. The intersections that were added under the modifications to Alternative 3 are as follows: one new crossing south of Deadman Creek, two crossings northeast of Coyle Butte at Rd 306. One crossing was dropped at Crystal Creek, near Corral Flat under the modifications. The net result is that the OHV trail proposed in Alternative 3 Modified would cross the non-system Mustang Loop Horse Trail at six places rather than four. The number of places at which the proposed OHV trail crosses the High Horse Loop Trail is the same under Alternative 3 Modified, crossing at five places. The overall number of crossings under Alternative 3 Modified is one less than under Alternative 4, which had six crossings on each equestrian loop. Thus the potential for conflict between non-motorized recreationists on the non-system horse trails and the proposed OHV trail system is slightly more than under Alternative 3, but less than Alternative 4. In addition, the modification deleted OHV routes north of Crystal Creek and in proximity to Corral Flats which should reduce potential conflict at the equestrian staging area and associated camps.

The provision of motorized recreation opportunity (total mileage in the designated system) is comparable, but greater under Alternative 3 Modified (just over 129 miles compared to 101miles in the original). Total mileage in the designated system not on open roads is also higher with the modifications (about 100 miles compared to 88 in the original). However, the distribution of this trail mileage among vehicles classes is different under the modifications: an increase in Class I trails (50" wide) of about 5 miles, a decrease in Class III trails (24" wide) of about 4.5 miles, and the inclusion of 11.8 miles of Class II trails that were not offered in the original alternative.

Geology

Because the amount of new trail construction in Alternative 3 Modified is approximately equal to Alternative 3, which is fully analyzed in the FEIS, the potential effects were found to be comparable. Specific areas of note include the following:

- With the deletion of trail segments and the additional new trail length, there will be less dormant landslide terrain crossed.
- The staging area at Six Corners Material Source would be a limited development trailhead instead of a fully developed staging area as was described for Alternative 3. Development would be limited to parking area, picnic tables and an informational kiosk. There would be directional signs and width control devices at the trail entry points from this trailhead. Dispersed camping would be allowed in accordance to the Motor Vehicle Use Map (MVUM). The less developed trailhead will mean less potential introduction of invasive plants to the active material source. There will still be a fence and gate installed to control access to the main portion of the active material source and remaining reserves, as mitigation.

Because the combined trail network created by the addition of routes to Alternative 3 Modified from Alternative 4 is substantially less than the network analyzed in Alternative 4, effects to geologic resources would be less than the effects determined for Alternative 4. The specific routes added were evaluated and found to not cross through dormant landslide terrain.

Soils

Alterative 3 Modified is a blend of Alternative 3 and parts of Alternative 4. This alternative includes approximately 129.2 miles (104.7 acres), much of which would be on existing roads and trails with only 50.3 miles or 41.4 acres being proposed as new trails. Also include are 4 staging areas of approximately 3 acres each for a 12 acre total. This proposal would meet regional standards and guidelines for soils.

The proposed new trail construction in Alternative 3 Modified would add 50.3 miles or 41.4 acres. These new trails would add only 3 percent to the total 1,820 miles of roads and trails. Total existing roads and trail acreage impacts would be increased by less than 0.014 percent across the project area (1.10% to 1.11%).

Alternative 3 Modified proposes the third most trail miles (129.2 miles, 104.7 acres), 59 stream crossings and 4 staging areas. New routes would comprise 50.3 miles (41.4 acres). See above table for comparison acreages. Class II OHV trails for jeeps and small trucks (80 inch category) would be included in this alternative which contributes to the increase in impacted acreage.

This alternative proposes the third most impacts overall. This alternative has the third most potential (of the four action alternatives) to increase the amount of detrimental soil compaction, displacement, and sedimentation. Short term impacts to uplands soils and streambanks would occur with initial trail construction such as contouring (blading, excavation), bridge construction (excavation of abutments) and culvert placement (excavation and filling). Longer term potential sedimentation would be reduced with these crossing features and the installation of relief culverts, rolling dips and bed armoring near crossings. Planting of native or cultivars of native species of grass and/or shrubs would help in providing effective cover for construction disturbance adjacent to the trail beds.

Since the OHVs would largely be restricted to existing disturbance (i.e. existing road prisms), these impacts would be limited (129.2 total miles, ca 104.7 acres, of which, 50.3 miles are new trails, ca 41.4 acres). Initial trail construction disturbance would have a short term effect but would largely be un-measurable at the landscape scale due to the large project area acreages involved. For example, of the total 129.2 miles of proposed OHV trails, 78.9 miles are on existing disturbance. OHV use on existing roads is only 4 percent of the total 1,820 miles (3,312 acres = 1.1 percent) of system and non-system road in the ca. 300,548 total project acreage. The proposed new trail construction adds 50.3 miles or 41.4 acres. These new trails add only 3 percent to the total 1,820 miles of roads and trails. Total existing roads and trail acreage impacts would be increased by less than 0.014 percent across this project area (1.10% to 1.11%).

Total miles of new OHV trails within 300 feet of drainways is 6.6 miles most of which are at existing crossings. Alternative 3 mileage within this same 300 foot distance has been decreased for a total of 6.2 miles which brings the net difference between Alternative 3 Modified and Alternative 3 to a net increase of 0.4 miles. Trail design standards such as bridges, culverts and armored fords and trail approaches plus seeding would reduce sediment delivery potential at these points. Effects would be un-measurable in the long term. Short term construction impacts would occur in the first year or two.

Hydrology and Aquatics

Sediment/Turbidity

Potential sediment and turbidity effects to streams from this project are primarily a result of trails located within 300 feet of perennial or intermittent streams, as well as the number of stream crossings.

Roads/Trails

Alternative 3 Modified proposes 1.8 miles less new trail compared to Alternative 3, resulting in 305 total miles of trail within 300 feet of streams. A comparison of ratings based on total road/trail densities within the sediment delivery zone of streams identifies little to no difference in effect (Table 140). The ratings do not change between Alternative 3 and Alternative 3 Modified. Total Road/Trail densities do; however, slightly decline between Alt. 3 and Alternative 3 Modified for Jackson Creek, Little Summit Prairie Creek, Lower Deep Creek, North Wolf Creek and Upper Marks Creek Subwatersheds.

Alternative 3 Modified avoids areas of specific hydrologic concern within the sediment delivery zone (see DEIS Table 83), resulting in slight decreases in the overall road/trail densities within 300' of streams in the Jackson Creek, Lower Deep Creek and Little Summit Prairie Creek Subwatersheds.

Table 140. Miles of Existing Roads and proposed trail miles within 300' of streams: comparison between Alternative 3 and Alternative 3 Modified.

Subwatershed	Alternative 3				Alt 3 Modified			
	New Trail Miles	Road + Trail Total	Road/ Trail Density	Rating	Trail Modifications Total Miles	Road + Trail Total	Road/ Trail Density	Rating
ELLIOTT CREEK	0.85	23.7	4.49	Good	0.00	23.7	4.49	Good
HOWARD CREEK	1.42	32.4	8.56	Poor	0.00	32.4	8.56	Poor
JACKSON CREEK	0.94	48.1	6.19	Fair	-0.19	47.9	6.17	Fair
LITTLE SUMMIT PRAIRIE CREEK	0.58	45.4	7.47	Poor	-0.10	45.3	7.45	Poor
LOWER DEEP CREEK	1.11	30.0	5.69	Good	-0.28	29.7	5.64	Good
NORTH WOLF CREEK	0.24	29.1	6.39	Fair	-0.24	28.8	6.34	Fair
PETERSON CREEK	0.00	29.2	4.31	Good	0.00	29.2	4.31	Good
PORTER CREEK	0.55	36.8	7.53	Poor	0.00	36.8	7.53	Poor
UPPER MARKS CREEK	1.07	32.1	6.44	Fair	-0.96	31.2	6.25	Fair

Alternative 3 Modified proposes ten fewer trail stream crossings compared to the Alternative 3 (Table 141). Nine fewer trail stream crossings and six additional trail stream crossings are identified in Alternative 3 Modified relative to the Alternative 3. Stream crossing densities and ratings are compared later in this addendum document.

Table 141. Comparison of Trail and Intermittent and Perennial Stream Crossings between Draft Alternative 3 and Modified Alternative 3.

Subwatershed	Alternative 3			Alt 3 Modified		
	Existing Route	New Trail	Total	Existing Route	New Trail	Total
ELLIOTT CREEK	1	4	5	1	4	5
HOWARD CREEK	1	0	1	1	0	1
JACKSON CREEK	6	6	12	5	5	10
LITTLE SUMMIT PRAIRIE CREEK	2	1	3	1	1	2
LOWER DEEP CREEK	5	4	9	2	3	5
NORTH WOLF CREEK	1	0	1	1	0	1
PETERSON CREEK	0	0	0	0	0	0
PORTER CREEK	2	5	7	2	5	7
UPPER MARKS CREEK	6	6	12	10	0	10
Grand Total	24	26	50	30	17	40

Sediment Loading

Table 142 displays estimated sediment contribution from road/trail crossings and road/trail segments within 300 feet of streams in project area subwatersheds for Alternative 3 and Alternative 3 Modified. The final column in the table compares the difference in sediment produced in tons/year between Alternative 3 and Alternative 3 Modified.

Table 142. Sediment contribution from road/trail crossing and adjacent road/trail segments (tons/year) for Alternative 3 and Alternative 3 Modified.

Subwatershed	Alternative 3		Alternative 3 Modified		Difference between Alternative 3 & Alternative 3 Modified (tons/year)
	Estimated Contribution from Adjacent Road/Trail Segments (tons/year)	Estimated Contribution from Road/Trail Crossings (tons/year)	Estimated Contribution from Adjacent Road/Trail Segments (tons/year)	Estimated Contribution from Road/Trail Crossings (tons/year)	
Elliott Creek	0.2	4.1	0.2	4.1	no change
Howard Creek	0.1	1.7	0.1	1.7	no change
Jackson Creek	0.3	7.5	0.4	7.4	no change
Little Summit Prairie Creek	0.05	0.7	0.04	0.6	-0.1
Lower Deep Creek	0.3	2.0	0.2	1.5	-0.6
North Wolf Creek	0.01	0.1	0.02	0.1	+0.01
Peterson Creek – North Fork Crooked River	0	0	0	0	no change
Porter Creek	0.4	2.5	0.5	1.9	-0.5
Upper Marks Creek	0.2	4.1	0.1	2.2	-2.0

In terms of sediment loading, there was no change between Alternative 3 and Alternative 3 Modified in the Elliott, Howard, Jackson, and Peterson Creek subwatersheds. There were reductions in sediment in all other subwatersheds except for North Wolf Creek, which is estimated to have a very slight increase in sediment (+0.01 tons) due to new trail located in soil types that are more erodible than what was proposed under Alternative 3. Upper Marks Creek will see the largest decreases in estimated sediment loading due to the reduction in new trail crossings constructed and instead, existing road crossings being used.

Flow and Sediment Regimes

Potential effects from an off-highway vehicle (OHV) trail system on the flow and sediment regimes within the project area are primarily a result of interconnection between the trail network and the stream network. This interconnection was analyzed in the draft document and this addendum compares effects between Alternative 3 and Alternative 3 Modified, specifically in the form of road/trail densities and road/trail stream crossing densities across each subwatershed.

Road/Trail Density

As a result of the modifications made to Alternative 3, overall road/trail densities were reduced slightly for the Upper Marks Creek Subwatershed as compared to the draft; however, total road/trail

densities would still be relatively high compared to the existing conditions within the project area (Table 143).

Table 143. Comparison of Alt. 3 and modified Alternative 3 road plus trail densities by subwatershed.

Subwatershed	Alternative		Alternative 3 (modified)	
	Density	Rating	Density	Rating
ELLIOTT CREEK	3.5	Moderate	3.5	Moderate
HOWARD CREEK	5.0	High	5.0	High
JACKSON CREEK	3.8	Moderate	3.8	Moderate
LITTLE SUMMIT PRAIRIE CREEK	4.1	High	4.1	High
LOWER DEEP CREEK	3.3	Low	3.3	Low
NORTH WOLF CREEK	4.0	Moderate	4.0	Moderate
PETERSON CREEK	3.2	Low	3.2	Low
PORTER CREEK	3.9	Moderate	3.9	Moderate
UPPER MARKS CREEK	4.7	High	4.5	High

Stream Crossing Density

Alternative 3 Modified results in a slight decrease in the stream crossing density in the Upper Marks Creek Subwatershed relative to the Alternative 3 (Table 144). This slight decrease; however, does not reduce the overall rating of high for road/trail stream crossings within the Upper Marks Creek Subwatershed, which remains high relative to the existing condition in subwatersheds within the project area.

Table 144. Comparison of Alternative 3 and Alternative 3 Modified road plus trail stream crossing densities by subwatershed.

Subwatershed	Alternative 3			Alt 3 Modified		
	# X-ings	Density	Rating	# X-ings	Density	Rating
ELLIOTT CREEK	61	3.7	High	61	3.7	High
HOWARD CREEK	66	4.4	High	66	4.4	High
JACKSON CREEK	75	2.0	Low	74	2.0	Low
LITTLE SUMMIT PRAIRIE CREEK	64	2.6	Moderate	64	2.6	Moderate
LOWER DEEP CREEK	46	2.0	Low	45	2.0	Low
NORTH WOLF CREEK	45	3.3	Moderate	45	3.3	Moderate
PETERSON CREEK	60	2.7	Moderate	60	2.7	Moderate
PORTER CREEK	66	4.3	High	66	4.3	High
UPPER MARKS CREEK	96	5.3	High	90	5.0	High
Grand Total	579			571		

Conclusion

Overall, slight reductions in miles of trail within the sediment delivery zone, as well as across project subwatersheds, reductions in stream crossings and overall estimated sediment production do not result in substantial changes in the effects of the Alternative 3 Modified as compared to Alternative 3. These changes address some specific hydrologic concerns and are beneficial from a hydrologic perspective; however, in combination with the existing road network, the overall effects are essentially the same as those described in Alternative 3 of the Draft Ochoco Summit Trail System EIS.

Based on the small changes in estimated sediment contributions between Alternative 3 and Alternative 3 Modified, the effects will essentially be the same for aquatic species as described in

each subwatershed under Alternative 3. From a sediment loading standpoint, Alternative 3 Modified is estimated to produce less sediment in the Little Summit Prairie, Lower Deep, Porter and Upper Marks Creek which will be more beneficial to aquatic species as compared to Alternative 3. The effects to aquatic species are less than what is displayed in Alternative 3 but greater than those displayed for the No Action Alternative and have adequately been displayed in the EIS. Alternative 3 Modified would have no effect on redband trout and Columbia spotted frog long-term in all project subwatersheds. Short-term sediment inputs from trail construction, especially at stream crossings, may have negative effects during construction when turbidity is high. These negative effects may include fish displacement during times of high turbidity, limited feeding, and possible mortality. Overall, Alternative 3 Modified "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." From an aquatic species standpoint, Alternative 3 Modified addresses some key hydrologic concerns that were brought up in comments and should, overall, be more beneficial to aquatic species than Alternative 3.

Wildlife

Because the length of new trail construction in Alternative 3 Modified is approximately equal to Alternative 3, which is fully analyzed in the FEIS, the potential direct effects to habitat abundance were found to be comparable between the original alternative and the modified alternative. The actual footprint may be slightly higher for Alternative 3 modified due to the slight increase in Class I trails (6 miles at 50" is about 3 acres more), the slight decrease in Class III trails (4.5 miles at 24" is about 1 acre less) and the inclusion of 11.8 miles of Class II trails (11.8 miles at 80" is about 9.5 miles more). So the potential direct effect of the trail tread on habitat is approximately 12 acres more than the original alternative, but it is well within the range of alternatives analyzed as it is substantially less than Alternative 4.

The effects to wildlife, however, extend beyond the footprint of the trail due to disturbance, particularly in proximity to human recreational uses including motorized travel, and due to edge effect and sound. For this reason the evaluation of modifications to Alternative 3 was done using the 200 m distance band (the zone of the highest impact for most species) to assess potential impacts to wildlife due to disturbance and edge effect for wildlife in general. Potential disturbance impact to elk and the potential of sound to effect wildlife was estimated using the ½ mile distance band as that is a measure found to be a significant indicator of elk avoidance and it is assumed (for the purpose of this comparison) to be an average distance at which sound would be audible above the ambient noise level in this project area.

- On the west end trail system (Class I system) the primary differences are associated with: 1) the increased disturbance from the loops added from Alternative 4 on the westernmost part of the system, where all of the added loops are on existing roads that are currently closed to motorized use under MVUM; 2) the reduced disturbance from the loops dropped from Alternative 3 in the vicinity of Hamilton Butte, Grant Butte, Corral Flats and Crystal Springs; and 3) increased disturbance from new trail added to connect between west end loops and open roads 2610-150 and 2620. The net effect of the additions and deletions in Alternative 3 modifications in this area is that the amount of habitat within 200 m of open motorized routes is comparable between Alternative 3 and Alternative 3 Modified. The distribution would be changed though, as there would be substantially less potential for disturbance north of Crystal Creek, but more on the unnamed ridgelines west and south of Deadman Creek. Distance banding beyond 200 m for Alternative 3 modified would also be comparable to Alternative 3 on the west end, thus the potential effects to wildlife in general from implementation of Alternative 3 Modified would be comparable to Alternative 3. As for the area more than ½ mile from a motorized route, the west end loops added from Alternative 4 would eliminate one small patch of habitat that is more than ½ mile from an open motorized route according

to MVUM. However, on the flip side, the routes dropped in the in proximity to Crystal Springs and Corral Flat would restore a piece of a large block of secure habitat extending through the Nature Creek area. Thus the amount of area more than ½ mile from open motorized routes would be comparable, but the value of the habitat retained would be higher than the habitat degraded based on patch size. The net result would be improved secure elk habitat retention in this area under the modifications to Alternative 3 than in the original alternative.

- On the east end trail system (Class II and III systems) the primary differences are associated with: 1) the increased disturbance from the loops added from Alternative 4 on the westernmost part of the system, where some of the added loops are on existing open and closed roads, and some would be new construction not on existing roads; 2) the increased disturbance from the new routes established to avoid riparian area and stream crossings; and 3) the reduced disturbance from the routes dropped from Alternative 3 in the vicinity of Crazy Creek, Happy Camp Creek, Jackson Creek, North Wolf Creek, Little Summit tributary and Big Springs Creek. The net effect of the additions and deletions in Alternative 3 modifications in this area is that the amount of area within 200 m of open motorized routes is comparable between Alternative 3 and Alternative 3 Modified. However, the distribution would be changed as there would be substantially less potential for disturbance in the areas surrounding the upper reaches of Happy Camp Creek and the lower half of Big Spring Creek, yet there would be more potential for disturbance on the ridgeline between Peterson Creek and East Porter Creek. Distance banding beyond 200 m for Alternative 3 modified would also be comparable to Alternative 3 on the east end, thus the potential effects to wildlife in general from implementation of Alternative 3 Modified would be comparable to Alternative 3. As for the area more than ½ mile from a motorized route, one route along the western edge of the system that was added from Alternative 4 would reduce the size of one small patch, while the reroute to avoid streams, meadows and TES plants in Big Spring Creek would reduce the size of one small patch and eliminate one very small patch. At the same time, the reroute around Happy Camp Creek puts the designated route on an existing open road and restores a small patch of area more than ½ mile from a motorized route compared to Alternative 3. Thus the amount of area more than ½ mile from open motorized routes would be comparable, slightly less than in the original alternative, but well within the range of effects of alternatives analyzed (much less impact than alternative 4). The net result would be very comparable impacts to elk security habitat in this area with the modifications to Alternative 3 as in the original alternative.

Potential elk calving/deer fawning areas were predicted by using gentle slope and proximity to riparian areas, hardwood patches and meadows as indicators of relatively high potential for use by these animals as reproductive areas. Using this potential habitat mapping as a basis for evaluating potential impacts, the changes in potential impacts related to modification of Alternative 3 were considered. Alternative 3 Modified has similar potential impacts as Alternative 3 to potential elk calving and deer fawning habitat, as some trails (comparable distance overall) pass through these areas on existing open or closed roads, or on new construction routes under both the original and the modified Alternative 3. Site specific changes include the following:

- The west half of the Class I trail system impacts less calving/fawning habitat in the modified alternative largely due to: 1) the deletion of routes north of Crystal Creek and near Corral Flats; and 2) the added loops at the west end (west of Deadman Creek) are primarily outside of mapped calving/fawning habitat. However, the new trail connecting between open mixed use roads 2610-150 and 2620 is both in and out of mapped calving/fawning habitat.

- The added open roads 2610-150 and 2620 and closed road 029 are primarily within mapped calving/fawning habitat, but the majority of this distance is on roads that are open year-round and are already designated for mixed use under MVUM.
- The east half of the Class I trail system impacts more calving/fawning habitat in the modified alternative due to the addition of trails accessing the ridge between the Walton Staging Area and Ochoco Butte and Slide Mountain. Though these trails are both in and out of mapped calving/fawning habitat, they represent new trail construction in potential calving/fawning habitat that was not involved in the original Alternative 3. They are however only a portion of the routes proposed in Alternative 4 and thus the impacts are within the range of effects for alternative analyzed in detail. The effects are less than under Alternative 4 because the routes added to Alternative 3 Modified involve less than half of the distance of routes in mapped habitat as compared to Alternative 4.
- In the east trail system (Class II and III) the impact of Alternative 3 Modified would fall in between the impacts disclosed in the FEIS for Alternatives 3 and 4. The modifications would better protect potential calving/fawning habitat in the Happy Camp Creek and Jackson Creek areas, would be about the same in the Big Spring/Buck Hollow Creek area, but would be more of an impact in the Peterson/Porter Creek area. The impacts would still be less than Alternative 4 as only a portion of the Class II routes from Alternative 4 were added to Alternative 3 Modified and only a portion of the Class III routes from Alternative 4 are included in Alternative 3 Modified.

The changes in trail crossings of mapped goshawk post fledging areas (PFA) were considered. Alternative 3 Modified has similar potential impacts as Alternative 3 as some trails pass through PFAs on existing open or closed roads, or on new construction routes. None of the routes in either in the original or the modified version of Alternative 3 enter or run adjacent to any known nest stand for any documented goshawk nesting territory. Site specific changes include the following:

- The reroute at Happy Camp Creek eliminates the route through the PFA on open road 2630-750.
- The added route out of the Ochoco Divide Snow Park is within the Nature Creek PFA, but well outside of the nest area.
- The added loops west of Deadman Creek include one new construction route and one route on an open road through Claypool Spring PFA, well outside of the nest area.

The changes in trail crossings of mapped pileated woodpecker reproductive (Old Growth Management Areas, OGMA) and feeding areas (Pileated Feeding Habitat, pfh) were considered. Alternative 3 Modified has similar potential impacts as Alternative 3 as some trails pass through pfh on existing open or closed roads, or on new construction routes. One route passes through each of three OGMA on a single new construction crossing, which will be the subject of site-specific non-significant Forest Plan Amendments under Alternative 3, with or without modifications. The routes crossing OG-D1-08 and OG-D1-12 were not changed in the modifications to Alternative 3, but the route through OG-D2-02 was modified to contour down a slope connecting between existing closed roads rather than crossing through on a route that crossed and then paralleled Big Spring Creek. Within mapped OGMA, one change in alignment in the modifications removes one route along to top of a slope within OGMA D1-08 (Indian Butte) and moves it to existing roadbeds outside of the OGMA. Within mapped pfh, the reroute at Happy Camp Creek eliminates a crossing in pfh associated with OG-D2-06, and the reroute at Jackson Creek eliminates a crossing in pfh associated with OG-D2-12.

The changes in trail locations with regard to documented raptor nests were considered. One new route added from Alternative 4 is approximately 290 m from a documented sharp shinned hawk nest

and another (on an open road) is within about 150 m from an osprey nest. The first of these is well beyond the distance for restriction buffers for this species (5 chains for habitat modification, 10 chains for disturbance, LRMP 4-249). The second of these is an osprey nest immediately adjacent to a high volume open road (FS 30) and in close proximity to a 5 way intersection of well-travelled open roads, three of which are already mixed use under MVUM (4200-450, 3000-500, 3000-550), with existing dispersed camp sites and legal dispersed camping along all of these open roads. Thus, this particular osprey nest site has a high ambient noise and human activity level. This would make the potential impact of a route designation on 4200-450, 3000-500 and 3000-550 and a legal mixed-use crossing on the FS 30 road negligible, if any, for this osprey nest. Given the proximity of this nest to existing open mixed use roads, a highway legal road and established camp sites, the designation of proposed routes as part of this Class II trail system is not likely to substantially alter the behavior or nesting success of osprey using this area. For these reasons, modifications to Alternative 3 are not expected to change the potential for impact to nesting raptors in the project area compared to the original alternative.

For the reasons disclosed above, the potential impact to wildlife from Alternative 3 Modified would be comparable to but slightly higher than the original Alternative 3, but would be substantially less than the impacts predicted and disclosed in the EIS for Alternative 4.

Botany

Because the amount of new trail construction in Alternative 3 Modified is approximately equal to Alternative 3, which is fully analyzed in the FEIS, the potential effects were found to be comparable. Specific areas of note include the following:

1. Reroute of Big Spring Cr. reduces trail route through documented populations of *Calochortus longebarbatus var. peckii*.
2. Reroute at Crazy Cr. avoids a population of sensitive *Calochortus longebarbatus var. peckii* and an invasive plant site (medusahead).

Because the combined trail network created by the addition of routes to Alternative 3 Modified from Alternative 4 is substantially less than the network analyzed in Alternative 4, effects to botanical resources would be less than the effects determined for Alternative 4. The specific routes added were evaluated and found to not cross through populations of sensitive plants or invasive plant sites.

I understand project design includes measures to allow adjustment during layout of trail system to avoid sensitive plant populations and non-native invasive plant sites currently known or that may be discovered during layout. Mitigation measures such as avoiding sensitive plant or weed sites, or monitoring followed by weed controls would be implemented (refer to resource protection measures in the FEIS). Specific areas include:

1. Nature Cr. - avoid hound’s-tongue infestations.
2. Deep Cr. – avoid Scotch broom infestations.
3. 2630 Rd. – control invasive plants.
4. 2610-150 and 2620, including routes between these roads – control invasive plants.
5. Avoid *Calochortus longebarbatus var. peckii* populations in vicinity of Big Spring Cr., Jackson Cr., Looney Cr., and Porter Cr. drainage.

Range Resources

Because the amount of new trail construction in Alternative 3 Modified is approximately equal to Alternative 3, which is fully analyzed in the FEIS, the potential effects were found to be comparable.

Because the combined trail network created by the addition of routes to Alternative 3 Modified from Alternative 4 is substantially less than the network analyzed in Alternative 4, effects to range resources would be less than the effects determined for Alternative 4.

There are 2 water developments that are within 100 feet of a connector trail in Alternative 3 Modified that uses the existing 2630 road so the effects would be no different than the current condition since they are already within 100 feet of an open road. The specific routes added were evaluated and found to not cross through the wild horse territory.

Mitigations were included in the range resource report to address livestock safety and harassment including cattle guards at trail crossings with fences and water developments 100 feet or more from the trail. These mitigation measures and the others included in the range report will be implemented for the Alternative 3 Modified.

Effects of Forest Plan Amendments

The effects of the proposed Forest Plan Amendments would be as described in Chapter 3, except for the following:

- Standards and guidelines that apply to Old Growth Management Area (OG-D2-02) near Deep Creek would be amended to allow motorized recreation only on one designated route between FS Roads 4250 and 4200-616 (see .
- Under Alternative 3 Modified, the new trail construction is limited in the affected Old Growth Management Areas to 0.32 miles at 50 inches in width and 0.41 miles at 24 inches in width. New trail construction would require clearing of approximately 1 foot on each side of the tread. Using a 4 foot clearing width for Class III trails and a 6 foot clearing width for Class I trails the impact of the new trail construction would total 0.43 acres in OGMAs (0.23 acres for Class I and 0.20 acres for Class III). The maximum area within clearing for new trail construction within an OGMA would be about ¼ acre under the selected alternative.

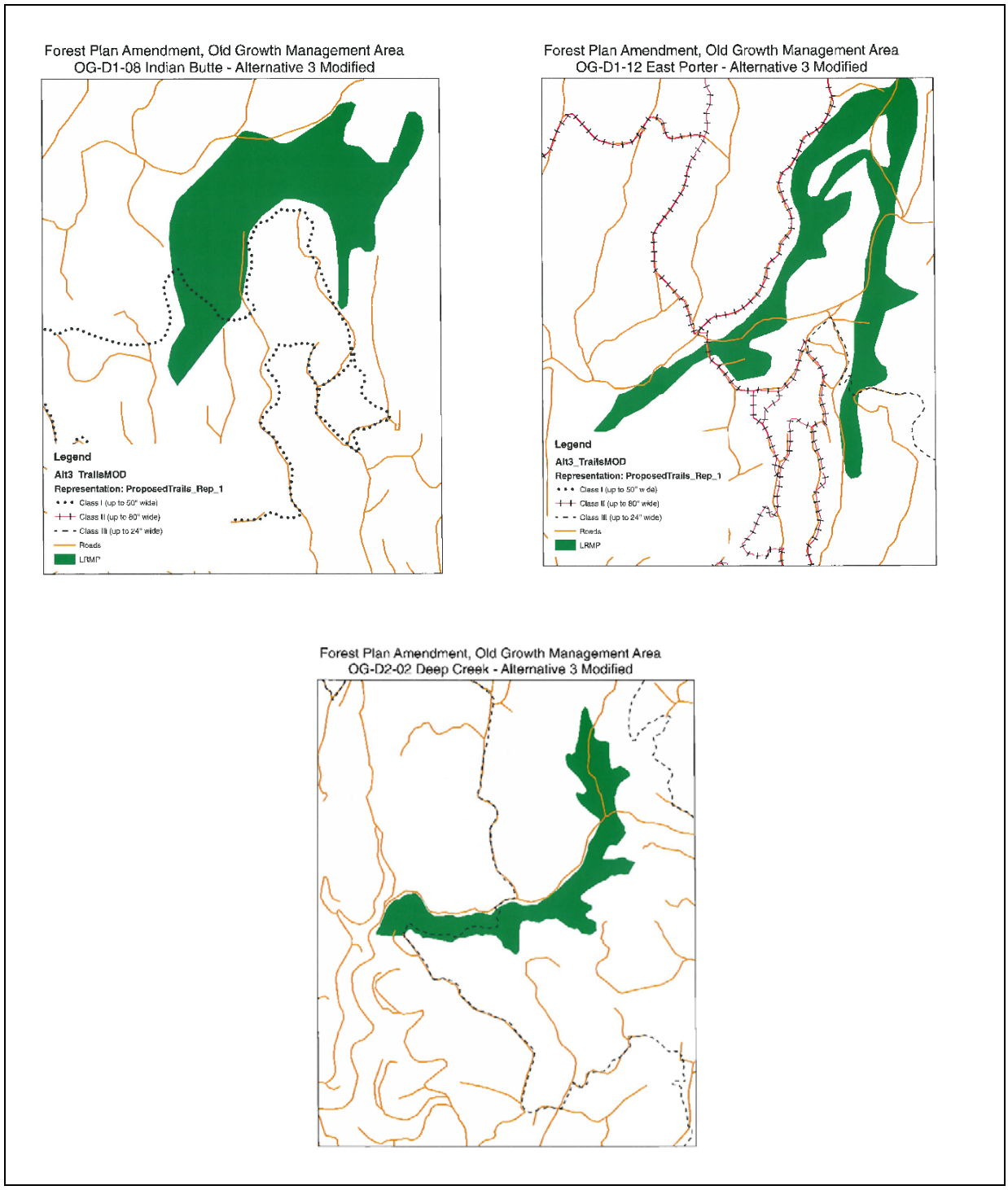

Figure 13. Proposed OHV trail system in and in the vicinity of OGMAs, Alternative 3 Modified.

APPENDIX C – LETTERS FROM AGENCIES

Oregon
John Kitzhaber, MD, Governor

Department of Fish and Wildlife
High Desert Region
61374 Parrell Road
Bend, OR 97702
(541) 388-6363
FAX (541) 388-6281

March 22, 2013

Kate Klein, Forest Supervisor
3160 NE 3rd Street
Prineville, OR 97754

RE: Ochoco Summit Trail System Project Draft Environmental Impact Statement

Dear Ms. Klein,

Oregon Department of Fish and Wildlife (Department) reviewed the Ochoco Summit Trail System Project Draft Environmental Impact Statement (DEIS). Following are our comments:

It is the policy of Oregon Department of Fish and Wildlife (Department), as mandated by the State, to manage fish and wildlife to prevent serious depletion of indigenous species and to provide optimum fish and wildlife recreational and aesthetic benefits for present and future generations of the citizens of this state (ORS 496.012).

Summary of Department Comments:

1. The DEIS proposed actions have not alleviated the Department's scoping concerns. However, we want to recognize and show our appreciation to Ochoco staff who worked with the Department to design a system that considered our scoping letter habitat categorizations and worked to address several Department concerns.

2. The Department strongly recommends Alternative 1, the No Action Alternative be selected based on information presented in the DEIS along with other available information we used to assess project effects on fish and wildlife resources.

3. The Department thinks the DEIS first project purpose (DEIS iii) and ORV objective (DEIS vii) are high bars to achieve and we don't think any of the action alternatives achieve either of these measures. Our rationale is based on DEIS analysis showing action alternatives will increase impacts to hydrology, motorized routes will increase, motorized intensity and frequency will increase, and OHV noise will increase. The DEIS did not assess how implementation of this project will change OHV and other motorized use on roads open to OHV travel (659 miles) within the project area, let alone adjacent to and across the forest. Furthermore, the DEIS did not analyze if this project would shift and/or increase existing OHV use in central Oregon to the proposed area or the associated fish and wildlife impacts that could result from a shift and/or increase in OHV use.

4. The Department thinks an analysis to determine the sustainable minimum motorized road and trail system to better meet today's Forest and public values should have been conducted first in order to have had a more relevant motorized system baseline from which to assess the DEIS. The existing open and closed road system is causing significant impacts to fish and wildlife resources and

modifications, physical closures and rehabilitation are needed now for those roads causing impacts to better meet today's Forest objectives and public values.

5. Implementation of the proposed Off-Highway Vehicle (OHV) area contradicts what the expected demand is for growth in recreational activities that the Forest is positioned to provide with implementation of the 2011 Travel Management Record of Decision (TM ROD) along with assessment and designation of a sustainable minimum road system. Implementation of the proposed OHV system will compromise the project long-term quiet non-motorized recreational activities which include fishing and wildlife viewing.

6. The wildlife section in the DEIS implies that the TM ROD will not be effective without implementation of a DEIS action alternative (DEIS 271) leading us to question the Forest's ability to obtain adequate funding for staff, engineering, education, enforcement, and monitoring actions that is needed to implement the DEIS if adequate funding cannot be obtained to implement the TM ROD. Our concern is further compounded when we consider the 938 miles of designated OHV trail already approved and under the Central Oregon Combined Off-Highway Vehicle Operations (COHVOPS) oversight, who also will have oversight of the DEIS system. Our concern stems from the fact that COHVOPS does not adequately oversee the existing OHV systems in place.

7. The Department thinks implementation of any of the action alternatives will further displace elk onto private lands thereby increasing damage by elk.

DEIS Overview:

The DEIS identifies four alternatives. Alternative 1 is the no action alternative, Alternative 2 is the proposed action that proposes to build a 170 mile trail network for Class I, II, and III vehicles, Alternative 3 is the preferred alternative that proposes to build two separate trail networks totaling 101 miles for Class I and III vehicles, and Alternative 4 is the Off Highway Vehicle (OHV) alternative that proposes to build a 212 mile trail network for Class I, II, and III vehicles. Seasonal restrictions are identified by alternative. All action alternatives include Project Design Criteria Common to All Action Alternatives (DEIS 24-32) and Mitigation Measures Common to All Action Alternatives (DEIS 32-36).

DEIS iii – *"The purpose and need for this proposal was derived from evaluating the Ochoco National Forest Land and Resource Management Plan (Forest Plan)..., identifying desired future conditions for motorized recreation, and comparing them to the existing conditions in the project area. The purposes of this proposal are to*:

1. *Designate a sustainable system of roads, trails and areas open to motor vehicles that will provide legal public access, enhance regulation of unmanaged wheeled motor vehicle travel, protect resources, and decrease conflicts between motorized and non-motorized use on the Ochoco National Forest.*
2. *Change the existing system of NFS motorized-use trails to provide a sufficient number and length of trial in a forested setting to disperse recreational users and make a sustainable network of trails.*
3. *Provide a diversity of off-highway motorized recreation opportunities including 4x4 vehicles, ATVs and motorcycles. It is Forest Service policy to provide a diversity of road and trail opportunities for experiencing a variety of environments and modes of travel."*

DEIS vii – "*The Forest Plan describes an objective for off-road vehicles (ORVs): ORV use, and trail construction and reconstruction, will be allowed where they are not in conflict with other resource objectives*."

DEIS 6 – The Decision Framework identifies that "…*the Responsible Official* [Forest Supervisor] *will consider how well the alternatives lead to providing a quality motorized recreation experience, minimizing disturbance to big game and big game habitat, minimizing effects to water quality and fish habitat, and managing conflicts between motorized and non-motorized recreationists*."

Department DEIS Comments

Comment 1 – The DEIS proposed actions have not alleviated the Department's scoping comment concerns. However, we want to recognize and offer our appreciation to Ochoco staff who worked with the Department to design a system that considered our scoping letter habitat categorizations and worked to address several Department concerns including avoiding some areas identified by the Department, identifying seasonal restrictions, and proposing installation of culverts and bridges over perennial streams and other sensitive drainages.

Comment 2 – The Department strongly recommends Alternative 1, the No Action Alternative be selected based on information presented in the DEIS along with other available information we used to assess project effects on fish and wildlife resources. Benefits associated with Alternative 1 are tied to implementation of the TM ROD, which controls unmanaged off-road travel while improving fish and wildlife habitat and associated recreational opportunity. The TM ROD closes the Forest to cross-country travel, prohibits OHV use of user created trails, and stops public motorized use on closed roads.

Comment 3 – The Department thinks the DEIS first project purpose (DEIS iii) and ORV objective (DEIS vii) are high bars to achieve and we do not think any of the action alternatives achieve either of these measures. Our rationale is based on DEIS analysis showing action alternatives will increase impacts on hydrology, motorized routes will increase, motorized intensity and frequency will increase, and OHV noise will increase. The DEIS did not assess how implementation of this project will change OHV and other motorized use on roads open to OHV travel (659 miles) within the project area, let alone adjacent to and across the forest. Furthermore, the DEIS did not analyze if this project would shift or increase existing OHV use in central Oregon to the proposed area or the associated fish and wildlife impacts that could result from a shift/increase in OHV use.

The first of three project purposes states: *Designate a sustainable system of roads, trails and areas open to motor vehicles that will provide legal public access, enhance regulation of unmanaged wheeled motor vehicle travel, protect resources, and decrease conflicts between motorized and non-motorized use on the Ochoco National Forest* (DEIS iii). This is a high bar to achieve and the Department does not believe this project meets this goal.

Likewise, "*The Forest Plan describes an objective for off-road vehicles (ORVs): ORV use, and trail construction and reconstruction, will be allowed where they are not in conflict with other resource objectives*" [DEIS vii], again a high bar to achieve, which we believe is not met through this project.

Our rationale that the above purpose and objective were not met is based on the following:

A. The Hydrology section (DEIS 105 – 232) describes how any of the action alternatives will have more impacts on watershed conditions (i.e., flow and sediment regime, sediment/turbidity) than the no action alternative assuming the TM ROD is implemented as described. However, it is

important to note that this assessment is based on existing conditions rather than correlating the assessment with efforts underway to move the system towards desired "excellent" conditions. Furthermore, the described project impacts are cumulative effects on top of a road system exhibiting road densities within 300 feet of perennial and intermittent streams within the Ochoco Summit project area subwatersheds ranging from 4.3 to 8.2 miles per square mile (DEIS 120); existing road densities within springs and wetlands and their associated Riparian Habitat Conservation Areas that are between 2.8 and 9.9 miles per square mile (DEIS 120); and existing road stream crossings per subwatershed that range from 1.8 to 5.0 crossings per square mile (DEIS 121). In other words, significant water quality impacts are currently occurring.

A misleading assessment is the Forest's ranking of the above ranges as being low, moderate, or high when one realizes these rankings are arbitrarily based on existing conditions with no relevance to healthy ecological functions or efforts being made to create desired conditions. The density of roads/trails within 300 feet of perennial and intermittent streams and the density of roads in Groundwater Dependent Ecosystems and associated Riparian Habitat Conservation Areas were ranked low (< 6 miles/square mile), moderate (6-7 mi/sq mile) or high (>7 mi/sq mile) but the Forest doesn't explain where this ranking system originated. The ranking does not appear to be scientifically based that demonstrates conditions that are conducive to good ecological health but rather an arbitrary system based on current densities. The overall density of roads within a subwatershed was ranked low (< 3.5 mi/sq mi), moderate (3.5-4 mi/sq mi) or high (>4 mi/sq mi) by taking all of the current densities and ranking the lowest 1/3 as low, the middle 1/3 as moderate and the upper 1/3 as high. This is an arbitrary ranking system that gives no indication if densities are conducive to healthy ecosystems. Of particular interest is that the DEIS states the current road/trail densities range from 3.0 – 4.6 (pg 120), which are all at or over the Land and Resource Management Plan (LRMP) standard. The same way of ranking drainage density and stream crossing density was used basing the ranking on general road density. If an existing condition is already degraded and the difference from the action alternative is small, a false conclusion could be made that there will be no too little impact from the alternative; where in reality, the impact will be cumulative to the degradation that is already occurring.

The Department doesn't think the current conditions were realistically described and therefore the effects of the project were not adequately analyzed. The physical data that was used was extremely limited and in many cases outdated (bottom line surveys conducted between 1991 & 2001, level II stream surveys between 1989 & 2011 pg 111). The DEIS (113) states, "*Changes in discharge, bank stability, sediment load and/or bedload can rapidly alter the width and/or depth of the channel.*" If changes can rapidly alter the channel, then using data up to 23 years old does not describe the current condition. Examples of limited and outdated data include the analysis of the Elliot Creek Subwatershed. The Elliot Creek Subwatershed includes 7 named streams and other unnamed stream channels yet the overall condition of the subwatershed was assessed using data from 2002 from one stream (Fox Creek, page 123 and 135).

The DEIS (135) states, "*Assuming that other streams in the Elliot Creek Subwatershed exhibit similar dominant channel type conditions and the implementation of design criteria that require the installation of a culvert or bridge installation that meets the 100-year flow event as well as armored approaches, bank stability is likely to be maintained, unless increased peak flows result from increases in road/trails and stream networks.*" The only problem with this statement is the Maxwell Fire in 2006 that burned in the Elliot Creek drainage. Due to the fire, it is highly unlikely that all of the other streams in the subwatershed exhibit similar conditions and therefore one location with outdated data does not represent the entire subwatershed.

Other examples of outdated data being used to describe current bank stability include the Howard Creek Subwatershed (1994 and 2001 pg 137), East Allen Creek (2001 which was prior to and severely affected by the Maxwell Fire pg 138 & 175), and East Porter Creek (1995 pg 139).

The Department also disagrees with how the Forest analyzed bank stability. The Forest only looked at the percent of cutbanks on a stream and didn't take into account lateral stability. The Forest's assumption was there would be an increase in peak flow if the connectivity between the trails and streams increased due to an increase in road/trail density. There are other factors that influence bank stability besides peak flow like the amount and type of plant communities found in the riparian zone, whether the bank is vegetated or unvegetated, amount of rock on the bank and the amount of bank alterations from other management practices including grazing, logging and user-created trails/crossings.

The DEIS (178) states "*Essentially, there are no measurable increased cumulative effects beyond those effects described in the "Direct and Indirect Effects" section relative to the flow and sediment regimes within the watersheds that overlap the Ochoco Summit project area*". The Department disagrees with this determination. Redband trout populations currently are vulnerable due to impacts from livestock grazing. Trout productivity is limited by excessive sediment load in streams from unstable banks reducing spawning success and limiting macroinvertebrate production. This condition will be exacerbated by additional sediment resulting from construction and use of trails in each of the action alternatives.

The DEIS (186) states "*By following the Project Design Criteria, the proposed trail May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend towards Federal Listing or Cause a Loss of Viability to the Population or Species*". The Department asserts this is a highly conjectural statement and specifically identifies monitoring as inadequate to effectively evaluate if project implementation is reducing viability of redband trout populations.

The DEIS (116) states "*Roads have the potential to increase the drainage density of a stream network by intercepting runoff at stream crossings or by channelizing flow that would otherwise be sheet flow or groundwater flow (Wemple at al. 1996; Jones et al. 2000; Takken et al. 2008). By increasing the drainage density and providing a more direct route to stream channels, roads in effect can decrease the time it takes for the precipitation, in the form of runoff, to enter the stream channel and potentially resulting in increased peak flows (La March and Lettenmaier 2001; Storck et al. 1998; Woldie et al. 2009). In addition, since erosion risk from ATV trails has been shown to potentially equal that of a forest road network, it can be expected that trails have the potential to increase drainage densities and peak flows similar to forest roads (Meadows et al., 2008). Areas with high road densities, high drainage densities, and a high density of stream crossings typically result in higher connectivity of the road and stream network. The effects of roads (or trails) on increased peak flows is expected to be greatest downstream of areas with a high density of stream crossings (Jones et al., 2000).*" The Department acknowledges the Forest's research in collecting information relevant to the contribution of roads and ATV trails on sediment delivery to streams. However, we are dismayed the Forest acknowledges these impacts and yet asserts that each of the action alternatives will not have significant impact to sediment delivery and sediment load in streams.

The DEIS evaluates the potential for sediment from the different alternatives based on average

precipitation patterns and modest hydrologic events. However, the greatest potential for sediment contribution to streams frequently occurs during the unusual event of high magnitude. These occur in the project area on an infrequent but regular basis as either rain on snow or summer thunderstorm events. Typically these are of short duration but their impacts in terms of sediment delivery in areas with disturbed soils, including roads and trails, can be severe and long lasting.

The 1st bullet DEIS 232 is contradictory to the entire fish section and the 3rd bullet below it. The entire section talks about sediment getting into the stream which will fill in the pools and interstitial spaces in the substrate which will impact spawning and macroinvertebrate distribution and community yet then the DEIS say in the first bullet that there will be no measurable effects.

When analyzing the cumulative effects of the Deep Creek Watershed Restoration (DEIS 174), it states that, "*Most proposed activities are located within RHCA's and were designed to move the watershed towards meeting interim RMOs.*" This tells the Department that the FS doesn't consider the Deep Creek area to be in good ecological condition yet, each action alternative mentions sediment and turbidity will increase in Deep Creek. If this area is not meeting RMO's then why does the Forest want to degrade it further with this project?

The DEIS (178) acknowledges that cattle use of user-created trails would maintain existing connectivity of streams and user-created trails which would continue to introduce sediment to the streams, but it doesn't mention cattle use of DEIS created trails and the associated effects.

The majority of streams within the identified project area are inhabited by interior Columbia redband trout, a State and Federal sensitive species. Genetic analysis conducted by Currens in 1994 indicated the population of redband trout in the Crooked River subbasin is genetically distinct from other populations. As such, viability of Crooked River redband trout is important to the long term conservation of the species. Due to past and current anthropogenic influences redband trout populations in the Crooked River subbasin are characterized as fragmented and depressed (ODFW 1996, Stuart et al 2007). The streams within the Ochoco National Forest represent the most extensive area of suitable redband trout habitat remaining in the subbasin. Other areas of the Crooked River watershed are highly degraded and the few strong redband populations are isolated. Habitat within the National Forest provides the best opportunity for persistence of the species.

While Forest habitat is essential for Crooked River redband trout conservation, many populations in streams within the ONF are depressed and vulnerable to stochastic and deterministic perturbations. The Department has been engaged with ONF staff in excess of 15 years regarding the impacts of livestock grazing on aquatic habitat and redband trout populations within the Forest. Most streams within the project area are on the Oregon Department of Environmental Quality 303d list for excessive temperatures. Many streams fail to meet the riparian management objectives identified in the LRMP and INFISH standard and guidelines. This is largely due to impacts from past and current livestock grazing practices. Interagency discussions regarding livestock grazing have been productive and the Department appreciates the Forest's recognition that additional monitoring is required to ensure current management is contributing to desired future conditions. However, implementation of monitoring plans has been limited at best and many streams and aquatic habitats fail to provide conditions to support robust redband trout populations.

In the end, every action alternative showed an increase in density for every factor. Continuing to

degrade a degraded system is contradictory to the LRMP which says riparian areas should move towards an excellent condition rating. The LRMP also states "*Design and construct the transportation system to minimize the numbers of stream crossings*" (LRMP 4-226), which the OHV system does not appear to do.

The Department recommends measures be taken to improve existing conditions significantly if the LRMP standard and guideline within 100 feet of perennial streams, lakes, and other water bodies is going to be met: "*No management practices causing detrimental changes in water temperature or chemical composition, blockages, or deposits of sediment which seriously and adversely affect water conditions or fish habitat shall be permitted within these areas*" (DEIS 107/108), which includes selecting the No Action Alternative for this project.

B. Thirty six miles (4.5%) of open roads out of 1,468 Forest jurisdiction miles (DEIS 47) within the 300,000 acre project area were identified to be closed under previous road analysis efforts (DEIS 49-51), yet no additional system roads were identified to be decommissioned or closed through this DEIS. This suggests that the Forest has determined that the existing road system is the sustainable minimum road system that best meets Forest and public needs. Based on this assumption, we could also assume that the existing system is fiscally and administratively doable and enforceable, and is needed to meet management goals and objectives in light of resource impacts that will continue to occur and increase as projected motorized use increases (DEIS 61). Implementation of any action alternative will increase motorized routes open to unlicensed OHVs by 10% and in 11 of 30 subwatersheds for Alternative 2, 7.6% and in 9 of 30 subwatershed for Alternative 3, and 12.3% and in 13 of 30 subwatersheds for Alternative 4 (DEIS xv & 659 miles open to unlicensed motor vehicles DEIS 47). These route increases will also experience an increase in motorized intensity (i.e., noise) and frequency over and above the existing use (DEIS 268, first sentence after bullets). Again, we question how the Forest can "protect resources" while increasing motorized activity in an area with extensive springs and streams and big game habitat.

We disagree that the current road system is the sustainable minimum road system since the Forest's budgets, including the road budget, are declining and any money allocated to the OHV project will be competing with all other approved OHV projects in central Oregon and throughout Region 6. Additionally, COHVOPS, who will be the primary party responsible for the OHV system (DEIS 67), currently has responsibility for 938 miles of designated OHV system roads and trails across central Oregon (East Fort Rock 318 miles, Millican 256 miles, Cline Buttes 91 miles, Edison 25 miles, Three Trails 222 miles, Henderson Flat 18 miles, Green Mt. 8 miles). COHVOPs ability to obtain outside grants plus funding from Forest Service and Bureau of Land Management budgets to adequately meet the engineering, education, and enforcement needs of the existing trail systems gets harder every year let alone the additional funding, staff, and enforcement personnel that will be needed to adequately meet the DEIS project design criteria, mitigation, monitor, and other proposed features for development and more importantly for operations and maintenance.

C. The Forest has never engaged the public to review and discuss a sustainable minimum motorized road and trail system and associated trade-offs through alternative development. Instead the Forest has determined independently what the sustainable minimum road and trail system is within the 300,000 acre project area, in spite of the likelihood that resource impacts will continue and increase resulting in loss of hunting and fishing and wildlife viewing recreational opportunity. Instead of just moving towards the Forest Plan road density objective of 3 miles per

square mile or less, a more strategic approach would be to minimally meet motorized access needs while increasing the number of 250 acre parcels ½ mile or further from a motorized route[4] (DEIS 265). A sound decision would be to apply the new Blue Mountain Elk Nutrition and Habitat Models to the four alternatives to better understand existing conditions and actions the Forests could take to improve conditions to help meet elk management objectives prior to any decision being made for this project.

Comment 4 – The Department thinks an analysis to determine the sustainable minimum motorized road and trail system to better meet today's Forest and public values should have been conducted first in order to have had a more relevant motorized system baseline from which to assess the DEIS. The existing open and closed road system is causing significant impacts to water quality, fisheries, and wildlife resources and modifications, physical closures and rehabilitation are needed now for those roads causing impacts to better meet today's Forest objectives and public values.

Currently, only 16 percent of the 300,000 acre project area is over ½ mile from a motorized route, which the Department recommends this percent be increase to at least 30% well distributed across the project area if the Forest's intent is to help meet public derived elk management objectives and associated hunting opportunity as implied by EO 13443. Likewise, existing road densities within 300 feet of perennial and intermittent streams within the Ochoco Summit project area subwatersheds range from 4.3 to 8.2 miles per square mile (DEIS 120). Existing road densities within springs and wetlands and their associated Riparian Habitat Conservation Areas are between 2.8 and 9.9 miles per square mile (DEIS 120). While existing road stream crossings per subwatershed range from 1.8 to 5.0 crossings per square mile (DEIS 121). The Department recommends these conditions be improved significantly if the Land and Resource Plan standard and guideline within 100 feet of perennial streams, lakes, and other water bodies is going to be met: *"No management practices causing detrimental changes in water temperature or chemical composition, blockages, or deposits of sediment which seriously and adversely affect water conditions or fish habitat shall be permitted within these areas"* (DEIS 107/108).

The current road system was built at a different time for a different purpose (DEIS 44/45). Motorized use on the existing road system, including closed roads, is increasing (DEIS 61) and continues to cause significant impacts to fish and wildlife resources. There is extensive research on the affects roads open to motor vehicles have on big game, other wildlife sensitive to human disturbance, aquatic resources, and watersheds. This DEIS as well as the 2009 Travel Management Draft Environmental Impact Statement (TM DEIS) and associated wildlife report do a good job presenting this information. The most pronounced impact is the reduction in hunting recreation and economic opportunity due to decreasing big game populations. Hunting opportunity is the only Forest visitation activity whose participants are limited due to a harvestable surplus which is declining and which is directly affected by motorized access[1].

The time is past due to resize the motorized system that better meets todays Forest objectives and public values, resource objectives, and the Forest's ability to manage and maintain it. The Forest asserts that adding an OHV system will minimally increase motorized impacts, however, the DEIS assessment is based on a road system that currently causes extensive resource impacts[2]. Increasing motorized impact through this project will cumulatively increase the existing motor vehicle impacts. Until there is a full accounting of the impacts and associated trade-offs the current road system is causing, particularly to fish and wildlife resources, we question the ability of the Forest to make a credible and informed

[1] E.g., the most current research shows a strong avoidance of elk to all-terrain vehicles detected up to one km from the disturbance. Preisler, H.K. et. al. In Press. Analyzing animal movement patterns using potential functions. Ecosphere
[2] E.g., 2009 TM DEIS, 2012 Ochoco DEIS, and associated fish and wildlife reports.

decision as to what the sustainable minimum motorized road and new OHV trail system should be to meet Forest objectives and public values.

Case in point, the existing blocks of habitat greater than ½ mile from an open road[3] constitute 16% of the acres within the project area (distribution of these acres was not presented). With each action alternative this amount decreases slightly (i.e., 15% or 14% for ≥250 acres blocks) (DEIS xv), yet the real issue is that only 16% of the 300,000 acre project provides security cover for elk greater than ½ mile from an open road. Furthermore, implementation of any of the action alternatives will result in increased route intensity (i.e., noise) along with more frequent OHV and other motorized use. If the intent of the Forest is to help meet the public derived elk management objectives in the long-term (as implied by EO 13443), then the amount of habitat greater than ½ mile from a road or trail used by a motor vehicle should increase, not decrease. Hillis (1991) recommends *30% of the analysis* area be in this condition for elk escapement during hunting season, Montgomery (2013) describes male and female elk avoidance of open roads seasonally, while Preisler (2013) describes a strong avoidance of elk to all-terrain vehicles detected up to one kilometer from the disturbance.[4] This research points to the need for more security cover if the intent is to retain elk hunting opportunities on the Ochoco National Forest in the long-term. Likewise, given the existing extensive road density and crossings throughout the subwatersheds (DEIS 120/121), increasing motorized routes in 11 of 30 for Alternative 2, 9 of 30 for Alternative 3, and 13 of 30 for Alternative 4 (DEIS xv) cumulatively adds impacts to the existing system.

In the past, the Ochoco Wildlife Management Unit (which encompasses much of the Ochoco National Forest and project area) was known as a premier elk area with good herd productivity and high bull ratios. It was a very popular unit for hunters to apply for bull elk tags. However, with high road densities and increased use of all roads, despite some attempts at gates and road closures that have been mostly ineffective due to lack of maintenance and enforcement, elk have moved off the Forest onto private lands. While overall herd numbers have remained relatively constant (DEIS 265), the distribution of animals has moved off Forest.

During the 2007 Travel Management Project Working Group Meetings, working group members interested in resizing the existing motorized system on the Deschutes and Ochoco National Forest and Crooked River National Grasslands were told that the Travel Management Project was not the place to do this, but that it would be appropriate to address the existing road system during site specific OHV system development. This intent was not carried forward to the OHV proposal even though this intent was expressed by the Department to Ochoco Leadership during a pre-project field review[5] and pre-project interagency discussions. Nothing in the DEIS reflects these discussions nor discusses the need for a sustainable minimum motorized system other than the first DEIS objective on page iii that infers the existing road system plus any of the three action alternatives would meet this objective.

The fundamental issue is the contradiction that while working on Travel Management, ODFW staff was told these issues would be dealt with in site specific OHV system developments, which we brought up

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[3] Only open roads were used in the analysis even though there are "*…669 miles of closed roads, many of which are receiving OHV use* (DEIS 234).

[4] Hillis e.al. 1991. Defining Elk Security: The Hillis Paradigm. Elk Vulnerability Symp., MSU, Bozeman, MT, April 10-12, 1991.

Montgomery et.al. 2013. Variation in Elk Response to Roads by Season, Sex, and Road Type. Journal Wildlife Mgmt. 77(2):313-325.

Preisler, H.K. et. al. In Press. Analyzing animal movement patterns using potential functions. Ecosphere

[5] 9/17/2009, Epperson, Crook County Natural Resources Planning Committee Ochoco Summit OHV Trail Planning Field Review

several times with leadership and project staff pre-project and during project planning, and now that it is proposed, the issue of assessing impacts and resizing the existing road system is dropped. How does the Forest hope to achieve protecting wildlife resources when each proposed project or action drops the issue of assessing the existing motorized system to better protect fish and wildlife habitat? Each National Environmental Protection Act document that proposes a new action but fails to address how the existing motorized system affects habitat protection further cumulatively impacts the remaining blocks of habitat, thereby causing the "death by a thousand cuts."

Now is the time to modify, physically close and rehabilitate open and closed roads that are causing impacts to water quality, fisheries, and wildlife resources to better meet today's Forest objectives and public values.

Comment 5 – Implementation of the proposed OHV area contradicts what the expected demand is for growth in recreational activities that the Forest is positioned to provide with implementation of the TM ROD along with assessment and designation of a sustainable minimum road system. Implementation of the proposed OHV system will compromise the projected long-term quiet non-motorized recreational activities which include fishing and wildlife viewing.

The DEIS did not look at the proposed OHV system relative to the need to provide additional OHV opportunities and experiences OHV users are seeking compared to what other Region 6 Forests are already providing, nor relative to what the extensive central Oregon OHV system of 938 miles of approved and designated roads and trails by OHV class is providing. Moreover, it doesn't consider how this system would affect projected non-motorized activities the Forest is positioned to provide in the future with implementation of the TM ROD including fishing and wildlife viewing. Information was provided on the OHV opportunities surrounding the project area by class (DEIS 70-72), but no assessment was done to determine the value of adding OHV trails by vehicle class on the Ochoco National Forest. Similarly, the Purpose and Need states that "*OHV riders have indicated a desire for additional motorized opportunities other than on mixed use roads*" (DEIS 3), but the DEIS does not fairly assess this need (if it really is a need) relative to other recreational activities that are declining. The Department recommends the Forest address those non OHV recreational needs that could be provided through implementation of the TM ROD and a sustainable minimum road system such as wildlife viewing, fishing, and deer and elk hunting before implementing a new OHV system that will further compromise non-OHV recreation.

It appears the DEIS was solely focused on the Ochoco National Forest, the proposed project area, and the anticipated need without considering how it fit in, would affect, or be affected by the already existing extensive designated OHV systems throughout central Oregon. The assumptions for the system are based on most riders coming from Crook, Deschutes, and Jefferson Counties (tri-county) (DEIS 73), and that the existing use will only increase 2.5 to 5.6 percent each year over the next decade. This translates into 125-280 new riders within the project area annually (DEIS 74). The Department believes this number will be much greater since we think riders will shift from the EFR (318 miles) and Millican (256 miles) dry dusty systems in July, August, and September to the more lush, less dusty, and more scenic Ochoco system (see Summary 7 below). We are concerned that the Forest is creating a new "destination" OHV area that will further encourage OHV use and compromise existing non-motorized recreation on the Forest.

Of further concern is that the proposed system does not include any OHV use thresholds, such as the maximum number of daily riders the system is being built for or what actions will be taken when this number is reached. Nor does the system measure if the assumptions about fish and wildlife resource

impacts and associated recreational opportunities occur as expected, or if they exceed impacts, which would then trigger corrective actions. In other words, no thresholds or a comprehensive review were included to determine if the implemented system was performing as excepted with actions to be taken if it wasn't, particularly relative to fish and wildlife effects and associated recreational opportunities. The Department recommends a comprehensive plan be included that identifies OHV use limits; water quality, fish and wildlife resource impact thresholds that are tied to existing policy, planning direction, goals, and objectives; and actions to be taken if limits and impacts are exceeded.

The TM DEIS identified that OHV use constituted 3.35 percent of the primary and secondary 2000 Forest visitation use while fishing constitutes 24.7 percent, hunting 22.59 percent, and wildlife viewing 59 percent. The 2012 DEIS information on primary activities from visitation surveys in 2008 determined that OHV use constituted 2.9 percent of Forest visitation main activities while fishing constituted 6.3 percent, hunting 18.6 percent, and wildlife viewing 0.9 percent. Both recreation assessments show fishing and hunting activities are much more important on the Forest then OHV activities today, which would be even greater if streams were classified as "proper functioning", and roads open to motor vehicles were reduced to better meet today's Forest and public needs. Of great concern to the Department is the affect any increase in motorized use will have on water quality and big game populations on the Ochoco National Forest. Case in point, the Forest has an extensive system of springs, streams and riparian habitat that is *negatively* affected by motorized roads and trails that will increase with implementation of any of the action alternatives (DEIS 131 – 174). Additionally, from 1999 to 2009 deer hunters declined 50 percent and elk hunters 46 percent; primarily due to declining deer and elk populations both of which are significantly affected by motor vehicle routes (DEIS 266-271).

Conversely, OHV systems that affect deer and elk populations and associated hunting opportunities are abundant and have expanded throughout central Oregon (DEIS 70-72), while most of the existing OHV systems were sited in areas with few springs, streams, and wetlands.

For over 20 years the Department has expressed to Forest leadership and staff the need to reduce motorized access to better meet water quality, fish and big game habitat needs and associated population management objectives. Actions have been taken to reduce sedimentation, improve fish movement, and to close system roads, yet system roads that have been closed continue to be driven on (DEIS 271) thereby causing continued detrimental water quality and wildlife impacts.

The Department thinks that implementation of the proposed OHV system will further reduce deer and elk populations, available big game habitat (DEIS xvi), and associated hunting opportunity. Likewise, we think the proposed OHV system will significantly affect water quality, fish populations, and fishing opportunity. Furthermore, we think that the high decibel levels associated with OHVs (99 decibels) will significantly affect wildlife viewing and fishing opportunities associated with primitive camping, scouting for big game, hiking, and other forms of non-motorized recreation that include a wildlife viewing component.

The DEIS implies that any of the action alternatives will <u>not</u> significantly affect fish and wildlife resources and associated fishing, hunting, and viewing opportunities as determined through analysis and findings associated with Key Indicators for Big Game Habitat (DEIS 265) along with the following assumptions. However, this assessment is based on the existing road system rather than a sustainable minimum road system that would better meet fish and wildlife resource needs:

- DEIS 87 – OHV sound greater than 45 decibels is analyzed only for the designated OHV trail system by alternative.

- DEIS 271 – *Alternative 1 would be most likely to retain the current pattern of disturbance from unregulated cross-country motor vehicle access, user-created trails, and use of closed roads because no closure of unauthorized routes would be implemented under this alternative.*
- DEIS 279 – *Unregulated cross-country motorized travel including user created trails across the analysis area is expected to be reduced as a result of provision of a designated system of trails and rehabilitation and concealment work at intersections of the proposed trail system with user created, decommissioned and closed roads…the action alternatives are expected to result in less motorized disturbance to big game animals in specific locations where existing road closures are reinforced and where unwanted user-created trails are rehabilitated.*
- *It is assumed that lands within the 200 m (600 foot) zone are unavailable for consistent elk use as cover or foraging areas during daylight hours when motorized traffic is more likely to occur* (DEIS 274).

The DEIS provided information on projected changes to existing deer and elk habitat by alternative (DEIS 271 – 277) along with deer and elk species viability (DEIS 283), yet no assessment was made relative to impacts from the existing road system, nor projected changes in deer and elk recreational opportunities (i.e., EO 13443) with implementation of any of the action alternatives.

No analysis or consideration was given to OHV noise impacts to non-motorized fish and wildlife recreationists for levels greater than 45 decibels on the 659 miles of roads open to OHV travel that likely will see increased OHV activity. Nor was an assessment conducted to determine the vehicle class and level of increased use those 659 miles of open roads within the 300,000 acre project area would receive as a result of any of the action alternatives. As noted in the DEIS (page 78) "*A growing body of research demonstrates that traditional and quiet recreationists are adversely affected by OHV use and often seek out landscapes free from OHVs.*"

The Department recommends an analysis of the proposed OHV system be conducted to understand the Forest's role to provide another designated OHV trail system experience for riders, by OHV class, from outside the area as well as for local riders. Part of this assessment is the need to determine the effects this system would have on other Recreational Opportunity Spectrum activities (DEIS 72/73) that the Ochoco National Forest can provide, such as elk hunting and finding one's own special place, that other local and Region 6 forests are more challenged to provide today, which could be due to past decisions including designation of an OHV system. In other words, an assessment is needed to determine if implementation of any of the action alternatives would significantly affect other recreational activities that are in greater need or demand that the Ochoco National Forest is more suited to provide in the long-term. As noted in the DEIS *"…it is predicted that in the next 10 years, the activities with the greatest growth (in terms of total participants multiplied by percent change) would be wildlife/birds, general relaxing, viewing other features, hiking/walking, fishing and driving for pleasure. The activities with the least growth are predicted to be backpacking, cross-country skiing, snowmobiling, horseback riding, and other motorized activities (USDA Forest Service 2005)"* (DEIS 72).

In essence, it appears that implementation of the proposed OHV area contradicts what the expected demand is for growth in recreational activities that the Forest is positioned to provide with implementation of the TM ROD along with assessment and designation of a sustainable minimum road system. Implementation of the proposed OHV system will compromise the projected long-term quiet non-motorized recreational activities including fishing and wildlife viewing.

Comment 6 – The wildlife section in the DEIS implies that the TM ROD will not be effective without implementation of a DEIS action alternative (DEIS 271 – Alt. 1), implying that there is not available

funding to adequately implement the TM ROD. This leads us to question the Forest's ability to obtain adequate funding for staff, engineering, education, enforcement, and monitoring that is needed to implement the DEIS. Our concern is further compounded when we consider the 938 miles of designated OHV trail already approved and under the COHVOPS oversight, who also will oversee the proposed OHV system.

If there is inadequate funding to implement the TM ROD as designed, then we believe there will be inadequate funds to implement or monitor results of any of the DEIS action alternatives as designed. We also have concerns with the action alternatives since no accounting of the Forest's ability to implement any of them as described was presented, other than a total dollar figure for construction (DIES xvi), nor were measures presented to be taken if proposed monitoring (DEIS 33 – 36) could not be conducted to assure project compliance along with implementing and measuring the effectiveness of alternative design criteria. As an example, much of the Crooked River National Grasslands has closed roads seasonally to limit motorized travel from late September or the end of November until the end of March each year. On almost any given weekend through the fall and winter and early spring, OHVs and other motorized vehicles violate these seasonal road closures. The Forest does not have the administrative and enforcement capacity to manage the existing road system on the Grasslands or the Forest. It is contradictory to think that the Forest can administer a new and increased motorized use when it doesn't have the capacity to enforce existing closures.

"*Alternative 1 would most likely retain the current pattern of disturbance…*" is stated as the status quo even though this type of use would be in violation of the TM ROD that instructs managers to close the Forest to cross-country travel. If the Forest is not able to meet the TM ROD direction, then we question the Forest's ability to meet the proposed DEIS criteria addressed in the bullets below. It is contradictory that the Forest TM ROD states that cross-country travel will be closed through its implementation, while the DEIS implies that this will only happen through implementation of one of the DEIS action alternatives.

To describe trade-offs between alternatives and to identify what is required for success the DEIS makes several assumptions without providing an accounting of the Forest's ability to meet those assumptions such as:

- Adequate funding for staff, engineering, education, enforcement, implementation, and monitoring will occur for all action alternatives.
- Motorized users will comply with the DEIS direction and those who don't will be managed through education, user created trail closures, physical closure of existing closed roads, and enforcement (i.e., Project Design Criteria DEIS 24-32, Mitigation Measures DEIS 32-33, and Monitoring DEIS 33-36).

The Department recommends that an accounting with a high level of certainty of where funding for engineering, education, enforcement, and monitoring resources will come from is provided along with an accounting with a high level of certainty of the Forest's ability to obtain and implement these resources in the short and long-term. A means of assessing the Forest's ability to successfully implement this project could be a review of COHVOPS ability over time to adequately meet the needs of the existing 938 miles of motorized roads and trails under their oversight in addition to meeting the needs of any of the DEIS proposed systems. Currently, it appears that COHVOPS ability to provide adequate resources for engineering, education, enforcement, monitoring, and system modifications based on monitoring results is inadequate for the designated road and trail systems they currently oversee (e.g., Henderson Flat, Green Mountain). Conversely, it seems the Forest is much better positioned to implement the TM ROD and to provide for existing and the growing non-motorized recreational

demands then it is to implement, manage, and maintain long-term any of the DEIS action alternatives.

Comment 7 – This project will attract and increase motorized use on the Ochoco National Forest (DEIS 45) which will increase the intensity (i.e., noise) and frequency of use on roads and trails within and outside of the 300,000 acre DEIS area. Increased OHV use will further displace elk[1] and this displacement will be onto private lands, thereby increasing private land damage from elk.

The 2003 OHV specialists report for the Opine Vegetation Project on the Deschutes National Forest estimated there were 15,000 visitors per years to the East Fort Rock OHV system (EFR), of which 80% were from out of town, many from Portland and the Willamette Valley, of which 75% occurred on weekends. Given the dry dusty conditions riders experience on the 318 mile EFR system during the months of July, August, and September (plus the 256 miles of Millican OHV system to the north of EFR), we could predict that a percentage (i.e., 33%) of those EFR (plus Millican) riders will branch off and travel to the proposed Ochoco Summit OHV system. A conservative estimate of 5,000 riders who would shift from EFR (plus a similar percent from Millican) to Ochoco Summit is probably a realistic number today[6]. More than 14,000 forest visitors participated in OHV or Motorized Trail Activities on the Forest in 2008 (DEIS 73), of which 57 percent came from Deschutes, Crook, and Jefferson Counties (DEIS 73). Adding 5,000 riders from outside of this tri-county area will increase this use by 36% or 100% if we just consider the project area (DEIS 73), which will also increase other motorized activities across the Forest (i.e., driving for pleasure, user created trails). This in turn will increase the intensity (i.e., noise) and frequency of motorized use across the Forest that in turn will result in disturbance to elk[1] and other wildlife sensitive to human disturbance with a high potential to see increased user created trails and impacts to springs, streams, wetlands and associated wildlife, fish and other aquatic organisms. The snowball effect is that creating a new OHV system will escalate the impacts to natural resources and non-motorized users, including elk displacement onto private lands.

As the DEIS notes *"Elk avoid areas near roads but avoidance varies in response to traffic rates"* (DEIS 266). *"At the present time, motorized road use in the OHV analysis area could be described as low to moderate during most of the year"* (DEIS 268). The Department thinks an increase in motorized intensity and frequency will increase elk displacement onto private lands resulting in more private land damage.

Clarification Requested: DEIS 104 Alt. 1 (with similar %s for Alts 2, 3, & 4) states "*OHV use on existing roads is only 5.5 percent of the total 1,820 miles (3,312 acres = 1.1 percent) of road in the approximately 301,000 acre analysis area.*" What does this refer to since DEIS 47 identifies 659 miles of shared use road in the project area of 1,738 miles of roads? Using figures from page 47, the percent of roads used by OHVs would be 37.9 percent, which if correct would call for a new project impact analysis.

Again, the Department wants to express our appreciation to Ochoco staff who worked with the Department to design a system that considered our scoping letter habitat categorizations and worked to address several of our concerns including avoiding some areas identified by the Department, proposing seasonal restrictions, and installing culverts and bridges over perennial streams and other sensitive drainages. However, based on information provided in the DEIS along with additional available information we used to assess projected impacts to fish and wildlife resources we strongly recommend Alternative 1, the No Action Alternative be selected.

[6] DEIS 61 "…regional and national OHV use days have increased 42 percent from 2001 – 2007"

Sincerely,

for

Amy Stuart
Deschutes Watershed District Manager
High Desert Region

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-2140

OFFICE OF
ECOSYSTEMS,
TRIBAL AND PUBLIC
AFFAIRS

March 25, 2013

Ochoco Summit Planning Team
Kate Klein, Forest Supervisor
c/o Ranger Slater Turner
Ochoco National Forest
3160 NE 3rd Street
Prineville, Oregon 97754

MAR 28 2013
RECEIVED

Re: U.S. Environmental Protection Agency comments for the Ochoco Summit Trail System Project Draft Environmental Impact Statement, Crook County Oregon, EPA Project Number: 09-067-AFS.

Dear Ms. Klein:

This review was conducted in accordance with our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act. Section 309 specifically directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions. Under our section 309 authority, our review of the DEIS considers the expected environmental impacts, and the adequacy of the EIS in meeting procedural and public disclosure requirements of NEPA.

The DEIS documents the analysis of four alternatives. The no-action alternative would not develop or designate trail for Off-Highway Vehicles. Alternative 2, the proposed action, would create a 170-mile trail network intended for motorcycles, ATVs, and Jeeps and 4x4 trucks. Alternative 3 would create a 101 mile network and not designate trails for jeeps and 4x4s. Alternative 4 would create a 212-mile trail network with areas for all three classes of OHVs.

We support the proposal's purpose to designate a sustainable system of roads, trails and areas open to motor vehicles that will provide legal public access, enhance regulation of unmanaged wheeled motor vehicle travel, protect resources, and decrease conflicts between motorized and non-motorized use on the Ochoco National Forest.

Project Design Criteria and Monitoring

Consistent with our December 18, 2009 scoping comment, we continue to believe that providing for motorized recreation that does not harm sensitive environmental resources can be as much a function of effective implementation and administration as it is a function of the specific combination of designated routes. Overall, the DEIS's inclusion of clear project design criteria and monitoring elements set the stage for effective implementation and administration. We especially support specific design elements for trails over 20% grade, using established in-water work windows, constructing cross-drainage features approximately every 50 feet up-hill from stream crossings to prevent channelizing sediment into streams, and sizing stream crossing structures to the 100-year flood level and to pass all aquatic

organisms.[1] We also support and encourage the inclusion, where possible, of specific decision thresholds and management responses. A good example of a decision threshold with management response from the DEIS is the erosion related project design criterion to shut down trails (or areas) if rutting, rilling, and gullying occurs until rehabilitated or reconstructed.

Compensatory Mitigation
While we believe that effective implementation and administration of project design criteria and monitoring substantially minimizes potential effects, we remain concerned about the action alternatives' potential unavoidable adverse effects – such as reduced water quality from increased sedimentation and turbidity. We are especially concerned about increased sediment delivery from trails less than 300 feet from a stream channel. To compensate (consistent with 40 CFR 1508.20 (e)) for unavoidable adverse impacts, we recommend that the Forest consider off-setting the impacts of new trail, new disturbance or increased use within sensitive areas with active decommissioning of user-created trails of commensurate length or disturbance area.

While we have focused on the sensitivity of riparian areas, we believe compensatory mitigation could be applied to other sensitive areas as well – such as: wildlife habitat, areas with rare plants or high likelihood of increasing the spread or introduction of invasive species, areas with high potential for conflict with non-motorized recreationists, and areas with cultural resources and historic properties.

We are rating the DEIS Environmental Concerns – Adequate (EC-1). Our EC-1 rating means that we believe the DEIS adequately sets forth the environmental impacts of the alternatives and that additional mitigation - such as, but not limited to, our suggestion for compensatory mitigation - would be needed to achieve full protection of the environment. A copy of our rating system is enclosed.

Thank you for this opportunity to continue our work with the Forest on travel management planning. If you have any questions please contact me at (206) 553-1601, or by electronic mail at: reichgott.christine@epa.gov, or you may contact Erik Peterson of my staff at (206) 553-6382, or by electronic mail at peterson.erik@epa.gov.

Sincerely,

Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

[1] DEIS, p. 27-28

U.S. Environmental Protection Agency Rating System for
Draft Environmental Impact Statements
Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections
The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns
EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections
EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory
EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

APPENDIX D – ORIGINAL PROJECT MAPS

These maps are unchanged from the maps published with the draft EIS.

- Map 1 – Ochoco Summit Trail System Project Area
- Map 2 – Forest Plan Management Areas
- Map 3 – Alternative 2 (Proposed Action) – East Side
- Map 4 – Alternative 2 (Proposed Action) – West Side
- Map 5 – Alternative 3 – East Side
- Map 6 – Alternative 3 – West Side
- Map 7 – Alternative 4 – East Side
- Map 8 – Alternative 4 – West Side
- Map 9 – Watershed Boundaries
- Map 10 – Riparian Habitat Conservation Areas (RHCAs)

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APPENDIX E - MAPS CREATED FOR THE FINAL EIS

- FEIS Map 1 – Alternative 3 Modified Proposed Trails (west side)
- FEIS Map 2 – Alternative 3 Modified Proposed Trails (east side)
- FEIS Map 3 – Alternative 3 Modified Proposed "Implementation" and "OHV Management" areas
- FEIS Map 4 - Recreation