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Final Environmental Impact Statement

Plumas National Forest Public Motorized Travel Management

Plumas National Forest
Plumas, Lassen, Yuba, Butte and Sierra Counties, California

Public Motorized Travel Management EIS

Final Environmental Impact Statement

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Abstract: This Final Environmental Impact Statement (EIS) describes the environmental effects of a proposal by the Plumas National Forest (PNF) to: 1. Prohibit cross-country motor vehicle travel off designated National Forest Transportation System (NTFS) roads, trails and areas by the public except as allowed by permit or other authorization (excluding snowmobile use). 2. Add 361 miles of existing unauthorized routes to the current system of NFTS trails currently open to the public for motor vehicle use. 3. Addition of 1 area, totaling 36 acres, where use of motor vehicles by the public would be allowed anywhere within that specifically delineated area. These actions are needed in order to implement the 2005 Travel Management Rule (36 CFR Part 212, Subpart B) while providing for a diversity of motor vehicle recreation opportunities and providing motorized access to dispersed recreation opportunities on the PNF. The Final EIS discloses environmental impacts associated with the proposed action, a No-action Alternative and three additional action alternatives developed to meet the purpose and need and respond to issues raised by the public. Of the alternatives under consideration, Alternative 5 is preferred by the responsible official.

Summary of the Final Environmental Impact Statement

Proposed Action

The Plumas National Forest (PNF) proposes the following actions: (1) The prohibition of motor vehicle travel off the designated National Forest Transportation System (NFTS) roads, motorized trails and areas by the public except as allowed by permit or other authorization (excluding snowmobiles). (2) The addition of 478 existing unauthorized routes (approximately 361 miles) to the current NFTS trails for public motor vehicle use. (3) The addition of 1 area, totaling 36 acres, where use of motor vehicles by the public would be allowed anywhere within that specifically delineated area.

Significant Issues

Internal and external scoping identified the following significant issues and these issues were used to develop the action alternatives (Table S-1).

Table S-1. List of significant issues.

Issue Topic	Cause and Effect
Resource Impacts	Many of the routes proposed for addition to the National Forest Transportation System (NFTS) as motorized trails are poorly located and would cause adverse impacts to plants, wildlife, water quality, soils and other natural resources.
Access and Recreation Opportunity	The proposed action reduces motorized recreation use by prohibiting cross-country travel and restricting motor vehicle travel to the National Forest Transportation System. The proposed action’s 361 miles of motorized trails added to the NFTS missed some key routes and roads desired by the public for motorized recreation.
Proposed Citizen Inventoried Roadless Areas	The proposed addition of motorized trails to proposed citizen inventoried roadless areas (CIRAs) would adversely affect the roadless characteristics of these areas including opportunities for solitude, undisturbed landscapes and primitive, non-motorized recreation.

Alternatives Considered In Detail

The PNF developed five alternatives: the No-action, the Proposed Action, and three other action alternatives developed to meet the purpose and need and respond to the significant issues listed above. The five alternatives considered in detail for this analysis are listed in Table S-2. Complete details of the alternatives, including project design criteria, are found in Chapter 2 of this document.

Table S-2. List of alternatives considered in detail.

Alternative	Description
Alternative 1: No-action Alternative	The No-action Alternative provides a baseline for comparing the other alternatives. This alternative maintains the status quo and provides maximum access and motorized recreation opportunity. Under the No-action Alternative, current management plans would continue to guide management of the project area. No changes would be made to the current NFTS and no permanent cross-country motor vehicle travel prohibition would be put into place. The temporary closure order, prohibiting motor vehicle cross country travel, would expire. The Travel Management Rule would not be implemented, and no Motor Vehicle Use Map (MVUM) would be produced. Motor vehicle travel by the public would not be limited to designated routes. The agency would take no affirmative action on any unauthorized routes. • Does Not Prohibit Cross-country Motorized Travel • Adds: No New NFTS Facilities (Roads, Trails, and Open Areas)
Alternative 2: Proposed Action	The Proposed Action is the proposed changes to the NFTS and the prohibition of cross-country motor vehicle travel as described in the NOI published January 3, 2008 (Volume 73, Number 2): 1. The prohibition of cross-country motor vehicle travel off designated NFTS roads, motorized trails and areas by the public except as allowed by permit or other authorization (excluding snowmobile use). 2. The addition of approximately 361 miles of existing unauthorized routes to the current NFTS trails for public motor vehicle use, and 3. The addition of one 36-acre area, where use of motor vehicles by the public would be allowed anywhere within that specifically delineated area. • Prohibits Cross-country Motorized Travel • Adds: 361 Miles of NFTS Motorized Trails • Adds: 36-Acre Sly Creek Area Open to 50 inch and less Motor Vehicles
Alternative 3:	Alternative 3 meets the objective of prohibiting cross-country travel, but proposes no new additions to the existing system of roads and trails. It responds to the issues of proposed citizen inventoried roadless areas (CIRAs) and natural resource impacts by prohibiting cross-country travel without adding any additional facilities to the NFTS. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS. • Prohibits Cross-country Motorized Travel • Adds: No New NFTS Facilities
Alternative 4:	Alternative 4 emphasizes natural resource protection and avoidance of CIRAs. This alternative prohibits cross-country travel, adds no motorized routes to CIRAs, California red legged frog critical aquatic refuge areas and does not add routes where resource concerns require extensive trail mitigation. • Prohibits Cross-country Motorized Travel • Adds: 140 Miles of NFTS Motorized Trails • Changes Vehicle Class on 4.1 Miles of NFTS Roads from Highway Legal Vehicles Only to Mixed Use (combining highway legal and non-highway legal vehicles on the same road)
Alternative 5:	Alternative 5 emphasizes both access and motorized recreation opportunity, as well as natural resource protection. This alternative prohibits cross-country travel and incorporates suggestions for additional and alternative routes received during public scoping. Trails with extreme resource problems are not included. Trails in California red-legged frog critical aquatic refuge areas are not included. Mitigation on trails with resource concerns would occur, thereby allowing trails with resource concerns to be included. Trails with extensive or critical trail mitigations would be added to the NFTS, but not placed on the MVUM as open to the public until the mitigation has been completed. • Prohibits Cross-country Motorized Travel • Adds: 234 Miles of NFTS Motorized Trails • Changes Vehicle Class on 4.1 Miles of NFTS Roads from Highway Legal Vehicles Only to Mixed Use (combining highway legal and non-highway legal vehicles on the same road)

Summary of Environmental Consequences

Table S-3 summarizes the environmental consequences by providing an average ranking of each alternative by resource area. Detailed information can be found in Chapter 3.

Table S-3. Summary of environmental consequences by alternatives

Resource Area:	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Aquatic Biota	1	2	5	4	3
Botanical Resources	1	2	5	4	3
Cultural Resources	1	2	5	4	3
Noxious Weeds	1	2	5	4	3
Motorized Recreation	5	4	1	2	3
Quiet Recreation	1	2	5	4	3
Visual Resources	1	2	5	4	3
Transportation Facilities	1	2	5	4	3
Water and Soil Resource	1	2	5	4	3
Terrestrial Biota	1	2	5	4	3

[1]A rank of 5 indicates the alternative has the least impact for the specified resource; a rank of 1 indicates the alternative has the most impact for specified resource. See Chapter 3 for more details.

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Chapter 1 Purpose and Need for Action

1.1 Document Structure

The Forest Service has prepared this Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This EIS discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

- Chapter 1. Purpose and Need for Action: This chapter briefly describes the proposed action, the need for that action, and other purposes to be achieved by the proposal. This section also details how the Forest Service informed the public of the proposed action and how the public responded.
- Chapter 2. Alternatives, including the Proposed Action: This chapter provides a detailed description of the agency's proposed action as well as alternative actions that were developed in response to comments raised by the public during scoping. The end of the chapter includes a summary table ranking the proposed action and alternatives with respect to their environmental impacts.
- Chapter 3. Affected Environment and Environmental Consequences: This chapter describes the environmental impacts of the proposed action and alternatives.
- Chapter 4. Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.
- Index: The index provides page numbers by document topic.
- Appendices: The appendices provide more detailed information to support the analyses presented in this Environmental Impact Statement.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at Plumas National Forest Supervisor's Office, Quincy CA.

1.2 Background

Over the past few decades, the availability and capability of motor vehicles, particularly off-highway vehicles (OHVs) and sport utility vehicles has increased tremendously. Nationally, the number of OHV recreationists has climbed sevenfold in the past 30 years, from approximately 5 million in 1972 to 36 million in 2000. California is experiencing the highest level of OHV use of any state in the nation. There were 786,914 All Terrain Vehicles (ATVs) and OHV motorcycles registered in 2004, up 330 percent since 1980. Annual sales of ATVs and OHV motorcycles in California were the highest in the U.S. for the last 5 years. Four-wheel drive vehicle sales in California also increased by 1,500 percent to 3,046,866 from 1989 to 2002.

Unmanaged motor vehicle use, particularly OHV use, has resulted in unplanned roads and trails, erosion, watershed and habitat degradation, and impacts to cultural resource sites. Compaction and erosion are the primary effects of motor vehicle use on soils. Riparian areas and aquatic dependent species are particularly vulnerable to damage from motor vehicle use. Unmanaged recreation, including impacts from OHVs, is one of “Four Key Threats Facing the Nation’s Forests and Grasslands.” (USDA Forest Service, June 2004).

On August 11, 2003, the Pacific Southwest Region of the Forest Service entered into a Memorandum of Intent (MOI) with the California Off-Highway Motor Vehicle Recreation Commission and the Off-Highway Motor Vehicle Recreation Division of the California Department of Parks and Recreation. That MOI set in motion a Region-wide effort to “Inventory and designate OHV roads, trails, and any specifically defined open areas for motor vehicles on maps of the 18 National Forests in California by 2007.”

On November 9, 2005, the Forest Service published final travel management regulations in the Federal Register (FR Vol. 70, No. 216-Nov. 9, 2005, pp 68264-68291), 36 CFR 212, Subpart B of the final Travel Management Rule requires designation of those roads, trails, and areas that are open to motor vehicle use on National Forests. Only roads and trails that are part of a National Forest Transportation System (NFTS) may be designated for motorized use. Designations are made by class of vehicle and, if appropriate, by time of year. Part 261 – Prohibitions, Subpart A (36 CFR 261.13) of the final rule prohibits the use of motor vehicles off designated roads, trails and areas, as well as use of motor vehicles on roads and trails that are not consistent with the designations.

On National Forest System (NFS) lands managed as open to cross-country motor vehicle travel, unrestricted, repeated motor vehicle travel has resulted in unplanned, unauthorized routes and areas (roads, trails and areas). These routes were developed without agency authorization, environmental analysis or public involvement, and do not have the same status as NFTS roads and NFTS trails. Nevertheless, some unauthorized routes may be well sited, provide excellent recreation opportunities for motorized and non-motorized recreationists, and may enhance the NFTS. Other unauthorized routes are poorly sited and cause unacceptable environmental impacts. Only NFTS roads, NFTS trails and discrete, specifically delineated areas can be designated for motor vehicle use. In order for an unauthorized route to be designated, it must first be added to the NFTS. In order for areas to be designated for motor vehicle travel, a discrete, specifically delineated space that is smaller, and in most cases much smaller, than a Ranger District Forest must be identified.

The Plumas National Forest has 999,521 acres currently open to cross-country travel by motor vehicles. In 2005, the Plumas National Forest completed an extensive inventory of unauthorized routes on NFS lands open to cross-country travel as described in the MOI. Approximately 1,107 miles of unauthorized routes were identified. The Forest then used an interdisciplinary process to review the existing NFTS and the inventory of unauthorized routes to identify proposals for limited additions to the NFTS. This process included review of the Forest Plan, internal and external discussions, including extensive public collaboration workshops and input, and internal and external validation of the locations of unauthorized routes using the inventory maps. The travel management regulations provide for the incorporation of previous decisions regarding travel management. Roads, trails and areas that are currently part of the Plumas National Forest transportation system and open to motor vehicle travel will remain designated for such use. This proposal makes needed changes (additional motorized trails and areas, seasonal restrictions, etc.) to the Plumas National Forest NFTS trails and areas on NFS lands in accordance with the Travel Management Rule (36 CFR Part 212, Subpart B).

In accordance with Subpart B of the Travel Management Rule (36 CFR 212.56), following a decision on this proposal, the Forest will publish a Motor Vehicle Use Map (MVUM) identifying all Plumas National Forest NFTS roads, trails and areas that are designated for motor vehicle use. The MVUM shall specify the classes of vehicles and, if appropriate, the time of year for which use is designated. Upon publication of the MVUM, it is prohibited to possess or operate a motor vehicle on NFS lands other than in accordance with those designations. These maps shall be made available to the public on the internet and at the headquarters of corresponding administrative units and Ranger Districts of the National Forest System. The unauthorized routes not included in this proposal are not precluded from future consideration for either removal from the landscape and restoration to the natural condition or addition to the NFTS and inclusion on a MVUM. Future decisions associated with changes to the NFTS and MVUM are dependent on available staff and resources and may trigger the need for additional environmental analysis, public involvement, and documentation.

1.2.1 Travel Management on the Plumas National Forest

The Plumas National Forest currently manages and maintains approximately 4,137 miles of NFS roads and 130 miles NFS motorized trails. The Plumas National Forest Transportation System (NFTS) was developed over many decades to meet a variety of needs including timber management, fuel treatment, access to private inholdings, fire control, utility management, special uses management and recreation. Other roads were acquired with past land exchanges or acquisitions.

The NFTS is managed and maintained to various road standards depending on management objectives. They range from paved roads to roughly graded high clearance roads, depending on the type of access necessary. In some cases, where public access is not needed, roads are “stored” for future management use. The NFTS is displayed on the Forest Transportation Atlas. The initial Forest Transportation Atlas consists of the maps, inventories and plans for forest transportation facilities and associated information available as of January 12, 2001 (FSM 7711.2). Details concerning the management of individual roads and trails are maintained in the Forest Infrastructure database (INFRA).

In 2002, the Forest populated the INFRA database by examining previous records (maintenance plans, maintenance expenditures, existing road and trail atlases, forest maps, etc.) to capture the entire NFTS and transfer the necessary information into INFRA and verify the Forest Transportation Atlas. Roads or trails that had no record of being mapped or maintained for a specific use were not included in the NFTS and INFRA database.

Since then, adjustments to the Transportation Atlas and INFRA database have been made to correct errors and account for NFS roads that were either newly constructed or overlooked in the 2002 effort. The current Forest Transportation Atlas identifies the existing NFTS and the management objectives for each transportation facility. Decisions regarding changes to the NFTS (new road construction, realignment, decommissioning, etc.) are subject to the National Environmental Policy

Act (NEPA) and require public involvement and disclosure. The NFTS is always changing depending on resource needs and management concerns.

This proposal is just one project, among many, in the Forest's long-term goal of managing the transportation system. Previous project decisions have substantially reduced the number of miles of NFTS roads and trails available for motorized use and in some cases restricted the season of use. These previous decisions have resulted in decommissioning 56 miles of system roads and 91 miles of unclassified roads. The net result is that the existing NFTS roads open year round have been reduced by 1.4 percent. This has been accomplished through Forest Planning, vegetation management projects, watershed restoration projects, fuel treatment projects, trail management decisions, landscape analysis, watershed analysis and the Roads Analysis Process (RAP). All of these efforts have helped to identify and manage the current transportation system.

In addition to this proposal, ongoing efforts to manage motor vehicle travel on the Forest include: (1) An interim Forest Order (MOI – Step 2) prohibiting cross-country motorized travel for resource protection pending a decision on this proposal, (2) reducing adverse environmental impacts associated with unauthorized motorized trails through various project-level planning efforts, and (3) addressing impacts associated with the current NFTS through the Forest's road and trail maintenance program.

Implementation of this proposal and subsequent designation of motorized routes through publication of the MVUM is only one step in the overall management of the Plumas National Forest NFTS.

1.2.2 Project Location

The proposal includes the entire Plumas National Forest. The Forest is located in northeast California (Figure 1).

Figure 1. Plumas National Forest Vicinity Map

1.3 Purpose and Need

The following needs have been identified for this proposal:

1. There is a need for regulation of unmanaged motor vehicle travel by the public. The proliferation of unplanned, unauthorized, non-sustainable roads, trails and areas created by cross-country travel adversely impacts the environment. The 2005 Travel Management Rule, 36 CFR Section 212, Subpart B, provides for a system of NFTS roads, NFTS trails and areas on National Forest System lands that are designated for motor vehicle use. After roads, trails , and areas are designated, motor vehicle use off designated roads and trails and outside designated areas is prohibited by 36 CFR 261.13. Subpart B is intended to prevent resource damage caused by unmanaged motor vehicle use by the public. In accordance with national

direction, implementation of Subpart B of the Travel Management Rule for the Plumas National Forest was scheduled for completion in 2009.

2. There is a need for limited additions to the Plumas NFTS to:
   - Provide motor vehicle access to dispersed recreation opportunities (camping, hunting, fishing, hiking, horseback riding, etc.). A substantial portion of known dispersed recreation activities are not typically located directly adjacent to existing NFTS roads or NFTS motorized trails. Some dispersed recreation activities depend on foot or horseback access, and some depend on motor vehicle access. Those activities accessed by motor vehicles are typically accessed by short spurs that have been created primarily by the passage of motor vehicles. Many such unauthorized “user-created” routes are not currently part of the NFTS. Without adding them to the NFTS and designating them on a MVUM, the regulatory changes noted above would make continued use of such routes illegal and would preclude public access to many dispersed recreation activities.
   - Provide a diversity of motorized recreation opportunities (4x4 vehicles, motorcycles, ATVs, SUVs, passenger vehicles, etc.). It is Forest Service policy to provide a diversity of road and trail opportunities for experiencing a variety of environments and modes of travel consistent with the National Forest recreation role and land capability (FSM 2353.03(2)). Implementation of Subpart B of the Travel Management Rule would severely reduce acres and miles of motorized recreation opportunities relative to current levels. As a result, there is a need to consider limited additions to the NFTS.

In making any limited additions to the National Forest Transportation System, the Plumas National Forest will be considering criteria contained in Subpart B of the Travel Management Rule, which include the following:

1. Impacts to cultural resources.
2. Public safety.
3. Access to public and private lands.
4. Availability of resources for maintenance and administration of roads, trails and areas that would arise if the uses under consideration are designated.
5. Minimizing damage to soil, watershed, vegetation and other forest resources.
6. Minimizing harassment of wildlife and significant disruption of wildlife habitat.
7. Minimizing conflicts between motor vehicles and existing or proposed recreational uses of NFS lands.
8. Minimizing conflicts among different classes of motor vehicle uses of NFS lands or neighboring federal lands.
9. Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, etc.

When making any limited additions to National Forest System Roads, the Forest will also consider the following:

- Speed, volume, composition and distribution of traffic on roads.
- Compatibility of vehicle class with road geometry and road surfacing.

- Maintaining valid existing rights of use and access (rights-of-way).

1.4 Proposed Action

1. **Prohibition of cross-country motor vehicle travel off designated NFTS roads, motorized trails and areas by the public except as allowed by permit or other authorization (excluding snowmobile use).**
2. **Additions to the National Forest Transportation System (NFTS)**—The PNF currently manages and maintains approximately 4,137 miles of NFTS roads and 130 miles of NFTS motorized trails. Based on the stated purpose and need for action, the PNF proposes to add approximately 361 miles of existing unauthorized routes. These additions would bring the total NFTS motorized trails to 491 miles.
3. **Motorized Open Area Addition**—The PNF currently has 1 area (approximately 4 acres) designated open to motor vehicle use. The PNF proposes to designate 1 additional open area (36 acres).

A detailed description of the proposed action can be found in Chapter 2 of this EIS. Maps depicting the proposed action are posted on the Plumas National Forest website. http://fs.usda.gov/plumas

1.5 Principle Laws and Regulations that Influence the Scope of this EIS

The National Environmental Policy Act (NEPA) of 1969 requires that all major federal actions significantly affecting the human environment be analyzed to determine the magnitude and intensity of those impacts and that the results be shared with the public and the public given an opportunity to comment. The regulations implementing NEPA further require that to the fullest extent possible, agencies shall prepare Environmental Impact Statements concurrently with and integrated with environmental analyses and related surveys and studies required by the Endangered Species Act of 1973, the National Historic Preservation Act of 1966, and other environmental laws and executive orders. Principle among these are the Multiple Use and Sustained Yield Act of 1960, the National Forest Management Act of 1976 as expressed through the Plumas National Forest Land and Resource Management Plan ("Forest Plan") and its amendments, the Clean Air Act of 1955, the Clean Water Act of 1948 (amended in 1972 and 1987), and the Forest and Rangeland Renewable Resources Planning Act of 1974.

Travel Management Rule (36 CFR 212, 251, 261 and 295): This EIS is designed specifically to implement the requirements of the November 5, 2005 Rule for Travel Management, Subpart B.

1.6 Decision Framework

The responsible official will decide whether to adopt and implement the proposed action, an alternative to the proposed action, or take no action to prohibit cross-country motor vehicle travel by the public off the designated system and to make limited additions to the Plumas National Forest Transportation System.

This proposal is not intended to revisit previous decisions that resulted in the current NFTS. This proposal is narrowly focused on implementing 36CFR 212, Subpart B of the Travel Management Rule. Previous administrative decisions concerning road construction, road reconstruction, road closures, road decommissioning, trail construction and land suitability for motorized use on the existing NFTS are outside the scope of this analysis.

1.6.1 Responsible Official

The Forest Supervisor for the Plumas National Forest will be the deciding official. The Forest Supervisor will sign the Record of Decision (ROD).

1.7 Public Involvement

The Interdisciplinary Team relied on public involvement to ensure that a full range of alternatives, representing a broad array of perspectives, would be analyzed. Public involvement occurred during three key periods: first during the public collaboration process that began in 2004, second during the 60-day public scoping period for the Notice of Intent (NOI) in 2008, and third during meetings with public groups to explore issues they raised during scoping.

During the summer and fall of 2004, an independent contractor reviewed and mapped routes and areas used by OHVs on the Forest. During 2004 and 2005, the Forest also sought route information from the public and validated route locations and mapped them. On May 14, 2005, the Forest provided on-the-ground training for the public to locate and map their favorite riding areas so they could effectively provide that information to the Forest Service.

In December 2006, public meetings were held in Oroville, Portola, and Quincy explaining the temporary Forest Order (effective December 31, 2006) that restricted OHV use to mapped roads, trails and areas.

By April 2007, the Forest Service developed the “first cut” route map, which included 220 miles of proposed motorized trails. The “first cut” consisted of known routes used by the public, including destinations, loops, and spur routes to fishing access and favorite dispersed camping sites. The “first cut” avoided routes on private land with no right of way, routes where motorized use would conflict with existing uses, and routes with measurable resource impacts. Information meetings were held in Quincy, Portola, and Oroville in April. Follow-up workshops were held in each city during May 2007.

Tribal consultation occurred concurrently with public involvement activities. Letters were sent to the tribes throughout the planning process, as well. The project was discussed at multiple meetings with Concow Maidu Tribe of Mooretown Rancheria, Estom Yumeka Tribe of Enterprise Rancheria, Greenville Rancheria, Mechoopda Indian Tribe of Chico Rancheria, Susanville Indian Rancheria, Tyme Maidu Tribe of Berry Creek Rancheria, and Washoe Tribe of California and Nevada.

In the spring of 2007, a series of three public meetings and three public workshops were conducted to identify which of the routes and areas should become part of the proposed action, the type of use that each would have, and routes to be considered for dispersed recreation access. The concept of “mixed use” (combining highway legal and non-highway legal vehicles on the same road) was also introduced during these meetings. At the first session of the 2007 two-part series, public meetings were held in Quincy (April 17) Portola (April 18), and Oroville (April 19). At the second set of workshops, individuals worked with Forest Service specialists to identify important routes. These meetings were held in Blairsden (May 2), Quincy (May 3) and Oroville (May 10). Groups shared their ideas and their various concerns. Roughly 300 people participated in these workshops. Afterwards, an e-mail update was issued sharing information on the meetings and the outcome. The Forest Service Interdisciplinary Team took this information and developed the proposed action for the NOI. The proposed action was designed to include as many routes as possible that were requested by the public. This inclusive approach was used so that these routes could be analyzed in detail and their effects disclosed as part of this NEPA process.

1.7.1 60-Day Public Scoping Period for the Notice of Intent

In January 2008, the Forest Service completed the Proposed Action and Notice of Intent to Prepare an Environmental Impact Statement (NOI), based on comments from the meetings held in the spring of 2007. The comment period on the proposed action began on January 3, 2008, and ended March 3, 2008. Presentations to a variety of groups, phone calls, news releases, website postings and emails were used to alert the public of the opportunity to comment on the proposed action. Public meetings were held in Blairsden (January 15), in Quincy (January 22) and in Oroville (January 29) to explain the Proposed Action. Over 3,300 comments were received. Many were identical emails.

1.7.2 75-Day Draft Environmental Impact Statement Comment Period

Following four years of work and over 20 public meetings and workshops, the Draft Environmental Impact Statement (DEIS) was released for public comment.

Interested parties, tribes and reviewing agencies were sent a letter on December 18, 2008. The DEIS, maps, and specialist reports were posted on the web the same day at: http://fs.usda.gov/plumas. Hard copies and/or CDs of the DEIS were sent to tribes and reviewing agencies requiring them. Remaining interested parties and reviewing agencies received a summary and website location for downloading documents and maps. A follow-up letter was sent to the same mailing list on December 22, 2008 to correct the expected notice of availability date in the original letter. The notice of availability was published by the Environmental Protection Agency in the Federal Register on December 29, 2008, which initiated the 45-day comment period. A legal notice was published the Feather River Bulletin on January 7, 2009.

The Forest Service received several comments requesting an extension to the comment period. The Forest Supervisor decided to extend the comment period an additional 30 days. On February 4, 2009, a legal notice explaining the extension was published in the Feather River Bulletin. A letter was sent to interested parties and reviewing agencies on February 6, 2009. The Forest Tribal Relations Specialist contacted tribal representatives by phone. The Environmental Protection Agency published an amended notice in the Federal Register extending the comment period on February 13, 2009.

The Forest Service received 4,310 total responses on the Draft EIS, including 340 original responses and 3,970 form letters. Most were received via email. An executive summary of the comments appears in Appendix G. Responses to comments are posted on http://fs.usda.gov/plumas.

1.8 Issues

Comments from the public, other agencies, and the Washoe Tribe were used to formulate issues concerning the proposed action. An issue is a matter of public concern regarding the proposed action and its environmental impacts. The Forest Service separated the issues into two groups: significant and non-significant. 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, the 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)…"

1.8.1 Significant Issues

The discussion on the significant issues was edited between the Draft and Final EIS. At the proposed action stage, resource surveys had not been completed. These surveys showed many adverse impacts to natural resources, making this the primary significant issue. The order of the issues was changed to reflect this. Specific information was added to the motorized recreation issue.

Issue 1: Many of the routes proposed for addition to the NFTS as motorized trails are poorly located and would cause adverse impacts to plants, wildlife, water quality, soils and other natural resources.

Discussion: Commenters expressed concerns about impacts to a variety of natural resources, citing stream crossings, habitat fragmentation, wildlife disturbance, sedimentation, cultural resources, invasive weeds and other resources that would be impacted by motorized use of trails added to the NFTS.

Issue 2: The proposed action reduces motorized recreation use by prohibiting cross-country travel and restricting motor vehicle travel to the National Forest Transportation System. The proposed action's 361miles of motorized trails added to the NFTS missed some key routes and roads desired by the public for motorized recreation.

Discussion: Concerns were raised that the proposed action did not include several routes that were important to the public for motorized recreation and as access to other outdoor activities such as hunting, fishing, and camping. The proposed action did not include any mixed use on Level 3 roads.

Issue 3: The proposed addition of motorized trails to proposed citizen inventoried roadless areas (CIRAs) would adversely affect the roadless characteristics of these areas including opportunities for solitude, undisturbed landscapes and primitive, non-motorized recreation.

Discussion: Concerns were raised that adding motorized trails to CIRAs on the Plumas National Forest would reduce opportunities for solitude, and primitive non-motorized experiences would be ruined by the noise and disturbance of vehicles. Motorized trails would change the character of these areas.

1.8.2 Non-significant Issues

1. **Snowmobile Use**: Concerns were expressed regarding the impacts of snowmobile use on the Plumas National Forest.

   Reasons why not addressed in the proposed action: Designation of areas open to snowmobile use is covered under 36 CFR 212, Subpart C, and is outside of the scope of this decision, which is focused on implementing 36 CFR 212, Subpart B of the Travel Management Rule.
2. **Other types of wheeled vehicle use (mountain bikes) or other forms of travel (hiking, horseback riding)**: Concerns were expressed regarding the need to provide opportunities for non-motorized forms of travel.

   Reasons why not addressed in the proposed action: This issue is outside of the scope of the purpose and need for the project. This proposal is focused only on motor vehicle use in accordance with 36 CFR 212, Subpart B of the Travel Management Rule.
3. **Addressing maintenance and decommissioning needs on the National Forest Transportation System (NFTS):** Concerns were expressed that the Forest should reconsider previous decisions to establish system roads and trails in the NFTS. Some existing system roads and trails are in need of repair and maintenance and should be either repaired or closed as part of the proposal.

   Reasons why not addressed in the proposed action: The proposed action implements 36 CFR 212, Subpart B of the Travel Management Rule, which states: *"The responsible official may incorporate previous administrative decisions regarding travel management made under other authorities, including designations and prohibitions of motor vehicle use, in designating National Forest System roads, National Forest System trails, and areas on National Forest System lands for motor vehicle use under this subpart"* (36 CFR: **§** 212.50 (b)). The responsible official has determined that existing NFTS roads and trails will not to be considered for repair, reconstruction, or decommissioning as part of this proposal. Repair and maintenance of the existing NFTS are routine, ongoing activities on National Forests and are typically categorically excluded from documentation in an environmental assessment or environmental impact statement in accordance with agency policy in Forest Service 36 CFR 220.6(d)(4) "Repair and maintenance of roads trails and landline boundaries." Further, re-evaluation of previous decisions that established the current NFTS is not necessary for implementing 36 CFR 212, Subpart B of the Travel Management Rule. However, past, present, and future environmental impacts of the current NFTS are incorporated into cumulative effects analyses for the proposed action and alternatives. Decommissioning occurs on an ongoing basis when roads and trails are no longer needed or are relocated for resource protection. Typically this occurs as part of vegetation management projects, watershed restoration projects, fuel treatment projects, and trail construction projects.

Chapter 2 Alternatives, Including the Proposed Action

2.1 Introduction

This chapter describes and compares the alternatives considered for the Plumas National Forest (PNF) Public Motorized Travel Management EIS. It describes both alternatives considered in detail and those eliminated from detailed study. The end of this chapter presents the alternatives in tabular format so that the alternatives and their environmental impacts can be readily compared.

Based on the issues identified through public comment on the proposed action, the Forest Service developed three alternative proposals that achieve the purpose and need differently than the proposed action. In addition, the Forest Service is required to analyze a No-action alternative. The proposed action, alternatives and No-action alternative are described in detail below.

This chapter is divided into four parts:

- Part 1 describes how the alternatives were developed.
- Part 2 presents the alternatives considered in detail.
- Part 3 presents the alternatives that were considered, but eliminated from detailed analysis. It includes the rationale for eliminating these alternatives.
- Part 4 compares the alternatives based on their environmental, social and economic consequences, and includes a comparative display of the projected effects of the alternatives.

2.2 How the Alternatives Were Developed

The four action alternatives represent a wide range of perspectives designed to address the purpose and need and the issues as described in Chapter 1.

2.2.1 Refining Alternatives Submitted by the Public During Scoping

During the 60-day public scoping process, alternatives were submitted for consideration by two groups. After the scoping period concluded, the Forest Service met with each of these groups to review and give due consideration to their proposals. The resulting alternatives incorporate these and other suggestions offered by the public.

Also important in this process were the ideas and advice gathered by the Forest Service in their consultation and discussions with tribal representatives, local counties, and Forest Service employees. State and Federal agencies advised the process through numerous informal contacts.

2.3 Alternatives Considered in Detail

Four action alternatives (Alternatives 2, 3, 4, and 5) and a No-action Alternative (Alternative 1) are analyzed in detail in this EIS. The No-action Alternative represents the continuation of cross-country travel including continued use of all unauthorized routes by motor vehicles. This alternative serves as a baseline for comparison among the alternatives, and is required by the implementing regulations of the NEPA.

Currently, the PNF has an interim Forest Order in place that prohibits motorized cross-country travel and confines motor vehicles to the National Forest Transportation System and existing unauthorized routes. This prohibition will remain in effect until December 31, 2010. It is assumed that unless one of the action alternatives implementing the Travel Management Rule is selected, the temporary Forest Order prohibiting motorized cross-country travel would expire and motorized cross-country travel would resume under the No-action Alternative.

The planning area for the alternatives includes National Forest System (NFS) lands on the PNF. It does not include any private, state, or other federal lands.

Each alternative assumes that other adjacent federal lands, such as those administered by the Bureau of Land Management would be managed according to existing management plans and applicable federal laws. Each alternative also assumes that private lands would meet applicable county, state and federal land use regulations.

2.3.1 Monitoring

All action alternatives include the following monitoring activities. Monitoring is critical for evaluating the effectiveness of management decisions and the accuracy of analysis assumptions and conclusions. Monitoring of trail conditions is required, and must meet Regional and/or National standards. If monitoring determines additional resource damage is occurring, steps to prevent further damage must be taken. If the mitigations are not effective or are not possible, additional trail closures may be required, which could require additional NEPA analysis.

Deferred maintenance trail condition monitoring: Trails would be monitored using the deferred maintenance condition survey protocol. A sampling of the routes would be completed each year; trails should be monitored on a 5-year cycle. Both PNF employees and the public would use this monitoring process to document trail conditions, based on field observations and measurements. Information derived from this monitoring is used to update the maintenance schedule and assist in prioritizing maintenance needs. Initially, the monitoring would focus on the unauthorized routes that have been added to the NFTS. The Plumas National Forest intends to apply for grants from the State of California Off-Highway Motor Vehicle Recreation Division to supplement appropriated funds for maintenance. If the grants are secured, monitoring would be conducted annually in compliance with standards set forth in the State's Off-Highway Motor Vehicle Recreation Grants and Cooperative Agreements Program Regulations.

Cultural Resource monitoring: Monitoring of potential effects to cultural resource sites would be conducted as prescribed in the Programmatic Agreement among the USDA Forest Service, Pacific Southwest Region, USDA Forest Service, Intermountain Region's Humboldt-Toiyabe National Forest, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Designating Motor Vehicle Routes and Managing Motorized Recreation on the National Forests in California (Motorized Recreation Programmatic Agreement (PA)) (2006).

All sites within the project area (227) have been either monitored or newly documented as part of the environmental analysis process. Of these, 37 sites with discernable impacts (direct and indirect) have been identified for additional monitoring as part of proposed mitigation measures. The Motorized Recreation PA specifies that these sites will be monitored within a two-year period after designation.

The mitigation measures initially prescribed qualify as minimal actions necessary to alleviate potential adverse effects. If monitoring demonstrates that prescribed mitigation measures are ineffective, it may be necessary to implement progressively more complex protection measures. This could culminate in route closures if other measures prove unsuccessful. This type of adaptive management policy is discussed in the Motorized Recreation PA (2006).

Sensitive plant and noxious weed monitoring: Monitoring would occur along routes added to the NFTS that have been identified as potential high risk to sensitive plants or as highly vulnerable to noxious weed spread (Appendix A). These areas have the greatest potential for adverse effects to botanical resources from the continued use of public motorized vehicles. Sites would be monitored annually for year 1 and 2. If negative impacts are documented, appropriate mitigation measures (i.e. signage, barriers, etc. or weed treatments) would be developed. The mitigation would be implemented within one year of the identified impact. Appendix A lists the sites to be monitored. Current PNF botany records and GIS data would be used as baseline data and compared with the future condition. The action alternatives include up to 11 routes with sensitive plant and/or noxious weed monitoring.

Soil and water monitoring: A portion (approximately one-half) of the set of trails monitored annually for trail condition (described above) would also be monitored for soil and water impacts. Estimated annual cost for soil and water monitoring is $3,600. Evaluations E08 and E09 of the USFS Pacific Southwest Region's "Best Management Practices (BMPs) Evaluation Program" (May 2002) would be used to evaluate whether the monitored trails are impacting soil or water resources. These evaluations were developed to monitor the condition and drainage features of road surfaces and road/stream crossings. While OHV trails are typically narrower and often steeper than forest roads, the drainage practices that are necessary to protect soil and water quality are the same for both types of facilities. Monitoring would first occur along routes that have been identified as a higher risk to soil or water resources (see Appendix A). The water quality indicator pertinent to these evaluations is observation (absence or presence, including magnitude) of trail-generated sediment delivered to a stream channel. Baseline water quality for normal and acceptable trail conditions is defined as (1) the effects of sediment delivery to beneficial uses are insignificant and immeasurable; and (2) the effects persist within a very short period (less than a 5-day period and are typically associated with a single activity or precipitation event). Immeasurable effects to beneficial uses means the pollutant (sediment) may be visible but is not likely detectable by compared measurements (e.g. turbidity or total suspended sediment) above and below the site. Trails for which monitoring indicates that BMP effectiveness rates "fail" or "at-risk" will be further investigated to determine if additional or existing trail drainage or stream crossing measures should be implemented or repaired (see the Soil and Water Resources section of Chapter 3).

Aquatic species and habitat monitoring: In addition to evaluating the BMP monitoring as described above, Stream Condition Inventory (SCI) reaches would be located adjacent to identified trails that have the potential to affect threatened, endangered or sensitive (TES) aquatic species and their habitat. The Forest would locate five SCI monitoring reaches across the Forest and these sites would be monitored bi-annually for six years. Key attributes to monitor are sedimentation, temperature, bank stability and any changes in habitat.

Several trails would be monitored for California red-legged frogs, foothill and mountain yellow-legged frogs (Appendix A). Fifteen trails would be monitored following the Fish and Wildlife Service's August 2005, Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog. Two of the fifteen would have additional monitoring using Fellers and Freel (1995) survey protocol for the foothill and mountain yellow-legged frogs.

2.3.2 Mitigation

2.3.2.1 Soil and Water Mitigation

Trails requiring mitigation prior to being added to the MVUM are indicated by an asterisk (*) in Table 1 and Appendix A. Activities listed in Appendix A on trails without an asterisk would occur as part of periodic trail maintenance. Site-specific mitigation and maintenance for 353 trails included in the action alternatives are described in Appendix A. They include activities such as grading trails to outslope them for drainage, adding rolling dips for drainage, installing culverts or putting in rocked fords or dips at trail stream crossings. They also include limits on the season of use to prevent damage during wet weather.

2.3.2.2 Mitigations for Aquatic Species and Habitat

1. **Installation of crossings**: Trails that cross perennial streams and have the potential to directly and indirectly affect the California red-legged frog, the mountain yellow-legged frog and foothill yellow-legged frog and their habitats, would be mitigated by installing concrete planks, or culverts, and hardening crossings at trail stream crossings on trails in potentially suitable habitat 27 trails (specific mitigations are described by trail in Appendix A, and in detail in "minimization measures" of the Aquatic Species Section of Chapter 3). For mountain yellow-legged frog crossings, further evaluation on the ground by the Forest Hydro Engineer and Aquatic Biologist may determine a crossing is not required. Only hardening of approaches may be required.
2. **Season of use**: Trail use would be limited to May 1st to October 14th on 71 trails and the Sly Creek open area for the California red-legged frog, mountain yellow-legged frog, and the foothill yellow-legged frog. A Forest Order would be utilized to restrict season of use as necessary determined by water year. The season of use is shown in Table 1 and Appendix A. Trail signs would include season of use information.
3. **Interpretive signs** would be installed to inform the public about aquatic species in the French Creek area and the need to protect these aquatic species. Information would be included in brochures and maps of French Creek watershed. The signs and information would be designed in consultation with US Fish and Wildlife Service.
4. **Trail Closure Signs:** Temporary trail closure signs would be placed at the head of trails closed during the seasonal closure.

5. **Soil and Water trail mitigation and maintenance** described in the section above would benefit aquatic species, as well.
6. **Aquatic Species Monitoring:** Trails in suitable California red-legged frog habitat would be monitored to verify the assumption that unsurveyed routes are occupied. Trails would be monitored using the US Fish and Wildlife Service's August 2005, *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog*.

2.3.2.3 Mitigations for Wildlife Species

A Season of Use (SOU) was applied to routes that were determined to pose effects or risks to individuals or breeding pairs of wildlife species based on the proximity of trails to a key wildlife area (winter range) or a known activity center (nest or roost site). Season of use periods are displayed in Table 1 and Appendix A. Wildlife seasons of use were combined with other resource area seasons of use (e.g. watershed and amphibians) where restrictions overlapped on the same route. Based on the analysis conducted, the following mitigations were applied.

1. For California Spotted Owls, a season of use (August 16th to December 31st or a shorter season of August 16th to October 14th if the trail has a season of use for frogs) was applied to 35 trails to minimize effects to breeding pairs based on the proximity of a route to a known activity center (nest or roost sites).
2. For Northern Goshawks, a season of use (September 16th to December 31st or a shorter season of September 16th to October 14th if the trail has a season of use for frogs) was applied to 11 trails to minimize effects to breeding pairs based on the proximity of a route to a known activity center (nest or roost sites).
3. For Mule Deer, a season of use (May 1st to December 31st) was applied to 13 trails to minimized effects to deer use in key wildlife areas during critical use periods (i.e. winter).
4. For Bald Eagles, a season of use (August 16th to December 31st) was applied to one trail to minimize effects to breeding pairs based on the proximity of a route to a known activity center (nest sites).

2.3.2.4 Maps and Signs

If the decision is to implement one of the action alternatives, a motor vehicle use map (MVUM) would be created and made available to the public at no cost, as soon as practical. This map is the legal document designating which routes on the Forest may be legally traveled with a motorized vehicle, by what type of vehicle, and any seasonal or other use restrictions. Designations, use restrictions, and operating conditions may be revised in future decisions as needed to meet changing conditions or management strategies. As changes or corrections are made to the transportation system, the MVUM will be periodically revised and reissued.

All NFTS roads and trails that are available for public use would be signed on the ground with a road or trail number and any regulatory information that may apply to the route. Where necessary for OHV areas, perimeter signing would be installed.

2.3.3 Descriptions of the Alternatives

This section describes each of the five alternatives considered in detail. The alternatives are described as follows:

- **Cross-country travel.** Generally, all of the action alternatives prohibit cross-country travel except in smaller "open" areas that are specifically designated for such use. Open areas are described below under "Roads, trails and areas to be added to the National Forest System".
- **Changes to the existing National Forest Transportation System (NFTS):** The alternatives vary in changes to the existing NFTS in terms of allowing mixed use on Slate Creek Road. This road provides the only motorized access linking route networks south of Quincy and those south of Meadow Valley. It was promoted in the past as an OHV route, and it serves as the only access to Rock Creek and Deanes Valley campgrounds, traditional favorites of families camping with OHVs.
- **Additions to the NFTS:** Each alternative includes lists of trails and open areas that are proposed for addition to the NFTS. Each of these trails is identified by a unique trail number and open areas are identified by name and location. All proposed trail additions have an assigned maintenance level based on specific trail management objectives. All proposed trails would receive the appropriate level of routine maintenance such as brushing, signing, cleaning, clearing debris, etc. Each trail or area is site-specifically addressed in "Appendix A—Route Analysis Database Summary Report" where site-specific reviews by resource specialists are documented. Resource specialists reviewed all proposed trails and open areas to determine site-specific impacts. For some trails and areas, no work beyond routine maintenance is needed. For others, additional work is needed to bring the trail or area up to a safe and environmentally sustainable condition.

2.3.3.1 Alternative 1: No-action

The No-action Alternative provides a baseline for comparing the other alternatives. This alternative maintains the status quo and provides maximum access and motorized recreation opportunity. Under the No-action alternative, current management plans would continue to guide management of the project area. No changes would be made to the current NFTS, and no cross-country travel prohibition would be put in place. The Travel Management Rule would not be implemented, and no Motor Vehicle Use Map (MVUM) would be produced. Motor vehicle travel by the public would not be limited to designated trails. Unauthorized routes would continue to have no status or authorization as NFTS facilities. Over 1,107 miles of unauthorized routes would continue to receive use. Of these, approximately 725 miles are usable by all vehicles, 159 miles are 50" or less in width and 225 miles are usable by motorcycles only. Routes would continue to proliferate.

1. **Cross-country travel**: Motor vehicle travel off designated NFTS roads, NFTS trails and areas by the public would continue except as prohibited by Forest Order.
2. **Changes to the existing National Forest Transportation System (NFTS)**: none proposed.
3. **Roads, trails and areas added to existing NFTS**: No roads, trails or areas are proposed for addition to the NFTS under this alternative.

2.3.3.2 Alternative 2: Proposed Action

The Proposed Action contains the proposed changes to the NFTS and the prohibition of cross-country travel as described in the NOI published January 3, 2008 (Volume 73, Number 2). The proposed action was designed to provide a high level of access and motorized recreation opportunity based on the purpose and need in Chapter 1. It was developed with extensive public involvement and collaboration (described in Chapter 1).

1. **Cross-country travel**: Motor vehicle travel off designated NFTS roads, NFTS trails and areas by the public except as allowed by permit or other authorization would be prohibited.
2. **Changes to the existing National Forest Transportation System (NFTS**): no changes proposed.
3. **Roads, trails and areas added to the existing NFTS**: The following table displays those trails and areas to be added into the NFTS and their season of use. Trails with an asterisk (*) after the trail number would need mitigation completed prior to being added to the MVUM and used by the public (see Appendix A for more information). Sly Creek (36 acres) would be added as a motorized area open for yearlong use for vehicles 50” or less in width.

Table 1. Alternatives—Trails added to the National Forest Transportation System under Alternatives 2, 4 and 5. (Alternatives 1 and 3 would not add any trails.)

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
4M01*	Motorcycle	FRRD	5/1-12/31	1.55		1.55
4M02	Motorcycle	FRRD		0.76		
5M01	Motorcycle	FRRD	5/1-12/31	2.16		2.16
5M02	Motorcycle	FRRD	5/1-12/31	2.74		2.54
5M04	Motorcycle	FRRD	5/1-12/31	1.92		1.92
5M05	Motorcycle	FRRD	5/1-12/31	0.88		0.88
5M06	<50"	FRRD	5/1-10/14	0.47		
5M07*	Motorcycle	FRRD	5/1-10/14	0.29		
5M08*	Motorcycle	FRRD	5/1-10/14	0.45		
5M08A	<50"	FRRD		0.12		
5M09	<50"	FRRD	5/1-10/14	0.65		
5M10*	Motorcycle	FRRD	5/1-10/14	0.28		
5M11*	Motorcycle	FRRD	5/1-10/14	0.65		
5M12	Motorcycle	FRRD	8/16-12/31	1.69	1.69	1.69
5M13*	Motorcycle	FRRD	8/16-12/31	1.11		1.11
5M14	<50"	FRRD		0.55		
5M15	Motorcycle	FRRD	5/1-10/14	1.05		
5M16	<50"	FRRD	5/1-12/31	0.84	0.84	0.84
5M17*	Motorcycle	FRRD	5/1-12/31	0.90		0.90
5M18	Motorcycle	FRRD	5/1-10/14	1.00		
5M19*	Motorcycle	FRRD	5/1-12/31	0.60		0.60
5M20*	Motorcycle	FRRD	5/1-10/14	0.85		
5M21	Motorcycle	FRRD	5/1-10/14	1.32		

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
5M22	Motorcycle	FRRD	5/1-10/14	1.60		
5M23	Motorcycle	FRRD	5/1-10/14	1.69		
5M24*	Motorcycle	FRRD	8/16-10/14	1.17		1.17
5M25*	Motorcycle	FRRD	8/16-12/31	0.76		0.76
5M25A	Motorcycle	FRRD		0.34		
5M26	All	FRRD	8/16-12/31	0.49	0.49	0.49
5M27	Motorcycle	FRRD	5/1-10/14	1.22		
5M28 W	Motorcycle	FRRD	8/16-12/31	0.43	0.43	0.43
5M28 E	Motorcycle	FRRD	5/1-10/14	0.76		
5M30	Motorcycle	FRRD	5/1-10/14	1.42		
6M02*	Motorcycle	FRRD	5/1-10/14	0.87		
6M03*	Motorcycle	FRRD	5/1-10/14	1.23		
6M04	Motorcycle	FRRD	5/1-10/14	1.39		
6M05*	Motorcycle	FRRD	5/1-10/14	0.41		
6M08*	Motorcycle	FRRD	5/1-10/14	1.52		
6M09	Motorcycle	FRRD	5/1-10/14	0.37		
6M10	Motorcycle	FRRD	5/1-10/14	5.48		
6M11*	Motorcycle	FRRD	5/1-10/14	1.09		
6M12*	Motorcycle	FRRD	5/1-10/14	0.43		
6M13 N*	Motorcycle	FRRD	5/1-10/14	0.79		
6M13 S	Motorcycle	FRRD	5/1-10/14	0.62		
6M14*	Motorcycle	FRRD	5/1-10/14	2.62		
6M14A	Motorcycle	FRRD		0.17		
6M15	Motorcycle	FRRD	5/1-10/14	0.40		
6M16*	Motorcycle	FRRD	5/1-10/14	2.26		
6M16A*	Motorcycle	FRRD	5/1-10/14	0.29		
6M16B	Motorcycle	FRRD		0.11		
6M17	Motorcycle	FRRD		1.00	1.00	1.00
6M17A	Motorcycle	FRRD		0.12	0.12	0.12
6M19	Motorcycle	FRRD	9/16-12/31	3.02		3.02
6M20 W	Motorcycle	FRRD	9/16-12/31	0.95		0.95
6M20 E	Motorcycle	FRRD	5/1-10/14	0.82		
6M21	Motorcycle	FRRD		0.86		
6M22 N*	Motorcycle	FRRD		1.90		1.90
6M22 S	Motorcycle	FRRD		0.93	0.93	0.93
6M22A*	Motorcycle	FRRD	5/1-10/14	0.65		0.65
6M23*	Motorcycle	FRRD		0.99		0.99
6M24*	Motorcycle	FRRD		0.23	0.23	0.23
6M25	All	FRRD		0.20		
6M26	Motorcycle	FRRD		1.36		
6M27	Motorcycle	FRRD		0.83		
6M28	Motorcycle	FRRD		0.09	0.09	0.09

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
6M29*	<50"	FRRD	8/16-10/14	3.25		3.25
6M29A*	Motorcycle	FRRD	5/1-10/14	0.20		0.20
6M29B*	Motorcycle	FRRD		0.47		0.47
6M29C*	Motorcycle	FRRD	8/16-10/14	0.76		0.76
6M29D*	Motorcycle	FRRD	9/16-10/14			0.52
6M29E*	Motorcycle	FRRD	5/1-10/14	0.65		0.65
6M30 E	Motorcycle	FRRD		0.33	0.33	0.33
6M30 W*	Motorcycle	FRRD	5/1-10/14	0.17		0.17
6M30A	Motorcycle	FRRD		0.30	0.30	0.30
6M31 W	Motorcycle	FRRD		0.20	0.20	0.20
6M31 E*	Motorcycle	FRRD	5/1-10/14	0.15		0.15
6M32	Motorcycle	FRRD	9/16-12/31	0.36	0.36	0.36
6M33	<50"	FRRD	9/16-12/31	0.65	0.65	0.65
6M34	All	FRRD		0.52	0.52	0.52
6M34A*	Motorcycle	FRRD		0.37		0.37
6M35	Motorcycle	FRRD		0.47		
6M36*	Motorcycle	FRRD	9/16-10/14	0.86		0.86
6M37	All	MHRD		1.42	1.42	1.42
6M38	All	MHRD	5/1-10/14	0.38		
6M39*	All	MHRD	5/1-10/14	0.66		0.66
6M47	Motorcycle	FRRD	5/1-10/14	1.56		
6M48*	Motorcycle	FRRD	5/1-10/14			
6M51	Motorcycle	FRRD	8/16-12/31		0.77	0.77
7M01	All	FRRD	5/1-10/14	0.59		
7M02	Motorcycle	FRRD		1.12		
7M03	All	FRRD		0.36	0.36	0.36
7M04*	Motorcycle	FRRD	5/1-10/14	0.66		0.66
7M07*	Motorcycle	FRRD		0.39		0.39
7M08	Motorcycle	FRRD		0.86		
7M09	All	FRRD		0.26		
7M10	Motorcycle	FRRD		0.54		
7M11	<50"	FRRD		0.48	0.48	0.48
7M12	<50"	FRRD		0.94		
7M13	All	MHRD	5/1-10/14	0.70		
7M14	All	MHRD		0.25	0.25	0.25
7M15	All	MHRD		1.20	1.20	1.20
7M16	All	MHRD		0.94	0.94	0.94
7M17	All	MHRD	8/16-12/31	1.73	1.73	1.73
7M18	All	MHRD		0.66	0.66	0.66
7M22	<50"	MHRD		0.72	0.72	0.72
7M28*	All	FRRD			0.39	0.39
8M01	Motorcycle	FRRD		0.50		

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
8M02	All	MHRD		0.78	0.78	0.78
8M03	All	MHRD		1.57	1.57	1.57
8M04	<50"	MHRD		0.69		
8M10	<50"	MHRD	9/16-12/31	0.67	0.67	0.67
8M11*	All	MHRD		1.01	1.01	1.01
8M11A*	Motorcycle	MHRD		0.84	0.84	0.84
8M13	<50"	MHRD		0.96		
8M14	<50"	MHRD		0.27		
8M15	<50"	MHRD		0.32	0.32	0.32
8M16	<50"	MHRD		0.77	0.77	0.77
8M17	<50"	MHRD	5/1-10/14	1.28		
8M18	<50"	MHRD		0.41		
8M19	<50"	MHRD		1.27	1.27	1.27
8M20	All	MHRD	5/1-10/14	0.19		
8M21	All	MHRD		0.72		
8M22	All	MHRD		0.48		
8M23*	All	MHRD	5/1-10/14	0.49		
8M24	<50"	MHRD	8/16-12/31	2.71		2.71
8M25	All	MHRD		1.03	1.03	1.03
8M26	All	MHRD		1.01	1.01	1.01
8M27	All	MHRD		2.26	2.26	2.26
8M27(ex)	All	MHRD	8/16-12/31	0.81		
8M27A	All	MHRD		0.33	0.33	0.33
8M28	<50"	MHRD		1.08	1.08	1.08
8M28A	<50"	MHRD		0.10		
8M29	<50"	MHRD		0.66	0.66	0.66
8M30	<50"	MHRD		0.49	0.49	0.49
8M31	<50"	MHRD		1.11	1.11	1.11
8M32	All	MHRD		0.64	0.64	0.64
8M33	All	MHRD		0.96	0.96	0.96
8M34	All	MHRD		0.06		
8M35	All	MHRD		1.57	1.57	1.57
8M36	All	MHRD		0.96	0.96	0.96
8M37	All	MHRD		0.82	0.82	0.82
8M37A	All	MHRD		0.08		
8M37B	All	MHRD		0.15	0.15	0.15
8M38*	All	MHRD		0.54		0.54
8M39	All	MHRD		0.71	0.71	0.71
8M39A	All	MHRD		0.32	0.32	0.32
8M40	All	MHRD		0.34	0.34	0.34
8M41*	All	MHRD		0.33		0.33
8M42*	<50"	MHRD		0.98		0.98

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
8M43	All	MHRD		0.36	0.36	0.36
8M44	All	MHRD		0.30	0.30	0.30
8M45	All	MHRD		0.46	0.46	0.46
8M46	All	MHRD		0.61	0.61	0.61
8M47	All	MHRD	8/16-12/31	1.46	1.46	1.46
8M47A	All	MHRD		0.35		
8M48*	All	MHRD		0.49		0.49
8M49	All	MHRD		0.32	0.32	0.32
8M50	All	MHRD		0.83	0.83	0.83
8M51	All	MHRD		0.84	0.84	0.84
8M52	All	MHRD	8/16-12/31	1.39	1.39	1.39
8M53	All	MHRD		0.66	0.66	0.66
8M54	All	MHRD		0.82	0.82	0.82
9M01	<50"	FRRD		0.91	0.91	0.91
9M02	Motorcycle	FRRD		0.39	0.39	0.39
9M03	<50"	FRRD	5/1-10/14	0.56		
9M04*	Motorcycle	FRRD	5/1-10/14	0.18		0.18
9M05 W	<50"	FRRD		1.57	1.57	1.57
9M05 E	<50"	FRRD		0.09		
9M06	<50"	FRRD		0.14		
9M07	Motorcycle	FRRD		0.08		
9M08	<50"	FRRD		2.11	2.11	2.11
9M08A	<50"	FRRD		0.13	0.13	0.13
9M09	<50"	FRRD		0.84	0.84	0.84
9M10	<50"	FRRD		1.65	1.65	1.65
9M11	Motorcycle	FRRD		0.65	0.65	0.65
9M12*	Motorcycle	FRRD	5/1-10/14	0.38		0.38
9M13*	All	FRRD	8/16-10/14	0.48		0.48
9M14 N*	All	FRRD	8/16-10/14	0.94		0.94
9M14 S	All	FRRD		0.56		
9M14A	All	FRRD		0.58		
9M15	Motorcycle	FRRD		0.81		0.81
9M16*	<50"	FRRD	5/1-10/14	1.22		1.22
9M16A	<50"	FRRD	5/1-10/14	0.57		
9M17	All	FRRD	5/1-10/14	1.38		
9M18	All	FRRD		0.05		
9M19	All	FRRD		0.67		
9M20	All	FRRD	5/1-10/14	1.39		
9M21	All	FRRD	8/16-12/31	1.63	1.63	1.63
9M22	All	FRRD	8/16-12/31	0.38		
9M23	All	FRRD	8/16-12/31	1.06	1.06	1.06
9M24	All	FRRD		0.85		

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
9M25	<50"	FRRD		1.72		
9M25A	<50"	FRRD		0.14		
9M26	<50"	FRRD		0.90		
9M27	<50"	FRRD		0.24		
9M32 W*	All	MHRD		0.53		
9M32 E	All	MHRD	5/1-10/14	0.43		
9M33	Motorcycle	MHRD	8/16-12/31	2.66		
9M34	Motorcycle	MHRD		0.55	0.55	0.55
9M35	Motorcycle	MHRD	8/16-12/31	0.69		0.69
9M36	All	MHRD		1.33		
9M37*	All	MHRD	8/16-12/31	1.68		1.68
9M37A	All	MHRD		0.43		
9M37B	All	MHRD		0.25		
9M38	<50"	MHRD		1.61	1.61	1.61
9M39	All	MHRD		1.13	1.13	1.13
9M39A	All	MHRD		0.69	0.69	0.69
9M40	<50"	MHRD		1.01	1.01	1.01
9M41	Motorcycle	MHRD		0.67	0.67	0.67
9M41A	Motorcycle	MHRD		0.19	0.19	0.19
9M42 N	All	MHRD		0.49	0.49	0.49
9M42 S	All	MHRD		0.32		
9M42A	All	MHRD		0.17	0.17	0.17
9M42B	All	MHRD		0.52		0.52
9M43	All	MHRD		0.26	0.26	0.26
9M44	All	MHRD		0.49	0.49	0.49
9M45*	Motorcycle	MHRD	8/16-12/31	0.61		0.61
9M46*	All	MHRD		0.95		0.95
9M46A*	All	MHRD		0.49		0.49
9M47A	All	MHRD		0.47	0.47	0.47
9M48	All	MHRD		0.96	0.96	0.96
9M49	All	MHRD		1.76	1.76	1.76
9M50	All	MHRD	9/16-12/31	0.33	0.33	0.33
9M51	All	MHRD		1.27	1.27	1.27
9M52	All	MHRD		0.63	0.63	0.63
9M53	All	MHRD	8/16-12/31	0.59		
9M53A	All	MHRD	8/16-12/31	0.46		
9M54	All	MHRD		1.00	1.00	1.00
9M55	All	MHRD		0.53	0.53	0.53
9M56*	All	MHRD		0.73		0.73
9M56A*	All	MHRD		0.38		0.38
9M57	All	MHRD		0.82	0.82	0.82
9M57A	All	MHRD		0.17	0.17	0.17

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
9M58	All	MHRD		1.11	1.11	1.11
9M58A	All	MHRD		0.63	0.63	0.63
9M58B	All	MHRD		0.55	0.55	0.55
9M59A	All	MHRD	5/1-12/31	0.47		
9M59C	All	MHRD	5/1-12/31	0.18		
9M59D	All	MHRD	5/1-12/31	0.18		
9M59E	All	MHRD	5/1-12/31	0.43		
9M60	All	MHRD		0.42	0.42	0.42
9M62	All	FRRD		0.48	0.48	0.48
9M65	All	MHRD		0.63	0.63	0.63
10M01	Motorcycle	FRRD				
10M02*	<50"	FRRD	8/16-10/14	1.25		1.25
10M07	<50"	FRRD		2.64		
10M09	All	FRRD		0.84		
10M11	All	FRRD		0.67		0.67
10M12	All	BKRD		0.95	0.95	0.95
10M13	All	BKRD		0.20		0.20
10M14	All	MHRD		0.12		0.12
10M15	All	BKRD		0.54		0.54
10M16*	All	MHRD		1.09		1.09
10M19	All	MHRD	8/16-12/31	1.26	1.26	1.26
10M20	All	MHRD		1.31	1.31	1.31
10M20A	All	MHRD		0.48	0.48	0.48
10M20B	All	MHRD	5/1-12/31	0.13		
10M21*	All	MHRD		1.24		1.24
10M21A W	All	MHRD		0.16		
10M21A E	All	MHRD		0.11		0.11
10M21B	All	MHRD		0.91		0.91
10M21C	All	MHRD	5/1-12/31	0.13		
10M22	All	MHRD		0.50		
10M23 N	All	MHRD			0.52	0.52
10M23 S	All	MHRD		2.07	2.07	2.07
10M24*	All	MHRD		1.28		1.28
10M25	All	MHRD		1.14	1.14	1.14
10M27*	All	MHRD		0.96		0.96
10M28	All	MHRD		1.38		
10M28A	All	MHRD		1.01		
10M29*	All	MHRD		1.56		1.56
10M30	All	MHRD		0.83	0.83	0.83
10M30A	All	MHRD		0.24	0.24	0.24
10M30B	All	MHRD		0.27		
10M30C	All	MHRD		0.09		

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
10M30D	All	MHRD		0.18		
10M31	All	MHRD		0.24	0.24	0.24
10M32*	<50"	MHRD		1.26		1.26
10M33	All	MHRD	5/1-12/31	0.70		
10M34	All	MHRD		1.83	1.83	1.83
10M35	All	MHRD	5/1-12/31	0.51		
10M36*	All	MHRD		1.01		1.01
10M36A	All	MHRD	5/1-12/31	0.17		
10M38	<50"	MHRD		2.47		
10M39	All	MHRD		0.17		
10M40*	<50"	MHRD		1.35		1.35
10M42	All	MHRD		1.44		
10M43	All	MHRD		1.15		
10M44	All	MHRD		0.45	0.45	0.45
10M45	All	MHRD		0.67	0.67	0.67
10M46	All	MHRD		0.71	0.71	0.71
10M47	All	MHRD		1.50	1.50	1.50
10M54	All	MHRD		0.83	0.83	0.83
10M55*	All	MHRD	5/1-10/14			0.25
11M02	All	BKRD		1.72	1.72	1.72
11M03	All	BKRD		0.52	0.52	0.52
11M04	All	BKRD		0.76	0.76	0.76
11M05	All	BKRD		0.96	0.96	0.96
11M06	All	BKRD		0.42	0.42	0.42
11M07	All	BKRD		0.16	0.16	0.16
11M08	All	MHRD	8/16-10/14	1.16		
11M08A	All	MHRD	8/16-10/14	0.27		
11M08B	All	MHRD	8/16-10/14	0.09		
11M09*	All	BKRD	8/16-12/31	1.07		1.07
11M10	<50"	BKRD		1.97	1.97	1.97
11M11	<50"	BKRD		1.03	1.03	1.03
11M13 N	<50"	MHRD		0.80		0.80
11M13 SW	<50"	MHRD		0.23		
11M13A	All	MHRD		0.35		0.35
11M13B	<50"	MHRD		0.53		0.53
11M13C	<50"	MHRD		0.06		0.06
11M13D	<50"	MHRD		0.08		
11M14	<50"	MHRD		0.42		
11M15	All	MHRD		0.38		0.38
11M15A	All	MHRD		0.25		
11M16	<50"	MHRD		0.65	0.65	0.65
11M17	All	MHRD		0.96		0.96

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
11M18	All	MHRD		0.14		0.14
11M19	All	MHRD		0.66		
11M20	All	MHRD		3.33	3.33	3.33
11M22	<50"	MHRD		0.40	0.40	0.40
11M23*	<50"	MHRD		0.67		0.67
11M24*	All	MHRD		0.47		0.47
11M25*	All	MHRD		0.43		0.43
11M30	All	MHRD		0.58	0.58	0.58
11M34	All	MHRD		0.73	0.73	0.73
11M35*	All	MHRD		0.71		0.71
11M36	All	MHRD		1.36	1.36	1.36
11M37	All	MHRD		2.15	2.15	2.15
11M38	All	MHRD		0.53	0.53	0.53
11M39	All	MHRD		0.55	0.55	0.55
11M40	All	MHRD	8/16-12/31	0.64		
11M41	All	MHRD		1.29	1.29	1.29
11M41A	All	MHRD		0.35	0.35	0.35
11M42	All	MHRD		0.16		
12M03	All	BKRD		0.76	0.76	0.76
12M04	All	BKRD		0.41	0.41	0.41
12M06	All	BKRD		0.85		
12M07	All	BKRD		0.44	0.44	0.44
12M08	All	BKRD		0.72		0.72
12M09*	All	MHRD		3.08		3.08
12M09A	All	MHRD		0.84	0.84	0.84
12M10*	All	BKRD		2.96		2.96
12M10A*	All	BKRD		0.35		0.35
12M12*	All	BKRD		0.67		0.67
12M13	All	BKRD		0.40	0.40	0.40
12M14	All	BKRD		0.58		
12M15*	All	MHRD		0.23		0.23
12M16	All	MHRD	8/16-12/31	1.21		
12M17	All	MHRD		0.16	0.16	0.16
12M18	All	MHRD		0.14		
12M19	All	MHRD		0.68	0.68	0.68
12M20	All	MHRD		0.11	0.11	0.11
12M21*	All	MHRD		0.23		0.23
12M21A*	All	MHRD		0.05		0.05
12M22*	All	MHRD		0.15		0.15
12M23	All	MHRD		0.91	0.91	0.91
12M24	All	MHRD		0.28		
12M25	<50"	MHRD	9/16-12/31	1.44		

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
12M26	<50"	MHRD		1.55		
12M27	<50"	MHRD		0.91	0.91	0.91
12M30	All	MHRD		0.04		
12M31*	All	MHRD				0.99
12M32	All	MHRD			0.16	0.16
12M34	All	MHRD			0.25	0.25
12M35	All	BKRD			0.11	0.11
12M37	All	BKRD			0.17	0.17
12M38	All	MHRD			0.26	0.26
13M01	All	BKRD		1.07	1.07	1.07
13M03	All	BKRD		0.45		
13M04	All	BKRD		0.49	0.49	0.49
13M04A	All	BKRD		0.16		
13M04B	All	BKRD		0.11	0.11	0.11
13M05	All	BKRD		0.58		
13M06*	All	BKRD		1.63		1.63
13M07	All	BKRD		1.24		
13M08	All	BKRD		1.39		
13M09	All	BKRD		0.46	0.46	0.46
13M09A	All	BKRD		0.06		
13M10	All	BKRD		12.04		
13M10A	All	BKRD		0.04		
13M10B	All	BKRD		0.13		
13M10C	All	BKRD		0.04		
13M11	<50"	BKRD		1.97		
13M12	All	BKRD		1.50	1.50	1.50
13M12A	All	BKRD		0.25	0.25	0.25
13M13	All	BKRD	9/16-12/31	1.07		1.07
13M14	All	BKRD	9/16-12/31	1.33	1.33	1.33
13M15	All	BKRD		0.81	0.81	0.81
13M16	All	BKRD		0.54	0.54	0.54
13M17	All	BKRD		1.02	1.02	1.02
13M18 N	All	BKRD		0.65	0.65	0.65
13M18 S	All	BKRD			0.85	0.85
13M19	All	BKRD		1.19		
13M20	All	BKRD		0.22		
13M21 S	All	BKRD		0.60	0.60	0.60
13M21 N	All	BKRD		0.71		
13M21A	All	BKRD		0.22		
13M22	All	BKRD		1.12		
13M23	All	BKRD		0.60		
13M24	All	BKRD		0.64		

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
13M25*	All	BKRD	5/1-10/14	0.70		0.70
13M26	All	BKRD		0.59	0.59	0.59
13M27	All	BKRD		0.93		
13M28	All	BKRD		0.45	0.45	0.45
13M29	All	BKRD		2.24	2.24	2.24
13M30*	Motorcycle	BKRD		0.43		0.43
13M31	All	BKRD		2.33		2.33
13M31A	<50"	BKRD		1.56		1.56
13M32	All	BKRD				0.21
13M34	All	BKRD			0.54	0.54
13M36	All	BKRD			0.13	0.13
13M37	All	BKRD			0.57	0.57
13M38	All	BKRD			0.47	0.47
13M40	All	BKRD			1.02	1.02
13M41*	All	BKRD				0.82
13M42*	All	BKRD				0.08
14M01	All	BKRD		1.76	1.76	1.76
14M01A	All	BKRD		0.22		
14M01B	All	BKRD		0.17		
14M01C	All	BKRD		0.24		
14M02 W	All	BKRD		0.45	0.45	0.45
14M02 E	All	BKRD		0.81		
14M04	All	BKRD		0.70	0.70	0.70
14M05*	All	BKRD		0.72		0.72
14M06*	All	BKRD		0.37		0.37
14M07	All	BKRD		0.49		
14M08	All	BKRD		0.48		
14M09	All	BKRD		1.41		
14M10	All	BKRD		0.57	0.57	0.57
14M11 NW	All	BKRD		0.57		
14M11 NE	All	BKRD		0.57	0.37	0.37
14M11 S	All	BKRD		1.70	1.70	1.70
14M12	All	BKRD		1.52	1.52	1.52
14M16	All	BKRD			0.29	0.29
15M01	<50"	BKRD		1.46		
15M01A	<50"	BKRD		0.16		
15M02	All	BKRD		1.46		
15M02A	All	BKRD		0.09		
15M02B	All	BKRD		1.08		
15M03*	All	BKRD		0.29		0.29
15M04	All	BKRD		0.32		0.32
15M05	All	BKRD		2.18		2.18

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles
15M07	All	BKRD				0.76
15M08	All	BKRD			0.40	0.40
15M10	All	BKRD			0.34	0.34
16M01	All	BKRD		1.78		
16M03	All	BKRD		0.77	0.77	0.77
16M03A	All	BKRD		0.12		
16M03B	All	BKRD		0.27		
16M04*	All	BKRD		2.08		2.08
16M04A*	All	BKRD		0.54		0.54
17M01	<50"	BKRD		0.28	0.28	0.28
17M02	All	BKRD		0.66		
17M03	All	BKRD		0.51	0.51	0.51
17M04	All	BKRD		1.22		1.22
17M05*	All	BKRD		3.87		
17M06	All	BKRD		0.72		
17M06A	All	BKRD		0.69		
Sly Creek*	<50"	FRRD	5/1-10/14	36 Ac		
All				216.07	108.14	156.35
<50"				62.81	22.42	38.71
Motorcycle				82.46	9.65	39.04
Total Miles				361.34	140.21	234.10

* Trail would require mitigation as shown in Appendix A prior to being added to the MVUM and used by the public.

2.3.3.3 Alternative 3: Cross-Country Travel Prohibition Only—Make No Additions to the Current National Forest Transportation System

Alternative 3 responds to non-motorized recreation interest in "Citizen Inventoried Roadless Areas (CIRAs)" proposed by the Wilderness Society and natural resource impacts by prohibiting cross-country travel without adding any additional facilities to the NFTS. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS. None of the current unauthorized routes would be added to the NFTS.

1. **Cross-country Travel**: Motor vehicle travel off the designated NFTS roads, NFTS trails and areas by the public except as allowed by permit or other authorization would be prohibited.
2. **Changes to the existing National Forest Transportation System (NFTS)**: None.
3. **Roads, trails and areas added to the existing NFTS**: No roads, trails or areas would be added to the NFTS.

2.3.3.4 Alternative 4: Minimize Impacts to Natural Resources and "Citizen Inventoried Roadless Areas"

Alternative 4 responds to non-motorized recreation interest in "Citizen Inventoried Roadless Areas (CIRAs)" proposed by the Wilderness Society and natural resource impacts. This alternative adds no motorized routes to CIRAs. This alternative does not designate routes as trails where resource concerns require extensive trail mitigation.

1. **Cross-country Travel**: Motor vehicle travel off the designated NFTS roads, NFTS trails and areas by the public except as allowed by permit or other authorization would be prohibited.
2. **Changes to the existing National Forest Transportation System (NFTS)**: The table below (Table 2) lists a NFTS passenger car road (highway legal vehicles only) that is proposed for mixed use (combining highway legal and non-highway legal vehicles on the same road). *Note: The Draft EIS showed three roads with such vehicle class changes. Following further analysis, French Creek Road (23N28 – 3.2 miles) and Janesville-Frenchman Road (28N01 – 4 miles) were determined to be Maintenance Level 2(ML2) roads. Maintenance Level 2 roads are roughly graded to accommodate high clearance vehicles at slow speeds and both highway legal and non-highway legal vehicles are already allowed on ML2 roads. Therefore, there is no need to change vehicle class on roads 23N28 or 28N01.*
3. **Roads, trails and areas added to the existing NFTS**: Table 1 displays those trails to be added to the NFTS.

Table 2. Alternative 4 and 5—Proposed vehicle class changes.

Road Number	Road Name	Current Vehicle Class	Proposed Vehicle Class	Length (miles)
24N28	Slate Creek	Highway Legal Vehicles Only	All Vehicles	4.1
			Total	4.1

2.3.3.5 Alternative 5: Improved Access and Motorized Recreation Opportunities

Alternative 5 responds to the issue of access, motorized recreation opportunity, and natural resource protection. During scoping the Plumas National Forest received suggestions for additional routes and alternative routes that would better provide access and motorized recreation opportunity. This alternative includes 10 miles of trails proposed by the public that were not in the proposed action. Between the Draft and Final EIS, trails in California red-legged frog critical aquatic refuge areas were dropped from this alternative. The Sly Creek open area (located in the Pinkard critical aquatic refuge) was also dropped from this alternative.

1. **Cross-country Travel**: Motor vehicle travel off the designated NFTS roads, NFTS trails and areas by the public except as allowed by permit or other authorization would be prohibited.
2. **Changes to the existing National Forest Transportation System (NFTS):** Table 2 lists a NFTS passenger car road (highway legal vehicles only) that is proposed for mixed use (combining highway legal and non-highway legal vehicles on the same road).
3. **Roads, trails and areas added to the existing NFTS**: Table 1 displays those trails to be added to the NFTS. Trails with an asterisk (*) after the trail number would need mitigation completed prior to being added to the MVUM and used by the public (see Appendix A for more information).

2.4 Alternatives Considered, but Eliminated from Detailed Analysis

The following describes those alternatives that were considered but eliminated from detailed study and the rationale for their elimination. Several were suggested in comments on the Draft EIS.

2.4.1 Designate All Inventoried Routes as Motorized Trails

A total of 1,107 miles of unauthorized routes were inventoried and considered for inclusion in the NFTS. Some commenters requested that the Forest examine an alternative that would add all of these routes to the NFTS as motorized trails. This alternative was eliminated from detailed study for the following reasons. It included many short routes that would not benefit the trail system. It included routes that are inconsistent with the criteria in Subpart B of the Travel Management Rule. Some have multiple resource issues, which is inconsistent with Subpart B criteria to minimize damage to forest resources. Some originate on private land or lead to private land, which could cause conflicts with adjacent landowners.

In addition, this proposed alternative included routes that were not surveyed because the public did not show specific interest in them during public scoping and collaboration. From the 1,107 miles of inventoried routes, the interdisciplinary team initially suggested 220 miles of trails based on a review and rating of trail destination opportunities, travel experiences, resource values, and administrative needs and concerns. The Forest Service solicited public input for additional trail suggestions. The original proposed action included the 220 miles suggested by the Forest Service and 155 miles of additional routes proposed by the public. After public scoping, an additional 35 miles of routes were surveyed as possible trail additions. A total of 410 miles were surveyed for possible trail additions.

The extensive public involvement and collaboration process are discussed in Chapter 1.

2.4.2 Designate More Trails

Some commenters requested an alternative with more trails than the proposed action. This alternative was eliminated from detailed study because the proposed action and Alternative 5 were designed to meet public desires for motorized trails based on extensive public collaboration. The Responsible Official chose to focus alternative development based on public concerns about specific trails rather than developing alternatives based on arbitrary total trail mileages. Designing and analyzing an alternative that adds additional trails that did not generate specific public interest or where those additions have substantial adverse effects to resources would be costly and time consuming without compelling benefits to recreation. Such an alternative would also likely include trails that do not meet the criteria to minimize damage to resources.

The range of alternatives considered in detail includes hundreds of miles of trails. In addition, the Forest has an extensive existing road network totaling over 4,000 miles. In cases where specific trails that were not part of the proposed action were requested by the public, the interdisciplinary team considered them and surveyed an additional 35 miles of routes with high recreation benefits. As discussed above, a total of 410 miles of routes were surveyed and considered for possible trail additions. Alternative 5 includes 10 miles of trails that were not part of the proposed action.

2.4.3 Designate all Inventoried Routes and Do Decommissioning and Restoration Later

Some commenters suggested that all inventoried routes be designated and then, on a yearly basis, drop some trails with extensive resource damage from the system and do resource restoration.

This was eliminated from detailed study because adding trails to the NFTS that are known to have extensive adverse effects, only to analyze them again in future years and remove them from the system, is unnecessarily costly and inefficient. It would also be inconsistent with the criteria in Subpart B of the Travel Management Rule to minimize damage to forest resources.

The Forest has other programs in place that are used to complete resource restoration on unauthorized routes. The Herger Feinstein Quincy Library Group Forest Recovery Act (HFQLG) vegetation and watershed projects include analysis of routes to see where restoration is needed. Through these projects, most of the Forest will be analyzed by 2012. The Forest watershed program carries out restoration projects on a regular basis, including routes damaged from motorized recreation.

2.4.4 Designate All Unpaved Maintenance Level 3 and 4 Roads for Mixed Use

An alternative was proposed to designate all unpaved Maintenance Level 3 and 4 passenger car roads for mixed use. The Plumas National Forest does not have unpaved Maintenance Level 4 roads, but does have unpaved Maintenance Level 3 roads. This proposal would make these NFTS passenger car roads (highway legal vehicles only) available for mixed use (combining highway legal and non-highway legal vehicles on the same road).

The purpose and need for this project includes managing unregulated cross-country vehicle travel by implementing the Travel Management Rule Subpart B's prohibition on cross-country travel and designating a system of trails that will continue to provide motorized recreation opportunities and access to recreation for the public. Consideration of extensive changes to the existing NFTS, such as the mixed use designation proposed in this Alternative, is not part of the purpose and need for action.

Based on public interest, Alternatives 4 and 5 described above include a mixed use road.

2.4.5 Designate and Manage Areas for Dispersed Camping

During proposed action development, the Forest Service considered setting up a managed dispersed camping program that would include mapping, numbering, signing and formal management of popular dispersed campsites. Dispersed camping is generally allowed throughout the Forest, but there are some prohibited areas and other restrictions. Such camping can occur in a motor vehicle, adjacent to a vehicle, or some distance from it. It varies from camping in a self-contained recreation vehicle (RV) to backpacker tent camping.

This alternative to manage dispersed camping was eliminated from detailed study for a few reasons. Setting up a managed dispersed camping program is not needed to meet the purpose and need to prohibit cross-country motor vehicle travel and the criteria to minimize damage to forest resources. While campsites may have vehicle use in the form of parking, they are not travel routes receiving repeated vehicle use and damage. Forest visitors generally park RVs and other vehicles along roads for camping purposes, which is still allowed under all of the alternatives. The Interdisciplinary Team found that current ongoing management of individual dispersed campsites provides resource protection, and there was no immediate need to limit or regulate dispersed camping beyond the Travel Management Rule's prohibition on cross-country vehicle travel.

Regulating the dispersed campsites through a formal program would change the nature of the dispersed camping experience (make it more like a developed site) and increase the use of individual dispersed campsites. An alternative developing a formal program would not provide more dispersed camping access over the action alternatives. It would just provide formal management of a select group of dispersed campsites.

2.4.6 Designate More Motorized Play Areas

Some commenters requested an alternative with more motorized play areas in addition to the 36-acre Sly Creek open area included in Alternative 2. Specific areas requested are near Meadow Valley, Oakland Camp and Greenville. In general they are areas that have been heavily used by local riders who have been creating and using concentrated, intertwined trail networks. Designating these areas was eliminated from detailed study because they are located adjacent to private land or a permit area. (Oakland Camp is a family and youth camp under special use permit on National Forest System land.) Play area use often generates conflicts with adjacent landowners due to problems with vehicle noise, road congestion, littering, and trespassing. The development of the play areas was legal because the Forest was open to cross-country travel. However, they are not suitable areas to designate as permanent play areas because of the nuisance they would cause adjacent landowners and campers. This alternative would not meet the Travel Management Rule criteria to minimize conflicts between motor vehicles and existing recreational uses of National Forest lands in the case of Oakland Camp. It would also not meet the criteria for compatibility of motor vehicle use with existing conditions in populated areas in the cases of Greenville and Meadow Valley.

2.4.7 Allow Cross-Country Travel to Firewood Trees

Some commenters requested cross-country motorized access to firewood trees.

Motor vehicles have not been allowed to travel cross country during firewood gathering on the Plumas for over a decade. Personal use firewood permits on the Plumas specify that permit holders may only cut dead trees within 100 feet of the road and must follow the Forest Off-Highway Vehicle policy, which currently restricts vehicles to existing roads, trails and mapped routes. In previous years, permits required that people park next to the road. The standard practice is to carry wood to the vehicle by hand or in a handcart or wheelbarrow.

This alternative was eliminated from detailed study for the following reasons. It does not meet the purpose and need for the Travel Management project. Because the Forest has an extensive road system, 100-foot buffers on each side of a road would add a huge area where motorized use and potential resource damage would occur, which is inconsistent with the need to regulate motorized use. The extent of the analysis required for this additional area is beyond the capability of the Forest, considering timeframes, cost and personnel.

2.4.8 Provide a Balanced Recreation Experience for all Vehicle Types

An alternative was requested that would provide a balanced recreation experience for all vehicle types. Creating a system of motorized trails with similar miles of trail for all vehicle types (motorcycles, ATVs, 4x4s) and experience levels (novice to expert) with the existing unauthorized routes is not possible. For example, most of the existing unauthorized routes are old temporary roads and do not meet objectives for expert motorcycle trails. This alternative was eliminated from detailed study because it would require design and construction of new trails. New trail construction is not part of this Travel Management project. The Travel Management Rule does include provisions for revising the system of trails in the future (36 CFR 212.54). None of the alternatives preclude future trail projects that would further enhance the balance of Forest trail opportunities.

2.4.9 Seasonal Closure Based on Rainfall

Some commenters requested an alternative that bases seasonal closures on rainfall, rather than dates. The Forest explored using rainfall or ground condition to trigger motorized trail closure in conjunction with established dates for a more flexible allowed season of use, which would be responsive to ground conditions and potential resource damage. However, short-term closure orders are limited to emergencies, not ongoing management needs, and Motorized Vehicle Use Maps (MVUMs) are required to use set dates to facilitate enforcement of closures; therefore developing a rainfall-based wet weather closure plan was eliminated from detailed study.

2.4.10 Designate Fewer Trails Based on Water and Soil

One commenter requested an alternative be considered that does not include the Sly Creek open area, routes in Critical Aquatic Refuges, serpentine soils or watersheds at high risk of cumulative effects or that exceed 4 miles of road per square mile. The commenter was concerned about the existing adverse effects in these areas.

This alternative was eliminated from detailed study because the existing adverse effects to resources would be mitigated in the Sly Creek area and on many specific proposed trails before being open to the public under the action alternatives (Appendix A). This would minimize damage to resources to a degree that the action alternatives would be an improvement compared to the current condition.

Alternative 4 is designed to reduce resource impacts based on the site-specific condition of individual trails. Alternative 3 does not add any trails, which responds to concerns about these areas.

2.4.11 Reduce Road Density Based on Comprehensive Travel Analysis and Seasonal Wet Weather Closures of Roads

Commenters requested an alternative that conducts comprehensive travel analysis and reduces NFTS road density and an alternative that adds seasonal wet weather closures to NFTS roads. These alternatives are outside of the scope of the project because they primarily point to Subpart A of the Travel Management Rule. This project was designed to implement Subpart B of the Travel Management Rule, which states,

> *"The Responsible Official may incorporate previous administrative decisions regarding travel management made under other authorities, including designations and prohibitions of motor vehicle use, in designating National Forest System roads, National Forest System trails, and areas on National Forest System lands for motor vehicle use under this subpart (36 CFR: § 212.50 (b))."*

The Responsible Official has determined that existing NFTS roads and trails would not to be considered for repair, reconstruction, decommissioning, or seasonal use restrictions, as part of this proposal. Repair and maintenance of the existing NFTS are routine, ongoing activities on National Forests, and are typically categorically excluded from documentation in an environmental assessment or environmental impact statement in accordance with agency policy in Forest Service Handbook 1909.15, Chapter 30, Section 31.12 (4): "Repair and Maintenance of Roads Trails and Landline Boundaries." Further, re-evaluation of previous decisions that established the existing NFTS is not necessary for implementing Subpart B of the Travel Management Rule. However, past, present, and future environmental impacts of the existing NFTS are incorporated into cumulative-effects analyses for the Proposed Action and alternatives.

This action is not addressing the creation of a travel management plan, but rather deals specifically with Subpart B of the Travel Management Rule, which provides direction for a system of NFTS roads, trails, and areas designated for motor vehicle use, and the prohibition of motor vehicle use off designated roads and trails and outside designated areas. Subpart B is intended to prevent resource damage caused by unmanaged motor vehicle travel by the public. Therefore, comprehensive changes to the existing NFTS are beyond the scope of this analysis.

2.5 Comparison of Alternatives

Chapter 3 describes the environmental consequences of the alternatives in detail. This section of Chapter 2 compares the alternatives by summarizing key differences between the alternatives and their effects (Table 3 and Table 4).

Table 3. Summary Comparison of Alternatives

Item		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Cross-country Travel		Continues	Prohibited	Prohibited	Prohibited	Prohibited
Changes to Vehicle Class from Highway Legal Only to Mixed Use (Both Highway-Legal and Non-Highway Legal Allowed)		0 miles	0 miles	0 miles	4.1 miles	4.1miles
Motorized Trails & Areas Added To National Forest System	**Trails Added Open to All Vehicles**	0 miles	216.07 miles	0 miles	108.14 miles	156.35 miles
	Trails Added Open to OHV Use Vehicles 50" or Less	0 miles	62.81 miles	0 miles	22.42 miles	38.71 miles
	Trails Added Open to Motorcycles	0 miles	82.46 miles	0 miles	9.65 miles	39.04 miles
	Total	0 miles	361.34 miles	0 miles	140.21 miles	234.10 miles
	Areas Added Open to OHV Use Vehicles 50" or Less	None	Sly Creek area 36 acres	None	None	None

Table 4. Summary comparison of alternatives by environmental effects.

Resource Area:	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Aquatic Biota	1	2	5	4	3
Botanical Resources	1	2	5	4	3
Cultural Resources	1	2	5	4	3
Noxious Weeds	1	2	5	4	3
Motorized Recreation	5	4	1	2	3
Quiet Recreation	1	2	5	4	3
Visual Resources	1	2	5	4	3
Transportation Facilities	1	2	5	4	3
Water and Soil Resource	1	2	5	4	3
Terrestrial Biota	1	2	5	4	3

[1]A rank of 5 indicates the alternative has the least impact for the specified resource; a rank of 1 indicates the alternative has the most impact for specified resource. See Chapter 3 for more details.

Chapter 3 Affected Environment and Environmental Consequences

3.1 Introduction

This chapter summarizes the physical, biological, social, and economic environments that are affected by the proposed action and alternatives ("Affected Environment") and the effects on that environment that would result from implementation of any of the alternatives ("Environmental Consequences"). This chapter also presents the scientific and analytical basis for comparison of the alternatives presented in "Chapter 2: Alternatives". The environmental consequences discussion centers on direct, indirect, and cumulative effects, along with applicable mitigation measures. These terms are defined as follows:

- **Direct effects** are caused by the action and occur at the same place and time as the action.
- **Indirect effects** are caused by the action and are later in time, or further removed in distance, but are still reasonably foreseeable.
- **Cumulative effects** are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

Specialist reports are incorporated by reference into this analysis.

3.1.1 Analysis Process

The environmental consequences presented in this chapter address the impacts of the actions proposed under each alternative for the Plumas National Forest. This effects analysis was done at the site specific and Forest scales (the scale of the proposed action as discussed in Chapter 1). Each affected road, trail and area proposed in the alternatives has been reviewed by resource specialists. These findings are summarized in Appendix A. Readers seeking information concerning the environmental effects associated with a specific road, trail or area are directed to Appendix A, where details concerning mitigation measures, maintenance, and resource effects are documented.

For ease of documentation and understanding, the effects of the alternatives are described separately for three discrete actions and then combined to provide the total direct and indirect effects of each alternative. The combination of these discrete actions is then added to the past, present and reasonably foreseeable actions in the cumulative effects analysis. The three discrete actions common to all action alternatives are:

1. Prohibition of cross-country motorized vehicle travel. The direct and indirect effects of this action are described generally in each alternative, considering both current conditions and projected trends. Both short (1 year) and long-term (approximately 20 years) effects are presented.
2. Addition of new facilities (roads, trails, and/or open areas) to the NFTS. As described above, the impacts of new facilities are addressed in sum total in this chapter while impacts of individual routes or areas are addressed in Appendix A. For most resources, one or more

resource indicators are used to measure the direct and indirect effects of each alternative. Both short (1 year) and long-term (approximately 20 years) impacts are presented.

3. Changes to vehicle class and season of use on the existing NFTS. Impacts caused by changes to vehicle class and season of use on the existing NFTS are described generally by alternative. For some impacts (for example public safety), impacts are also addressed by route.

3.1.2 Cumulative Effects

According to the Council of Environmental Quality (CEQ) NEPA regulations, the definition of "cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions (40 CFR 1508.7).

The cumulative effects analysis area is described under each resource, but in most cases includes the entire Plumas National Forest including private and other public lands that lie within the Forest boundary. Past activities are considered part of the existing condition and are discussed in the "Affected Environment (Existing Conditions)" and "Environmental Consequences" section under each resource.

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 cannot reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human action risks does not take into account the important residual effects of past natural events, which may contribute to cumulative effects just as much as human action. 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. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. 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." Past actions are treated similarly in the recently published Forest Service Regulations for implementing the National Environmental Policy Act (36 CFR 220). For these reasons, the analysis of past actions in this section is based on current environmental conditions.

Appendix C lists present and reasonably foreseeable future actions potentially contributing to cumulative effects. While the appendix lists all actions, every resource is not affected by every action. For example, a future project may affect wildlife but not affect water quality.

3.1.3 Affected Environment Overview

There are many aspects of the affected environment that are shared by all resources. In order to avoid repeating these shared elements of the affected environment in each resource section the following general elements of the affected environment are provided.

Unmanaged OHV use has resulted in unplanned roads and trails, erosion, watershed and habitat degradation, and impacts to cultural resource sites. On some Plumas National Forest System (NFS) lands, long managed as open to cross-country motor vehicle travel, repeated use has resulted in unplanned, unauthorized roads and trails. These routes generally developed without environmental analysis or public involvement, and do not have the same status as National Forest Transportation System (NFTS) roads and NFTS trails included in the Forest transportation system.

In December 2007, a temporary Forest Order was implemented that prohibited travel off of existing routes shown on the Forest Order exhibit map. The order was established as a temporary measure to protect resources and help prevent additional user-created routes from being established while the PNF undertook implementation of the Travel Management Rule and the production of their Motor Vehicle Use Map (MVUM).

3.1.4 Appendix A

Appendix A lists each route proposed for addition to the NFTS and identifies the alternative(s) under which the route is proposed, the type of vehicle(s) allowed, and the season when the route would be open. In addition, Appendix A identifies any resource concerns and necessary maintenance and mitigation measures.

3.1.5 Law Enforcement Assumptions Common to Effects Analyses

- Enforcement of the laws and regulations related to Travel Management will be enforced equally in authority and weight as with all other Federal laws and regulations (see Appendix I for more information).
- As with any change in a regulation on NFS lands, there is usually a transition period for the public to understand the changes. It is anticipated there will be a higher number of violations to the Travel Management Rule the first few years and the number of violations will decline as the users understand and comply with the rules.

- Once the Motor Vehicle Use Map is published, the implementation of the established dedicated network of roads, trails, and areas with signs and user education programs, will reduce the number of motor vehicles traveling off designated routes.
- Providing motorized recreation opportunities in popular, key areas will help relieve pressure to travel off designated routes.

3.1.6 Analysis Framework: Statute, Regulation, Forest Plan and Other Direction

The National Environmental Policy Act at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft EIS concurrently with and integrated with …other environmental review laws and executive orders." Each resource section includes a list of applicable laws, regulations, policies and Executive Orders that are relevant to that resource. Surveys, analyses, and findings required by those laws are addressed in those sections.

3.1.6.1 National Forest Management Act

The Forest Service is complying with the provisions of this law by designing the project to meet Forest Plan Standards and Guidelines. Appendix B contains a list of the Forest Plan Standards and Guidelines that apply to this project.

3.1.6.2 2005 Travel Management Rule 36 CFR 212

This project is designed to comply with the provisions of this law by developing a travel management plan that ends cross-country travel and associated route proliferation.

3.1.6.3 Wilderness Act of 1964

The actions proposed are in compliance with Wilderness Designations and the Wilderness Act of 1964. Motorized activity continues to be prohibited in wilderness under all the alternatives per the Wilderness Act of 1964.

3.2 Recreation Resources

Between the Draft and Final Environmental Impact Statements, National Visitor Use Monitoring data was expanded to summarize motorized recreation. Mileage was updated to reflect increased proposed trail mileage for Alternatives 4 and decreased mileage for Alternative 5. A section on Citizen Inventoried Roadless Areas was added to explain the impact to these areas. A section on Wild and Scenic Rivers was added to show how direction is met by the alternatives.

3.2.1 Introduction

Nearly all forest visitors, regardless of the purpose for their visit, use the motorized transportation system to reach their destination. Making changes to the NFTS (e.g. adding facilities, prohibiting or allowing motor vehicle use by vehicle type or season of use) changes the diversity of motorized and non-motorized opportunities on the forest. These visitors may be participating in motorized recreation, or utilizing motor vehicles to access trailheads, facilities, destinations, or geographic areas that are utilized for non-motorized recreational activities. This section of the Travel Management FEIS examines the extent to which the diversity of recreation opportunities are affected by the proposed action and alternatives and the extent to which alternatives are consistent with direction established in the Plumas National Forest Land and Resource Management Plan (LRMP), the Sierra Nevada Forest Plan Amendment (SNFPA) the Travel Management (TM) Rule.

3.2.2 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant to the alternatives as they affect recreation resources includes:

National Forest Management Act (NFMA) of 1976. The NFMA sets forth requirements for development of Forest Plans. The Plumas National Forest Land and Resource Management Plan includes standards and guidelines for management of recreation including use of Off Highway Vehicles (see below).

Sierra Nevada Forest Plan Amendment (SNFPA) 2004. The 2004 SNFPA established the direction to restrict motor vehicle travel to designated routes, trails, and limited off-highway vehicle (OHV) use areas. Unless otherwise restricted by current Forest Plans or other specific area Standards and Guidelines, cross-country travel by over-snow vehicles would continue.

Travel Management Rule. The Travel Management Rule requires that in designating NFS roads, trails, and areas, responsible officials consider the provision of recreational opportunities; public access needs; conflicts among uses of NFS lands, including other recreational uses; and the compatibility of motor vehicle use with existing conditions in populated areas.

Plumas National Forest Land and Resource Management Plan. The Forest Plan provides goals for the recreation resource and requires a broad range of developed and dispersed recreation opportunities in balance with existing and future demand. The Forest Plan goals for Recreation that are relevant to this analysis are: 1) Provide for a variety of forest-related recreation, and coordinate recreation with other resource use through the Recreation Opportunity Spectrum system; 2) Improve and expand developed facilities and trails to meet demand while reducing unit costs and protecting other resources; 3) Minimize conflicts between various recreational users; 4) Manage selected unroaded areas to provide for semi-primitive opportunities; and 5) Allow use of off-road vehicles wherever user conflicts or unacceptable resource damage are unlikely; and 6) Provide separate Off-Road Vehicle (ORV) routes wherever conflicting uses are substantial. In addition, the Forest Plan and Sierra Nevada Forest Plan Amendment (SNFPA) established Standards and Guidelines for use of the Recreation Opportunity Spectrum; Trails, including the Pacific Crest Trail (PCT); and ORV use (see Appendix B for a complete list of the SNFPA and Forest Plan Standard and Guidelines that apply to this project).

The Recreation Opportunity Spectrum (ROS) is the basic inventory that was used to create recreation-opportunity "zoning" in the Forest Plan. The ROS inventory provides for a spectrum of recreation opportunity classes from "Urban" to "Primitive." There is a distinction between motorized and non-motorized classes (or "zones"). Motorized use falls in the motorized ROS classes (Urban, Rural, Roaded-Modified, and Roaded-Natural). Non-motorized classes include Semi-Primitive Non-Motorized (SPNM) and Primitive Non-Motorized (PNM).

Description: These are the ROS classes on the Plumas National Forest.

Table 5. ROS acres in each class for all alternatives

Recreation Opportunity Spectrum Class	Acres	% of Total
Primitive	23,148	2%
Semi-Primitive Non-Motorized	91,723	8%
Roaded Natural	161,330	13%
Roaded Modified	894,983	74%
Rural	31,831	3%
Total	1,203,015	100%

As noted above, NFMA requires that "off-road vehicle" opportunities be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of NFS lands. For the purposes of travel management actions, the terms land and other resources include wilderness areas and the PCT, and the term "off-road vehicles" is applied to public motor vehicle use (highway legal and non-highway legal).

3.2.3 Effects Analysis Methodology

3.2.3.1 Assumptions Specific to Recreation Resources Analysis

1. Unless otherwise proposed as a Forest Plan amendment, the prohibition of motorized cross-country travel is not a change to ROS. It is simply a prohibition within that ROS "zone" to travel off of designated routes. The ability to add or remove routes in the future is still guided by NFMA largely through local Forest Plan ROS and is not affected by the action of prohibiting motorized cross-country travel and limiting travel to designated routes throughout the Forest.

2. Proposed additions to the NFTS would have a beneficial effect on the motor-vehicle experience by providing a variety of riding experiences (variety of easy-to-difficult riding experiences) and contributing to the continuity of the motor-touring experience, including access to dispersed recreation activities (both motorized and non-motorized).
3. The Plumas National Forest's Visitor Use Monitoring (NVUM) report accurately represents the most popular motorized and non-motorized recreation activities for analysis.
4. Overall changes in the NFTS may result in corresponding changes in the net Semi Primitive Non Motorized ROS class acres available on the Forest and would require a plan amendment.
5. A discussion of unacceptable resource damage is found in other resource sections.
6. Visual-resource effects on the PCT will be covered in the Visual Resources section of this analysis.

3.2.3.2 Data Sources

1. Plumas National Forest Plan for distribution of ROS classes.
2. Forest's NVUM.

3.2.3.3 Recreation Resources Methodology by Action

The indicators address how alternatives respond to the Forest Plan and the Travel Management Rule: whether the motorized recreation opportunity conflicts with other recreation opportunities, specifically non-motorized opportunities; the proximity of motor vehicle use to populated areas or neighboring federal lands; the quality of the motorized recreation experience; and the quality of motorized access to dispersed areas.

For analyzing the effects of changes to the NFTS by vehicle class and season of use as well as the addition of unauthorized routes to the NFTS as roads or trails, indicator measures were used. Mileage available for each vehicle type is useful in analyzing the ability of Forest users to not only travel around the Forest and enjoy motorized recreation opportunities but also to access non-motorized recreation opportunities, such as trailheads, hunting, and dispersed recreation sites for activities such as fishing and camping, which the forest has determined are important based on both NVUM data and public scoping for this project. Mileage for motorized recreation is an indicator of the number and types of experiences available for motorcycles, ATVs, and 4WDs in each alternative. The changes to motorized mileages can be used to interpret the level of change in opportunities for motorized and non-motorized users. The details of the proposed seasonal closure relate to both the months that motorized recreation will not be allowed to use designated roads, trails or areas and, conversely, the time of year that conflicts between motorized and non-motorized uses will be minimized. Also, the effect on non-motorized recreation activities that are accessed by native surface roads is considered. Number of acres located ½ mile away from roads, trails and boundaries are used to analyze the opportunity for non-motorized and 'quiet' recreation on the Forest. Finally, to determine the amount of dispersed recreation access provided under each alternative, the number of sites accessible by road or trail was determined for each alternative.

3.2.3.3.1 Measurement Indicator 1: Non-motorized recreation opportunity

Description: This measurement indicator looks at the impact of proposed changes to the NFTS on non-motorized recreation (dust, noise, use conflicts). It also addresses the "quiet recreation" issue.
Method: Number of acres outside a ½ mile buffer where motorized use is allowed (designated roads, trails and areas in the NFTS miles that would result under each alternative). Areas where motorized use is allowed (proposed or designated roads, trails and areas) were buffered by a distance of ½ mile. Areas outside of this buffer would be considered available for quiet recreation and non-motorized activities without the potential for use conflicts with motor vehicles.
Short-term timeframe: 1 year.
Long-term timeframe: 20 year.
Spatial boundary: Plumas National Forest

Table 6. Acreage outside ½ mile of routes proposed for public use under each alternative as a measurement indicator of acreage affected by motorized use where quiet recreation and non-motorized activities without the potential for use conflicts with motor vehicles.

Acreage and % of Total Forest Acreage	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
	Acreage	%	Acreage	%	Acreage	%	Acreage	%
All motorized routes traveling through the Forest [b]	212,452	17.7	234,463	19.5	228,710	19.0	220,290	18.3

[b]. Analysis of "All motorized routes traveling through the Forest" for the alternatives included the proposed trail and area additions and existing NFTS forest roads and trails.

3.2.3.3.2 Measurement Indicator 2: Motorized recreation opportunity

Description: This measurement indicator looks at the impact of proposed changes to the NFTS to motorized recreation opportunities by alternative.

Method:

Roads: Number of miles available by vehicle class.

Trails: Number of miles available by vehicle class.

Areas: Number of acres in open areas by vehicle class.

Short-term timeframe: 1 year.
Long-term timeframe: 20 year.
Spatial boundary: Plumas National Forest

Visitors should expect that the potential recreation experience may differ greatly among the alternatives, which contain routes ranging from high standard surfaced roads already designated for public highway-licensed motor vehicle use to roughly graded native surface roads and trails.

Table 7 displays the mileage by vehicle type for each alternative. As the table illustrates, all the action alternatives decrease the acreage open to cross country motor vehicle travel compared to Alternative 1. This would result in adverse impacts to off-highway motorized recreationists as cross-country travel, including use of any unauthorized routes, is prohibited in all action alternatives.

Alternative 1 provides the greatest opportunity for motor vehicle recreation because the Forest would remain open to cross-country travel including use of approximately 1,107 miles of various unauthorized routes. Alternatives 2, 5 and 4 provide the highest mileage of NFTS roads and motorized trails in that order. The alternative with the lowest mileage of NFTS roads and motorized trails is Alternative 3.

Table 8 displays the total mileage available for each vehicle type by alternative. Unlicensed vehicles (ATVs and some motorcycles) cannot use passenger car roads unless the roads are designated for mixed use. Alternatives 4 and 5 include 4.1 miles of mixed use on one important ATV connector route (Table 9). All-Terrain Vehicles are not allowed on motorcycle trails and vehicles greater than 50" in width are not allowed on ATV and motorcycle trails. Table 9 displays the one open area proposed in Alternative 2.

Table 7. Mileage by vehicle type for each action alternative.[1]

Vehicle Type	Alt. 2	Alt. 3	Alt. 4	Alt. 5
	Mileage	Mileage	Mileage	Mileage
Passenger Car Only	631	631	627	627
Mixed Use	3,487	3,487	3,491	3491
4WD Trails	325	109	217	265
ATV Trails	70	7	29	46
Motorcycle Trails	96	14	24	53
Total Miles	**4,609**	**4,248**	**4,388**	**4,482**

[1]Under Alternative 1 (No-action) approximately 999,521 acres remain open to cross-country motor vehicle travel. This includes approximately 1,107 miles of unauthorized routes used by OHVs (4WD, ATV, Motorcycle).

Table 8. Total mileage available for each vehicle type for each action alternative.[1]

Vehicle Type	Alt. 2	Alt. 3	Alt. 4	Alt. 5
	Mileage	Mileage	Mileage	Mileage
Total Miles	4,609	4,248	4,388	4,482
Passenger Car	4,118	4,118	4,118	4,118
4WD	4,443	4,227	4,335	4,383
ATV - Unlicensed	3,882	3,603	3,738	3,802
Motorcycle - Unlicensed	3,978	3,617	3,761	3,855
Motorcycle - Licensed	4,609	4,248	4,388	4,482

[1]Under Alternative 1 (No-action) approximately 999,521 acres remain open to cross-country motor vehicle travel

Table 9. Total Mileage Proposed for Mixed Use and Acreage of Open Areas

Vehicle Type	Season of Use	Mileage Proposed for Mixed Use				
		1	2	3	4	5
All Vehicles	Year-round	0	0	0	4.10	4.10

Vehicle Type	Season of Use	Open Area Acreage Proposed to be Added to NFTS				
		1	2	3	4	5
Vehicles 50" or less in width	Year-round	0	36	0	0	0

3.2.3.3.3 Measurement Indicator 3: Type of motorized access to dispersed recreation

Description: This measurement indicator looks at the impact of proposed changes to the NFTS to motorized access to dispersed recreation opportunities by alternative.

Method: The Plumas NF has identified proposed trail additions which provide access to dispersed camping sites in each alternative. In some instances multiples sites may be accessed by these proposed route additions. The number of dispersed camping sites shown in the table below represents the minimum number of dispersed camping sites potentially accessed in each alternative. Visitors selecting dispersed recreation areas, rather than developed areas, report they viewed highly developed areas as overcrowded, noisy, expensive, and too developed. These visitors preferred the characteristics of roaded, dispersed areas, including the lack of development, fees, regimentation, control, and greater privacy and the freedom to engage in activities that may conflict with others in developed locations, such as OHV use, bringing along a noisy dog, and occupying the site in a manner that meets their needs. In addition, dispersed recreation areas provide large groups better opportunity to camp in close proximity to each other, and away from others, than do most developed group campgrounds.

The action alternatives have the potential to reduce motorized access to dispersed recreation across the Forest, resulting in reduced access to dispersed recreation by motor vehicles (Table 10). Decreased direct motor vehicle access to dispersed use areas would directly impact recreationists with campers and trailers, limiting their choices in parking locations to the designated system. Motor vehicle access to dispersed camping is reduced in all action alternatives (Table 10).

Short-term timeframe: 1 year.

Long-term timeframe: 20 year.

Spatial boundary: Plumas National Forest

Table 10. Inventoried dispersed camp sites accessible by proposed motorized trail or system motorized trail of system road.

Alternative[1]	Sites accessible by proposed motorized trail or System Road	Percentage of inventoried dispersed recreation sites accessible by motor vehicle.
2	110	92%
3	89	75%
4	101	85%
5	110	92%

[1]Approximately 119 inventoried dispersed recreation sites can be accessed via system road or motorized cross-country travel.

The action alternatives result in a relative decrease in the number of dispersed recreation camp sites accessible by motorized route from 8 to 25%, compared to Alternative 1. Alternatives 2 and 5 pose the least impact to dispersed camping access followed by Alternative 4. The greatest impact to dispersed camping access is Alternative 3. Under Alternative 1, access to dispersed camping sites would continue. The number of dispersed camp sites on the Forest is difficult to determine. Currently, there are about 159 inventoried dispersed camping sites, which require some level of active management on the Forest. Of these sites, 40 dispersed camping sites are off state or county roads, 89 off existing roads, while the remaining 30 are accessed from motorized trails or unauthorized routes. With continued cross-country travel under Alternative 1, more dispersed camping sites may develop in the short and long terms. Some of the inventoried dispersed camping sites are located next to the existing NFTS and access to these sites would not be affected by the proposed alternatives.

3.2.3.3.4 Measurement Indicator 4: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Description: This measurement indicator looks at the impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts) by alternative. Proximity to populated areas and compatibility of motor vehicle use were criteria considered by the interdisciplinary team during project design. Public involvement was used to determine where adjacent landowners wanted motorized trails and where they did not want them. For example this decision does not include trails adjacent to East Quincy where there have been noise and private land trespass problems. This decision does include some trails near Greenville where neighbors supported them and the trails are accessible without going through private land.

Method: Number of miles of new routes proposed within ½ mile of populated areas, neighboring federal land boundaries, wilderness boundaries, and private land boundaries.

Short-term timeframe: 1 year.

Long-term timeframe: 20 year.

Spatial boundary: Plumas National Forest

Table 11. Number of miles of routes proposed for addition to the NFTS under each alternative within ½ mile of neighboring private and federal lands.

	Proposed Mileage to be Added to NFTS			
	2	3	4	5
Route Additions	165	0	74	120
Percent Change	7.6%	0%	3.4%	5.5%

Total Mileage by Alternative includes 2,197 miles of existing NFTS roads and motorized trails within ½ mile of neighboring private and federal lands and wilderness.

3.2.4 Affected Environment

The Plumas National Forest currently hosts a wide range of motorized and non-motorized recreation experiences that occur year round. Motorized recreation involves the use of highway-licensed cars, sedans, sport utility vehicles (SUVs), dual-sport motorcycles, off-highway vehicles (OHVs), motorcycles, all terrain vehicles (ATVs), four-wheel drives (4WDs), and snowmobiles, including highly customized and specialized machines able to travel extreme terrain. Non-motorized recreational activities, include hiking, camping, mountain bike riding, horseback riding, wildlife viewing, picnicking, rock climbing, hunting, fishing, recreational shooting, cross-country skiing, snowshoeing, snow camping and snow play. These opportunities are roughly depicted in the Recreation Opportunity Spectrum (ROS) mapping completed at the time the Forest Plan was developed.

3.2.4.1 Recreation Visitor Use

Visitor use estimates for the Forest were generated based on the National Visitor Use Monitoring (NVUM) survey that was conducted from October 2004 through September 2005. The survey was designed to assess existing recreation demand on the Forest by asking visitors what they did during their visit, and visitors could check multiple activities. This resulted in two categories of visitor use, activities participated in and main activity and it highlighted the fact that the two may or may not be related. For example, over 75% of Forest visitors reported participating in the viewing of natural features but less than 7% reported that as their main activity. On the other hand, 34% reported participating in fishing and 28% reported that as their main activity (Table 12).

Table 12. Plumas National Forest visits by participation and primary activity

Activity	Participating (%)	Main Activity (%)
Relaxing	77.2	11.3
Viewing Natural Features	75.1	7.3
Viewing Wildlife	60.6	1.1
Hiking/Walking	45.7	14.1
Fishing	34.1	27.5
Motorized Water Activities	32.9	11.1
Driving for Pleasure	26.9	3.2
Other Non-motorized	15.3	3.4
Developed Camping	11.4	1.5
Snowmobiling	9.8	9.0
Visiting Historic Sites	9.8	0.3
Some Other Activity	8.7	5.2
Picnicking	8.7	1.5
Nature Study	7.2	0.1
Gathering Forest Products	5.7	2.9
Non-motorized Water	4.1	1.1
Primitive Camping	2.7	0.1
Skiing	2.4	1.7
OHV Use	1.6	0.3
Backpacking	1.3	0.7
Bicycling	1.3	0.4
Resort Use	1.0	0.1
Hunting	0.9	0.5
Horseback Riding	0.3	0.1

The EIS NVUM data measures only the number of visits in which OHV use was the principal activity. This number does not include visits in which OHV use was secondary to some other type of recreational activity (e.g. hunting, camping, fishing, hiking, etc.) The NVUM data only applies to OHV use for recreational purposes. Users of OHVs for commercial purposes (e.g. mining, maintenance of permitted infrastructure, collecting firewood, etc.) or transportation purposes (e.g. driving into town from a private inholding) would not be counted in the NVUM data. The NVUM data measures the number of visits, which is distinct and separate from the number of activity days. Consequently, a person who goes on a week-long vacation using their OHV would be counted as only one visit according to NVUM data; but the forest may measure seven total visitor days for this visit.

While access to all types of recreation is recognized as the most common motor vehicle use, it was reported that an estimated 27% of visits involved driving for pleasure, while 1.6 % of visits involved OHV use. OHV use as the primary activity was estimated for only 0.3% of visits. Conversely, an estimated 46% of visits involved hiking/walking in the Forest with 14% of visits reporting hiking/walking as the primary activity.

Based on the reported 667,600 public visits to the Plumas National Forest (PNF) during fiscal year 2005, this would mean that 179,600 visits involved driving for pleasure, 10,700 visits involved the use of OHVs and the main activity for 2,000 visits to the PNF was OHV use. Additionally, 305,100 visits involved hiking or walking and the main activity for 94,100 visits to the PNF. When motorized uses are combined, including OHV use, and driving for pleasure, the approximated number of visits is 190,300 or 28.5% and the main activity is 23,350 or 3.5%. When non-motorized uses are combined, including backpacking, fishing, hiking/walking, horseback riding, bicycling, and other non-motorized activities the approximated number of visits is 308,450 visits, or 46% for the main activity. Nearly all users of the Plumas National Forest rely on a vehicle to access their recreational activity.

3.2.5 Environmental Consequences

This section discloses the environmental effects of each of the alternatives on recreation on the Forest. This analysis is focused on the effects of three management actions: (1) the prohibition of cross-country travel, (2) additions of currently unauthorized routes to the national forest transportation system (NFTS), and (3) changes to the existing NFTS. Nearly all forest visitors, regardless of the purpose for their visit, use the motorized transportation system to reach their destination. Changes to traditionally accepted forest practices, such as cross-country motorized travel, alters the diversity of motorized and non-motorized opportunities on the Forest. Visitors seeking a quiet, non-motorized experience often utilize motor vehicles to access trailheads, facilities, destinations, or geographic areas for non-motorized recreational activities.

The recreation analysis used a series of measurement indicators to measure change from existing conditions for each of the alternatives considered in the FEIS. Indicators were developed to respond to the significant issues identified by the public during scoping. The indicators were not used to establish desired conditions or legal standards for recreational uses (e.g., “quiet recreation”, “conflicts between users”, and “conflicts with private property”) on the Plumas National Forest. Nor were the indicators used to identify routes in close proximity to private property. Instead, the indicators were used to determine how each alternative responds to the significant issues and to identify the potential for conflict with other recreation opportunities. They are intended to provide both context (e.g., how much change) and intensity (e.g., how close the alternative will come to responding to the issue) for the changes brought about by the alternatives.

3.2.5.1 Direct and Indirect Effects for all Alternatives

3.2.5.2 Alternative 1

The No-action Alternative provides a baseline for comparing the other alternatives. This alternative maintains the status quo and provides maximum access and motorized recreation opportunity. Under the No-action Alternative, current management plans would continue to guide management of the project area. No changes would be made to the current NFTS and no cross-country travel prohibition would be put into place. The Step 2 order, restricting cross-country travel, would expire. The Travel Management Rule would not be implemented, and no Motor Vehicle Use Map (MVUM) would be produced. Motor vehicle travel by the public would not be limited to designated routes. The agency would take no affirmative action on any unauthorized routes.

- Does Not Prohibit Cross-country Motorized Travel
- Adds No New NFTS Facilities

3.2.5.2.1 Direct/indirect effects of the prohibition of cross-country motor vehicle travel.

Under this alternative, cross-country motor vehicle travel would continue. Motorized recreation would not be reduced. Alternative 1 includes the most motorized travel opportunity of all alternatives with 999,521 acres open to motorized use including approximately 1,107 miles of unauthorized routes. With no change to the managed use of existing NFS roads and trails, this alternative would result in the least impact to motorized recreation. Since Alternative 1 represents the existing condition, few adverse impacts are incurred by motorized recreationists. The unauthorized routes, however, vary greatly in condition and the quality of recreational experience. In some areas, visitors may have difficulty making sense of, and navigating, the dense web of unauthorized routes. This alternative does not represent a cohesively designed or well-managed recreation system. The existing 4 acre Four Corners open area would continue to be available for use.

Indicator(s): (1) Non-motorized recreation opportunity, (2) motorized recreation opportunity, (3) impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

3.2.5.2.2 Direct/Indirect Effects of adding facilities to the NFTS, including identifying seasons of use and vehicle class.

Continued cross-country travel would have a negative effect in both short and long term context for non-motorized opportunities due to continued noise, dust, physical presence, possible use conflicts and displacement. Under this alternative the proposed route additions would decrease quiet recreation on the Forest by 5.5 percent with 14.0 percent of the Forest available for quiet recreation and 4.0 percent of the Forest (14% minus 10% Primitive and Semi-Primitive acreage) could be affected in the future with continued expansion of cross-country travel and proliferation of unauthorized routes. When compared to the other action alternatives, Alternative 1 would have the greatest impact on the Forest's "quiet" recreation opportunities. Alternative 1 has 999,521 acres open to motorized cross country travel (including approximately 580 miles of unauthorized routes) within ½ mile of neighboring private and federal lands and wilderness areas, potentially having noise, dust, and physical presence impacts on neighboring private and federal lands and wilderness areas. When compared to the action alternatives, Alternative 1 has the greatest impacts on neighboring private and federal lands and wilderness areas.

Designated motor vehicle routes would not be defined and published on a motor vehicle use map (MVUM). As a result, a higher frequency of user conflicts between non-motorized and motorized recreation users would continue in the short and long terms under Alternative 1.

Alternative 1 provides motorized access to 119 dispersed recreation sites; more than all the action alternatives. This alternative represents the least adverse impact to dispersed recreationists seeking motorized access.

Indicator(s): (1) non-motorized recreation opportunity, (2) motorized recreation opportunity, (3) type of motorized access to dispersed recreation, (4) Impact of proposed changes to the NFTS on neighboring private and Federal lands.

3.2.5.2.3 Direct/indirect effects of changes to the existing NFTS.

Changes to the NFTS that add vehicle classes to the NFTS by providing more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities while changes in class that restrict motor vehicle on the NFTS would negatively affect motorized recreation diversity. No season of use restrictions are proposed to the existing NFTS under this alternative.

Alternative 1 does not provide mixed use. . Alternative 1 provides less mixed use motorized recreation opportunity when compared to Alternatives 4 and 5.

Indicator(s): (1) Motorized recreation opportunity.

3.2.5.3 Alternative 2

The Proposed Action is the proposed changes to the NFTS and the prohibition of cross-country travel as described in the NOI published January 3, 2008 (Volume 73, Number 2): 1. The prohibition of cross-country motor vehicle travel off designated NFTS roads, motorized trails and areas by the public except as allowed by permit or other authorization (excluding snowmobile use). 2. The addition of approximately 361 miles of existing unauthorized routes to the current NFTS trails for public motor vehicle use, and 3. The addition of one 36-acre open area, where use of motor vehicles by the public would be allowed anywhere within that specifically delineated area is also proposed.

- Prohibits Cross-country Motorized Travel
- Adds: 361 Miles of NFTS Motorized Trails
- Adds: One Specifically Delineated 36-Acre Open Area to Motor Vehicles

3.2.5.3.1 Direct/indirect effects of the prohibition of cross-country motor vehicle travel.

Under this alternative, cross-country motor vehicle travel would be prohibited. The prohibition of motor vehicle use off the NFTS and proposed open areas would have a beneficial effect on non-motorized recreation activities throughout the Forest, in populated areas, and neighboring federal lands in the short and long terms. Prohibiting cross-country motorized travel would also curtail on-going effects from motor vehicles such as noise, dust and physical presence in the short and long terms.

Prohibiting cross-country motor vehicle travel in Alternative 2 would result in a net loss of acreage available for motorized recreation. Although motorized recreation would be reduced, this alternative proposes the 36 acre Sly Creek open area for cross-country motor vehicle travel, with a season of use from 5/1 to 10/15, in addition to the existing 4 acre Four Corners open area. Area perimeters would be defined with either signs or fencing. A parking area would be established and a kiosk installed posting rules, regulations, Tread Lightly information, and area map. The Sly Creek Use Area would require mitigation before it can be used. That mitigation would include improved access and watershed restoration. This open area was used for material to construct the Sly Creek dam. The adjacent campground would benefit by improvements to the site.

The loss of available open acreage is somewhat offset, however, by the proposed addition of motorized routes to the NFTS. Although motorized recreation opportunities on open acreage would be greatly reduced, other motorized recreation opportunities would be available.

Indicator(s): (1) Non-motorized recreation opportunity, (2) motorized recreation opportunity, (3) impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

3.2.5.3.2 Direct/Indirect Effects of adding facilities to the NFTS, including identifying seasons of use and vehicle class.

Adding presently unauthorized roads and trails may have a negative effect in both short and long term context for non-motorized opportunities due to an increase in noise, dust, physical presence, possible use conflicts and displacement. Under this alternative the proposed route additions would decrease quiet recreation on the Forest by 1.8 percent with 17.7 percent of the Forest available for quiet recreation. When compared to the other action alternatives, the proposed route additions under Alternative 2 would have greater impact on the Forest’s “quiet” recreation opportunities than Alternatives 3-5. Alternative 2 proposes 165 miles of road and trail route additions within ½ mile of neighboring private and federal lands and wilderness areas, potentially having noise, dust, and physical presence impacts on neighboring private and federal lands and wilderness areas. When compared to the other action alternatives, Alternative 2 has more impacts on neighboring private and federal lands and wilderness areas than Alternatives 3-5. The season of use restrictions on proposed trail additions may have a negative effect in the short and long terms to motorized opportunities and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure.

Motorized, non-motorized, and mixed-use roads, trails, and areas would be administratively defined and published on a motor vehicle use map (MVUM). Recreationists would be able to better plan recreational pursuits based on an individual’s unique expectations. As a result, the frequency of user conflicts between non-motorized and motorized recreation users would likely decrease in the short and long terms.

Adding presently unauthorized roads and trails would have a beneficial effect on motorized opportunities. The proposed trail additions in Alternative 2 contribute to a variety of experiences with easy-to-difficult riding experiences for all trail class vehicles. The proposed route additions also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities.

Alternative 2 proposes trail additions to the NFTS (361.3 miles), presenting a beneficial effect on motorized recreation opportunities for a diversity of vehicle classes. This alternative proposes year-round motorized opportunities on 249.9 miles of trails for motorcycles, ATVs and 4WDs. An additional 111.4 miles of trail would be open to all vehicle classes seasonally. Alternative 2 includes the French Creek, Flea and Granite Basin and Four Trees motorcycle single track and ATV riding trails. These three trail systems provide exceptional riding experiences for all levels of motorcycle riders. They are sponsored by very active groups who are committed to maintaining and improving the riding conditions of these trails. In the rest of the Forest, proposed designated trails would provide access to many outstanding points of interest with groups committed to maintaining these trails.

This alternative proposes additional motorized opportunities on 361 miles of trails for motorcycles, ATVs and 4WDs. Dual sport highway-legal motorcycles and nonhighway-legal motorcycles would have the most opportunities on proposed trails in this alternative with all proposed trail additions open to these vehicle classes. About 82 miles of trail would be for motorcycle single-track. About 63 miles of trail would be for ATVs, while 216 miles of trail would be for highway-legal high-clearance and nonhighway-legal vehicles.

Alternative 2 provides motorized access to 110 dispersed camping sites; more than all the other action alternatives. This alternative represents the least adverse impact to dispersed recreationists seeking motorized access.

Indicator(s): (1) non-motorized recreation opportunity, (2) motorized recreation opportunity, (3) type of motorized access to dispersed recreation, (4) Impact of proposed changes to the NFTS on neighboring private and Federal lands.

3.2.5.3.3 Direct/indirect effects of changes to the existing NFTS.

Changes to the NFTS that add vehicle classes to the NFTS by providing more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities. Changes in class that restrict motor vehicle on the NFTS would negatively affect motorized recreation diversity. No season of use restrictions are proposed to the existing NFTS under this alternative.

Alternative 2 does not provide mixed use. The NFTS of maintenance level 3-5 roads would only be available for highway-legal vehicle classes. The prohibition of mixed use which restricts nonhighway-legal motor vehicles on the NFTS would negatively affect motorized recreation diversity. Of particular concern for motorized recreationists, two campgrounds on Slate Creek Road, between Quincy and Meadow Valley, which have established use for OHV related family camping, would no longer be accessible for nonhighway-legal motor vehicles. Alternative 2 provides less motorized recreation opportunity through proposed mixed use changes when compared to Alternatives 4 and 5.

Indicator(s): (1) Motorized recreation opportunity.

3.2.5.4 Alternative 3

Alternative 3 meets the objective of prohibiting cross-country travel, but proposes no new additions to the existing system of roads and trails. It responds to the issues of proposed citizen inventoried roadless areas (CIRAs) and natural resource impacts by prohibiting cross-country travel without adding any additional facilities to the NFTS. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS.

- Prohibits Cross-country Motorized Travel
- Adds No New NFTS Facilities

3.2.5.4.1 Direct/indirect effects of the prohibition of cross-country motor vehicle travel.

Under this alternative, cross-country motor vehicle travel would be prohibited. The prohibition of motor vehicle use off the NFTS and proposed open areas would have a beneficial effect on non-motorized recreation activities throughout the Forest, in populated areas, and neighboring federal lands in the short and long terms. Prohibiting cross-country motorized travel would also curtail on-going effects from motor vehicles such as noise, dust and physical presence in the short and long terms.

Prohibiting cross-country motor vehicle travel in Alternative 3 would result in a net loss of acreage available for motorized recreation. The existing 4 acre Four Corners open area would continue to be available for use.

Indicator(s): (1) Non-motorized recreation opportunity, (2) motorized recreation opportunity, (3) impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

3.2.5.4.2 Direct/Indirect Effects of adding facilities to the NFTS, including identifying seasons of use and vehicle class.

By adding no presently unauthorized trails, a positive effect would occur in both short and long term context for non-motorized opportunities due to a reduction in noise, dust, physical presence, possible use conflicts and displacement. Under this alternative 19.5 percent of the Forest would be available for quiet recreation. When compared to the other action alternatives, Alternative 3 would have least impact on the Forest's "quiet" recreation opportunities. Alternative 3 proposes 0 miles of road and trail route additions within ½ mile of neighboring private and federal lands and wilderness areas, potentially reducing noise, dust, and physical presence impacts on neighboring private and federal lands and wilderness areas. When compared to the other action alternatives, Alternative 3 has the least impacts on neighboring private and federal lands and wilderness areas.

Motorized, non-motorized, and mixed-use roads, trails, and areas would be administratively defined and published on a motor vehicle use map (MVUM). Recreationists would be able to better plan recreational pursuits based on an individual's unique expectations. As a result, the frequency of user conflicts between non-motorized and motorized recreation users would likely decrease in the short and long terms.

By adding no presently unauthorized trails, Alternative 3 would have a negative effect on motorized opportunities. The lack of proposed trail additions in Alternative 3 would not help contribute to a variety of experiences with easy-to-difficult riding experiences for all trail class vehicles.

Single track motorcyclists are particularly impacted. The existing road and trail system on the Plumas NF was developed without any programmatic consideration for the single track experience. Existing system single-track consists of 14 miles of isolated trail segments. These segments do not provide any single track trail network opportunities to allow for loop travel or day-length experiences. Such opportunities are of great importance to motorcycle riders and are evident by user created single track trail systems which tend to concentrate in focused forest locations, rather than be dispersed through general forest. User created trails in Granite Basin typifies very focused network development.

The lack of proposed route additions would not improve motor-touring opportunities and would limit access to a diversity of dispersed recreation activities, now considered to be traditional OHV destinations. These include vistas and unique cultural, geologic and vegetative features that have locally established lore for OHV recreationists. Some popular dispersed campsites are among these destinations.

Alternative 3 provides motorized access to 89 dispersed camping sites; the least of all action alternatives. This alternative represents the greatest impact to dispersed recreationists seeking motorized access.

Indicator(s): (1) non-motorized recreation opportunity, (2) motorized recreation opportunity, (3) type of motorized access to dispersed recreation, (4) Impact of proposed changes to the NFTS on neighboring private and Federal lands.

3.2.5.4.3 Direct/indirect effects of changes to the existing NFTS.

Changes to the NFTS that add vehicle classes to the NFTS by providing more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities. Changes in class that restrict motor vehicle on the NFTS would negatively affect motorized recreation diversity. No season of use restrictions are proposed to the existing NFTS under this alternative.

Alternative 3 does not provide mixed use. The NFTS of maintenance level 3-5 roads would only be available for highway-legal vehicle classes. The prohibition of mixed use which restricts nonhighway-legal motor vehicles on the NFTS would negatively affect motorized recreation diversity. Of particular concern for motorized recreationists, two campgrounds on Slate Creek Road, between Quincy and Meadow Valley, which have established use for OHV related family camping, would no longer be accessible for nonhighway-legal motor vehicles. Alternative 3 provides less motorized recreation opportunity through proposed mixed use changes when compared to alternatives 4 and 5.

Indicator(s): (1) Motorized recreation opportunity.

3.2.5.5 Alternative 4

Alternative 4 emphasizes natural resource protection and avoidance of CIRAs. This alternative prohibits cross-country travel, adds no motorized routes to CIRAs, California red legged frog critical aquatic areas and does not add routes where resource concerns require extensive trail mitigation.

- Prohibits Cross-country Motorized Travel
- Adds: 140 Miles of NFTS Motorized Trails
- Changes Vehicle Class on 4.1 Miles of NFTS Roads

3.2.5.5.1 Direct/indirect effects of the prohibition of cross-country motor vehicle travel.

Under this alternative, cross-country motor vehicle travel would be prohibited. The prohibition of motor vehicle use off the NFTS and proposed open areas would have a beneficial effect on non-motorized recreation activities throughout the Forest, in populated areas, and neighboring federal lands in the short and long terms. Prohibiting cross-country motorized travel would also curtail on-going effects from motor vehicles such as noise, dust and physical presence in the short and long terms.

Prohibiting cross-country motor vehicle travel in Alternative 4 would result in a net loss of acreage available for motorized recreation. . The existing 4 acre Four Corners open area would continue to be available for use.

Indicator(s): (1) Non-motorized recreation opportunity, (2) motorized recreation opportunity, (3) impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

3.2.5.5.2 Direct/Indirect Effects of adding facilities to the NFTS, including identifying seasons of use and vehicle class.

Adding presently unauthorized roads and trails may have a negative effect in both short and long term context for non-motorized opportunities due to an increase in noise, dust, physical presence, possible use conflicts and displacement. Under this alternative the proposed route additions would decrease quiet recreation on the Forest by 0.5 percent with 19.0 percent of the Forest available for quiet recreation. When compared to the other action alternatives, the proposed route additions under Alternative 4 would have lesser impact on the Forest's "quiet" recreation opportunities than alternatives 1, 2 and 5 and slightly more impact on the Forest's "quiet" recreation opportunities than Alternative 3. Alternative 4 proposes 74 miles of road and trail route additions within ½ mile of neighboring private and federal lands and wilderness areas, potentially having noise, dust, and physical presence impacts on neighboring private and federal lands and wilderness areas. When compared to the other action alternatives, Alternative 4 has fewer impacts on neighboring private and federal lands and wilderness areas than Alternatives 1, 2 and 5. The season of use restrictions on proposed trail additions may have a negative effect in the short and long terms to motorized opportunities and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure.

Motorized, non-motorized, and mixed-use roads, trails, and areas would be administratively defined and published on a motor vehicle use map (MVUM). Recreationists would be able to better plan recreational pursuits based on an individual's unique expectations. As a result, the frequency of user conflicts between non-motorized and motorized recreation users would likely decrease in the short and long terms.

Adding presently unauthorized roads and trails would have a beneficial effect on motorized opportunities. The proposed trail additions in Alternative 4 contribute to a variety of experiences with easy-to-difficult riding experiences for all trail class vehicles. The proposed route additions also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities.

Alternative 4 includes the Granite Basin motorcycle single track and ATV areas, but excludes the French Creek area due to California red legged frog concerns and most of the Flea area due to watershed concerns. All proposed trails in Citizen Inventoried Roadless Areas (CIRAs) have been dropped from this alternative to reduce impacts to these areas. In the rest of the Forest, proposed trails would provide access to many outstanding points of interest with groups committed to maintaining these trails.

Alternative 4 proposes trail additions to the NFTS (140.2 miles), presenting a beneficial effect on motorized recreation opportunities for a diversity of vehicle classes. This alternative proposes year around motorized opportunities on 124.6 miles of trails for motorcycles, ATV's and 4WDs. An additional 15.6 miles of trail would be open to all vehicle classes seasonally. Dual sport highway-legal motorcycles and nonhighway-legal motorcycles would have the most opportunities on proposed trails in this alternative with all proposed trail additions open to these vehicle classes. About 9.7 miles of proposed trail would be for motorcycle single-track. About 22.4 miles of proposed trail would be for ATVs, while 108.1 miles of proposed trail would be for highway-legal high-clearance and nonhighway-legal vehicles.

Alternative 4 provides motorized access to 101 dispersed camping sites; the second least. This alternative represents the second greatest impact to dispersed recreationists seeking motorized access.

Indicator(s): (1) non-motorized recreation opportunity, (2) motorized recreation opportunity, (3) type of motorized access to dispersed recreation, (4) Impact of proposed changes to the NFTS on neighboring private and Federal lands.

3.2.5.5.3 Direct/indirect effects of changes to the existing NFTS.

Changes to the NFTS that add vehicle classes to the NFTS by providing more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities. Changes in class that restrict motor vehicle on the NFTS would negatively affect motorized recreation diversity. No season of use restrictions are proposed to the existing NFTS under this alternative.

Alternative 4 proposes mixed use on about 4.1 miles of NFTS roads. Mixed use on NFTS roads would benefit motorized recreation by increasing the diversity of motorized opportunities. Alternative 4 provides less motorized recreation opportunity through proposed route additions and proposed mixed use changes when compared to Alternative 2 and 5, but it provides more motorized recreation on existing NFTS roads through mixed use when compared to Alternatives 2 and 3. Alternative 4 would be beneficial for motorized recreation opportunities, albeit less than Alternative 5.

Indicator(s): (1) Motorized recreation opportunity.

3.2.5.6 Alternative 5

Alternative 5 emphasizes both access and motorized recreation opportunities and natural resource protection. This alternative prohibits cross-country travel and incorporates suggestions for additional and alternative routes received during scoping. This includes trails identified during scoping as necessary to access dispersed campsites and recreational use and destination points of interest. Trails with extreme resource problems are not included. Maintenance on trails with resource concerns would occur thereby allowing trails with resource concerns to be included. Trails with extensive or critical trail mitigations would be added to the NFTS, but not placed on the MVUM as open to the public until the mitigation has been completed.

- Prohibits Cross-country Motorized Travel
- Adds: 234 Miles of NFTS Motorized Trails
- Changes Vehicle Class on 4.1 Miles of NFTS Roads

3.2.5.6.1 Direct/indirect effects of the prohibition of cross-country motor vehicle travel.

Under this alternative, cross-country motor vehicle travel would be prohibited. The prohibition of motor vehicle use off the NFTS and proposed open areas would have a beneficial effect on non-motorized recreation activities throughout the Forest, in populated areas, and neighboring federal lands in the short and long terms. Prohibiting cross-country motorized travel would also curtail on-going effects from motor vehicles such as noise, dust and physical presence in the short and long terms. Prohibiting cross-country motor vehicle travel in Alternative 5 would result in a net loss of acreage available for motorized recreation.

Indicator(s): (1) Non-motorized recreation opportunity, (2) motorized recreation opportunity, (3) impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

3.2.5.6.2 Direct/Indirect Effects of adding facilities to the NFTS, including identifying seasons of use and vehicle class.

Alternative 5 includes the second highest motorized trail mileage (364 miles) of the alternatives that add trails to the NFTS. This alternative has the second highest mileage of motorcycle-only trail (53 miles) of the alternatives that add motorized trails. Adding presently unauthorized roads and trails may have a negative effect in both short and long term context for non-motorized opportunities due to an increase in noise, dust, physical presence, possible use conflicts and displacement. Under this alternative the proposed route additions would decrease quiet recreation on the Forest by 1.2 percent with 18.3 percent of the Forest available for quiet recreation. When compared to the other action alternatives, the proposed route additions under Alternative 5 would have greater impact on the Forest's "quiet" recreation opportunities than Alternatives 3 and 4 and less impact on the Forest's "quiet" recreation opportunities than Alternative 2. Alternative 5 proposes 120 miles of road and trail route additions within ½ mile of neighboring private and federal lands and wilderness areas, potentially having noise, dust, and physical presence impacts on neighboring private and federal lands and wilderness areas. When compared to the other action alternatives, Alternative 5 has more impacts on neighboring private and federal lands and wilderness areas than Alternatives 3 and 4. The season of use restrictions on proposed trail additions may have a negative effect in the short and long terms to motorized opportunities and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure.

Motorized, non-motorized, and mixed-use roads, trails, and areas would be administratively defined and published on a motor vehicle use map (MVUM). Recreationists would be able to better plan recreational pursuits based on an individual's unique expectations. As a result, the frequency of user conflicts between non-motorized and motorized recreation users would likely decrease in the short and long terms.

Adding presently unauthorized trails would have a beneficial effect on motorized opportunities. The proposed trail additions in Alternative 5 contribute to a variety of experiences with easy-to-difficult riding experiences for all trail class vehicles. The proposed route additions also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities.

Alternative 5 includes the Granite Basin and Four Trees motorcycle single track and ATV areas, but excludes most of the French Creek area due to California red legged frog concerns and most of the Flea area due to watershed concerns. Alternative 5 includes the Granite Basin motorcycle single track and ATV area, establishing trail networks to meet demand for a specific, quality recreation experience that is not met by riding on wider four-wheel vehicle trails and roads. This area provides exceptional riding experiences for all levels of motorcycle riders, adding diversity to motorized recreational opportunities on the Plumas. The area is sponsored by very active groups that are committed to maintaining and improving the riding conditions of these trails. In the rest of the Forest, proposed designated trails will provide access to many outstanding points of interest with groups committed to maintaining these trails. Without these trails, the Plumas National Forest would not be able to offer a single track experience, which is highly sought after by many of our recreating public.

Alternative 5 proposes trail additions to the NFTS (234.1 miles), presenting a beneficial effect on motorized recreation opportunities for a diversity of vehicle classes. This alternative proposes year-round motorized opportunities on 178.8 miles of trails for motorcycles, ATV's and 4WDs. An additional 55.3 miles of trail would be open to all vehicle classes seasonally. Dual sport highway-legal motorcycles and nonhighway-legal motorcycles would have the most opportunities on proposed trails in this alternative with all proposed trail additions open to these vehicle classes. About 39 miles of proposed trail would be for motorcycle single-track. About 39 miles of proposed trail would be for ATVs, while 156 miles of proposed trail would be for highway-legal high-clearance and nonhighway-legal vehicles.

Alternative 5 provides motorized access to 110 dispersed camping sites; the same as Alternative 2. This alternative represents the nearly identical impact to dispersed recreationists seeking motorized access as Alternative 2 due to trails added to the alternative specifically to access dispersed sites even though it has fewer proposed trails than Alternative 2. Alternative 5 accesses fewer dispersed sites than Alternative 1.

Indicator(s): (1) non-motorized recreation opportunity, (2) motorized recreation opportunity, (3) type of motorized access to dispersed recreation, (4) Impact of proposed changes to the NFTS on neighboring private and Federal lands.

3.2.5.6.3 Direct/indirect effects of changes to the existing NFTS.

Changes to the NFTS that add vehicle classes to the NFTS by providing more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities. Changes in class that restrict motor vehicle on the NFTS would negatively affect motorized recreation diversity. No season of use restrictions are proposed to the existing NFTS under this alternative.

Alternative 5 proposes mixed use on about 4.1 miles of NFTS roads. Mixed use on NFTS roads would benefit motorized recreation by increasing the diversity of motorized opportunities. The prohibition of mixed use which restricts nonhighway-legal motor vehicles on the NFTS would negatively affect motorized recreation diversity. Alternative 5 provides less motorized recreation opportunity through proposed route additions when compared to Alternative 2, but it provides more motorized recreation on existing NFTS roads through mixed use when compared to Alternatives 2 and 3. Alternative 5 would have beneficial impacts for motorized recreation opportunities, albeit less than Alternative 2.

Indicator(s): (1) Motorized recreation opportunity.

3.2.6 Cumulative Effects

The cumulative effects analysis for recreation considers the impact of the alternatives when combined with the following past, present, and foreseeable future actions and events: routes both NFTS and unauthorized, any projects with road actions with decisions that have not been implemented on the ground, any projects with road actions with decisions that are not yet in INFRA, any projects with road actions in projects listed on the Schedule of Proposed Actions (that do not yet have decisions). Road actions are considered as new construction, reconstruction, decommissioning, or opening old roads, not road maintenance or use. These actions were selected because they have caused or have the potential to cause changes in recreation opportunities, public access, or the creation of routes on the ground. The spatial boundary (forest wide) of the cumulative effects analysis was selected because impacts to the recreation system in one area of the Forest can affect the continuity of the system and public access opportunities in other parts of the Forest. The temporal scope is 20 years and was selected because impacts to recreation and public access can continue over time. Furthermore, the identification of unclassified motorized routes during the route inventory captured the network of routes which have shaped the current recreation settings and opportunities.

Measurement indicators 1, 2, 3, and 4 were used in the cumulative effects analysis. Measurement indicator 1 looks at the impact of proposed changes to the NFTS on non-motorized recreation (dust, noise, use conflicts). It also addresses the “quiet” recreation issue. Quiet recreation is defined by measurement indicator 1 as the acres outside ½ mile of an area where motorized use is allowed. For cumulative effects analysis, quiet recreation acreage for the No Action Alternative was determined using the existing NFTS, other State, County, or private roads traveling through the Forest, and the currently identified unclassified OHV routes. Quiet recreation acreage for the action alternatives was determined using the existing NFTS roads and any proposed route and area additions.

Measurement indicator 2 looks at the impact of proposed changes to the NFTS to motorized recreation opportunities by alternative by analyzing roads, motorized trails, and areas added to the NFTS. The total motorized mileage in an alternative includes proposed route additions mileage and motorized NFTS mileage, considered to be operational maintenance levels 2-5.

Measurement indicator 3 looks at the impact of proposed changes to the NFTS to motorized access to dispersed recreation opportunities by alternative by analyzing number of dispersed sites accessed as a result of the additions identified in Measurement indicator 3.

Measurement indicator 4 looks at the impact of proposed changes to the NFTS on neighboring private and federal lands by alternative by analyzing the number of miles that occur within ½ mile of neighboring lands. For Alternative 1, routes considered were open roads on the existing NFTS and any proposed route and area additions.

3.2.6.1 Alternative 1

Unrestricted cross-country motorized travel under this alternative has the potential to create resource issues in the future and a proliferation of user created routes single track routes that are not properly located. This alternative has the greatest potential to negatively alter non-motorized recreation settings as it is difficult to predict where future cross-country motorized use would occur. Dust, noise, and motor vehicle presence may impact non-motorized recreationists seeking a “quiet” recreation experience. Cumulatively under this alternative, 84.7 percent of the Plumas NF would be affected by motorized use and would not be available for “quiet” recreation, the greatest amount of all the alternatives. This alternative also has the greatest impact on neighboring private and federal lands and wilderness areas, as determined using measurement indicator 5, with about 580 miles of unauthorized motorized routes occurring within ½ mile of neighboring private and federal lands, the highest amount of disturbance when compared to the other alternatives. This alternative has the highest potential cumulative impact on non-motorized recreation opportunities and neighboring federal and private lands and wilderness areas.

With no proposed additions or changes to the use of existing NFTS roads or trails and no prohibition of cross-country motorized travel, this alternative results in the least impact to motorized recreation opportunities. Since no net change would be made from the current management situation, no cumulative effects to motorized recreation would result.

3.2.6.2 Alternative 2

This alternative has the potential to negatively alter non-motorized recreation settings when considering the proposed route additions, the existing NFTS, and other roads traveling through the Forest. Dust, noise, and motor vehicle presence may impact non-motorized recreationists seeking a “quiet” recreation experience. Cumulatively under this alternative, 80.3 percent of the Plumas NF would be affected by motorized use and would not be available for “quiet” recreation, less than the No Action Alternative, but most among the action alternatives. This alternative, combined with the past, present and reasonably foreseeable future actions, also has the potential to impact neighboring private and federal lands and wilderness areas. About 165 miles of proposed route additions occur within ½ mile of neighboring private and federal lands and wilderness areas. The proposed route additions provide for a 7.6 percent increase from the current condition of open NFTS roads occurring within ½ mile of neighboring private and federal lands and wilderness areas. This alternative has the highest potential cumulative impact on non-motorized recreation opportunities among the action alternatives, but less of an impact than the No Action Alternative or the current condition.

This alternative would have beneficial cumulative effects to motorized recreation. Proposed route additions contribute to a variety of riding experiences as well as the continuity of the motor-touring opportunities. The route additions also provide loops, connectors, and access to a diversity of dispersed recreation activities which can benefit both motorized and non-motorized recreation opportunities by providing access to trailheads, dispersed campsites etc. Proposed road additions and open NFTS roads would provide about 4,609 miles of motorized recreation opportunity, more than the other action alternatives and the current condition.

3.2.6.3 Alternative 3

This alternative improves the non-motorized recreation settings. Dust, noise, and motor vehicle presence would be reduced for non-motorized recreationists seeking a “quiet” recreation experience. Cumulatively under this alternative, 80.5 percent of the Plumas NF would be affected by motorized use and would not be available for “quiet” recreation, the least of all the alternatives. Only the existing NFTS and other State, County, or private roads traveling through the Forest were considered for Alternative 3. This alternative, combined with the past, present and reasonably foreseeable future actions, also has the potential to impact neighboring private and federal lands. Since there are no proposed route additions less potential cumulative impact on neighboring federal and private lands than Alternatives 1, 2, 4, and 5. This alternative has the most beneficial cumulative impact to non-motorized recreation opportunities.

The open NFTS roads would provide about 4,248 miles of motorized recreation opportunity, less than all the alternatives. This alternative has the most potential cumulative impact on motorized users by providing fewer motorized recreation opportunities than the current condition. All cross-country travel would be prohibited, and no route additions, area additions, or mixed use would be proposed.

3.2.6.4 Alternative 4

This alternative has the potential to negatively alter non-motorized recreation settings when considering the proposed route additions, the existing NFTS, and other roads traveling through the Forest. Dust, noise, and motor vehicle presence may impact non-motorized recreationists seeking a “quiet” recreation experience. Cumulatively under this alternative, 81.0 percent of the Plumas NF would be affected by motorized use and would not be available for “quiet” recreation, and the second least of all the alternatives. Although Alternative 4 proposes route additions, these route additions are in close enough proximity to the existing NFTS that cumulatively their effect on “quiet” recreation is the only slight higher than Alternative 3. This alternative, combined with the past, present and reasonably foreseeable future actions, also has the potential to impact neighboring private and federal lands. About 74 miles of proposed route additions occur within ½ mile of neighboring private and federal lands, providing the second least potential cumulative impact on neighboring federal and private lands. The proposed route additions provide for a 3.4 percent increase from the current condition of open NFTS roads occurring within ½ mile of neighboring private and federal lands and wilderness areas. This alternative and Alternative 3, when compared to the other action alternatives and the current condition, have the most beneficial cumulative impact to non-motorized recreation opportunities.

This alternative would have beneficial cumulative effects to motorized recreation. Proposed route additions contribute to a variety of riding experiences as well as the continuity of the motor-touring opportunities. The route additions also provide loops, connectors, access to a diversity of dispersed recreation activities, which can benefit both motorized and non-motorized recreation opportunities by providing access to trailheads, dispersed campsites etc. Proposed road additions and open NFTS roads would provide about 4,388 miles of motorized recreation opportunity, more than alternative 3 but less than Alternatives 1, 2, 5, and 6. Proposed mixed use, which adds vehicle classes to the NFTS, would benefit motorized recreation by increasing the diversity of motorized opportunities.

3.2.6.5 Alternative 5

This alternative has the potential to negatively alter non-motorized recreation settings when considering the proposed route additions, the existing NFTS, and other roads traveling through the Forest. Dust, noise, and motor vehicle presence may impact non-motorized recreationists seeking a “quiet” recreation experience. Cumulatively under this alternative, 81.7 percent of the Plumas NF would be affected by motorized use and would not be available for “quiet” recreation. This alternative, combined with the past, present and reasonably foreseeable future actions, also has the potential to impact neighboring private and federal lands and wilderness areas. About 120 miles of proposed route additions occur within ½ mile of neighboring private and federal lands and wilderness areas. The proposed route additions provide for a 5 percent increase from the current condition of open NFTS roads occurring within ½ mile of neighboring private and federal lands and wilderness areas. This alternative has more beneficial cumulative impact to non-motorized recreation opportunities than current condition and Alternative 2.

This alternative would have beneficial cumulative effects to motorized recreation. Proposed route additions contribute to a variety of riding experiences as well as the continuity of the motor-touring opportunities. The route additions also provide loops, connectors, access to a diversity of dispersed recreation activities, which can benefit both motorized and non-motorized recreation opportunities by providing access to trailheads, dispersed campsites etc. Proposed road additions and open NFTS roads would provide about 4,482 miles of motorized recreation opportunity, more than Alternatives 3 and 4, but less than Alternative 1 and 2. Proposed mixed use, which adds vehicle classes to the NFTS, would benefit motorized recreation by increasing the diversity of motorized opportunities.

3.2.7 Inventoried Roadless Areas

The project does not propose any motorized trails or areas in Forest Service Inventoried Roadless Areas. The project does not propose any motorized trails or areas in semi-primitive and primitive non-motorized land allocations. Inventoried Roadless Areas on the Plumas National Forest are allocated as semi-primitive non-motorized areas in the Forest Plan so these areas were avoided to be consistent with the Forest Plan.

3.2.8 Citizens Inventoried Roadless Areas

In 2001, the California Wilderness Coalition (CWC) completed its own inventory of potential wilderness areas on California public lands. For the purpose of this analysis, these areas will be referred to as citizen-inventoried roadless areas (CIRAs). The CWC inventory identified 229,579 acres of land on the PNF as potential wilderness areas, approximately 25% of which is within agency-identified Inventoried Roadless Areas (IRAs). 171,738 acres of the CWC-inventoried areas are outside of IRAs.

Because they include a number of long-standing developed recreation sites and the roads used to access those sites, many of the CIRAs provide a very different experience than found in adjacent IRAs. There are currently 53.5 miles of NFS roads and motorized trails and 35.0 miles of unauthorized routes in CIRAs (Table 13 and Table 14). Existing route density within CIRAs is 0.20 miles per square mile, which is lower than the general forest area where route density averages 0.59 miles per square mile. In comparison, route density within IRAs is 0.04 miles per square mile.

Management direction for IRAs is provided by the 1988 LRMP, as amended. No trails in IRAs were proposed in any of the five alternatives.

Table 13. NFTS Routes in Citizen Inventoried Roadless Areas by Alternative

Motorized trail additions in CIRAs.	Alternative 1 (miles)	Alternative 2 (miles)	Alternative 3 (miles)	Alternative 4 (miles)	Alternative 5 (miles)
Motorcycle Trails	0	20.00	0.00	0.00	14.25
Trail Vehicles <50”	0	6.77	0.00	0.00	3.21
All Vehicle Types	0	0.40	0.00	0.00	0.40
Subtotal miles	**0**	**27.17**	**0.00**	**0.00**	**17.87**
Existing NFTS roads and trails in CIRAs	**Alternative 1 (miles)**	**Alternative 2 (miles)**	**Alternative 3 (miles)**	**Alternative 4 (miles)**	**Alternative 5 (miles)**
Roads open to all vehicles	41.29	41.29	41.29	41.29	41.29
Motorcycle Trails	0	0.00	0.00	0.00	0.00
Trail Vehicles <50”	0	0.00	0.00	0.00	0.00
All Trail Vehicle Types	14.81	14.81	14.81	14.81	14.81
Subtotal NFTS roads and motorized trails	56.10	56.10	56.10	56.10	56.10
NFTS miles in CIRAs	**56.10**	**83.27**	**56.10**	**56.10**	**73.97**

Table 14. Unauthorized and NFTS Routes in Citizen Inventoried Roadless Areas by Alternative and CIRA area.

CIRA Name	Miles of Existing Roads, Existing Trails, and Proposed Trails Within CIRAs														
	Alternative 1			Alternative 2			Alternative 3			Alternative 4			Alternative 5		
	Roads (Exist)	Trails (Exist)	Prop. Trails	Roads (Exist)	Trails (Exist	Prop. Trails	Roads (Exist)	Trails (Exist	Prop. Trails	Roads (Exist)s	Trails (Exist	Prop. Trails	Roads (Exist)	Trails (Exist	Prop. Trails
Adams Peak	0.38	0	0	0.38	0	0.005	0.38	0	0	0.38	0	0	0.38	0	0.005
Bucks Lake	3.96	0	0	3.96	0	0	3.96	0	0	3.96	0	0	3.96	0	0
Chips Creek	0.67	4.18	0	0.67	4.18	0	0.67	4.18	0	0.67	4.18	0	0.67	4.18	0
Crystal Peak	2.03	0	0	2.03	0	1.20	2.03	0	0	2.03	0	0	2.03	0	0
Diamond Mountain	1.01	0.96	0	1.01	0.96	0	1.01	0.96	0	1.01	0.96	0	1.01	0.96	0
Dixie Mountain	2.82	0	0	2.82	0	0	2.82	0	0	2.82	0	0	2.82	0	0.72
Feather Falls	6.49	0	0	6.49	0	0	6.49	0	0	6.49	0	0	6.49	0	0
Grizzly Mountain	3.59	0	0	3.59	0	4.80	3.59	0	0	3.59	0	0	3.59	0	3.82
Horton Ridge	1.52	0.69	0	1.52	0.69	1.81	1.52	0.69	0	1.52	0.69	0	1.52	0.69	0.36
Lakes Basin-Yuba	2.48	0.61	0	2.48	0.61	0	2.48	0.61	0	2.48	0.61	0	2.48	0.61	0
Last Chance	1.70	0	0	1.70	0	7.88	1.70	0	0	1.70	0	0	1.70	0	7.79
McKesick Peak	3.76	0	0	3.76	0	2.72	3.76	0	0	3.76	0	0	3.76	0	2.72
Middle Fork Feather River	4.64	6.86	0	4.64	6.86	1.51	4.64	6.86	0	4.64	6.86	0	4.64	6.86	0.84
Mount Jura	2.82	1.51	0	2.82	1.51	1.53	2.82	1.51	0	2.82	1.51	0	2.82	1.51	1.17
Squaw Peak	0	0	0	0	0	5.32	0	0	0	0	0	0	0	0	0.03
Thompson Peak	3.42	0	0	3.42	0	0.40	3.42	0	0	3.42	0	0	3.42	0	0.40
Totals	**41.29**	**14.81**	**0**	**41.29**	**14.81**	**27.17**	**41.29**	**14.81**	**0.00**	**41.29**	**14.81**	**0**	**41.29**	**14.81**	**17.86**

3.2.9 Wild and Scenic Rivers

There are no impacts to designated or eligible wild river corridors in any of the alternatives because there are no routes or proposed trails within these corridors. Miles of proposed motorized trails in the scenic and recreation river corridors are shown in the table below. Alternative 1 has the greatest impact to designated, recommended and eligible scenic and recreation river corridors because cross country travel would not be prohibited (including use of approximately 72 miles of unauthorized routes within these areas). Unauthorized routes would continue to proliferate with associated soil, water, vegetation, noise and scenic impacts to river corridors. Alternative 2 has the next greatest impact, with 15.0 miles, Alternative 5 with 7.5, Alternative 4 with 3.0 miles and Alternative 3 with none.

Table 15. Proposed Motorized Trails (Alts. 2-5) within Scenic and Recreation River Corridors

River Type	Proposed Mileage to be Added to NFTS			
	2	3	4	5
Designated Scenic Rivers	0.6	0.0	0.0	0.2
Designated Recreation Rivers	0.6	0.0	0.4	0.6
Recommended Scenic Rivers	0.0	0.0	0.0	0.0
Eligible Scenic Rivers	1.3	0.0	0.6	0.7
Eligible Recreation Rivers	12.5	0.0	2.0	6.0
Total Scenic and Recreation Rivers	15.0	0.0	3.0	7.5

All proposed trails within the scenic and recreation river corridors are consistent with management direction to protect outstandingly remarkable values except for Alternative 2's Trails 7M01 and 13M10. (Trail 7M01 has adverse effects to water quality and 13M01 has adverse effects to a Special Interest plant). Alternative 3 is consistent with management direction because it adds no trails to the NFTS. All of the motorized trails included in Alternatives 4 and 5 meet management direction and protect outstandingly remarkable values. The table below displays management direction to protect outstandingly remarkable values and determinations for all proposed trails that are located in or have a portion of their length in the scenic or recreation river corridors. The project record contains further information on the Forest's wild and scenic river direction. Information on recreation and scenic criteria was part of the recreation analysis. Information on the vegetative criteria was obtained from the botany analysis (FEIS 3.8 and Appendix A). Information on the ecologic criteria was obtained from the aquatic and wildlife species analysis (FEIS 3.6, 3.7 and Appendix A). Information on hydrologic criteria was obtained from the soil and water resources analysis (FEIS 3.5 and Appendix A). Information on the cultural criteria was obtained from the cultural resources analysis (FEIS 3.10 and Appendix A).

Table 16. Scenic and Recreation River Direction to Protect Outstandingly Remarkable Values and Determinations for Proposed Trails

River	Direction and ORVs	Trail	Miles	Alt.	Determination
Middle Fork Feather River	Designated - Recreation – trails for recreation use will be provided where needed	11M09	0.2	2, 5	Meets direction. Trail located above the railroad to a tunnel entrance, access needed for railroad and fishing.
		12M04	0.4	2, 4, 5	Meets direction. Trail located above Camp Layman, needed for fishing access.
	Designated – Scenic – protect scenic values, no interference with recreational use of river	10M13	0.1	2, 5	Meets direction and protects values. Trail provides access and parking for river access (Nelson Point).
		10M14	0.1	2, 5	Meets direction and protects values. Trail provides access to rest room at developed rec site (Red Bridge)
		10M15	0.0	2, 5	Meets direction and protects values. Screened by vegetation, ends at boundary of corridor
		11M08	0.4	2	Meets direction and protects values. Screened by vegetation, does not access river
		11M08B	0.0	2	Meets direction and protects values. Screened by vegetation, ends at boundary of corridor
East Branch North Fork Feather River	Eligible - Recreation - Trails compatible and protect scenic, cultural, vegetative values	9M65	0.5	2, 4, 5	Meets direction and protects values. Heavy vegetation screening. Cultural resource and botany surveys found no sites.
Little North Fork Middle Fork Feather River	Eligible – Recreation - Trails compatible protect vegetative, scenic, recreational values	6M20E	0.5	2	Meets direction and protects values. Botany survey found no sites. Single track trail with river crossing, not very noticeable. Useful river access for motorcycle or foot travel.
		6M21	0.3	2	Meets recreation and scenic direction for trails. Trail is actually a system road (23N18S) inadvertently included in proposed action. Not visible from river. No effect to recreation value of river.
		6M29	1.4	2, 5	Meets direction and protects values. Botany survey found no sites. Single track trail with river crossing, not very noticeable. Useful river access for motorcycle or foot travel.
		6M29B	0.2	2, 5	Meets direction and protects values. Botany survey found no sites. Trail not visible from river (over 500 feet away), screened by vegetation.
		6M29C	0.6	2, 5	Meets direction and protects values. Botany survey found no sites. Trail not visible from river, screened by vegetation.
		6M51	0.8	4, 5	Meets direction and protects values. Botany survey found no sites. Trail not visible from river (over 800 feet away), screened by vegetation.
Slate Creek	Eligible – Recreation - Trails compatible and protect hydrologic, vegetative, ecologic,	9M14S	0.1	2	Meets recreation direction for trails. Trail is actually a system road (22N55Y) inadvertently included in proposed action. Not visible from

River	Direction and ORVs	Trail	Miles	Alt.	Determination
	cultural values				river, screened by vegetation.
		9M14A	0.4	2	Meets recreation direction for trails. Trail is actually a system road (22N55Y) inadvertently included in proposed action. Not visible from river, screened by vegetation.
		9M15	0.6	2, 5	Meets direction and protects values. Trail not visible from river, screened by vegetation. Periodic trail maintenance would protect water quality. Botany survey found no sites. Project includes protection measures to ensure cultural values are maintained.
		9M21	0.2	2, 4, 5	Meets direction and protects values. Trail not visible from river, screened by vegetation. Periodic trail maintenance would protect water quality. Botany and cultural resource surveys found no sites. Project includes season of use to protect California spotted owl.
		9M23	0.5	2, 4, 5	Meets direction and protects values. Trail not visible from river, screened by vegetation. Periodic trail maintenance would protect water quality. Botany and cultural resource surveys found no sites. Project includes season of use to protect California spotted owl.
South Branch Middle fork Feather River	Eligible – Recreation - Trails compatible and protect hydrologic, scenic values	7M01	0.6	2	Does not meet direction because hydrologic values are not protected. Trail has extreme adverse effects to water quality. Trail provides recreation access to river.
Squaw Queen Creek	Eligible – Recreation - Trails compatible and protect cultural, vegetative values	12M10	0.5	2, 5	Meets direction and protects values. Trail not visible from the river, screened by vegetation. Botany and cultural resource surveys found no sites.
		12M10A	0.0	2, 5	Meets direction and protects values. Trail ends at boundary of river corridor. Botany and cultural resource surveys found no sites.
		12M12	0.7	2, 5	Meets direction and protects values. Trail has a river crossing and provides recreation access to river. Botany and cultural resource surveys found no sites.
		13M09	0.1	2, 4, 5	Meets direction and protects values. Trail provides recreation access to Camp 13. Cultural resource survey found no sites. Project includes requirements to avoid TES plant sites during trail maintenance.
		13M10	5.4	2	Does not meet direction because vegetative values are not protected. Trail goes through *Mimulus pygmaeus* and has adverse effects. Trail located in sagebrush and meadow, not visible from river. Project includes measures to protect

River	Direction and ORVs	Trail	Miles	Alt.	Determination
					cultural resources.
		13M11	0.0	2	Meets recreation direction for trails. Trail not visible from river, barely reaches river corridor. Trail non-existent in places. Inadvertently included in proposed action.
		14M07	0.0	2	Meets recreation direction for trails. Trail not visible from river, barely reaches river corridor. No access to this trail without 13M10, which does not meet direction for recreation rivers.
Nelson Creek	Eligible – Scenic - Trails compatible and protect vegetative, fishery, recreational, cultural values	10M13	0.1	2, 5	Meets direction and protects values. Access and parking for river access (Nelson Point). Project includes protection measures to ensure cultural values are maintained. Botany survey found no sites. Periodic maintenance would protect water quality for fish.
Silver Creek	Eligible – Scenic - Trails compatible and protect ecologic values	7M13	0.4	2	Meets direction and protects values. In upper reaches, trail not visible from river. Project includes season of use to protect mountain yellow-legged frog.
		8M10	0.6	2, 4, 5	Meets direction and protects values. Trail not visible from river. Project includes season of use to protect northern goshawk
		8M20	0.2	2	Meets direction and protects values. In upper reaches, trail not visible from river. Project includes season of use to protect mountain yellow-legged frog.

3.2.10 Summary of Effects Analysis Across all Alternatives

Table 17. Summary comparison of alternatives by environmental effects for recreation.

Indicators – Recreation Resources	Rankings of Alternatives for Each Indicator[1]				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Proximity: Non-Motorized Recreation Compatibility (The extent of non-motorized recreation activities displaced by proposed motor vehicle use).	1	2	5	4	3
Proximity: Proximity of motor vehicle use to populated areas, neighboring federal lands (The number of NFTS miles within proximity to populated areas or neighboring federal lands (within WUI zone).	1	2	5	4	3
Average for Non Motorized Recreation Resources	1	2	5	4	3
Opportunity: Quality and diversity of motorized recreation experience (The number of miles devoted to each vehicle class).	5	4	1	2	3
Opportunity: Quality of motorized access to dispersed recreation opportunities (The number of miles devoted to each vehicle class for access to dispersed activities).	5	4	1	2	3
Average for Motorized Recreation Resources	5	4	1	2	3

[1] A score of 5 indicates the alternative with the least impact on the recreation resources related to the indicator; A score of 1 indicates the alternative has the most impact for recreation resources related to the indicator.

3.2.11 Compliance with the Forest Plan and Other Direction

Alternative 1 does not comply with the 2004 Sierra Nevada Forest Plan Amendment Record of Decision because it would allow motor vehicle travel off of designated routes, trails and limited off-highway vehicle use areas.

None of the alternatives impact Semi Privative Non Motorized Recreation Opportunity Spectrum areas as all proposed trails are outside of the “influence” zone of these areas.

None of the alternatives impact Inventoried Roadless Areas because no trails are added to these areas.

3.3 Transportation Facilities

3.3.1 Introduction

Between draft and final Environmental Impact Statements, existing system road average annual maintenance costs were updated to reflect last year's contract road maintenance costs. Miles of motorized trails in serpentine, propose motorized trail mileage, and trail system affordability were updated to reflect increased proposed trail mileage for Alternative 4 and decreased trail mileage for Alternative 5. Motorized mixed use mileage was updated to reflect changing two roads from maintenance level 3 to maintenance level 2 thus allowing mixed use on these roads.

This section of the environmental analysis examines the extent to which alternatives respond to transportation facilities direction established in the Plumas National Forest Land and Resource Management Plan. The Forest Plan transportation facilities direction was established under the implementing regulations of the National Forest Management Act (NFMA) and the National Forest Roads and Trails Act (FRTA). The National Forest Transportation System (NFTS) consists of roads, trails, and airfields. The NFTS provides for protection, development, management, and utilization of resources on the National Forests. There are other roads and trails existing on the Forest that are not currently part of the NFTS. Transportation facilities considered in this analysis include roads and trails that are suitable for motor vehicle use. This analysis considers changes needed to the NFTS to meet the purpose and need of this analysis. Decisions regarding changes in the transportation facilities must consider: 1) providing for adequate public safety, and 2) providing adequate maintenance of the roads and trails that will be designated for public use. The analysis in this section focuses primarily on these two aspects of the NFTS.

3.3.2 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant and specific to the proposed action as it affects transportation facilities includes:

Title 36, Code of Federal Regulations, Part 212 (36 CFR 212) is the implementing regulation for the FRTA and includes the Travel Management Rule published in the Federal Register on November 9, 2005. Part 212 Subpart B provides criteria for designation of roads and trails. Providing safe transportation facilities and considering the affordability of maintaining the transportation facilities are two of the criteria.

Forest Service Manual Sections 2350 and 7700 contain agency policy for management of the National Forest Transportation System. The policy requires the development of trail management objectives (TMOs) and road management objectives (RMOs). The TMOs and RMOs document the purpose of each trail or road. The purpose for the trail or road sets the parameters for maintenance standards needed to meet user needs, resource protection and public safety. Forest Service Handbook 7709.59 Chapter 60 describes the maintenance management system the Forest Service uses and the maintenance standards needed to meet road management objectives (RMOs) for the road system, including considerations for public safety.

Regional Forester's letters, file code 7700/2350, dated 08/26/06 and 06/20/07 contain procedures National Forests in Pacific Southwest Region will use to evaluate safety aspects of public travel on roads when proposed changes to the NFTS will allow both highway legal and non-highway legal traffic on a road (motorized mixed use).

The California Vehicle Code (CVC) regulates the use of motor vehicles in California. 36 CFR 212.5a makes the CVC applicable to NFTS roads in California. The CVC sets standards and qualifications for motor vehicles and vehicle operators. It defines the safety equipment needed for highway legal and non-highway legal vehicles. It also defines the roads and trails where non-highway legal motor vehicles may be operated without being subject to CVC requirements.

3.3.3 Effects Analysis Methodology

3.3.3.1 Transportation Specific Assumptions

1. Any motor vehicle use authorized by state law is occurring on the NFTS unless there are Forest specific prohibitions.
2. Motor vehicle use by special use permit or other permitted activities are outside the scope of this proposal (fuel wood gathering, motorized Special Use Permit event, Recreation Residences, mining activities, etc.).
3. Motorized trails eligible classes are high clearance vehicles (4WD etc.), ATV and motorcycles. Low clearance highway legal vehicles are not prohibited on trails but will not be found using trails.
4. There is some need for maintenance generated by traffic on any route open to motor vehicle use. When the users are the recreating public, financial responsibility for this maintenance falls on the Forest Service.
5. The CVC establishes standards and qualifications for motor vehicle operators

Public Safety – 36 CFR 212.55 requires public safety be considered when designating roads, trails and areas for motor vehicle use. The proposed additions and changes to the NFTS have been evaluated for the effects on public safety.

Affordability – 36 CFR 212.55 requires consideration of the need for maintenance and administration of the designated NFTS. Costs for the NFTS system include costs for needed maintenance work that has not been completed for various reasons (deferred maintenance) and costs of maintenance that should be performed routinely to maintain the facility to its current standard (annual maintenance). In addition, there may be additional costs associated with proposed changes to the NFTS (implementation costs). These costs may be for improving unauthorized routes that will be added to the NFTS, costs for proposed safety and resource improvements, costs for changing maintenance levels, and costs for closing routes to use by motor vehicles.

3.3.4 Affected Environment

The road system has evolved over time. The first roads built through the Plumas National Forest were routes providing access to Chester, Greenville, Quincy and Portola along the Feather River. These early roads followed existing trails used by miners and trappers. As transportation needs changed over time, the routes were reconstructed to higher standards.

In 1910, work was completed on the Western Pacific Railroad in the North Fork of the Feather River. Completion of Highway 70 in 1937 opened the Feather River drainage to automobile traffic, encouraging tourism associated with the abundance of wildlife and natural beauty. The Forest undertook a transportation planning effort in the 1920s with a focus on access for fire protection, but little road construction actually occurred. The Civilian Conservation Corps built some roads in the 1930s. In 1935 another Forest transportation study was conducted, again with the goal of enhancing fire protection, but little road construction occurred until America entered World War II, when emphasis was directed towards developing access to strategic mineral deposits. Even with this emphasis, most of the Forest remained inaccessible by vehicle.

In the late 1940s, America demanded timber to support its building boom. Congress appropriated large road budgets to develop an infrastructure for removing timber from previously remote areas. Main roads were designed and constructed by the Bureau of Public Roads, now the Federal Highway Administration; these roads were normally constructed to highway standards. The Forest Service was responsible for providing a long-term, sustainable flow of timber. Development of a system of lower-volume project roads, such as the roads within timber sale areas, fell to the agency. Often the road location, design, and construction standards were left to the timber purchaser's discretion. In the urgency to provide timber access, many miles of primary timber access roads were hastily surveyed and constructed with insufficient attention paid to possible watershed impacts and long-term stability issues. Many roads were constructed during this period, accessing large areas of old growth and late serial stage timber throughout the Forest.

In the early 1950s, the Forest Service began requiring the use of geometric standards for road design that set limits on maximum grade steepness and minimum curve radius. These standards were developed with the limited horsepower and primitive braking systems available on log trucks at the time in mind. (Today's trucks have far more power and much better braking systems.) The standards resulted in long sustained grades and large cuts and fills. Most of the high-volume roads were designed and constructed with crowned running surfaces, roadside ditches, and ditch relief culverts. This design template concentrates surface runoff at culvert outlets and often contributes to offsite resource damage.

The majority of the roads on the Forest were constructed from 1960 through 1990 in support of a robust timber program, which averaged 203 million board feet of timber from 1974 to 1990. Road construction programs were large. To ensure that the Forest Service was receiving the quality of road paid for, an emphasis was placed on contract administration. A national training and certification program was developed to ensure that contract administrators were qualified and experienced. Timber companies that used the roads for hauling were required to provide for maintenance of the roads they used as authorized by the National Forest Roads and Trails Act (FRTA) of 1964. Large reconstruction budgets in the 1970s and 1980s and the authorization in FRTA to use requirements on purchasers of National Forest timber to fund needed road reconstruction allowed managers to reconstruct many problem road segments associated with early road construction practices.

During this period road standards were modified several times. The geometric design standards introduced in the 1950s were used until 1976, when nongeometric design methods were implemented. These standards permitted the road alignment to follow the existing contour of the ground as closely as possible, resulting in significantly less excavation, embankment, and ground disturbance. Also, roads were typically designed with an out-sloped configuration, thereby reducing the concentration of road surface runoff. In the early 1980s, the agency began a shift in emphasis away from commodity outputs to a more holistic view of resource management. This new focus allowed the Forest Service to sacrifice serviceability of the road in order to reduce potential environmental impacts. Lower design standards and nongeometric design methods coupled with well trained administrators significantly reduced many of the environmental impacts associated with early road construction and use.

By the mid-1980s, the amount of new road construction began to taper off. The timber program was fluctuating, and the majority of the arterial and collector road system was in place. New road construction was primarily limited to short spur roads needed to access individual timber stands. As timber harvest decreased, maintenance of the transportation system became an issue.

The Plumas National Forest Land and Resource Management Plan (Forest Plan), issued in 1988, established land allocations applied to the Forest. Some of these, such as Late-Successional Reserves and Riparian Reserves, are not considered available for timber harvest. Currently, approximately 77% of the land base is available for programmed timber harvest. The annual harvest levels of 200 million board feet common in the 1970s and 1980s have been reduced to an estimated annual sale quantity of 15 million board feet. A significant portion of the road system initially developed to facilitate timber harvest now accesses lands where timber harvest is either not permitted or is not the primary management emphasis. This means that while the Forest Service still requires timber purchasers to perform maintenance made necessary by their use, the road system will receive a very limited amount of maintenance from timber harvest in the future.

The current road inventory for the Plumas National Forest is 4,137 miles, which includes approximately 458 miles of cost share roads. These are NFTS roads that are jointly financed and maintained by the Forest and the cooperating companies Sierra Pacific Industries, Soper Wheeler, Collins Pine and Pacific Gas and Electric. The Forest Service manages the roads as part of the transportation system. The cooperators have real property rights in individual roads documented in recorded easements. The Forest Service cannot make unilateral decisions to decommission, reconstruct, or change maintenance levels. Road decisions must be made in accordance with the terms of the applicable Cooperative Road Construction and Use Agreements with each company.

Forest-wide average costs per mile to maintain each operational maintenance level (ML) were developed and applied to the road system to calculate the estimated total cost. The average annual maintenance costs are shown in the following table. The average costs per mile were derived from condition survey estimates. This includes costs for maintaining route markers and signs needed for public safety.

The Plumas National Forest expects to receive $700,000 in Forest Service appropriated funds. Cooperators and timber purchasers invest approximately $500,000 in road maintenance work per year on the Forest. The remaining short fall means that some roads are not maintained on a yearly basis and maintenance is completed on roads with the most use.

Table 18. Existing System Roads Average Annual Maintenance Needs

Operational Maintenance Level	Miles	Cost per Mile	Annual Maintenance Cost
1	262	$82	$21,000
2	3,241	$82	$266,000
3	404	$407	$165,000
4	106	$3,527	$373,000
5	124	$3,527	$437,000
Total	4,137	$306	$1,262,000

The expected average annual motorized trail maintenance cost by alternative is shown in the following table. The cost per mile for trail maintenance is estimated to be the following; all vehicles - $225 per mile, 50”and less - $112/mile and motorcycle - $56/mile. Costs include safety and resource improvements on system trails. The Plumas National Forest expects to receive $25,000 in Forest Service appropriated funds for motorized trail maintenance. Trail maintenance money has been declining each year and the Plumas National Forest is dependent on volunteer labor and grants for any additional trail maintenance.

Table 19. Existing Motorized Trail Average Annual Maintenance Cost by Alternative

	Alt 1- 5
All Vehicles Miles	109
50" Less Miles	7
Motorcycle Miles	14
Total Miles	130
Total Maintenance	$26,100

3.3.5 Environmental Consequences

3.3.5.1 Measurement Indicator 1: Public Safety

Adding unauthorized routes to the trail system: Most of the trails added to the system would not have safety concerns. Routes with safety concerns would be identified and corrections made during trail maintenance work. Some of the more demanding motorcycle singletrack trails could be a safety concern for the inexperienced rider. Local riding maps with difficulty ratings would be helpful to direct riders to trails of their ability.

Soils derived from serpentinite and other types of ultra-mafic bedrock can contain asbestos fibers that may cause health concerns. Soils derived from these magnesium-iron rich rocks are commonly referred to as serpentine soils. The following table depicts the number of miles of trails proposed to be added to the NFTS that traverse serpentine soils. All trails in serpentine soils in Alternative 5 have been sampled for asbestos and no asbestos was detected.

Table 20. The Number of Miles of Motorized Trails in Serpentine Ecosystems by Alternative

	Alt 2	Alt 3	Alt 4	Alt 5
OHV 4WD	3.2	0	0.9	0.9
OHV ATV	2.2	0	0	0.1
Motorcycle	4.5	0	0.7	4.4
Total Miles	9.8	0	1.6	5.4

Motorized Mixed Use: The Travel Management Rule (TM), 36 CFR 212, 251, 261, and 295, super cedes past practices and enforcement of OHV use on the National Forests. In consideration of public safety and to best comply with State traffic laws, as required by 36 CFR 212.5a, the Pacific Southwest Region, R5, equates Forest Service roads maintained for passenger vehicle use (Maintenance levels 3, 4, and 5) to roads defined as “highways” under the California Vehicle Code (CVC). (This determination is also in concurrence with US Department of Transportation regulations at 23 CFR 460.2 and 23 CFR 655.603 which define “Roads Open to Public Travel” and require signs and traffic control devices on such roads be in compliance with the Manual on Uniform Traffic Control Devices for Streets and Highways.) In making this determination, the Forest Service has aligned OHV use on FS Maintenance Level 3, 4 and 5 roads to CVC restrictions and requirements for OHV use on highways. This policy was further clarified by the Regional Forester by letter, dated January 13, 2009, entitled Motorized Mixed Use on National Forest Roads in the Pacific Southwest Region. Travel Management on the Plumas NF is consistent with this direction.

The Center for Disease Control and Prevention’s fact sheet on “Teen Drivers” (http://www.cdc.gov/motorvehiclesafety/teen_drivers/teendrivers_factsheet.html) indicates that, “per mile driven, teen drivers ages 16 to 19 are four times more likely than older drivers to crash.” Designation for motorized mixed use involves allowing unlicensed children to operate motor vehicles on roads. We believe unlicensed children, unfamiliar with rules of the road in general and conditions on unsurfaced NFS roads in particular, are even more likely to be involved in crashes than licensed teenage drivers. At a time when highway safety officials nationwide are raising minimum age and driving experience requirements for a first driver’s license as well as instituting graduated requirements for the first licenses received, it is foolish for the Forest Service to disregard risks involved when young people operate motor vehicles.

Motorized mixed use (MMU) on high clearance roads (maintenance level 2): All the high clearance roads currently open to the public on the Plumas National Forest were determined to have minimal safety concerns and will be designated as open to all vehicles.

Motorized mixed use (MMU) on passenger car roads: One passenger car road (4.0 miles) has been proposed for mixed use (See Chapter 2 Table 2). Mixed use analysis consistent with Regional direction showed that the probability and severity of risk is low for mixed vehicle use on this road. This road has no accident history and has very few safety concerns. It is near the end of the passenger car segment and is narrower and has more curves then the previous passenger car segment. It is out sloped and requires slower speeds. It will be posted for mixed use to warn drivers to anticipate ATVs and motorcycles.

The following table displays the number of miles of proposed and existing motorized trails. Alternative 1 is displayed to show the miles of unauthorized routes as if they were added to the trail system. These miles would remain open and therefore would continue to have potential safety and exposure concerns to the public. The table also shows the miles of proposed motorized mixed use roads consistent with California vehicle code requirements.

Table 21. Public Safety Measurement Indicator – Proposed and Existing Motorized Trails

	Alt 1 (No Action)	Alt 2	Alt 3	Alt 4	Alt 5
4WD Trail Miles	1,036	325	109	217	265
ATV Trail Miles	81	70	7	29	46
Motorcycle Miles	120	96	14	21	53
Total OHV Trail Miles	1,237	491	130	270	364
Motorized Mixed Use on Low Clearance Roads	0	0	0	4	4

3.3.5.2 Measurement Indicator 2: Transportation System Affordability

Table 22 below displays the proposed and existing motorized trails and estimated costs for each alternative. The total cost shown at the bottom of the table includes the estimated annual maintenance costs as well as implementation costs for motorized trails. Costs include safety and resource improvements on the motorized trails, work needed to bring unauthorized routes to acceptable standards for use by motor vehicles and the cost of producing the motor vehicle use map. The following cost per mile for trail maintenance is estimated to be the following: all vehicles-$225 per mile, 50" and less-$112/mile and motorcycle-$56/ mile. The following cost per mile to bring the proposed trail to minimum trail standards is estimated to be the following: all vehicles-$1,000 per mile, 50" and less-$500/mile and motorcycle-$250/ mile. These costs are averaged over all miles and will be accomplished with grant money and volunteer labor.

Table 22. Trail System Affordability

	Alt 1 (No Action)	Alt 2	Alt 3	Alt 4	Alt 5
Annual Maintenance:	$26,093	$86,341	$26,093	$53,249	$67,745
Cost of adding trails	0	$384,000	$116,000	$236,750	$301,250
Cost of implementing MVUM	$0	$30,000	$30,000	$30,000	$30,000
Total Estimated cost for Alternative	$26,093	$500,341	$172,093	$319,999	$398,995

3.3.5.3 Alternative 1 – No action

3.3.5.3.1 Direct and Indirect Effects

3.3.5.3.1.1 Public Safety

Alternative 1 includes the most motorized route mileage of the all alternatives (1,237 miles) and cross-country travel on 999,521 acres is not prohibited. Since no change is proposed to the managed use of existing NFS roads and trail, this alternative would result in the greatest impact to motorized safety. Under Alternative 1 an unknown number of unauthorized routes with natural occurring asbestos would remain open.

This alternative has the highest mileage of 4X4 motorized routes (1,036 miles), ATV routes (81 miles) and motorcycle only routes (120 miles) of all alternatives, but none of these would become system trails. These routes would continue to cause resource damage and would need a certain amount of maintenance in order to continue to be usable. The routes, however, vary greatly in condition and the quality of recreational experience provided. In some areas, visitors may have difficulty making sense of, and navigating, the dense web of routes. This alternative does not represent a cohesive, designed, or well-managed recreation system.

Maintenance, signing and trail improvements would not occur and therefore safety concerns would not be addressed. Maps to help direct riders to the appropriate trails for their skill level would not be available to the public.

3.3.5.3.1.2 Transportation System Affordability

Alternative 1 requires the least amount of investment and maintenance because no trails or areas would be added to the system.

3.3.5.4 Alternative 2 – Proposed Action

3.3.5.4.1 Direct and Indirect Effects

3.3.5.4.1.1 Public Safety

Alternative 2 includes the highest proposed motorized trail mileage of all the action alternatives (361 miles). This alternative proposes the highest mileage of motorcycle only trails (82 miles) of all the action alternatives. The Forest would be closed to cross-country travel. Maintenance, signing and trail improvements would occur. Maps to help direct riders to the appropriate trails for their skill level would be available to the public. Alternative 2 would have 1.45 miles of motorized trail segments in areas that may have natural occurring asbestos present. These trail segments would have to be tested to ensure that they do not actually have asbestos before being open to the public.

3.3.5.4.1.2 Transportation System Affordability

Alternative 2 requires the highest amount of investment and maintenance because 361 mile of motorized trails and the 36 acre Sly Creek Area would be added to the system. Trails added to the system would be maintained thereby reducing the amount of damage inflicted on other resources.

3.3.5.5 Alternative 3

3.3.5.5.1 Direct and Indirect Effects

3.3.5.5.1.1 Public Safety

Alternative 3 has no proposed additional NFTS motorized trail miles. This alternative results in the least impact to public safety. The Forest would be closed to cross-country travel. Alternative 3 would have 0 miles of motorized trail segments in areas that have natural occurring asbestos present.

3.3.5.5.1.2 Transportation System Affordability

Alternative 3 requires the least amount of investment and maintenance because no trails would be added to the system.

3.3.5.6 Alternative 4

3.3.5.6.1 Direct and Indirect Effects

3.3.5.6.1.1 Public Safety

Alternative 4 includes the least proposed motorized trail mileage of alternatives with proposed additional motorized trails (140 miles). This alternative includes the least mileage of proposed motorcycle-only trails (10 miles) for all the action alternatives. The Forest would be closed to cross-country travel. Maintenance, signing and trail improvements would occur. Maps to help direct riders to the appropriate trails for their skill level would be available to the public. Alternative 4 would have 0 miles of motorized trail segments in areas that have natural occurring asbestos present.

3.3.5.6.1.2 Transportation System Affordability

Alternative 4 requires the lowest amount of investment and maintenance of alternatives with proposed additional motorized trails because only 140 mile of motorized trails would be added to the system.

3.3.5.7 Alternative 5

3.3.5.7.1 Direct and Indirect Effects

3.3.5.7.1.1 Public Safety

Alternative 5 includes the second highest proposed motorized trail mileage of all the action alternatives (234 miles). This alternative included the second highest mileage of proposed motorcycle only trails (39 miles) of all the action alternatives. The Forest would be closed to cross-country travel. Maintenance, signing and trail improvements would occur. Maps to help direct riders to the appropriate trails for their skill level would be available to the public. Alternative 5 would have 0 miles of motorized trail segments in areas that have natural occurring asbestos present.

3.3.5.7.1.2 Transportation System Affordability

Alternative 5 requires the second highest amount of investment and maintenance of the action alternatives because 234 mile of motorized trails would be added to the system.

3.3.5.8 Cumulative Effects

The cost of adding and maintaining trails will come from grants and the value of volunteer labor. As increased use of the motorized trail system occurs, additional trails, trail heads and sanitary facilities may need to be added in the future.

3.3.6 Summary of Effects Analysis Across All Alternatives

Table 23. Summary Comparison of Alternatives by Environmental Effects for Facilities

Indicators – Facilities Resources	Rankings of Alternatives for Each Indicator1				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Public Safety	1	2	5	4	3
Transportation System Affordability	5	2	5	4	3
Average for Facilities Resources	2	1	5	4	3

[1] A score of 5 indicates the alternative is the best for facilities resources related to the indicator; A score of 1 indicates the alternative is the worst for facilities resources related to the indicator

3.3.7 Compliance with the Forest Plan and Other Direction

All alternatives comply with the Plumas National Forest Land and Resource Management Plan and other regulatory directions.

3.4 Visual Resources

Between draft and final Environmental Impact Statements, mileage for Retention and Partial Retention Visual Quality Objective Area was updated to reflect increased proposed trail mileage for Alternative 4 and reduced trail mileage in the French Creek drainage and the dropped area at Sly Creek for Alternative 5.

3.4.1 Introduction

This section examines the extent to which alternatives respond to visual resources management direction established in the Plumas National Forest Land and Resource Management Plan (Forest Plan) and the Travel Management (TM) Rule. The Forest Plan visual resources direction was established under the implementing regulations of the National Forest Management Act (NFMA).

In the development of the Plumas Forest Plan, the Forest's visual resources were inventoried to determine the landscape's scenic attractiveness (Variety Class inventory) and the public's visual expectations (Sensitivity Level inventory). Based upon these inventories, Visual Quality Objectives (VQOs) were established for all Forest land areas. The VQOs establish minimum acceptable thresholds for landscape alterations from an otherwise natural-appearing forest landscape. For example, areas with a Retention VQO are expected to retain a natural appearance; areas with a Partial Retention VQO may have some alterations, but they remain subordinate to the characteristic landscape; areas with a Modification VQO can have alterations that do not look natural appearing. Visual Resources management direction in the Forest Plan includes a goal to maintain high visual quality from recreational development, major travel routes, and other high use areas. Standards and Guidelines in the Forest Plan include direction to vary Visual Quality Objectives according to land use; restore high visual quality to lands apparent from high-use areas; and maintain visual quality along the Pacific Crest Trail (PCT), specifically a Partial Retention VQO in the foreground zone of the PCT.

Roads and trails create linear alterations in landscapes that can be mitigated through sound design. Unmitigated, they present uncharacteristic line qualities in forest landscapes. Landscapes with a dense canopy cover have the capability of masking these linear alterations; sparsely covered landscapes have less capability. The proliferation of unauthorized routes, particularly in sparsely covered landscapes, can adversely affect the Forest's visual resources.

3.4.2 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant to the proposed action as it affects visual resources includes:

National Forest Management Act (NFMA). The National Forest Management Act (NFMA), and its implementing regulations, required the inventory and evaluation of the Forest's visual resource, addressing the landscape's visual attractiveness and the public's visual expectations. Management prescriptions for definitive land areas of the Forest are to include Visual Quality Objectives.

Travel Management Rule. The TM Rule does not cite aesthetics specifically, but in the designation of trails or areas, the responsible official shall consider effects on Forest resources, with the objective of minimizing effects of motor vehicle use.

Sierra Nevada Forest Plan Amendment (SNFPA). No specific direction related to visual resources is in the Final Supplemental ROD.

Plumas National Forest Land and Resource Management Plan (Forest Plan). The Forest Plan contains Forest-wide management direction in the form of Goals, and Standards and Guidelines for visual resources.

3.4.3 Effects Analysis Methodology

3.4.3.1 Assumptions specific to visual resources analysis:

1. The basic Measurement Indicator for the visual resources is compliance with the Retention and Partial Retention VQOs.
2. A second Measurement Indicator has been added to analyze effects on the PCT.
3. Other high-use areas identified in the Forest Plan are already incorporated in the adopted VQOs.
4. Visual resources restoration, as identified in the Forest Plan, is limited to natural regeneration.
5. NFTS additions that contribute to the continuity of motor touring will have a beneficial effect on visual resources, since it is assumed that dead-end route situations will be reduced.

3.4.3.2 Data Sources:

Forest Plan for distribution of VQOs.

3.4.3.3 Visual Resources Indicators:

1. The extent to which the proposed NFTS falls within the Retention and Partial Retention VQOs (number of miles traversing landscapes that are to remain natural to near-natural appearing in character).
2. The extent to which the proposed NFTS are in proximity to the PCT and meet the Partial Retention VQO in the foreground zone.

3.4.3.4 Visual Resources Methodology by Action:

1. Direct/indirect effects of the prohibition of cross-country motorized vehicle travel. The prohibition of cross-country motorized vehicles will have a positive effect on the Forest's visual resources. Improvement of the visual resource is long-term; unauthorized routes and impact areas will gradually heal over time.
2. Direct/Indirect Effects of adding trails and areas to the NFTS, including identifying vehicle class. Table 24 and Table 25 document the miles of trails in Retention and Partial Retention Visual Quality Objective areas. Table 26 illustrates the number of proposed OHV mileage within ½ mile of the PCT (1/2 mile is the maximum distance for defining the foreground distance zone per the Visual Management System, Agriculture Handbook 462). Non-characteristic line quality created by trail segments is the greatest impact to the visual

resources – the location and design of these segments can significantly reduce their visual impact.

3. Changes to the existing NFTS. There are no changes to the existing NFTS other than the Deans Valley Road (4.1 mi.) being made available for mixed use.

Table 24. Proposed OHV Mileage within Retention Visual Quality Objective Area

Vehicle Type	Alt. 2		Alt. 3		Alt. 4		Alt. 5	
	Mileage	%	Mileage	%	Mileage	%	Mileage	%
OHV 4WD	19.5	59	0	0	13.0	78	16.6	78
Less than 50”	5.8	18	0	0	3.1	18	4.1	19
Motorcycle	7.6	23	0	0	0.6	4	0.6	3
Total/% Existing	32.9	33	0	0	16.7	17	21.3	21

Alternative 1 has 99.8 miles of unauthorized routes within Retention Visual Quality Objective Area

Table 25. Proposed OHV Mileage within Partial Retention Visual Quality Objective Area

Vehicle Type	Alt. 2		Alt. 3		Alt. 4		Alt. 5	
	Mileage	%	Mileage	%	Mileage	%	Mileage	%
OHV 4WD	52.8	64	0	0	27.4	76	37.9	67
Less than 50”	14.1	17	0	0	6.2	17	9.0	16
Motorcycle	15.8	19	0	0	2.5	7	9.7	17
Total/% Existing	82.7	24	0	0	36.1	10	56.6	16

Alternative 1 has 346.5 miles of unauthorized routes within Partial Retention Visual Quality Objective Area

Table 26. Proposed OHV Mileage within ½ Mile of the Pacific Crest Trail

Vehicle Type	Alt. 2	Alt. 3	Alt. 4	Alt. 5
	Mileage	Mileage	Mileage	Mileage
OHV 4WD	0	0	0	0
Less than 50”	0	0	0	0
Motorcycle	0	0	0	0
Total	0	0	0	0

Alternative 1 has 0.77 miles of unauthorized routes within ½ miles of the Pacific Crest Trail

Short-term timeframe: 1 year

Long-term timeframe: 20 years.

Spatial boundary: The “viewshed” is the unit of spatial analysis when considering effects associated with changes in the NFTS.

Indicator(s): The extent to which the proposed NFTS falls within the Retention and Partial Retention VQOs (number of miles traversing landscapes that are to remain natural to near-natural appearing in character); and proposed NFTS within ½ mile of the Pacific Crest Trail.

Methodology: GIS analysis of proposed NFTS segments in relation to Retention and Partial Retention VQOs, or within ½ mile of the PCT. The analysis will take into consideration slope/topography, vegetative screening and distance to determine if proposed NFTS segments meet the Retention or Partial Retention VQO.

Rationale: Compliance with the Retention and Partial Retention Visual Quality Objectives (VQOs), or the foreground distance zone Forest Plan direction for the PCT.

Changes to the existing NFTS

No change in effect for visual resources.

Cumulative Effects

Short-term timeframe: Not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years.

Spatial boundary: The “viewshed” is the unit of spatial analysis for determining cumulative effects.

Indicator(s): Number of view sheds that are or have the potential to be affected by motor vehicle travel.

Methodology: Identify Forest view sheds such as scenic byway corridors, and views from the PCT for cumulative effects analysis. Using the same GIS analysis as identified above, determine if any of the proposed NFTS segments exceed the Partial Retention VQO threshold (Modification VQO) when added to past, present or foreseeable actions.

Rationale: Compliance with the Retention and Partial Retention Visual Quality Objectives (VQOs).

3.4.4 Affected Environment

In the development of the Plumas Forest Plan, the Forest’s visual resources were inventoried to determine the landscape’s scenic attractiveness (Variety Class inventory) and the public’s visual expectations (Sensitivity Level inventory). Based upon these inventories, Visual Quality Objectives (VQOs) were established for all Forest land areas. The VQOs establish minimum acceptable thresholds for landscape alterations from an otherwise natural-appearing forest landscape. For example, areas with a Retention VQO are expected to retain a natural appearance; areas with a Partial Retention VQO may have some alterations, but they remain subordinate to the characteristic landscape; areas with a Modification VQO can have alterations that do not look natural appearing.

Visual quality objectives describe different degrees of acceptable alteration of the natural landscape. The Objectives are considered the measurable standards for the management of the “seen” aspects of the land. Roads and trails create linear alterations in landscapes that are hard to mitigate, making Retention and Partial Retention VQO achievement difficult. Landscapes with a dense canopy cover have the capability of masking these linear alterations; sparsely covered landscapes have less capability. The proliferation of unauthorized routes, particularly in sparsely covered landscapes, can adversely affect the Forest’s visual resources.

3.4.5 Environmental Consequences

3.4.5.1 Alternative 1 – No action

3.4.5.1.1 Direct/indirect effects of the prohibition of cross-country motorized vehicle travel

Approximately 446 miles out of 1,107 miles of unauthorized (40%) routes are in retention and partial retention VQOs. Additional routes would develop with no prohibition of cross-country motorized vehicle travel. Users would continue to create additional motorcycle single track and quad trails. Two routes would impact the Pacific Crest Trail.

3.4.5.1.2 Direct/Indirect effects of adding facilities (presently unauthorized routes, and areas) to the NFTS

No routes would be added to the NFTS.

3.4.5.1.3 Changes to the existing NFTS

No changes to the NFTS would occur.

3.4.5.1.4 Cumulative Effects

Alternative 1 has the greatest potential for having a negative cumulative effect for visual resources. The continued proliferation and concentration of user-created route segments may create uncharacteristic line quality in forest landscapes. The Pacific Crest Trail would continue to see possible impact from additional user created trails within ½ mile of the trail.

3.4.5.2 Alternative 2 – Proposed Action

3.4.5.2.1 Direct/indirect effects of the prohibition of cross-country motorized vehicle travel

The continued proliferation and concentration of user-created route segments would cease to occur. The Pacific Crest Trail would have no unauthorized routes impacting the trail.

3.4.5.2.2 Direct/Indirect effects of adding facilities (presently unauthorized routes, and areas) to the NFTS

Approximately 116 miles of proposed trails out of 446 miles of unauthorized (26%) routes are in retention and partial retention VQOs. The majority of these trails are not visible because they are screened by vegetation and have little or no cut banks or fill slopes. No additional routes would develop with a ban on cross-country motorized vehicle use. The Sly Creek Use area, which is on top of the hill that was used for borrow to build the Sly Creek Dam, is screened from the Sly Creek Campground, the Sly Creek Reservoir, and the Sly Creek Road (21N16) with vegetation that blocks any view of the area.

3.4.5.2.3 Changes to the existing NFTS

No changes to the existing NFTS will occur.

3.4.5.2.4 Cumulative Effects

Alternative 2 has the second highest potential for having a negative cumulative effect for visual resources. With a ban on cross-country travel, over time an improvement of the visual resource would occur with unauthorized routes and impact areas gradually disappearing. The Pacific Crest Trail would no longer have possible impact from additional user created trails within ½ mile of the trail.

3.4.5.3 Alternative 3

3.4.5.3.1 Direct/indirect effects of the prohibition of cross-country motorized vehicle travel

The continued proliferation and concentration of user-created route segments would cease to occur. The Pacific Crest Trail would have no unauthorized routes impacting the trail.

3.4.5.3.2 Direct/Indirect effects of adding facilities (presently unauthorized routes, and areas) to the NFTS

This alternative does not add any trails. Therefore, there is no effect (0% proposed trails) in retention and partial retention VQOs. No additional trails would develop with a ban on cross-country motorized vehicle use.

3.4.5.3.3 Changes to the existing NFTS

No changes to the existing NFTS will occur.

3.4.5.3.4 Cumulative Effects

Alternative 3 has the lowest cumulative effect for visual resources because no unauthorized routes are proposed to be added to the trail system. With a ban to cross-country travel, over time an improvement of the visual resource would occur with unauthorized routes and impact areas gradually disappearing. The Pacific Crest Trail would no longer have possible impact from additional user created trails within ½ mile of the trail.

3.4.5.4 Alternative 4

3.4.5.4.1 Direct/indirect effects of the prohibition of cross-country motorized vehicle travel

The continued proliferation and concentration of user-created route segments would cease to occur. The Pacific Crest Trail would have no unauthorized routes impacting the trail.

3.4.5.4.2 Direct/Indirect effects of adding facilities (presently unauthorized routes, and areas) to the NFTS

Approximately 53 miles of proposed trails out of 446 miles of unauthorized (12%) routes are in retention and partial retention VQOs. The majority of these trails are not visible because they are screened by vegetation and have little or no cut banks or fill slopes. No additional trails would develop with a ban on cross-country motorized vehicle use.

3.4.5.4.3 Changes to the existing NFTS

The Deanes Valley Road will be available for mixed use.

3.4.5.4.4 Cumulative Effects

Alternative 4 has second lowest potential cumulative effect for visual resources with the second lowest miles of trails added to the trail system. With a ban to cross-country travel, over time an improvement of the visual resource would occur with unauthorized routes and impact areas gradually disappearing. The Pacific Crest Trail would no longer have possible impact from additional user created trails within ½ mile of the trail.

3.4.5.5 Alternative 5

3.4.5.5.1 Direct/indirect effects of the prohibition of cross-country motorized vehicle travel

The continued proliferation and concentration of user-created route segments would cease to occur. The Pacific Crest Trail would have no unauthorized routes impacting the trail.

3.4.5.5.2 Direct/Indirect effects of adding facilities (presently unauthorized routes, and areas) to the NFTS

Approximately 78 miles of proposed trails out of 446 miles of unauthorized (17%) routes are in retention and partial retention VQOs. The majority of these trails are not visible because they are screened by vegetation and have little or no cut banks or fill slopes. No additional trails would develop with a ban on cross-country motorized vehicle use.

3.4.5.5.3 Changes to the existing NFTS

The Deanes Valley Road will be available for mixed use.

3.4.5.5.4 Cumulative Effects

Alternative 5 has third lowest potential cumulative effect for visual resources with the third lowest miles of trails added to the trail system. With a ban to cross-country travel, over time an improvement of the visual resource would occur with unauthorized routes and impact areas gradually disappearing. The Pacific Crest Trail would no longer have additional impact from possible user created trails within ½ mile of the trail.

3.4.6 Summary of Effects Analysis Across All Alternatives

Table 27. Visual Resources Indicator Assessment

Indicators – Visual Resources	Rankings of Alternatives for Each Indicator[1]				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Disturbance/Integrity: Compliance with the Retention and Partial Retention VQOs.	1	2	5	4	3
Disturbance/Integrity: Meets Partial Retention VQO from PCT	1	5	5	5	5
Average for Visual Resources	1	2	5	4	3

[1] A score of 5 indicates the alternative is the best for visual quality related to the indicator; A score of 1 indicates the alternative is the worst for visual quality related to the indicator.

3.4.7 Compliance with the Forest Plan and Other Direction

Alternative 1 does not comply with regulatory direction. All other alternatives comply with the Plumas Forest Plan and other regulatory directions.

3.5 Soil and Water Resources

3.5.1 Changes to this Section between DEIS and FEIS

- Effects indicator data have been updated to reflect the small number of proposed trails for which the soil and water resource rating was changed.
- While the cumulative effects methodology has not changed since the DEIS, additional descriptive material has been added to clarify the methodology.
- The analysis purpose of the Erosion Hazard Rating indicator has been clarified.
- Input from the 2007 HFQLG FRA Pilot Project Monitoring Report to Congress for Question 17 has been updated with the 2008 version.
- Additional information is provided to describe the rationale for the Season of Use mitigation.

3.5.2 Introduction

The Plumas National Forest has managed the landscape as open to cross-country motor vehicle travel (motorized travel off of designated National Forest System (NFS) roads, trails or areas). Repeated use has resulted in unplanned, unauthorized routes. These routes generally developed without environmental analysis or public involvement, and do not have the same status as NFS roads and NFS trails included in the National Forest Transportation System (NFTS). This has resulted in unplanned roads and trails created without meeting Forest Plan Standards and Guidelines and Best Management Practices (BMPs). As a result, effects to soil and water resources have occurred in some locations.

The purpose of the Soil and Water Resource section is to analyze the direct, indirect, and cumulative effects of the alternatives on soil and water resources, specifically long-term soil productivity and hydrologic function. The land management activities proposed under this project have the potential to affect soil and water resources in a beneficial, indifferent, or adverse manner. This report identifies maintenance and mitigation measures needed to have a functioning trail system with minimal effects to these resources.

The soil resource provides many essential functions for NFS lands. It sustains plant growth that provides forage, fiber, wildlife habitat and watershed protection. It absorbs precipitation, stores water for plant growth, and gradually releases surplus water, which attenuates runoff rates. It sustains microorganisms which recycle nutrients for continued plant growth. The National Forest Management Act of 1976 and other acts recognized the fundamental need to protect, and where appropriate, improve the quality of soil. The alternatives could potentially affect soil productivity and its other ecosystem functions and is therefore addressed in this section.

Protection of water quantity and quality is an important part of the mission of the Forest Service. Management activities on NFS lands must be planned and implemented to protect the hydrologic function of watersheds, including the volume, timing, and quality of streamflow. The use of roads, trails, and other areas on National Forests for public operation of motor vehicles has potential to affect these hydrologic functions through interception of runoff, compaction of soils, and detachment of sediment. Management decisions to eliminate cross-country motorized travel and add new trails and areas to the NFTS could potentially affect watershed functions and are therefore addressed in this section.

3.5.3 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant to the project as it affects soil resources includes:

National Forest Management Act of 1976. Renewable Resource Program. “recognize the fundamental need to protect and where appropriate, improve the quality of soil, water, and air resources.”

National Soil Management Handbook. The Soil Management Handbook (USDA 1991) is a national soils handbook that defines soil productivity and components of soil productivity, establishes guidance for measuring soil productivity, and establishes thresholds to assist in Forest Planning.

Region 5 Soil Management Handbook Supplement. The Forest Service Region 5 Soil Management Handbook Supplement (R5 FSH Supplement 2509.18-95-1) establishes Regional Soil Quality Analysis Standards and provides threshold values that indicate when changes in soil properties and soil conditions would potentially result in a significant change in soil productivity (including soil loss, porosity, and organic matter), soil hydrologic function, or soil buffering capacity. The analysis standards are to be used for areas dedicated to growing vegetation. They are not applied to lands with other dedicated uses, such as developed campgrounds, administrative facilities or in this case, the actual land surface authorized for travel by the public using various kinds of vehicles.

Regional Forester’s Letter (dated Feb 5, 2007). This letter provided clarification to Forest Supervisors on the appropriate use of the R5 Soil Management Handbook Supplement (R5 FSH Supplement 2509.18-95-1). It states in part:

> *Analysis or evaluation of soil condition is the intended use of the thresholds and indicators in R5 FSH Supplement 2509.18-95-1. They are not a set of mandatory standards or requirements. They should not be referred to as binding or mandatory requirements in NEPA documents. Standards and guidelines in Forest Land and Resource Management Plans provide the relevant substantive standards to comply with NFMA.*

The thresholds and indicators represent desired conditions for the soil resource. Utilization of the thresholds and indicators provides a consistent method to analyze, describe and report on soil condition throughout the Region.

Plumas National Forest Land and Resource Management Plan. The 1988 Forest Plan establishes Standards and Guidelines to prevent significant or permanent impairment of soil productivity on page 4-44 (USDA 1988). The analysis standards are to be used for areas dedicated to growing vegetation. They are not applied to lands with other dedicated uses, such as developed campgrounds, administrative facilities or in this case, the actual land surface authorized for travel by the public using various kinds of vehicles.

Direction relevant to the project as it affects water resources includes:

Clean Water Act of 1948 (as amended in 1972 and 1987) establishes as federal policy the control of point and non-point pollution and assigns the States the primary responsibility for control of water pollution. Compliance with the Clean Water Act by National Forests in California is achieved under state law (see below). Section 404 permit requirements for discharge or placement of fill in a stream channel that carries waters of the US, as administered by the US Army Corps of Engineers, will be appropriately satisfied prior to construction of any applicable maintenance or mitigation prescribed by this FEIS for existing trails proposed for addition to the NFTS.

Section 303(d) of the Clean Water Act. This section requires the identification of water bodies that do not meet, or are not expected to meet, water quality standards or are considered impaired. The list of affected water bodies, and associated pollutants or stressors, is provided by the State Water Resources Control Board and approved by the US EPA. The most current list available is the 2006 303(d) list (SWRCB, 2006). The Plumas National Forest has three streams listed as impaired: Dolly Creek and Little Grizzly Creek (both due to heavy metal contamination from the Walker Mine and Walker Tailings sites) and the North Fork Feather River (mercury and temperature). The addition of trails to the NFTS would not cause additional mine tailings or mercury to enter the stream course. The temperature concerns on the North Fork Feather River are due to the hydropower facilities and dams.

Non-point source pollution on Plumas National Forest (including state Waste Discharge Requirements) is managed through the Regional Water Quality Management Plan (USDA Forest Service, Pacific Southwest Region (USFS R5), 2000). *Water Quality Management for Forest System Lands in California* (USDA, 2000) contains the 1981 Management Agency Agreement (MAA) between the California State Water Resources Control Board (CSWRCB) and USDA, Forest Service. The State Board has designated the Forest Service as the management agency for all activities on National Forest System lands and the MAA constitutes the basis of regional waivers for non-point source pollution. USFS R5 and CA Regional Water Quality Control Boards are currently in the process of working with the State and Regional boards to modify the water quality management program and the MAA to reflect changes that have occurred in state non-point source pollution control policy. However, the 1981 MAA has never been rescinded and remains in effect.

The MAA does not provide the Forest Service with a basis for waiver of point source discharges and USFS is not exempt from point source pollution control regulations, including National Pollutant Discharge Elimination Permitting (NPDES) requirements. However, point source pollution control permitting is generally not applicable to this project because USFS transportation facilities, including drainage features on those facilities, are not considered point sources since those facilities do not channel pollutants to a discrete conveyance structure.

The Regional Water Quality Management Plan relies on implementation of prescribed best management practices (BMPs). Best Management Practices are procedures, techniques, and mitigation measures that are incorporated in project actions to protect water resources and prevent or diminish adverse effects to water quality. The Plan BMPs have been certified by CSWRCB and approved by US EPA. The Plan includes one BMP for OHV use (4-7) and 28 BMPs related to road construction and maintenance (2-1 to 2-28). Since all of these BMPs address drainage control, erosion and sedimentation control, or protection of stream channels along motorized NFTS facilities, the practices apply to both Forest roads and OHV trails.

Of particular relevance for motorized travel management, BMP 4-7 requires each Forest to: (1) identify areas or routes where OHV use could cause degradation of water quality; (2) identify appropriate mitigation and controls, and (3) restrict OHV use to designated routes. This BMP further requires Forests to take immediate corrective actions if considerable adverse effects are occurring or are likely to occur (See below Sections “Effects Analysis Methodology and “Affected Environment/Environmental Consequences”).

Regional Water Quality Control Board—Central Valley and Lahontan Regions—Beneficial Uses and State Water Quality Objectives. Beneficial uses are defined under California State law in order to protect against degradation of water resources and to meet state water quality objectives. The Forest Service is required to protect and enhance existing and potential beneficial uses during water quality planning (California Regional Water Quality Control Board [CRWQCB] 1998). A small portion of the eastern side of the Forest drains to the Great Basin and is under jurisdiction of the CA Lahontan Regional Water Quality Control Board. The Cumulative Off-site Watershed Effects analysis for this FEIS is designed to include all effects on beneficial uses of water that occur away from locations of actual land use and are transmitted through the fluvial system (USDA Forest Service 1990). Beneficial uses of surface water bodies that may be affected by activities on the Forest are listed in Chapter 2 of the Central Valley Region’s Water Quality Control Plan (hereinafter referred to as the “Basin Plan”) for the Sacramento and San Joaquin River basins (CRWQCB 1998). Existing and potential beneficial uses are defined for Lake Almanor, North Fork Feather River, Middle Fork Feather River, source to Little Last Chance Creek, Frenchman Reservoir, Little Last Chance Creek to Lake Oroville, Lake Davis, Lakes Basin Lake, and Lake Oroville for the Feather River from the fish barrier dam in Oroville to the Sacramento River, for the watershed areas that are sources to Englebright Reservoir on the Yuba River, and for the Yuba River downstream of Englebright Reservoir. The defined existing beneficial uses are listed in the Riparian Conservation Objectives (RCO) Analysis (Soil and Water Resource Report, Appendix A in the project record).

The California Water Code. Consists of a comprehensive body of law that incorporates all state laws related to water, including water rights, water developments, and water quality. The laws related to water quality (sections 13000 to 13485) apply to waters on the National Forests and are directed at protecting the beneficial uses of water. Of particular relevance for the proposed action is section 13369, which deals with nonpoint-source pollution and best management practices.

The Porter-Cologne Water-Quality Act, as amended in 2006 (included in the California Water Code). This Act provides for the protection of water quality by the State Water Resources Control Board and the Regional Water Quality Control Boards, which are authorized by the U.S. Environmental Protection Agency to enforce the Clean Water Act in California.

The Sierra Nevada Forest Plan Amendment (SNFPA). The Record of Decision (ROD) for the 2004 SNFPA includes a strategy for aquatic management that provides broad goals for riparian areas. Land management activities that move ecosystem conditions toward these goals will restore and maintain the physical, chemical and biological integrity of the region’s waters as mandated by the Clean Water Act, and will support the Forest Service’s mission to provide habitat for riparian- and aquatic-dependent species per other federal mandates, including the National Forest Management Act and the Endangered Species Act. The SNFPA aquatic management goals address several aspects associated with aquatic, riparian, and meadow ecosystems, including Water Quality, Species Viability, Plant and Animal Community Diversity, Special Habitats, Streamflow Patterns and Sediment Regimes, and Stream Banks and Shorelines.

To achieve these goals, the aquatic management strategy defines six Riparian Conservation Objectives (RCOs) as well as management standards and guidelines associated with each objective. The 2004 ROD requires that each Forest project shall define riparian conservation areas (RCAs) that delineate aquatic, riparian, and meadow habitats and are to be managed consistent with the RCOs and associated standards and guidelines. The RCO analysis for this project, presented in Appendix A of the Soil and Water Resource Report, assesses the level of consistency of project alternatives with RCO objectives and standards and guidelines.

RCAs widths for this project are consistent with those suggested in the 2004 ROD: (1) *Perennial Streams*: 300 feet on each side of the stream, measured from the bank full edge of the stream; (2) *Seasonally Flowing Streams (includes intermittent and ephemeral streams)*: 150 feet on each side of the stream, measured from the bank full edge of the stream; (3) *Streams in Inner Gorge (stream adjacent slopes greater than 70 percent gradient)*: top of inner gorge; (4) *Special Aquatic Features(includes lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs) or Perennial Streams with Riparian Conditions extending more than 150 feet from edge of streambank or Seasonally Flowing streams with riparian conditions extending more than 50 feet from edge of streambank:* 300 feet from edge of feature or riparian vegetation, whichever width is greater.

Specific Standards and Guidelines for water resources that apply to the Motorized Travel Management EIS are summarized generally in the Soil and Water Resource Report, Appendix B—Streamside Management Zone Plan, in the project record.

Plumas National Forest Land Management Resource Plan (“Forest Plan”). The 1988 Forest Plan was amended by the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) Record of Decision. The Forest Plan states “maintain or, where necessary, improve water quality using Best Management Practices.” Subsequent Forest Plan Standards and Guidelines state: “implement BMPs to meet water quality objectives and improve the quality of surface water on the Forest.” Streamside Management Zone (SMZ) widths presented in the Forest Plan are now defined by the RCA widths required by the 2004 SNFPA ROD. The Forest Plan requires preparation of an SMZ plan, which is presented in Appendix B of the Soil and Water Resource Report.

3.5.4 Effects Analysis Methodology

This section describes the methodology used for the effects analysis of the proposed project for soil and water resources. This section establishes indicators chosen to measure potential effects, the analysis area, timeframe, methods used (including field survey methods), and assumptions made for the effects analysis to soil and water resources of all action alternatives.

The overall methodology used for effects analysis of soil and water resources is separated into two topics to be analyzed. The first topic is a site-specific analysis of each individual, existing unauthorized route that is proposed for addition to the current NFTS. The second topic is an analysis of each project alternative as a whole.

3.5.4.1 Site Specific Analysis Indicators for Existing Unauthorized Routes:

- Indicator #1: BMP Evaluation E08 Rating (Pass, Fail or At-Risk) for each segment of each route.
- Indicator #2: Stream Diversion Potential at route/stream crossings.

Geographic Scope of the Soil and Water Resource Analysis. Plumas National Forest watershed staff performed initial or abbreviated field surveys of the full length of every existing, unauthorized route that is proposed for addition to the current NFTS under Alternatives 2 through 5. Subsequent field visits to potentially problematic routes identified by the initial field surveys were performed in summer 2008 to assess water quality effects and to formulate mitigations. The focus of these surveys was to determine whether the unauthorized route was causing adverse soil and water resource effects, or had the potential to cause future adverse effects and, if so, whether these adverse effects could be mitigated within the scope of this project. The goal of these surveys, and subsequent field visits and discussions, is to make one of four ratings of soil and water effects for each proposed trail:

1. Low: The route was considered, a field visit was made and the soil and water resource effects would not be adverse (assuming routine maintenance of the trail).
2. Moderate: The route was considered, a field visit was made and soil and water effects are currently less than adverse. Site-specific maintenance measures are prescribed to prevent future potential adverse effects to soil and water resources. For routes rated as “moderate”, since adverse effects have not been currently observed, maintenance for these routes may occur after the route is added to the NFTS and legal for traffic under one of this project’s alternatives. Site-specific maintenance may include addition or modification of route drainage features (out-sloping, switchbacks, rolling dips, waterbars, or ditch relief culverts); and addition or modification of existing route stream crossing structures.
3. High: The route was considered, a field visit was made and soil and water effects are currently adverse. Site-specific mitigations may include addition or modification of route drainage features (out-sloping, switchbacks, rolling dips, waterbars, or ditch relief culverts); addition or modification of existing route stream crossing structures; and designation of acceptable seasons of use and vehicle class. Mitigations for routes rated “High” are necessary to reduce current soil and water resource effects to less than adverse. The watershed staff recommends that these routes may be added to the NFTS with this FEIS but not be legal for traffic until these critical mitigations are in place and proper installation is verified by Forest staff.
4. Extreme: The route was considered, a field visit was made and a determination was made that the soil and water resource effects are currently adverse. The route is not recommended by the watershed staff for addition to the NFTS. The reason for this recommendation is that mitigations to reduce soil and water resource effects to less than adverse are not available within the scope of the analysis for this FEIS, typically due to physical or topographic constraints (such as the route’s close proximity to streams, frequent stream crossings, steep slopes, or highly erosive soils). Substantial relocation of a proposed trail is typically not a

mitigation available because the new trail location would involve ground outside the geographic area surveyed and analyzed by PNF specialists for this FEIS

Field surveys performed in fall 2007 and summer 2008 were completed for all of the roughly 370 miles proposed for addition to the NFTS throughout all action alternatives. Further, subsequent field visits to potentially problematic routes identified by the initial field surveys to assess potential maintenance or mitigation were performed in summer 2008. The proposed Sly Creek play area was surveyed in summer 2008. Trail 5M30 (1.5 miles long) and 6M48 (0.28 miles) were not surveyed per the initial survey methodology because this route was located within the perimeter of the 2008 Butte Lightning Complex wildfires and was generally unsafe to access in summer and fall 2008. However, abbreviated surveys of these routes were performed. The abbreviated survey covered the entire length of the proposed trails but the full set of initial field survey data was not gathered due to time and safety constraints. However, the determination of the soil and water resource impact level was made based upon key elements of the initial survey protocol. See Appendix A of the FEIS or Appendix G of the Soil and Hydrology Report for more information.

The entire set of existing, unauthorized routes described in the No-action alternative (totaling approximately 1,107 miles) was not surveyed for existing condition because all of these routes are not proposed for addition to the NFTS.

Timeframe for the Analysis: The site-specific analysis establishes the existing condition of the routes. The analysis also indicates mitigations or maintenance needed to reduce soil and water resource effects to less than adverse or to prevent future adverse effects.

Passive vegetative recovery of existing, unauthorized routes that are not proposed for addition to the NFTS is expected to occur within 20 to 30 years. Recovery depends upon soil type, precipitation amounts and level of disturbance to soil productivity and hydrologic function.

Field survey methodology. The methodology used to assess the existing condition of unauthorized routes stems from general direction for soil and water resources in the Forest Plan and from the Standards and Guidelines listed in the 2004 SNFPA ROD (see above Section “Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction” for specific information).

The Pacific Southwest Region has developed a “Best Management Practices Evaluation Program (BMPEP)” (USDA 2002) to assess both the implementation of BMPs and BMP effectiveness. The Program consists of 25 evaluation protocols. Two protocols were used on this project: Evaluation E08, “Road Surface Drainage and Protection,” and E09, “Stream Crossings”. Standardized forms for Evaluations E08 and E09 are utilized to assess BMPs 2-1, 2-2, 2-4, 2-5, 2-6, 2-7, 2-10 and 2-23.

Roads and trails may differ in terms of potential impacts to water resources. Trail surfaces may be much narrower than road surfaces so the amount of sediment that is dislodged and mobilized from a trail surface may be less than the sediment dislodged from a road surface of similar soil texture. The USDA Water Erosion Prediction Project (WEPP) model component for roads incorporates a direct relationship between the width of a road and the amount of erosion leaving the road prism (i.e., in comparing one road that is twice as wide as another road, the amount of eroded material leaving the wider road prism is predicted to be twice the amount of erosion than the narrower road). However, whether or not significant erosion occurs from a road or trail depends largely upon how well the route's drainage features disperse runoff and prevent concentration of flow along the surface, down fill slopes, along cut slopes, etc. A narrow trail surface and template is usually equally capable of disrupting natural drainage patterns and concentrating runoff as a wider road template. The surface drainage and protection BMPs that are evaluated by E08 are the same practices that are necessary to protect water quality effects from OHV trails. Applied appropriately to the type of NFTS facility, the E08 evaluation allows flexibility in assessing whether the route drainage features adequately protect water quality. Mitigations prescribed in the field also take into account the steeper grades encountered on OHV trails. For example, prescribed waterbar or rolling dip spacing is shorter on the steeper OHV trails.

WEPP modeling is not part of the analysis methodology for trails proposed by this project because field surveyors focused on observing, for each route proposed, whether route drainage was effectively dispersed, whether erosion occurred, and whether erosion entered stream channels rather than on collecting the extensive fill slope and buffer length and gradient data necessary to run the theoretical WEPP model.

The E08 effectiveness evaluation criteria and rating scheme were used for the analysis of the field survey data collected on unauthorized routes proposed for addition to the NFTS as trails. These unauthorized routes are typically old temporary roads used in past timber sales, old firelines, or user-created routes so evaluation of whether or not BMPs were implemented at the time of route creation is not appropriate. However, the E08 effectiveness evaluation criteria indicate whether the drainage features, and the surface and slope characteristics of the route template—as these route features currently exist on the ground—are effective in preventing adverse effects to soil resources and water quality. The E08 effectiveness evaluation consists of objective measures of road surface rilling; erosion and/or failure of route fill slopes, cutslopes, and inside ditches; whether or not erosion from these features is delivered to stream channels; and scour and/or plugging of route cross drain structures (rolling dips, waterbars, or ditch relief culverts).

The full length of each proposed trail was field surveyed and evaluated by dividing each route into a number of separate segments. Beginning and end points of segments were defined at the points where surface drainage left the route (i.e., a cross drain feature, a stream crossing, or a sag in route profile). The E08 effectiveness criteria were applied to each separate segment. The Pacific Southwest Region BMPEP scoring system was applied to each set of segment data, resulting in an objective rating of "Pass," "Fail" or "At-Risk." This scoring system emphasizes whether or not route-generated sediment is delivered to a stream channel; any one E08 criterion which indicated sediment delivery to a channel automatically results in a "Fail" rating for that segment.

Ratings of "Fail" or "At-Risk" for one or more segments of a proposed trail did not necessarily result in a "Moderate," "High," or "Extreme" rating for the route, but did indicate that further investigation of that route was necessary before rating the route as "Low" for soil and water effects. Further investigation consisted of a subsequent field visit to investigate potential water quality effects and possible mitigation measures or a closer look at other data collected during the initial survey, such as route slope, route width, soil texture, frequency of cross drain structures, route location (near ridgetop or mid-slope), proximity to nearest stream channel, and route/stream crossing characteristics (including diversion potential).

Effectiveness criteria for evaluation E09, “Stream Crossings” were evaluated for every stream crossing on the proposed trails. “Pass”, “Fail” or “At-Risk” ratings were not determined for the E09 data because most of the E09 criteria (such as route and fill slope rilling, fill slope failure, and drainage ditch stability) are included in the E08 evaluation. However, four criteria are specific to stream crossings and are unique to the E09 evaluation (crossing scour at outlet, plugging and piping of crossing structures, and the crossing’s potential to divert the stream down the proposed trail). Effectiveness deficiencies observed for these four crossing criteria were considered in rating each route for soil and water effects. The diversion potential criterion is presented as an indicator for the direct and indirect effects analysis for each alternative. A minimum of two soil texture samples were collected on each route to indicate erosion potential of the route and to verify soil survey map units. Additional soil texture samples were collected where ground conditions and ocular observations indicated that the soil texture had changed significantly.

Copies of the Watershed Field Survey form and the BMPEP rating scheme are presented in the Soil and Water Resource Report, Appendix C in the project record. A summary of E08 ratings for all proposed trails surveyed to date are presented for each District in Appendix F, G and H of the the Soil and Water Resource Report in the project record.

3.5.4.2 The Field Survey Protocol: Potential Impacts, Assumptions and Limitations

3.5.4.2.1 Soil Resource

The principal concern or effect to be assessed for the soil resource is the potential for soil erosion and subsequent effects on soil productivity or the ability of the soil to produce vegetation. The 1988 Forest Plan establishes Standards and Guidelines to prevent significant or permanent impairment of soil productivity, and the Region 5 Soil Management Handbook establishes soil quality analysis standards (see above Section “Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction”). However, both documents only apply to areas dedicated to growing vegetation. Erosion of trail system surfaces, fill slopes and cut slopes are not a concern in regards to soil productivity because all of the routes proposed for addition to the NFTS currently exist on the landscape are no longer dedicated to growing vegetation. The proposed trail areas would be dedicated to motor vehicle use. Therefore, the soil quality analysis standards were not applied to the route areas proposed for addition to the NFTS. Erosion and sediment generated by system trail surfaces is a concern to water quality if there is potential for its delivery to a water feature. These factors were included in the analysis for water resource concerns.

Secondary effects from erosion are the loss of soil depth, infiltration capacity and permeability or reduction in the soil hydrologic function. Erosion of Forest landscapes due to cross-country travel on previously untracked areas is a concern to the soil resource because that erosion can disturb the A-horizon (organic-rich topsoil) portion of soil profiles (Figure 2) to the point where vegetative productivity in those disturbed areas is reduced.

Figure 2. Cross-country travel on previously untracked areas can modify surface water runoff timing and magnitude due to vehicle ruts, particularly on steep and/or moist slopes. Multiple passes could disturb the topsoil portion of the soil profile to the point where vegetative productivity is lost. Photo taken in 2003 near Smith Lake on Mount Hough Ranger District. This area was subsequently protected and restored using grant funds from the CA State Division of Off-Highway Motor Vehicle Recreation.

3.5.4.2.2 Water Resources

All road and trail templates that currently exist on the landscape, whether these templates are unauthorized routes or part of the NFTS, modify surface-water runoff timing and magnitude owing to interception of surface and subsurface runoff during rainfall and snowmelt events. Road and trail cut-slopes can intercept subsurface spring flows, causing groundwater flows that would have percolated slowly through the hillside to become surface flows that run much more quickly over land Figure 3). All road and trail surfaces intercept and concentrate precipitation and snowmelt to some degree. Runoff that would have been well dispersed and would have flowed slowly over well-vegetated hillsides is instead concentrated in roadside ditches or surface drains (rolling dips or waterbars), flowing much more quickly. The result is a modification of the natural watershed drainage regime that is created by nearly every road and trail on the landscape. This modification is frequently manifested as a network of unnatural, small drainage (i.e. stream) channels created by a road or trail.

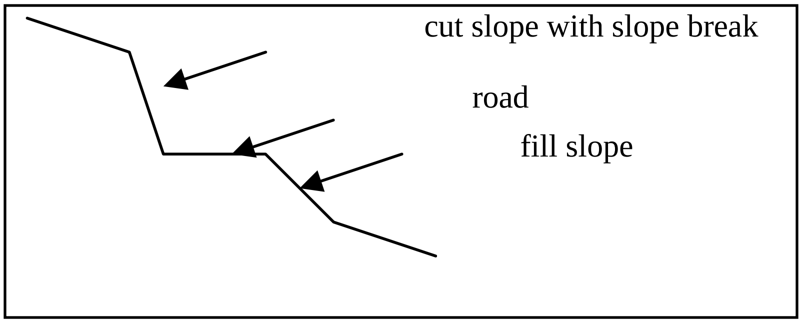


Figure 3. Typical cross section of a road template.

Cross-country travel on previously untracked areas can cause similar modification of surface water runoff timing and magnitude due to the vehicle track ruts that can occur (Figure 2). Such rutting occurs much more readily when ground conditions are wet in late fall and early spring.

The magnitude of effects to surface water runoff timing and volume caused by roads and trails may be insignificant for individual routes, particularly those located near ridge tops or in low-precipitation areas. However, even these individually insignificant effects can add up to cumulative effects that can accelerate stream erosion processes, resulting in the alteration of physical processes in streams and potential loss or degradation of beneficial uses of water in those streams. Watersheds with high route densities can result in significant and long lasting degradation of water quality and aquatic habitat.

A second potential impact to water resources of NFS roads, trails, and cross-country travel is the generation of erosion that can be delivered as fine sediments to stream channels. Runoff on nearly all road and trail surfaces will result in mobilization of at least some amount of fine material that will eventually leave the surface. The mean amount of road-generated sediment for gravel-surfaced roads can be as much as 16 times less than for native surface roads. (Coe 2006) Sedimentation effects are also substantially less for roads and trails that have been designed, constructed and maintained with quality drainage systems that disperse runoff effectively. However, roads and trails that are constructed with few or no surface drainage features (rolling dips or waterbars) or are entrenched, may result in runoff flowing down the surface for hundreds or thousands of feet. Other route templates that are sloped inward to the hillside will concentrate runoff in a roadside ditch that, if infrequently drained, may also run for hundreds or thousands of feet. Runoff that remains confined to a surface or ditch for long runs may gain enough flow magnitude to mobilize substantial amounts of fine material, resulting in surface ruts or eroding ditches (Figure 4).

This concentrated runoff from poorly drained roads and trails – and the sediment carried with it - will eventually flow off of the surface at the next down gradient cross drain feature, stream crossing, or natural sag in the road profile. The outlets of surface drains (rolling dips, waterbars, or ditch relief culverts) that are spaced too far apart are often observed to be significant and continual sources of sediment (Figure 5). Oftentimes on uncontrolled or poorly drained roads or trails, the runoff will leave the road or trail at an inopportune location, such as down a steep slope that is not well vegetated, resulting in additional erosion from the road or trail fill slope (Figure 6Figure 6). If the runoff is concentrated on a surface or in a ditch for a great distance, even well vegetated slopes can be badly eroded where the runoff leaves the road or trail, creating a perpetual source of erosion that can even cut through much of the road or trail template width, resulting in tons of sediment mobilized and delivered downslope. Further, runoff that is concentrated in ditches for long runs can also lead to under-cutting of the road or trail cutslope, adding more sediment to the ditch flow. For steep, unvegetated cut slopes, such undercutting may result in slopes so steep that the slopes will not be stable again for decades, until the slope ravels to the ridgetop.

Figure 4. In 2002, Road 22N25 on Feather River Ranger District exhibits severe rutting as a result of a poorly drained surface that concentrates runoff. This road was reconstructed in 2003.

Road/stream crossings are significant sources of sedimentation on NFS lands. Even well-drained roads and trails will likely deliver some amount of surface-generated sediment to stream channels at crossings. For the approximately 50-200 feet of a well designed road or trail surface (length depending upon the slope of the terrain) that approaches the stream channel on both sides of the crossing (between the crossing and the nearest surface or ditch cross-drain structure), there is really no other place for surface-generated erosion to go but into the stream channel or streamside vegetation buffer.

Apart from this inevitability, a second sediment impact frequently observed at stream crossings is diversion of the stream by the road or trail. Poorly designed, constructed, or maintained road or trail surfaces (e.g. rutted, entrenched roads or roads with berms created by poor grading practices) may capture the stream flow at crossings, sending the entire stream flow, including flood flows, down the road or trail surface. Eventually, this flow may leave the surface at inopportune locations, resulting in the drastic erosion sites described above (Figure 6).

Figure 5. Due to infrequent cross drain spacing, the outlet of this rolling dip on 22N25 was badly eroding and delivered sediment off of the road to the neighboring riparian area. This road was reconstructed in 2003. (Clipboard is shown for scale).

Culverts at road/stream crossings, even those that are properly sized and maintained, are susceptible to plugging during extreme flood events. Such plugging, usually initiated by woody debris caught across the span of the culvert inlet, may result in the flood flow over-topping the road or trail and returning to the channel over the steep, and oftentimes unarmored, crossing fill slope. In large floods, over-topping can cut through the entire width of the road or trail template at the crossing, resulting in tens to hundreds of tons of fine sediment delivered to the stream channel. Plugged stream crossings can also be captured and diverted down the road or trail, resulting in the drastic erosion events described above.

Active restoration or obliteration of one or more unauthorized routes or areas is not part of any of this project's action alternatives. Without active restoration or obliteration of road and trail templates (including out-slope and re-contour of road and trail areas to closely match the natural topography and removal of culverts and other stream crossing structures), some amount of the potential water resource effects described above will persist for periods of years to decades following prohibition of public motorized vehicle use on the Plumas National Forest. Impacts to water resources will be reduced, however, over this period due to the vegetative recovery that will occur on routes in which traffic is prohibited.

Figure 6. This bank erosion occurred on 22N25 during a normal precipitation year when concentrated surface drainage left the road at an inopportune location. The slump material was delivered to the RCA of Pinchard Creek, which is located less than 150 feet from the road. This road was reconstructed in 2003. (clipboard is shown for scale).

At a broad scale, sediment production from motor vehicle use of native-surfaced NFTS roads and trails is typically increased by higher levels of traffic and is reduced by proper design, installation, and maintenance of road drainage features (including out-sloped surface, rolling dips, waterbars, ditches, and ditch relief culverts).

3.5.5 Analysis Methodology for Each Project Alternative as a Whole:

As defined in the regulations for implementing NEPA, Code of Federal Regulations, Chapter 40, Sections 1500-1508, direct effects are those effects which are caused by the project actions and which occur at the same time and place as the action. Indirect effects are those caused by the action, which are later in time or farther removed in distance from the location of the action.

Direct and indirect effects of each project alternative will be analyzed together for three separate action components:

1. The prohibition of cross-country motorized vehicle travel
2. The addition of facilities (trails and/or areas) to the Plumas National Forest Transportation System (NFTS)
3. Changes to the existing NFTS, including deletions of existing facilities or changing the vehicle class and season of use for existing facilities

3.5.5.1.1 Direct and Indirect Effects of the Prohibition of Cross-Country Motorized Vehicle Travel.

Indicator # 1: Total mileage of proposed trails and roads open to motorized traffic on Plumas National Forest System lands

Short-term timeframe: 1 year

Long-term timeframe: 25 to 30 years

Spatial boundary: Area of land managed by the Plumas National Forest.

Methodology: A Geographic Information System (GIS) data layer was created for the road and trail locations proposed for each alternative. The route locations are based on information from the public (digitized from maps) and Global Positioning System (GPS) data from contractors and Forest Service Employees. This GIS data layer, the corporate NFTS roads GIS layer (created from PNF INFRA database), and the corporate GIS ownership layer were used to calculate the total miles of routes and roads open to motorized traffic by alternative. Limitations to this calculation include unauthorized routes not found during data call and errors in the INFRA database such as missing roads or included roads that had been removed from the NFTS.

Indicator # 2: Total mileage of proposed trails and roads open to motorized traffic on Plumas National Forest System lands that are situated in hydrologically sensitive areas

Short-term timeframe: 1 year

Long-term timeframe: 25 to 30 years

Spatial boundary: Hydrologically sensitive areas are Riparian Conservation Areas (RCAs) as defined by the 2004 SNFPA ROD.

Methodology: A GIS layer for hydrologically sensitive areas was created using known information from corporate GIS layers for PNF streams, lakes, and meadows. The GIS route location layer described above for proposed roads and trails, the corporate NFTS roads GIS layer, the hydrologically sensitive layer, and the corporate GIS ownership layer were used to calculate the total miles of routes, trails and roads open to motorized traffic within hydrologically sensitive areas by alternative. Limitations to this calculation include those mentioned above for Indicator #1 plus errors in the stream and meadow layers. The corporate stream layer is based on a crenulations model and some portions of the Forest are either over mapped or under mapped depending on the topography. The corporate stream type designation (perennial, intermittent, or ephemeral) was based on an office exercise, so the designations of these are not always accurate. The meadow and lake corporate layers only include the larger features identified on topographic maps.

Indicator # 3: Total mileage of proposed trails and roads open to motorized traffic on Plumas National Forest System lands by Maximum Potential Erosion Hazard Rating (EHR)

Short-term timeframe: 1 year

Long-term timeframe: 25 years on the westside and 30 years on the eastside

Spatial boundary: Area of land managed by the Plumas National Forest and maximum potential of EHR as defined by the Plumas National Forest Soil Resource Inventory, which is an Order 3 soil survey (USDA Forest Service 1989).

Methodology: EHR is a risk assessment of specific soil factors that induce accelerated erosion (USDA 1990). The purpose of the EHR is to: (1) evaluate the likelihood of accelerated sheet and rill erosion from a specific soil disturbing activity, (2) evaluate the risk for adverse consequences, and (3) identify approximate soil cover amounts needed to achieve an acceptable risk. A corporate GIS soil layer was created based on the PNF Soil Resource Inventory, including the calculated maximum EHR for each soil map unit. The Plumas National Forest Soil Resource Inventory (USDA 1989) was a broad survey and identifies general soil map units; it does not delineate the exact location of each soil type. Map unit soil textures for trails proposed for addition to the NFTS were confirmed using the soil texture samples described in the Site Specific Analysis section above.

The GIS route location layer described above for proposed roads and trails, the corporate NFTS roads GIS layer, the soil layer, and corporate GIS ownership layer were used to calculate the total miles of proposed NFTS trails by EHR for each alternative. Limitations to this calculation include those mentioned above for Indicator #1 plus the fact that the soil layer only includes broad general information about soil map units.

While similar in nomenclature, note that the “Low”, “Moderate”, “High”, and “Very High” categories that result from the EHR assessment are distinct from the “Low”, “Moderate”, “High”, and “Extreme” soil and water resource effect ratings that are determined for each trail proposed for addition to the NFTS (Appendix A). The purpose of the EHR indicator is to give a broad description, for each alternative, of how the prohibition of cross-country motorized vehicle travel would affect the number of miles of motorized roads and trails located in areas at risk of accelerated erosion. The EHR categories are not used to make site-specific determinations of soil and water resource effects for individual trails proposed for addition to the NFTS.

3.5.5.1.2 Direct and Indirect Effects of adding trails and areas to the NFTS, including identifying seasons of use and vehicle class.

Short-term timeframe: 1 year

Long-term timeframe: 25 or 30 years

Spatial boundary: Area of land managed by the Plumas National Forest

Indicator(s): (1) BMP Evaluation E08 Rating (Pass, Fail or At-Risk) for each segment of each trail proposed for addition to the NFTS; (2) Stream Diversion Potential at stream crossings for each trail proposed for addition to the NFTS

Methodology: Field survey methodology and the process for developing E08 ratings are described above under “Site Specific Analysis Indicators for Existing Unauthorized Routes.” E08 ratings of “Fail” or “At-Risk” for one or more segments of a proposed trail indicated that further investigation was necessary. Further investigation consisted of a second field visit by a PNF hydrologist or a closer look at other data collected during the initial survey and other site-specific information available in PNF files. Second field visits investigated the scale of potential water quality impacts from the proposed route and possible maintenance or mitigation measures available. All routes rated as “High” or “Extreme” were visited by a PNF hydrologist. The number of Stream Diversion Potential locations was totaled for each proposed route and each alternative from the diversion potential data gathered during the initial field surveys.

3.5.5.1.3 Direct and Indirect Effects of Changes to the existing NFTS

The only change to existing NFTS facilities would be the mixed use proposed for approximately 4.1 miles of National Forest System roads in Alternatives 4 and 5. These alternatives would allow non-highway legal vehicles to use the Slate Creek Road as shown in Chapter 2 under the descriptions of the alternatives. Direct and indirect effects to soil and water resources due to changes in the vehicle class allowed on existing NFTS facilities are expected to be negligible. Allowing narrower, non-street legal vehicles to travel existing NFS roads would not lead to a change in the width of those roads.

3.5.5.1.4 Cumulative Effects of the Three Alternative Components as a Whole

As defined in the Code of Federal Regulations, Chapter 40, Sections 1500-1508, cumulative effects are those effects "on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time."

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 25 to 30 years

Spatial boundary: Motorized road and trail density calculations are based on watersheds created for the Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act EIS and ROD. These watersheds are generally on a HUC -7 scale.

Indicator: Density based on miles per square mile (mi/mi^2) of proposed trails and roads open to motorized traffic on public and private lands within Plumas National Forest watersheds.

Methodology: The route location GIS layer described above was used in conjunction with the HFQLG watershed GIS layer, and the corporate NFTS roads GIS layer to calculate the total miles of routes, proposed trails, and roads open to motorized traffic on both public and private lands for each alternative. Limitations to this calculation include unauthorized routes not found during data call and errors in the INFRA database such as missing roads or included roads that were removed from the NFTS; additionally, there isn't a HFQLG watershed identified in the Paradise area (see the Soil and Water Resource Report, Appendix D—Watershed Maps in the project record).

As stated above, the combination of the three action components analyzed for direct and indirect effects was then added to past, present and reasonably foreseeable actions to analyze the cumulative effects of implementing each alternative as a whole.

Past actions are represented by the existing condition of Plumas National Forest watersheds. The existing condition of Plumas National Forest watersheds and the sensitivity to disturbance of these watersheds were analyzed in Appendix N of the 1999 Final EIS for the Herger-Feinstein Quincy Library Group Forest Recovery Act (HFQLG FRA) (see the Soil and Water Resource Report, Appendix E in the project record). This analysis was performed for all watersheds containing Plumas National Forest System lands. The watersheds were analyzed at a scale that ranged between Hydrologic Unit Code 7 (HUC-7) and HUC-6. The watersheds range in size from 1,192 to 23,516 acres, with a mean of 8,536 acres. Watershed sensitivity ratings for each watershed were developed based upon Erosion Hazard Rating, the percent of the watershed in slopes greater than 60%, the percent alluvial stream channels, rain-on-snow or thunderstorm potential, and vegetative recovery potential. Watershed condition ratings for each watershed were developed based upon road density, road/stream crossing density, condition of alluvial stream channels, and percentage of land disturbed. The sensitivity rating and condition rating for each watershed were multiplied to derive a sensitivity condition rating, which determined a risk of cumulative watershed effects of low, moderate, high or very high.

The condition and sensitivity of these Plumas National Forest watersheds, i.e. the existing condition of these watersheds, has changed little since that 1999 HFQLG FEIS analysis. More than 15 miles of alluvial channels have been restored since 1999; particularly eastside meadow channels that had been subjected to head-cuts and gully erosion, but the length of these reaches total a relatively small amount of the total alluvial stream channels that exist on the Forest. Data presented in the 2008 HFQLG FRA Pilot Project Monitoring Report to Congress for “Question 17: What is the effect of activities on indicators of watershed condition?” indicate that little change in watershed condition has occurred since 1999 (Table 28). Road density decreased approximately 3.0%, primarily due to obliteration of more than 80 miles of road implemented by Plumas National Forest staff. The number of road/stream crossings decreased by 1.8% (a total decrease of 57 crossings), again due primarily to the obliteration of roads mentioned above. Near-stream road density decreased by 5.5%, a larger percent decrease than the total road density decrease because the road obliteration projects were focused on roads that contributed significant volumes of sediment to stream channels.

Table 28. Summary of HFQLG Question 17 Monitoring Plan Results (2008).

Watershed Condition Indicator	Total acreage of sub-watersheds reporting	Unit of Measure	Pre-Project Condition	Post-Project Condition	Percent Change
Road Density	788,000 acres	miles per square mile	2.97	2.88	- 3.0%
Near-Stream Road Density	308,000 acres	miles per square mile	3.62	3.42	- 5.5%
Equivalent Roaded Acres (ERA)	1,220,000 acres	equivalent roaded acres	61,800 (5.1%)	79,400 (6.5%)	+ 28%
Near-Stream ERA	17,700 acres	equivalent roaded acres	472	489	+3.6%
Number of Road/Stream Crossings	571,000 acres	number	3,108	3,051	- 1.8%

The percentage of land disturbed in Plumas National Forest watersheds has increased since the 1999 HFQLG EIS as reflected in the reported increase in Equivalent Roaded Acres (ERA). The ERA measure is derived from site disturbance coefficients used to track general changes in hydrologic function of watersheds. The coefficients have been developed by comparing the effect of a land use activity to that of a road in terms of altering surface runoff patterns and timing. For example, the

Plumas National Forest has typically modeled one acre of single-tree selection harvest with tractor yarding as being equivalent to 0.15 to 0.2 acres of roaded landscape. The ERA increase of 17,600 acres across the entire HFQLG FRA pilot project area, as reported in the 2008 Monitoring Report, when expressed as a percentage of watershed area, results in a 1.4% average increase (from 5.1% to 6.5%). However, this average increase results when the ERA increase is applied to only the HUC-8 subwatershed areas in which work occurred (a total of 1.220 million acres). Much of the HFQLG watershed areas were devoid of work between 1999 and 2008. When the ERA increase of 17,600 acres is applied over the entire area of HFQLG watersheds in which work occurred (2.256 million acres), the resulting average increase is 0.8%.

To describe existing condition, the ERA increase for each HFQLG watershed that includes Plumas NFS lands is presented in the Soil and Water Resource Report, Appendix E in the project record. Between 1999 and 2008, work has occurred in 80 HFQLG watersheds. The data indicate that the change in ERA for these watersheds, expressed as a percentage of the HFQLG watershed area, ranges from -0.85% to 7.92% with an average increase of 0.94%. The median increase is 0.39%. The reported ERA increases are predominantly due to vegetation management actions (group selection and fuel reduction thinning treatments) that have occurred under the HFQLG FRA Pilot Project. Designs for these vegetation projects are closely controlled to assure that the resulting ERA model outputs for the project watersheds, when expressed as a percentage of total watershed area, do not cause exceedance of the prescribed Threshold of Concern (TOC). Predominantly, the TOC for Plumas NF watersheds is prescribed to be 12-14% of the watershed area.

To further describe existing condition, since 1999, none of the analyzed PNF vegetation management projects have resulted in an exceedance of the TOC for any of the project watersheds (except for the burned area projects discussed in the paragraph below). In most cases, the ERA increase (0.8% on average, as stated above) is minor and leaves the analysis watershed well below threshold. For the remaining watersheds, including the one that experienced the 7.9% increase in ERA and several others that were close to the TOC under the pre-project condition, vegetation management activities are minimized or controlled so that the TOC is not exceeded.

In the past year, several vegetation management projects have been proposed on PNF lands to recover timber from areas that were severely burned in the wildfires of 2007 and 2008. High-intensity wildfire has left much of these areas with diminished levels of effective ground cover to disperse precipitation and runoff and protect soils from accelerated erosion. These projects do propose timber harvest and management actions in watersheds that have ERA totals that exceed the TOC. Modeling for these projects typically indicates that the management activities would result in additional ERAs, but the additional ERA total is a small fraction of the ERAs that were added as a result of the fire. For example, for the proposed action for the Moonlight and Wheeler (2007 Fires) Fire Recovery and Restoration Project, the Indian Creek watershed below Antelope, Babcock was modeled to have a total ERA of 19.7% of the watershed area, well in excess of the 13% TOC (USDA 2009). However, just 1.9% of the ERA was attributed to the proposed timber management actions and 16.6% was attributed to the watershed effects of the high-intensity wildfire. Watershed effects attributed to wildfire are typically short-lived as brushy vegetation quickly establishes effective ground cover within 2-3 years.

The addition of unauthorized routes to the NFTS as trails would not increase the percentage of land disturbed because these routes already exist on the landscape. The prohibition of cross-country travel would reduce future land disturbance on the Forest and would allow passive recovery of unauthorized routes that have already disturbed the landscape.

ERA values are reported in Appendix E of the Soil and Water Resource Report only to describe existing condition. As stated above, for this FEIS, motorized road and trail density is used as the indicator for cumulative watershed effects. For Forest timber projects, the typical indicator used to assess cumulative watershed effects is ERA, but ERA is not a good indicator for this project. To illustrate this, consider that for watershed 110067, the watershed with the highest existing motorized route density (6.48 mi/mi^2), the total miles of routes in the watershed (92 miles) comprises less than 2% of the watershed area, a small fraction of the TOC (Table 29). The total mileage of unauthorized routes in this watershed is 39 miles. Allowing for the narrower width of these routes, the unauthorized routes comprise less than 0.4% of the watershed area, a small and likely insignificant fraction of the typical TOC. Unlike timber projects that can affect broad areas of a watershed, the relatively small area disturbed by motorized routes does not reflect the effect these routes can have on watershed condition. The effect of greatest concern to watershed condition is not the area disturbed but, rather, the general effect of motorized roads and trails concentrating natural runoff patterns and often channeling runoff to a point that leads to excessive erosion of the route and adjacent landscape. Narrow trails can disrupt natural drainage patterns and concentrate runoff to the same degree as roads. Therefore, total motorized road and trail density was chosen as the indicator for analyzing cumulative watershed effects.

For each alternative, the density of roads and routes that would be open to motorized vehicle traffic within each analysis watershed is compared with a cautionary density value. The cautionary value does not represent an exact level at which a detrimental Cumulative Watershed Effect (CWE) would occur. Rather, it serves as a “yellow flag” indicator of risk of significant adverse cumulative effects occurring within a watershed. Analysis watersheds that have exceeded this density level require additional, focused analysis, as presented below in the “Environmental Consequences” section. The exact level of road/route density that would result in a detrimental CWE is dependent upon a variety of factors that are specific to each analysis watershed. These factors include soil type, hillslope gradient and road location. Based upon past experience and observations on the Plumas NF, for the purpose of this project analysis, Forest watershed staff has determined a road/route density cautionary level of 4.0 miles per square mile. Watersheds with motorized road and route densities that have exceeded this threshold are at risk of detrimental CWE.

A short-term timeframe is not applicable to the cumulative effects analysis. For existing unauthorized routes that are not proposed for addition to the NFTS, it will be assumed that passive recovery of soil cover and the vegetative productivity of soils, with concurrent reductions in erosion and sedimentation from road surfaces, will occur over a 25 year period on the westside and 30 year period on the eastside. As stated above, effects to soil and water resources due to changes in the vehicle class allowed on existing NFTS facilities are expected to be negligible. The vast majority of soil and water resource effects of the unauthorized routes and areas that are proposed for addition to the NFTS have already occurred since these routes currently exist on the landscape. It is assumed that all of the reasonably foreseeable actions presented in Appendix C will proceed in the future regardless of which project alternative is selected.

3.5.6 Affected Environment

3.5.6.1 Climate

Weather in the planning area follows a Mediterranean pattern of wet winters and dry summers. East of the Sierra crest, marine influence lessens and there is a greater range in daily and seasonal temperatures, lower precipitation and humidity, and rain from summer thunderstorms is normal. Most precipitation on both sides of the crest falls as winter frontal disturbances are lifted and cooled over the mountains.

Over 95% of the precipitation in the planning area occurs during winter months. Precipitation ranges from 15 inches on the eastside of the Sierra crest, to as much as 90 inches on the westside. Winter temperatures below 0°F and summer temperatures above 100°F have been recorded. Snowpack is common from December through May at elevations above 4,000 feet, although individual winter storms may bring rain to the highest elevations. Thunderstorms generally occur during the summer months and most frequently on the eastside of the range.

3.5.6.2 Watershed Condition

Streamflow in the planning area corresponds to seasonal precipitation, with low flows during summer and fall, and higher flows during winter and spring. Floods can occur throughout winter and spring, with large peak flows causing major flooding. Storm events that cause these peak floods occur approximately every 1 to 10 years (Department of Water Resources: California Climate Facts, circa 1960). Warm mid-winter rainstorms on snowpack generate most large floods.

The watersheds in the planning area are composed of a variety of soil types that influence the timing of water movement to streams. Some soils contribute to rapid runoff and abrupt increases in streamflow during storm events. Other soils moderate runoff and streamflow. Shallow soils usually generate quicker winter and spring runoff than deeper soils do. Deep soils not only absorb and store more water than shallow soils, they also release more to summer flows. The deep soils of large alluvial areas, such as meadows, not only store and release water, but moderate high flows and increase late season flows (USDA 1999).

A combination of road construction, soil compaction, ground cover reduction, and degradation of stream channels and riparian conditions has generated "accelerated over natural conditions" runoff and sediment yields from many watersheds (USDA 1999).

Streams in the planning area range from high gradient (usually headwater channels that are sources and transporters of sediment, water, nutrients, and large wood), to low gradient channels (usually in riparian ecosystems), which can be very sensitive to changes in the amount of water and sediment delivered to them. Degradation of Sierra Nevada streams, and their aquatic and riparian ecosystems, has been linked to dams, reservoirs, water diversions, livestock grazing, invasive species, mining, water pollution, roads, logging, direct changes to stream channels and stream flows, and recreational and residential developments (USDA 1999).

The low gradient channels of the east and central areas generally flow through large, wide meadows. On the westside, channels more often flow through narrow valley bottoms. Most meadow streams were once a braided network of shallow channels that overflowed their banks each year and covered the meadows with water. The meadows remained wet most of the year, slowly releasing water to downstream reaches well into the dry season. Today, most of these meadow channels have been deeply gullied. Rather than holding water close to the surface of the meadow, gullied streams are deep and wide enough to contain most flood flows and subsequently drain much of the water from meadows early in the dry season. Through this process, wetland areas have evolved into dry lands that foster dry land conditions and species (USDA 1999).

3.5.7 Environmental Consequences

3.5.7.1 Alternative 1

As described in Chapter 2 of this EIS, under the No-action alternative (Alternative 1), current management plans would continue to guide management of the project area. No changes would be made to the current NFTS, and no cross-country travel prohibition would be put into place. The Travel Management Rule would not be implemented, and no Motor Vehicle Use Map (MVUM) would be produced. Motor vehicle travel by the public would not be limited to designated trails. Unauthorized routes would continue to have no status or authorization as NFTS facilities. Routes would continue to proliferate.

1. **Cross-country travel**: For Alternative 1, motor vehicle travel off designated NFTS roads, NFTS trails and areas by the public would continue except as prohibited by Forest Order.
2. **Roads, Trails and Areas Added to Existing NFTS**: No roads, trails or areas are proposed for addition to the NFTS under Alternative 1.
3. **Changes to the Existing National Forest Transportation System (NFTS)**: None are proposed in Alternative 1.

3.5.7.1.1 Direct and Indirect Effects:

3.5.7.1.1.1 Alternative 1, Action Component 1: Prohibition of Cross-Country Vehicle Travel

Under Alternative 1, cross-country motorized travel would be permitted on Plumas National Forest areas beyond the authorized NFTS. Approximately 5,023 miles of existing routes and roads on Plumas NFS lands would be available to motorized traffic (Table 31), including 2,183 miles situated in hydrologically sensitive areas. Motorized traffic would be prohibited on none of the miles of existing, unauthorized routes (totaling 1,107 miles) that are currently open to motorized traffic, including 459 miles of existing routes situated in hydrologically sensitive areas. As described above, direct and indirect effects to water resources due to motorized travel on these routes include increased peak flows and sediment loads.

Past cross-country motorized travel on these unauthorized routes has resulted in soil compaction and erosion of the A-horizon portion of soil profiles to the point where vegetative productivity in those disturbed areas is significantly reduced. Certain soil types are more susceptible to erosion. Table 31 displays the number of miles of NFTS routes on Plumas NF lands available to motorized traffic within the different Erosion Hazard Rating categories. Direct and indirect effects to soil resources due to the continuation of cross-country traffic include a continuation of these soil compaction and erosion effects.

In the short term (considered to be a 1-year timeframe for the purpose of this analysis), the unauthorized routes disturbed by motor-vehicle use would not change because these routes would still be open to motorized traffic. The short-term reductions in sediment delivery to stream systems in the vicinity of these routes predicted for Alternatives 2 through 5 would not occur.

Restoration of soil vegetative productivity would potentially not occur on the 1,107 miles of unauthorized routes as a result of Alternative 1 because motorized traffic would not be prohibited on these areas. Vegetative recovery would presumably occur on some of these routes if public members are not interested in traveling upon them over the long term. However, without a defined prohibition, it is difficult to predict how many routes would experience vegetative recovery. Without vegetative recovery, these unauthorized routes would not regain their hydrologic and geomorphic functions over the long term (considered to be a 25 to 30 year timeframe for the purpose of this analysis).

With continued motorized traffic, the increased peak flow effect that has occurred to date as a result of these unauthorized routes will remain over the long term because the road templates will continue to intercept subsurface runoff and concentrate surface runoff. Additionally, without vegetative recovery, unauthorized routes with continued motorized traffic would not experience the decreased amounts of erosion sediment delivery to area stream channels that would be experienced under Alternatives 2 through 5.

Cross-country traffic on areas that are currently untracked would not be prohibited under Alternative 1. The potential would exist for proliferation of new unauthorized routes with the same type of effects to soil and water resources that are observed on existing, unauthorized routes. Erosion and disturbance of the A-horizon (organic-rich topsoil) portion of soil profiles in areas that are currently untracked could occur, impacting soil vegetative productivity. Modification of surface water runoff timing and magnitude due to vehicle track ruts on currently untracked areas could occur, particularly on steep slopes, impacting water resources downslope of those areas.

3.5.7.1.1.2 Action Component 2: Addition of Facilities (Routes and Areas) to the NFTS

Direct and indirect effects for this component are not applicable to Alternative 1 because no facilities are proposed to be added to the NFTS.

3.5.7.1.1.3 Action Component 3: Changes to the existing NFTS

Direct and indirect effects for this component are not applicable to Alternative 1 because no changes to the existing NFTS are proposed.

3.5.7.1.2 Cumulative Effects

When compared with Alternatives 2 through 5, no apparent long-term (25-30 year) benefit to soil and water resources would occur under Alternative 1 because motorized traffic would be allowed on all

1,107 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic. Additionally, potential risks to long-term watershed condition are apparent under Alternative 1 as a result of the potential for further proliferation of cross-country traffic on areas that are currently untracked. Erosion and disturbance of the A-horizon portion of soil profiles in areas that are currently untracked would likely occur, potentially impacting soil vegetative productivity. Modification of surface water runoff timing and magnitude due to vehicle track ruts on currently untracked areas would likely occur, particularly if such use occurred on steep slopes, potentially impacting water resources downslope of those areas.

The net effect of past, present and reasonably foreseeable actions on each subwatershed is indicated by the total mileage and density of routes and roads open to traffic on public and private roads within the watershed (Table 31). Road and route density could continue to proliferate under Alternative 1 but would decrease significantly under Alternatives 2 through 5. It is possible that some existing unauthorized routes could revegetate due to lack of motorized traffic on routes that no longer hold interest to the public. This would decrease cumulative impacts to Forest soil and water resources. However, there is a greater possibility that the number of unauthorized routes would increase without a prohibition on cross-country motorized travel, resulting in an increased cumulative impact to Forest soil and water resources.

3.5.7.2 Alternative 2

As described in Chapter 2 of this EIS, the Proposed Action (Alternative 2) consists of these proposed changes to the NFTS and the prohibition of cross-country travel.

1. **Cross-country Travel**: Motor vehicle travel off designated NFTS roads, NFTS trails and areas by the public except as allowed by permit or other authorization would be prohibited.
2. **Trails and Areas Added to the Existing NFTS**: For Alternative 2, a total of 361 miles of existing, unauthorized routes are proposed to be added to the NFTS as trails open to motorcycles, ATVs, a combination of these two vehicle types, or all vehicles. Also, the 36-acre Sly Creek area would be open year-round to motorized vehicles with widths that do not exceed 50”.
3. **Changes to the Existing National Forest Transportation System (NFTS)**: no changes proposed.

3.5.7.2.1 Direct/Indirect Effects

3.5.7.2.1.1 Alternative 2, Action Component 1: Prohibition of Cross-Country Vehicle Travel

The effect of the prohibition of cross-country motorized travel would be to end traffic on Plumas National Forest areas beyond the authorized NFTS. For Alternative 2, 4,301 miles of routes and roads on Plumas NF lands would be available to motorized traffic (Table 31), including 1,857 miles situated in hydrologically sensitive areas. Motorized traffic would be prohibited on at least 746 miles of existing, unauthorized routes that are currently open to motorized traffic, including 325 miles of existing routes situated in hydrologically sensitive areas. Direct and indirect effects to water resources due to prohibition of motorized travel on these routes include reduced peak flows and sediment loads.

Past cross-country motorized travel on these routes has resulted in soil compaction and erosion of the A-horizon portion of soil profiles to the point where vegetative productivity in those disturbed areas is significantly reduced. Certain soil types are more susceptible to erosion. For Alternative 2, Table 31 displays the number of miles of NFTS routes on Plumas NFS lands available to motorized traffic within the different Erosion Hazard Rating categories. Direct and indirect effects to soil resources due to prohibition of cross-country traffic include cessation of these soil compaction and erosion effects.

In the short-term (considered to be a 1-year timeframe for the purpose of this analysis), the unauthorized routes and areas disturbed by motor-vehicle use would not change much because removal of vegetation, compaction of soils, and alteration of drainage patterns require time to heal without active restoration. Thus, short-term reductions in peak flows would be small and unquantifiable since the routes would continue to intercept and concentrate surface flows. However, short-term reductions in sediment delivery to stream systems in the vicinity of these routes would be realized. Erosion of native-surfaced roads and routes is typically higher for routes with active motorized traffic.

Due to the highly compacted condition and the loss of A-horizon for soils in many of these areas, this analysis assumes that full restoration of the original soil productivity would not occur as a result of traffic prohibition alone. However, analysis indicates that, by prohibiting traffic, all of these routes hold the potential to substantially revegetate and regain much of their hydrologic and geomorphic functions over the long term (considered to be a 25 to 30-year timeframe for the purpose of this analysis). Vegetation growth on lands throughout the Forest is typically vigorous, due to favorable climate and precipitation. Additionally, needle scatter and litter fall from nearby trees is usually sufficient to provide seed source and the soil cover and organic input necessary to facilitate re-growth of vegetation. Recent experience in closing and obliterating roads on all three Ranger Districts indicate that for the vast majority of the obliterated road areas the addition of straw mulch is not necessary to provide the cover necessary to protect and keep soils in place or to restore sufficient organic concentrations in the soils. Needle scatter and placement of slash is typically sufficient to provide soil cover.

The Plumas NF land base totals approximately 1.146 million acres. Re-vegetation of 746 miles of existing unauthorized routes under Alternative 2 could restore productivity on, at most, 800 acres of Forest land (less than 0.07% of the land base). The addition of 361 miles of routes to the NFTS would likely preclude productivity on no more than 400 acres of PNF land (less than 0.04% of the land base). For all action alternatives, the revegetation of existing unauthorized trails is important for hydrologic function but amounts to little in terms of the amount of productive land on the Forest.

With regard to soil compaction, the recent Long-term Soil Productivity (LTSP) study indicates that severe compaction of forest soils does not preclude the re-establishment of vegetation (Powers 2005). The National ten-year results indicate that soil compaction effects on total biomass productivity (all vegetation within a site, not just tree growth) differs depending upon the soil particle size or soil texture, along with other factors such as initial bulk density, rock content, and climate. On soils characterized as “sandy”, compacted plots had greater biomass productivity than uncompacted plots; on soils characterized as “loamy”, compaction resulted in little change in biomass productivity; and on soils characterized as “clayey”, compaction resulted in up to a 50% reduction in biomass productivity at particular sites in the Southern Coastal plains, primarily in areas with poor soil drainage or high water table. This ten-year publication incorporated results from 6 of the 12 California sites. Recently in June 2007, during the National LTSP Conference, additional results were presented by David Young (R5 North Zone Soil Scientist) incorporating 9 of the 12 California sites to reach ten years; these sites include all study sites within the Sierra Nevada (including Challenge Experimental Forest located on the Feather River Ranger District of the Plumas National Forest). The latest results have concluded that severe soil compaction, even at degrees that far exceed what is considered detrimental by Regional analysis standards (a vibrating drum roller, typically used in highway construction, was used), has little effect on soil productivity at most sites, at least at ten years of growth (based on personal communications with David Young, June through July 2007). These results will be revisited and published after ten year data is available for all 12 California LTSP sites. It is clear from this study and observations of roads closed in the past on the Forest, that compacted road surfaces are typically still capable of absorbing and holding the water necessary to support vegetative recovery in the Mediterranean climate of the Plumas National Forest.

Active restoration or obliteration of unauthorized routes (including out-sloping and re-contouring routes to closely match the natural topography and removal of culverts and other stream crossing structures) is not a part of any of the project alternatives because effects analysis for the ground disturbance associated with obliteration of each existing route was not feasible on the timeframe available for this EIS. Future PNF projects will investigate and prioritize existing routes that need active restoration to ameliorate soil and water impacts. Funding sources, both inside and outside the USFS, will be utilized to perform NEPA planning and on-the-ground implementation of needed obliteration.

Without active restoration, much of the increased peak flow effect that has occurred to date as a result of these unauthorized routes will remain over the long term. The route templates, including any cut slopes, ruts, ditches, or culverts that currently exist, will continue to intercept subsurface runoff and concentrate surface runoff. However, the long-term establishment of vegetative growth on these routes will somewhat reduce area peak flows. More significantly, this vegetation will substantially decrease the amount of erosion from these areas and the amount of sediment delivered to area stream channels. The vegetative canopy will intercept precipitation and significantly reduce detachment of soil particles from the former route surface due to rain-splash erosion. Stems that grow on the route surface will intercept surface runoff, slowing and lengthening the runoff flow path to reduce the occurrence of concentrated runoff that generates erosion. Roots of vegetation that re-grows on these routes will act to hold vast areas of soil in place. Re-established vegetation will transpire a significant portion of precipitation that formerly ran down and off the road surface.

In addition to soil and water improvements realized by the prohibition of motorized traffic on these 746 miles of existing unauthorized routes, prohibition of cross-country traffic on areas that are currently untracked would prevent the same type of effects to soil and water resources that are observed on existing, unauthorized routes. Erosion and disturbance of the A-horizon (organic-rich topsoil) portion of soil profiles in areas that are currently untracked would be prevented, protecting soil vegetative productivity. Modification of surface water runoff timing and magnitude due to vehicle track ruts on currently untracked areas, particularly if such use occurred on steep slopes, would be prevented, protecting water resources downslope of those areas.

Unauthorized use of existing routes by motorized traffic following prohibition could delay or prevent recovery.

3.5.7.2.1.2 Alternative 2, Action Component 2: Addition of Facilities (Routes and Areas) to the NFTS

Alternative 2 proposes to add 361 miles of existing, unauthorized routes to the NFTS. Additionally, Alternative 2 would allow year-round motorized vehicle traffic within the 36-acre Sly Creek area. In general, any direct and indirect effects to soil and water resources caused by motorized travel on these previously unauthorized routes have already occurred. Water resource effects that have already occurred include modification of surface-water runoff timing and magnitude owing to interception of surface and subsurface runoff during rainfall and snowmelt events. Water resource direct effects that have already occurred also include the generation of erosion that can be delivered as fine sediments to stream channels. Indirect effects that have already occurred include potentially significant and long lasting degradation of water quality and aquatic habitat. Direct effects to soil resources that have already occurred include a loss of vegetative productivity for the routes and areas subjected to motorized vehicle traffic, due to loss of soil cover, soil compaction, and loss of soil hydrologic function.

Of the 361 miles of trail proposed under Alternative 2, roughly 30 miles are described in Appendix A as being redundant (4 miles), system roads already on the NFTS (6 miles), routes with access issues (4 miles), or routes that were not located by PNF surveyors (16 miles). These proposed routes are not included in the direct and indirect effects indicator data for this section.

For Alternative 2, E08 evaluation data indicates that 126 miles (35% of the 361 miles proposed for addition to the NFTS) contain at least one segment that rates as “Fail” for effectiveness in protecting water quality (Table 31). Typically, these segments “fail” because of delivery of route-generated sediment to stream channels or because the route has captured a stream channel. Over half of these effects can be mitigated (Table 31). For Alternative 2, 122 route/stream crossings were observed to either be currently diverting stream flow down the route surface or having the potential to divert stream flow if the route/stream crossing plugged. “Moderate”, “High” or “Extreme” ratings for soil and water resource effects were rated for 331 proposed miles of trails, meaning that soil and water effects are currently adverse or have the potential to be adverse in the future. Of these 331 miles, 72 miles are rated as “High”, meaning that soil and water effects are currently adverse but can be mitigated. Fifty-four miles of routes proposed under Alternative 2 are rated “Extreme” for soil and water effects, meaning that effects are currently adverse and effective mitigation of these effects in the route’s current location is not available within the scope of this FEIS, typically due to physical or topographic constraints. For example, many of the “Extreme” routes are located along stream channels on steep, erosive soils and are entrenched, a combination that results in no viable alternative for adequately draining the route to prevent sediment from entering the channel. Other “Extreme” routes are located within active stream channels and would require a new location, a mitigation that is beyond the scope of this EIS. Site specific survey, effects and mitigation information for each route is included in Appendix A of the FEIS and Appendices F, G, and H of the Soil and Water Resource Report, in the project record.

Site-specific mitigations would include addition or modification of route drainage features (out-sloping, rolling dips, waterbars, or ditch-relief culverts) and addition or modification of existing route stream crossing structures. Where applied, these mitigations will ameliorate water quality impacts that are currently adverse along the proposed routes by dispersing runoff and surface drainage or by stabilizing stream crossings. Routine maintenance of these mitigations would also assure long-term sustainability of the proposed trails. Short-term water quality impacts associated with installation of these mitigations would be prevented by applying BMPs during construction.

3.5.7.2.1.3 Season of Use Mitigation

On the Feather River Ranger District there are two areas, Flea Mountain and French Creek Basin, where a wet season closure is needed below 4,000 feet in elevation. A wet season closure is a project designed mitigation measure for protecting native surfaced roads and trails that are susceptible to rutting and soil erosion. Rutting is the creation of furrows or grooves in the travel way due to vehicle travel when the soil strength cannot support the weight of the vehicle. Ruts commonly occur when the soil and subgrade are saturated, causing the soil strength to be low. Rutting causes direct damage to travel-way treads, concentrates runoff that can lead to gully erosion, leads to trail widening, loss of vegetation, ground cover, and organic material and increased compaction beyond desirable conditions. Wet season use can also damage drainage structures such as rolling dips, waterbars, and other waterbreaks. In contrast to rutting, compaction of the designated travel way is beneficial in creating a good running surface in native materials. Compaction is optimal when soil voids are only partially filled with water, rather than fully saturated.

The primary objectives of the wet season closure are to protect the drainage structures from damage, to protect the road or trail tread from rutting and other damage, and to minimize impacts to soil productivity and water quality at stream crossings or where drainage off of roads or trails becomes concentrated, potentially carrying sediment and other materials into stream courses.

Typically, both surface soils and subsoils are dry at the start of the fall and winter rainy season. During the first rains only the surface soil is wetted while the subsoil remains dry, and has high strength. The interface between moist and dry soil is the wetting front. As precipitation falls during the season, a portion of the moisture moves into and through the soil, increasing the depth of wetting front. The characteristics of the rainfall events in the Fall are important in determining how and when this wetting front progresses and when tread damage may occur. Early in the fall season, soils are not fully saturated, and so the soils can become compacted from vehicle travel, rather than rutted. Since native surface road and trail treads are commonly already compacted, these surfaces take up water more slowly, and can sustain travel following early season precipitation without tread damage. In fact, early season travel can be beneficial after a light rain on a previously dry fluffy tread because it helps to compact and strengthen the tread.

Near the end of the winter season and into the spring, soils are typically moist or wet throughout, including road or trail treads and subgrades. These soils begin to dry at the surface as precipitation ends and as evapotranspiration exceeds precipitation. This interface between dry soil above and wet (or saturated) soil below is called a drying front. Under a drying front, soils can be dry at the surface, but can be wet and have low strength below the surface. When subgrades are wet, traffic can damage treads by “pumping”, whereby there is an increase in the pore water pressure and subsequent weakening of the soil strength. Damage to road and trail treads can also occur when the dryer surface is not thick enough or strong enough to bear the traffic and is broken through.

The Feather River Ranger District is located on the west side of the Sierra Nevada Mountains, within an area of Mediterranean climate, characterized by a rainy, wet winter season and a dry summer season. Above about 7,000 feet, nearly all of the winter precipitation comes as snowfall. Below 7,000 feet, fall through spring precipitation is a combination of rain and snow. Rain/snow mix especially occurs below 4000 feet.

Figure 7 includes monthly precipitation data collected by California Department of Water Resources between 1996 and 2008 recorded at the Brush Creek rain gauge (ttp://cdec.water.ca.gov). The Brush Creek rain gauge is located at Brush Creek Work Center on the Feather River Ranger District. The rain gauge is at an elevation of 3560 and is located on a ridge of the French Creek Watershed. The precipitation data was compared to a defined water year. California Department of Water Resources has defined 5 water year types: Critical, Dry, Below Normal, Above Normal, and Wet. The definition varies based on a defined basin. The Feather River Ranger District is located in the Sacramento River Valley Basin. The water year types are categorized by a calculated index originally specified in the 1995 SWRCB Water Quality Control Plan and is used to determine the Sacramento Valley water year type as implemented in SWRCB D-1641. The water year index is based on measured unimpaired runoff (in million acre-feet or maf). Unimpaired runoff represents the natural water production of a river basin, unaltered by upstream diversions, storage, export of water to or import of water from other basins. Sacramento River Runoff is the sum (in maf) of Sacramento River at Bend Bridge, Feather River inflow to Lake Oroville, Yuba River at Smartville, and American River inflow to Folsom Lake. For more information see the following website: http://cdec.water.ca.gov.

The three lines on Figure 7 represent: (1) the average monthly precipitation of all data collected at the station (the green line), (2) the average monthly precipitation of the dry years (pink line), which includes one Critical, 3 Dry, and 1 Below Normal Water Type years, and (3) the average monthly precipitation of wetter years (blue line), which includes 2 Above Normal and 5 Wet Water Type years. The data trend is precipitation events occur in October through June, with the majority of the precipitation occurring in December through March.

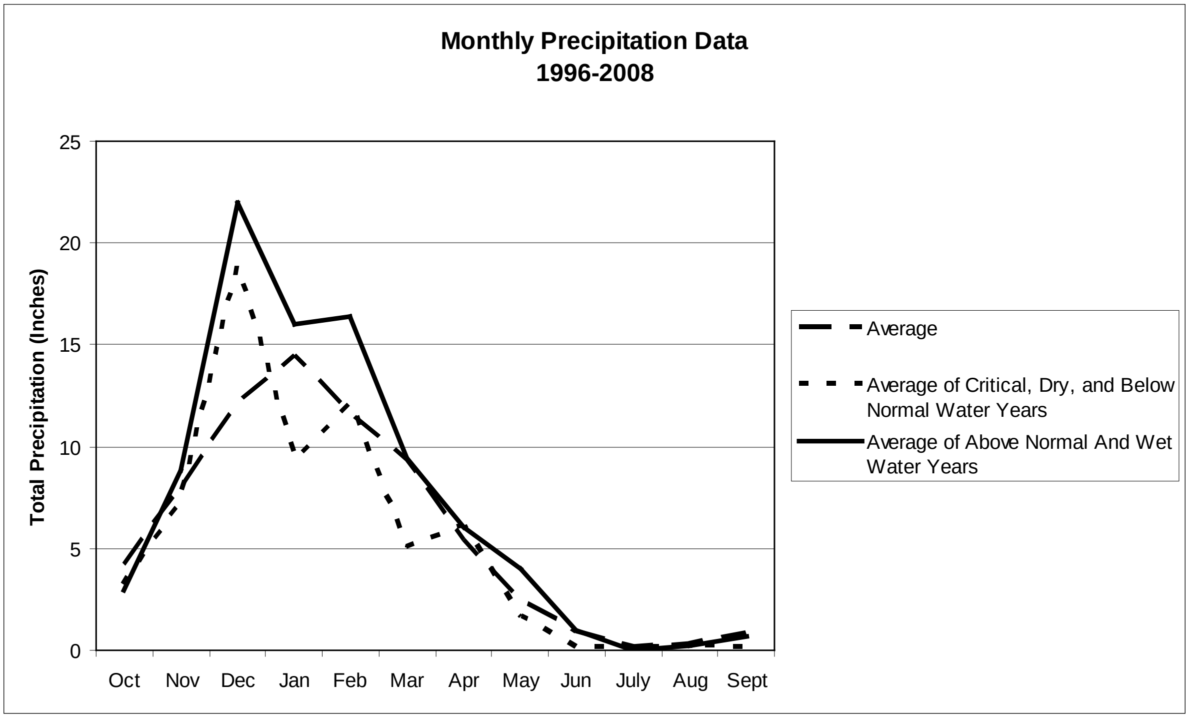


Figure 7. Summary of monthly precipitation data collected by California Department of Water Resources between 1996 and 2008 recorded at the Brush Creek rain gauge

Trails within the French Creek Basin typically consist of clay loam and sandy clay loam soil textures. Trails within the Flea Mountain area typically consist of sandy loams, loams, sand, and in a few locations sandy clay loams. During the wet season, native surface roads and trails in these areas are susceptible to rutting when the soil has reached saturation point. Rutting increases erosion in predominantly sandy soil types because the sand particles are not cohesive and can be easily carried where water has been concentrated. Numerous trails in these areas are located on steep slopes (greater than 20%). Almost every proposed trail in the French Creek Basin has one or more stream crossings.

Saturation of the soil is affected by soil porosity, vegetative canopy, and soil cover. In areas of thick vegetative canopy and effective soil cover, rain fall is intercepted and soil saturation occurs over a period of multiple rain events. Both the Flea Mountain area and the French Creek Basin are heavily forested and typically the saturation point of these soil types occurs in January as result of the amount and duration of precipitation events in December. Time period for the soil to dry out is also effected by soil type, vegetation canopy, and soil cover. For example, sandy soils dry quickly as a result of low porosity or water holding capacity. During an average water year, the soil in these areas has a drying out time in March and April and the soils do not reach saturation point again as a result of precipitation events in May through June. Therefore, the season of use restriction mitigation for the French Creek Basin and the Flea Mountain area would be January 1 to April 30 for all action alternatives. See Appendix F of the Hydrology and Soils Report for specific trail information. The season of use mitigation for each trail described in Appendix F of the Report may not be the same as the season of use described in Appendix A of this FEIS since additional seasonal restrictions from other Forest resources (e.g. wildlife) may also apply.

Due to unpredictable changes in climate, the season of use could change with Forest Supervisor authority. During wet years, large precipitation events could occur in October or November and occur later than March (see blue line on Figure 7). During wet years, saturation points could occur sooner and/or for longer durations. During wet years, the Forest Supervisor has the authority to extend the season of use restriction time period. During dry years, there are typically large and frequent precipitation events in December, and a drying off time period in January and February, and wet period again in March (see pink line of Figure 7). The soils could be dry enough to travel on without causing trail tread damage. During dry years, the Forest Supervisor has the authority to suspend portions of the prescribed season of use restriction when appropriate weather and soil moisture conditions exist.

Alternative 2 proposes to add a 36-acre area near Sly Creek to the NFTS. This area would be open year-round to motorized vehicles with widths that do not exceed 50”. Sly Creek Reservoir and the South Fork Feather River, situated adjacent to and downstream from the proposed open area, do not serve as critical fish habitat. South Feather Water and Power Agency manages Sly Creek Reservoir as a source for municipal water supply. This area is rated as “High” for soil and water resource effects. The current access approach to the area is too steep, causing excessive rutting and erosion that will, in the near future, preclude this location’s use as an access approach to the play area. Additionally, an ephemeral channel is currently used as access to the play area from Sly Creek Campground. Traffic in this channel is causing discharge of traffic-related sediment to and beyond the downstream paved road drainage system. Mitigations are prescribed for this area (see Appenidx G of the Soil and Hydrology Report). Current adverse impacts from the area do not significantly affect Sly Creek Reservoir as a source for municipal water supply and prescribed mitigations would ameliorate these impacts. Watershed staff recommends that this area not be open to motorized traffic until these mitigations are in place.

By prohibiting traffic on other unauthorized routes on the Forest, facilities added to the NFTS under Alternative 2 may experience increased traffic levels resulting in a slight increase in road and trail generated erosion. However, increased maintenance attention, along with mitigations installed to prevent adverse effects to water quality, for these added facilities would reduce erosion and sedimentation to a greater degree.

3.5.7.2.1.4 Alternative 2, Action Component 3: Changes to the existing NFTS

Direct and indirect effects for this component are not applicable to Alternative 2 because no changes to the existing NFTS are proposed.

3.5.7.2.2 Cumulative Effects

As stated above, the combination of the three action components analyzed for direct and indirect effects are added to past, present and reasonably foreseeable actions to analyze the cumulative effects of implementing each alternative as a whole.

As described above in the “Effects Analysis Methodology”, past actions are represented by the existing condition of PNF watersheds. The existing condition of PNF watersheds is represented by the watershed condition sensitivity rating and risk of cumulative watershed effects from the 1999 Final

EIS for the Herger-Feinstein Quincy Library Group Forest Recovery Act, with further indication of the condition provided by results from the 2008 HFQLG FRA Pilot Project Monitoring Report to Congress. The 2008 Monitoring Report to Congress indicates that watershed condition, when analyzed at the scale of the HFQLG FRA watersheds, has changed little since the 1999 HFQLG FEIS analysis. The most significant potential change to watershed condition observed in the report is reflected in increases in ERA values due to HFQLG FRA projects implemented since 1999. Since 1999, none of the completed or planned HFQLG FRA projects have increased a watershed's total ERA over the threshold of concern (TOC). For the watersheds presented in Table 29, the percent increase in ERA for each watershed averaged 1.2% with a median change of 0.4%. ERA changes are presented for each analysis subwatershed in the Soil and Water Resource Report, Appendix E in the project record.

Reasonably foreseeable actions are presented in Appendix C. It is assumed that each of these actions would potentially occur regardless of which alternative for this project is selected. As described in the paragraph above, the largest cumulative effect of future actions to watershed condition will result from HFQLG FRA projects.

Alternative 2 proposes to add 361 miles of existing, unauthorized routes to the NFTS. Additionally, Alternative 2 would allow year-round motorized vehicle traffic within the 36-acre Sly Creek area. This addition of unauthorized routes to the NFTS as trails would not increase the percentage of land disturbed and would not increase adverse effects to soil and water resources over existing levels because these routes already exist on the landscape. Proposed mitigations for routes added to the NFTS would decrease existing adverse effects to soil and water resources. Alternative 2 would result in prohibition of travel on 746 miles of unauthorized routes that are open to motorized traffic under the No-action alternative. The prohibition of cross-country travel would reduce future land disturbance on the Forest and, over the long-term timeframe for this analysis (25-30 years), would allow passive recovery of unauthorized routes that have already disturbed the landscape. At the analysis watershed scale, the cumulative effect to watershed condition of Alternative 2 would be beneficial as a result of passive recovery of 746 miles of unauthorized routes currently open to motorized traffic, mitigations performed on routes added to the NFTS, and protection of areas that are currently untracked.

The long-term, net effect of past, present and reasonably foreseeable actions on each analysis watershed is indicated by the total mileage and density of existing roads and trails and proposed NFTS trails open to motorized traffic on public and private roads within the watersheds See the Soil and Water Resource Report, Appendix E in the project record. ERA values are reported in Appendix E only to describe existing condition. Unlike timber projects that can affect broad areas of a watershed, the relatively small area disturbed by motorized routes does not reflect the effect these routes can have on watershed condition. For this project, motorized road and trail density is used as the indicator of cumulative watershed effects because the effect of greatest concern to watershed condition is the general effect of motorized roads and trails concentrating natural runoff patterns and often channeling runoff to a point that leads to excessive erosion of the route and adjacent landscape. Narrow trails can disrupt natural drainage patterns and concentrate runoff to the same degree as roads.

As described above in the methods section, the road/route density is compared with a cautionary value of 4.0 miles per square mile. This cautionary value does not represent an exact level at which a detrimental CWE would occur but serves as a “yellow flag” indicator of increased risk of significant adverse cumulative effects occurring within a watershed. Additional analysis and discussion is required for watersheds that exceed the cautionary density level to determine whether a detrimental cumulative watershed effect would occur as a result of Alternative 2.

Reasonably foreseeable actions are presented in Appendix C. As described above, the largest cumulative effect of future actions to watershed condition would result from HFQLG FRA projects. As indicated in Table 28, HFQLG FRA projects typically result in no change or small decreases in motorized road density. Throughout implementation of the HFQLG FRA project, the construction of a new system road for a PNF timber project has been a rare occurrence. A small number of temporary roads are typically constructed for each project to access timber, but such temporary roads have been obliterated soon after haul is finished. Any construction of new system roads has been offset by obliteration of unnecessary system roads in the HFQLG FRA project areas (as indicated in Table 28). Analysis for HFQLG FRA projects adjacent to private timber lands has demonstrated that this trend of little or no permanent road construction also holds true for private lands within project analysis watersheds. Therefore, the reasonably foreseeable actions presented in Appendix C are not expected to appreciably increase or decrease the density of roads and trails open to motorized traffic on public and private lands within the analysis watersheds. Thus, the density of motorized roads and trails calculated for each project alternative is used to analyze the risk of cumulative watershed effects.

Under the existing condition (represented by Alternative 1), 19 of the 178 analysis watersheds (11%) have road/route densities that exceed the cautionary level of 4.0 mi/mi^2 (Table 29). For these 19 watersheds, the mean density is 4.71 mi/mi^2 and the median is 4.55 mi/mi^2. Since these routes have predominantly existed on the landscape for many years, any resulting detrimental CWE would have already occurred. Two of these watersheds were determined to be at “High” risk of CWE in the 1999 HFQLG EIS and the remaining 17 watersheds rated as “Moderate” risk. Since 1999, watershed condition has changed little in these 19 watersheds, as demonstrated by the 2008 HFQLG FRA monitoring report.

The density of roads and routes open to motorized traffic would decrease for all of these watersheds under Alternative 2. A net total of 124 miles of unauthorized routes within these 19 watersheds would be made unavailable to motorized traffic under Alternative 2, with watershed 110192 experiencing the largest decrease (over 22 miles). The average decrease in road/route density for these 19 watersheds would be 0.75 mi/mi^2 with a median decrease of 0.71 mi/mi^2. As a result, the density for 9 of the 19 watersheds would be less than the cautionary level under Alternative 2. For the remaining 10 watersheds, the effect of Alternative 2 on watershed resources would also be beneficial, including improved surface water runoff timing and magnitude and reduced sediment delivery as a result of decreased road/route density. For watersheds in which the motorized route density is reduced below 4.0 mi/mi^2, Alternative 2 will not necessarily result in full recovery of a detrimental CWE that may have occurred but will represent a step forward in the continuing recovery of the watershed. A similar furthering of recovery would be realized in the 10 watersheds in which Alternative 2 would reduce the motorized density but the density remains over the cautionary level.

For the three watersheds with the greatest increase in past ground disturbance from 1999 – 2008, watersheds 110041, 110021, and 110192 (respectively situated on the Feather River Ranger District in the Lower North Fork Yuba River HUC-5 drainage (both 110041 and 110021) and on the Beckwourth Ranger District in the Last Chance Creek HUC-5 drainage), Alternative 2 would produce significant reductions in road/route density, resulting in densities of 3.83, 4.30 and 1.81 mi/mi^2, respectively. While Alternative 2 would add to the NFTS 3.9 miles, zero, and 0.6 mile of trails to the watersheds (respectively), these routes already exist in these watersheds and this alternative would also prohibit motorized traffic and allow for the passive restoration of 7.1, 2.6, and 23.1 miles of routes (respectively) that currently exist in these watersheds.

For the two watersheds that were determined to have a high risk of CWE in the 1999 HFQLG EIS, watersheds 110114 and 110159 (both situated on the Mount Hough Ranger District in the Spanish Creek and Seneca HUC-5 drainages, respectively), Alternative 2 would produce significant reductions in road/route density, resulting in densities of 4.49 and 3.40 mi/mi^2, respectively. While Alternative 2 would add to the NFTS 3.1 and 5.0 miles of trails to the watersheds (respectively), these routes already exist in these watersheds and this alternative would also prohibit motorized traffic and allow for the passive restoration of 11.2 and 11.1 miles of routes (respectively) that currently exist in these watersheds.

The cumulative effect for each watershed as a result of Alternative 2 is predominantly beneficial (173 of 178 or 97% of the analysis watersheds), as indicated by a decrease in density of roads and routes open to motorized traffic (see the Soil and Water Resource Report, Appendix E in the project record). For these watersheds, prohibition of motorized traffic on 746 miles of unauthorized routes would result in a decrease in road/route density. The density decrease in each watershed ranges from 0.01 to 2.27 mi/mi^2 with a mean of 0.33 and a median of 0.24 mi/mi^2. Proposed mitigations for routes added to the NFTS would decrease existing adverse effects to soil and water resources. Additionally, long-term watershed condition would improve and risk of cumulative watershed effects would decrease under Alternative 2 as a result of prohibition of cross-country traffic on areas that are currently untracked. Erosion and disturbance of the A-horizon portion of soil profiles in areas that are currently untracked would be prevented, protecting soil vegetative productivity. Modification of surface water runoff timing and magnitude due to vehicle track ruts on currently untracked areas would be prevented, particularly if such use occurred on steep slopes, protecting water resources downslope of those areas.

The road/route density for the remaining 5 subwatersheds (3% of analysis watersheds) indicates no change in the risk of cumulative soil and water resource effects. These subwatersheds are not affected by the prohibition of motorized traffic on the 746 miles of unauthorized routes. However, the benefits of prohibition of cross-country traffic on areas that are currently untracked would also be realized within these subwatersheds, resulting in a long-term improvement of watershed condition and a long-term decrease in the risk of cumulative watershed effects.

Cumulative watershed effects for the watershed in the area of Paradise and Magalia would be beneficial for Alternative 2. As described above in the Analysis Methodology section, small portions of PNF land exist in this watershed but a HFQLG analysis watershed does not exist for that area. For Alternative 2, 1.9 miles of trail are proposed for addition to the NFTS in this watershed (trails 4M02, 5M29 and 5M30). This addition of unauthorized routes to the NFTS as trails would not increase the percentage of land disturbed and would not increase adverse effects to soil and water resources over existing levels because these routes already exist on the landscape. Alternative 2 would result in prohibition of travel on 3.1 miles of routes that are currently open to motorized traffic. The prohibition of cross-country travel would reduce future land disturbance on the Forest and allow passive recovery of these unauthorized routes. Proposed mitigations for 5M29 would decrease existing adverse effects to soil and water resources. Trails 4M02 and 5M30 are rated “Extreme” for soil and water resource effects, meaning that effects are currently adverse and cannot be feasibly mitigated within the scope of this FEIS analysis.

Reasonably foreseeable actions that would affect soil and water resources at a cumulative watershed scale are chiefly HFQLG FRA vegetation management activities. As stated above, HFQLG FRA projects typically result in no change or small decreases in motorized road density. Several watershed restoration activities are listed in Appendix C that would further improve watershed condition. The severe wildfires of 2007 and 2008 (Moonlight Fire, Antelope Complex, Butte Lightning Complex, and Canyon complex) have resulted in several subwatersheds being at risk of accelerated erosion due to lack of ground cover. This effect is typically short-term in that brushy vegetation is expected to become established over the next 2-5 years to provide sufficient ground cover. The salvage logging projects listed in Appendix C would provide small increases in ground cover due to slash disposal treatments and no permanent road construction is proposed for these projects. Alternative 2 would further benefit watershed condition in burned watersheds as a result of passive recovery of 746 miles of unauthorized routes currently open to motorized traffic and protection of areas that are currently untracked. The most severe and large-scale of the PNF fires, the 2007 Moonlight Fire, did not occur in any of the 19 subwatersheds with road/route densities exceeding the cautionary level. The Private THP projects listed in Appendix C are expected to result in no net increase in permanent motorized road density. The improvement in road/route density under Alternative 2, considered along with the watershed restoration activities associated with the reasonably foreseeable actions, would result in no increase in risk of detrimental cumulative watershed effects and would, by and large, decrease this risk.

While the cumulative effect of Alternative 2 is predicted to be beneficial at the watershed scale for all 179 watersheds, adverse effects are indicated at specific route locations per the Action Component 2 analysis above. Alternative 2 proposes to add to the NFTS 126 miles of routes that are rated as “High” or “Extreme” for soil and water effects, meaning that all of these routes are currently having adverse effects on soil and water resources. Of these 126 miles, 54 miles are rated “Extreme”, meaning that these adverse effects cannot be feasibly mitigated and would persist in the future. Mitigations are prescribed for the 72 miles of proposed trail that are rated as “High”.

Table 29. Summary of Existing Condition Information for Watersheds Exceeding the Cautionary Level for Motorized Road / Route Density

Watershed ID Number	Watershed Area, (sq mi)	1999 Watershed Sensitivity Condition Rating (a)	1999 Risk of Cumulative Effects (a)	Change in ERA, as % of watershed area, 1999-2008 (b)	Total ERA, as % of watershed area (with TOC, as % of watershed area) (b)	Existing Density of Roads and Routes open to motorized traffic (mi/mi^2), (Alt. 1)
110067	14.16	72.0	M	0.4	4.5 (12)	6.48
110114	6.00	77.0	H	2.0	7.8 (12)	5.84
110034	11.04	60.0	M	0	N/A	5.61
110054	8.05	54.0	M	N/A	N/A	5.36
110051	16.55	72.0	M	0.4	3.6 (12)	4.91
110021	8.10	60.0	M	4.0	8.6 (13)	4.61
110042	13.12	72.0	M	1.4	7.0 (12)	4.59
110041	4.29	66.0	M	5.6	12.7 (13)	4.57
110069	1.86	50.0	M	N/A	N/A	4.56
110053	12.42	60.0	M	N/A	N/A	4.55
110124	6.29	60.0	M	0.1	4.2 (12)	4.54
110030	14.83	50.0	M	0.1	6.0 (12)	4.43
110038	17.41	60.5	M	0.8	5.4 (12)	4.40
110055	7.19	55.0	M	N/A	N/A	4.30
110159	6.93	77.0	H	0.7	5.5 (12)	4.29
110113	8.99	45.0	M	0.7	3.5 (12)	4.28
110023	17.49	60.0	M	2.5	6.6 (13)	4.13
110192	9.88	71.5	M	3.5	5.6 (12)	4.08
110033	10.29	55.0	M	0	N/A	3.96

a - from Appendix N, "Herger Feinstein Quincy Library Group Forest Recovery Act FEIS" (August 1999)

b - from "Monitoring Report Fiscal Year 2008, Herger Feinstein Quincy Library Group Forest Recovery Act Pilot Project"

N/A - Not applicable. No HFQLGFRA work planned or implemented in this watershed for 1999-2008

3.5.7.3 Alternative 3

Alternative 3 responds to non-motorized recreation interest in "Citizen Inventoried Roadless Areas (CIRAs)" proposed by the Wilderness Society and natural resource impacts by prohibiting cross-country travel without adding any additional facilities to the NFTS. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS. None of the current unauthorized routes would be added to the NFTS.

1. **Cross-country Travel**: Motor vehicle travel off the designated NFTS roads, NFTS trails and areas by the public except as allowed by permit or other authorization would be prohibited.
2. **Roads, Trails and Areas Added to the Existing National Forest System**: No roads, trails or areas would be added to the NFTS.
3. **Changes to the Existing National Forest Transportation System (NFTS)**: None

3.5.7.3.1 Direct and Indirect Effects

3.5.7.3.1.1 Action Component 1: Prohibition of Cross-Country Vehicle Travel

The direct and indirect effects to soil and water resources of the prohibition on cross-country motorized travel would be similar to Alternative 2. For Alternative 3, 3,941 miles of roads and routes on Plumas NFS lands would be available to motorized traffic (Table 31), including 1,724 miles situated in the hydrologically sensitive areas described in the Methods section. Motorized traffic would be prohibited on all 1,107 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic, including 459 miles of existing routes situated in hydrologically sensitive areas. Direct and indirect effects to water resources due to prohibition of motorized travel on these routes include reduced peak flows and sediment loads.

When compared with Alternative 2, greater long-term (25-30 year) benefit to soil and water resources would occur under Alternative 3 because an additional 361 miles of unauthorized routes would be prohibited from motorized traffic. This would allow the passive re-vegetation of an additional 361 miles of unauthorized routes, resulting in these areas attaining much of their original hydrologic and geomorphic functions. The long-term establishment of vegetative growth on these routes will substantially decrease the amount of erosion and the amount of sediment delivered to area stream channels from 1,107 miles of unauthorized routes and would somewhat reduce area peak flows.

Benefits to soil and water resources due to prohibition of cross-country traffic on areas that are currently untracked would be the same as Alternative 2. These benefits associated with prohibition of cross-country traffic on areas that are currently untracked would be identical for all action alternatives (Alternatives 2 through 5). Unauthorized use of existing routes by motorized traffic following prohibition could delay or prevent recovery.

Table 30. Summary of Cumulative Soil and Water Resource Effects Analysis Indicator for Watersheds Exceeding Density Threshold

Watershed ID Number	Watershed Area, (sq mi)	Density of Roads and Routes open to motorized traffic (mi/mi^2), Alt. 1	Density of Roads and Routes open to motorized traffic (mi/mi^2), Alt. 2	Density of Roads and Routes open to motorized traffic (mi/mi^2), Alt. 3	Density of Roads and Routes open to motorized traffic (mi/mi^2), Alt. 4	Density of Roads and Routes open to motorized traffic (mi/mi^2), Alt. 5
110067	14.16	6.48	5.27	3.82	4.16	5.08
110114	6.00	5.84	4.49	3.96	3.96	4.06
110034	11.04	5.61	5.05	4.58	4.58	4.58
110054	8.05	5.36	4.51	3.45	3.61	3.54
110051	16.55	4.91	4.70	4.62	4.64	4.64
110021	8.10	4.61	4.30	4.30	4.30	4.30
110042	13.12	4.59	4.16	2.92	3.49	3.69
110041	4.29	4.57	3.83	2.93	3.75	3.75
110069	1.86	4.56	3.14	3.14	3.14	3.14
110053	12.42	4.55	3.84	3.31	3.31	3.31
110124	6.29	4.54	3.33	2.68	3.00	3.31
110030	14.83	4.43	4.39	4.39	4.39	4.39
110038	17.41	4.40	4.25	4.23	4.23	4.23
110055	7.19	4.30	4.09	3.59	3.83	3.99
110159	6.93	4.29	3.40	2.68	3.16	3.35
110113	8.99	4.28	3.55	2.85	3.05	3.47
110023	17.49	4.13	3.75	3.70	3.75	3.75
110192	9.88	4.08	1.81	1.75	1.90	1.90
110033	10.29	3.96	3.39	3.01	3.01	3.01

3.5.7.3.1.2 Action Component 2: Addition of Facilities (Routes and Areas) to the NFTS

Direct and indirect effects for this component are generally not applicable to Alternative 3 because no facilities are proposed to be added to the NFTS. Site-specific amelioration of water quality impactsdue to prescribed mitigations along routes proposed for addition to the NFTS under Alternatives 2, 4, and 5 would not occur under Alternative 3.

3.5.7.3.1.3 Action Component 3: Changes to the existing NFS

Direct and indirect effects for this component are not applicable to Alternative 3 because no changes to the existing NFTS are proposed.

3.5.7.3.2 Cumulative Effects

General cumulative effects to soil and water resources under Alternative 3, and indeed for all action Alternatives (2 through 5) would be the same as cumulative effects for Alternative 2. The cumulative effect to watershed condition of Alternative 3 would be beneficial as a result of passive recovery of 1,107 miles of unauthorized routes currently open to motorized traffic and protection of areas that are currently untracked. Detailed differences from the Alternative 2 cumulative watershed effects analysis are presented below.

When compared with Alternative 2, greater long-term benefit to soil and water resources would occur under Alternative 3 because motorized traffic would be prohibited on all 1,107 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic resulting in an additional 361 miles of routes to be prohibited from motorized traffic.

The reasonably foreseeable actions presented in Appendix C are not expected to appreciably increase or decrease the density of roads and trails open to motorized traffic on public and private lands within the analysis watersheds. Therefore, the density of motorized roads and trails calculated for each project alternative is used to analyze the risk of cumulative watershed effects. Under the existing condition, 19 of the 178 analysis watersheds (11%) have road/route densities that exceed the cautionary level of 4.0 mi/mi^2 (Table 30Table 31). For these 19 watersheds, the mean density is 4.71 mi/mi^2 and the median is 4.55 mi/mi^2. The density of roads and routes open to motorized traffic would decrease for all of these watersheds under Alternative 3. A net total of 215 miles of unauthorized routes within these 19 watersheds would be made unavailable to motorized traffic under Alternative 3, with watershed 110067 experiencing the largest decrease (over 37 miles). The average decrease in road/route density for these 19 watersheds would be 1.2 mi/mi^2 with a median decrease of 1.4 mi/mi^2. As a result, the density for 14 of the 19 watersheds would be less than the cautionary level under Alternative 3. For the remaining 5 watersheds, the effects of Alternative 3 on watershed resources would also be beneficial, including improved surface water runoff timing and magnitude and reduced sediment delivery as a result of decreased road/route density. The decrease in density realized for each of the 19 watersheds will not necessarily result in full recovery of a detrimental CWE that may have occurred but will represent a step forward in the continuing recovery of the watershed.

For the three watersheds with the greatest increase in past ground disturbance from 1999–2008 watersheds 110041, 110021, and 110192, Alternative 3 would produce significant reductions in road/route density, resulting in densities of 2.93, 4.30, and 1.75 mi/mi^2, respectively. For the two watersheds that were determined to have a high risk of CWE in the 1999 HFQLG EIS, watersheds 110114 and 110159, Alternative 3 would produce significant reductions in road/route density, resulting in densities of 3.96 and 2.68 mi/mi^2, respectively.

Long-term watershed condition would improve and risk of cumulative watershed effects would decrease under Alternative 3. The net effect of past, present and reasonably foreseeable actions on each subwatershed, as indicated by the total mileage and density of proposed trails and roads open to traffic on public and private roads within the subwatershed (see the Soil and Water Resource Report, Appendix E in the project record), is generally beneficial. Over 99% of the analysis subwatersheds (177 out of 178) indicate a decrease in road/route density. The density decrease for each watershed ranges from 0.01 to 2.72 mi/mi^2 with a mean of 0.48 and a median of 0.33 mi/mi^2. The road/route density for the remaining one subwatershed (less than 1% of the analysis watersheds) indicates no change in the risk of cumulative soil and water resource effects. However, the benefits of prohibition of cross-country traffic on areas that are currently untracked will be realized in all analysis subwatersheds. This long-term improvement of watershed condition and long-term decrease in the risk of cumulative watershed effects due to protection of untracked areas is identical to the effect for Alternatives 2, 4 and 5.

As with Alternative 2, cumulative watershed effects for the watershed in the area of Paradise and Magalia would be beneficial. Alternative 3 would result in prohibition of travel on 5.0 miles of unauthorized routes that are currently open to motorized traffic. The prohibition of cross-country travel would reduce future land disturbance on the Forest and allow passive recovery of these routes.

Reasonably foreseeable actions (Appendix C) that would affect soil and water resources at a cumulative, watershed scale are chiefly the HFQLG FRA vegetation management activities. The cumulative result of foreseeable actions and Alternative 3 are generally the same as stated above for Alternative 2. The improvements in road/route density for analysis watersheds under Alternative 3, considered along with the watershed restoration activities associated with the reasonably foreseeable actions, will result in no increase in risk of detrimental cumulative watershed effects and would, predominantly, decrease this risk.

3.5.7.4 Alternative 4

Alternative 4 responds to non-motorized recreation interest in “Citizen Inventoried Roadless Areas (CIRAs)” proposed by the Wilderness Society and natural resource impacts. This alternative adds no motorized routes to CIRAs. This alternative does not designate routes as trails where resource concerns require extensive or critical trail mitigation (those routes rated as “High” for soil and water resource effects). This alternative also does not propose trails that are rated “Extreme” for soil and water resource effects.

1. **Cross Country Travel:** Motor vehicle travel off designated NFTS roads, NFTS trails and areas by the public except as allowed by permit or other authorization would be prohibited.

2. **Trails and Areas Added to the Existing National Forest Transportation System (NFTS):** For Alternative 4, a total of 140 miles of existing, unauthorized routes are proposed to be added to the NFTS as trails and open to motorcycles, ATVs, a combination of these two vehicle types, or all vehicles. The 36-acre Sly Creek area would not be open to motorized vehicles.
3. **Changes to the Existing National Forest Transportation System (NFTS)**: The 4.1-mile Slate Creek Road is proposed for mixed use (combining highway legal and non-highway legal vehicles on the same road).

3.5.7.4.1 Direct and Indirect Effects

3.5.7.4.1.1 Action Component 1: Prohibition of Cross-Country Vehicle Travel

The direct and indirect effects to soil and water resources of the prohibition on cross-country motorized travel would be similar to Alternatives 2 and 3. For Alternative 4, 4,087 miles of roads and routes on Plumas NFS lands would be available to motorized traffic (Table 31), including 1,772 miles situated in hydrologically sensitive areas. Motorized traffic would be prohibited on 967 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic, including 411 miles of existing routes situated in hydrologically sensitive areas. Direct and indirect effects to water resources due to prohibition of motorized travel on these routes include reduced peak flows and sediment loads.

When compared with Alternatives 2 and 3, long-term (25-30 year) benefits to soil and water resources under Alternative 4 would be greater than Alternative 2 because an additional 221 miles of unauthorized routes would be prohibited from motorized traffic. Long-term benefits to soil and water resources under Alternative 4 would be less than Alternative 3 because an additional 140 miles of routes would be available for motorized traffic. Alternative 4 would allow the passive re-vegetation of 967 miles of routes, resulting in these areas attaining much of their original hydrologic and geomorphic functions. The long-term establishment of vegetative growth on these routes would substantially decrease the amount of erosion and the amount of sediment delivered to area stream channels from 967 miles of unauthorized routes and would somewhat reduce area peak flows.

Benefits to soil and water resources due to prohibition of cross-country traffic on areas that are currently untracked would be identical for all action alternatives (Alternatives 2 through 5). Unauthorized use of existing routes by motorized traffic following prohibition could delay or prevent recovery.

3.5.7.4.1.2 Action Component 2: Addition of Facilities (Routes and Areas) to the NFTS

Alternative 4 proposes to add 140 miles of existing, unauthorized routes to the NFTS. In general, as with Alternative 2, any direct and indirect effects to soil and water resources of motorized travel on these previously unauthorized routes have already occurred.

For Alternative 4, E08 evaluation data indicates that 28 miles (20% of the 140 miles proposed for addition to the NFTS) contain at least one segment that rated as “Fail” for effectiveness in protecting water quality as a result of initial field survey data, indicating a potential for adverse soil and water effects. However, subsequent site visits determined that effects are currently less than adverse. For

Alternative 4, 47 route/stream crossings were observed to either be currently diverting stream flow down the route surface or having the potential to divert stream flow if the route/stream crossing plugged. All of these crossings can be fixed with maintenance activities available within the scope of this project. Twenty-six miles are rated as “Low” and 114 miles as “Moderate” for soil and water resource effects, but all routes which rated “High” or “Extreme” have been excluded from Alternative 4, meaning that soil and water effects are not currently adverse for any of the routes proposed for addition to the NFTS. “Moderate” routes have the potential to present adverse soil and water effects in the future but maintenance activities are prescribed to prevent these potential effects. Short-term water quality impacts associated with this maintenance would be prevented by applying BMPs during construction. Site specific survey, effects and maintenance information for each route is included in Appendix A of the FEIS and Appendices F, G, and H in the Soil and Water Resource Report, in the project record

By prohibiting traffic on other unauthorized routes on the Forest, facilities added to the NFTS under Alternative 4 may experience increased traffic levels resulting in a slight increase in road generated erosion. However, increased maintenance attention for these added facilities would reduce erosion to a greater degree.

3.5.7.4.1.3 Action Component 3: Changes to the Existing NFTS

Direct and indirect effects to soil and water resources due to allowing all motorized vehicle classes on 4.1 miles of existing NFTS roads currently open only to highway-legal vehicles are expected to be negligible. Allowing narrower, non-street legal vehicles to travel existing NFS roads would not lead to a change in the width of those roads.

3.5.7.4.2 Cumulative Effects

General cumulative effects to soil and water resources under Alternative 4, and indeed for all action alternatives (2 through 5), would be the same as cumulative effects for Alternative 2. The cumulative effect to watershed condition of Alternative 4 would be beneficial as a result of passive recovery of 967 miles of unauthorized routes currently open to motorized traffic, maintenance performed on routes added to the NFTS, and protection of areas that are currently untracked. Detailed differences from the Alternative 2 cumulative watershed effects analysis are presented below.

The addition of unauthorized routes to the NFTS as trails would not increase the percentage of land disturbed and would not increase adverse effects to soil and water resources over existing levels because these routes already exist on the landscape. Long-term (25-30 year) benefits to soil and water resources under Alternative 4 would be greater than Alternative 2 because an additional 221 miles of unauthorized routes would be prohibited from motorized traffic. Long-term benefits to soil and water resources under Alternative 4 would be less than Alternative 3 because an additional 140 miles of routes would be available for motorized traffic.

The reasonably foreseeable actions presented in Appendix C are not expected to appreciably increase or decrease the density of roads and trails open to motorized traffic on public and private lands within the analysis watersheds. Therefore, the density of motorized roads and trails calculated for each project alternative is used to analyze the risk of cumulative watershed effects. Under the existing condition, 19 of the 178 analysis watersheds (11%) have road/route densities that exceed the cautionary level of 4.0 mi/mi^2 (Table 30). For these 19 watersheds, the mean density is 4.71 mi/mi^2 and the median is 4.55 mi/mi^2. The density of roads and routes open to motorized traffic would decrease for all of these watersheds under Alternative 4. A net total of 186 miles of unauthorized routes within these 19 watersheds would be made unavailable to motorized traffic under Alternative 4, with watershed 110192 experiencing the largest decrease (over 32 miles). The average decrease in road/route density for these 19 watersheds would be 1.1 mi/mi^2 with a median decrease of 1.1 mi/mi^2. As a result, the density for 13 of the 19 watersheds would be less than the analysis cautionary level under Alternative 4. For the remaining 6 watersheds, the effects of Alternative 4 on watershed resources would also be beneficial, including improved surface water runoff timing and magnitude and reduced sediment delivery as a result of decreased road/route density. The decrease in density realized for each of the 19 watersheds will not necessarily result in full recovery of a detrimental CWE that may have occurred but will represent a step forward in the continuing recovery of the watershed.

For the three watersheds with the greatest increase in past ground disturbance from 1999–2008, watersheds 110041, 110021, and 110192, Alternative 4 would produce significant reductions in road/route density, resulting in densities of 3.75, 4.30 and 1.90 mi/mi^2, respectively. For the two watersheds that were determined to have a high risk of CWE in the 1999 HFQLG EIS, watersheds 110114 and 110159, Alternative 4 would produce significant reductions in road/route density, resulting in densities of 3.96 and 3.16 mi/mi^2, respectively.

Long-term watershed condition would improve and risk of cumulative watershed effects would decrease under Alternative 4. The net effect of past, present and reasonably foreseeable actions on each subwatershed, as indicated by the total mileage and density of proposed trails and roads open to traffic on public and private roads within the subwatershed (see the Soil and Water Resource Report, Appendix E in the project record), is generally beneficial. More than 98% of the analysis subwatersheds (175 out of 178) indicate a decrease in road/route density. The density decrease for each watershed ranges from 0.01 to 2.32 mi/mi^2 with a mean of 0.42 and a median of 0.30 mi/mi^2. The road/route density for the remaining three subwatersheds (less than 2% of the analysis subwatersheds) indicates no change in the risk of cumulative soil and water resource effects. However, the benefits of prohibition of cross-country traffic on areas that are currently untracked would be realized in all analysis subwatersheds. This long-term improvement of watershed condition and long-term decrease in the risk of cumulative watershed effects due to protection of untracked areas is identical for all action alternatives (Alternatives 2 through 5).

As with Alternative 2, cumulative watershed effects for the watershed in the area of Paradise and Magalia would be beneficial. For Alternative 4, no trails are proposed for addition to the NFTS in this watershed. Alternative 4 would result in prohibition of travel on 5.0 miles of routes that are currently open to motorized traffic. The prohibition of cross-country travel would reduce future land disturbance on the Forest and allow passive recovery of these unauthorized routes.

Reasonably foreseeable actions (Appendix C) that would affect soil and water resources at a cumulative, watershed scale are chiefly the HFQLG FRA vegetation management activities. The cumulative result of foreseeable actions and Alternative 4 are generally the same as stated above for Alternative 2. The improvements in road/route density for analysis watersheds under Alternative 4, considered along with the watershed restoration activities associated with the reasonably foreseeable actions, will result in no increase in risk of detrimental cumulative watershed effects and will, predominantly, decrease this risk.

Unlike Alternative 2, Alternative 4 does not propose to add any routes that are rated as “High” or “Extreme” for soil and water effects (routes that are currently having adverse effects on soil and water resources).

3.5.7.5 Alternative 5

Alternative 5 responds to the issue of access, motorized recreation opportunity, and natural resource protection. During scoping the Plumas National Forest received suggestions for additional routes and alternative routes that would better provide access and motorized recreation opportunity. This alternative includes approximately 10 miles of trails proposed by the public that were not in the proposed action. This alternative also removes all proposed trails from the proposed action that have an “Extreme” rating for soil and water resource effects.

1. **Cross-country Travel**: Motor vehicle travel off the designated NFTS roads, NFTS trails and areas by the public except as allowed by permit or other authorization would be prohibited.
2. **Trails and Areas Added to the Existing National Forest Transportation System (NFTS):** For Alternative 5, a total of 234 miles of existing, unauthorized routes are proposed to be added to the NFTS as trails open to motorcycles, ATVs, a combination of these two vehicle types, or all vehicles. Trails that require extensive or critical mitigations to protect water quality (trails rated as “High” for soil and water effects) would be added to the NFTS with this EIS but not placed on the motor vehicle use map until the mitigation has been completed. The 36-acre Sly Creek area would not be open to motor vehicles.
3. **Changes to the Existing National Forest Transportation System (NFTS)**: The 4.1-mile Slate Creek Road is proposed for mixed use (combining highway legal and non-highway legal vehicles on the same road).

3.5.7.5.1 Direct and Indirect Effects

3.5.7.5.1.1 Action Component 1: Prohibition of Cross-Country Vehicle Travel

The direct and indirect effects to soil and water resources from the prohibition of cross-country motorized travel would be similar to Alternatives 2, 3 and 4. For Alternative 5, 4,173 miles of roads and routes on Plumas NF lands would be available to motorized traffic (Table 31), including 1,803 miles situated in the hydrologically sensitive areas described in the Methods section. Motorized traffic would be prohibited on 873 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic, including 379 miles of existing routes situated in hydrologically sensitive areas. Direct and indirect effects to water resources due to prohibition of motorized travel on these routes include reduced peak flows and sediment loads.

When compared with Alternatives 2, 3 and 4, long-term (25-30 year) benefits to soil and water resources under Alternative 5 would be greater than Alternative 2 because an additional 127 miles of unauthorized routes would be unavailable for motorized traffic. Long-term benefits to soil and water resources under Alternative 5 would be less than Alternative 3 because an additional 234 miles of unauthorized routes would be available for motorized traffic. Long-term benefits to soil and water resources under Alternative 5 would be less than Alternative 4 because an additional 94 miles of unauthorized routes would be available for motorized traffic. Alternative 5 would allow the passive re-vegetation of 873 miles of unauthorized routes, resulting in these areas attaining much of their original hydrologic and geomorphic functions. The long-term establishment of vegetative growth on these routes would substantially decrease the amount of erosion and the amount of sediment delivered to area stream channels from 873 miles of unauthorized routes and would somewhat reduce area peak flows.

Benefits to soil and water resources due to prohibition of cross-country traffic on areas that are currently untracked would be identical for all action alternatives (Alternatives 2 through 5). Unauthorized use of existing routes by motorized traffic following prohibition could delay or prevent recovery.

3.5.7.5.1.2 Action Component 2: Addition of Facilities (Routes and Areas) to the NFTS

Alternative 5 proposes to add 234 miles of existing, unauthorized routes to the NFTS. In general, as with Alternative 2 and 4, any direct and indirect effects to soil and water resources from motorized travel on these previously unauthorized routes have already occurred.

For Alternative 5, E08 evaluation data indicates that 86 miles (37% of the 234 miles proposed for addition to the NFTS) contain at least one segment that rates as “Fail” for effectiveness in protecting water quality as a result of initial field survey data, indicating a potential for adverse soil and water effects. Typically, these segments “fail” because of delivery of route-generated sediment to stream channels or because the route has captured a stream channel. Subsequent site visits indicated that potential effects are currently less than adverse and mitigations are feasible for 31 miles that contain these “fail” segments. The remaining 55 miles were rated as “High” for soil and water effects (see paragraph below). For Alternative 5, 69 route/stream crossings were observed to either be currently diverting stream flow down the route surface or having the potential to divert stream flow if the route/stream crossing plugged. All of these crossings can be mitigated. Short-term water quality impacts associated with maintenance or installation of mitigations would be prevented by applying BMPs during construction. Trails that rated as “Extreme” for soil and water resource effects are not proposed for addition to the NFTS under Alternative 5.

“Moderate” or “High” ratings for soil and water resource effects were rated for 200 miles of proposed trails, meaning that soil and water effects are currently adverse or have the potential to be adverse in the future. Of these 200 miles, 55 miles of routes proposed under Alternative 5 are rated as “High” for soil and water effects, meaning that effects are currently adverse and mitigations are necessary to reduce current soil and water resource effects to less than adverse. Alternative 5 proposes to designate these routes as part of the NFTS but these routes would not be placed on the motor vehicle use map until the critical, prescribed mitigations are in place. Motorized traffic would not be legal on these routes until proper installation of the mitigations is completed. If the mitigations are not installed for a number of years, these routes would begin to re-vegetate and regain their hydrologic and geomorphic functions. If the mitigations do not occur within 5-10 years, it is unlikely that the resource analyses provided in this EIS would still be valid and additional analysis would likely be needed to add the routes to the NFTS. Site specific survey, effects and maintenance or mitigation information for each route is included in Appendix A of the FEIS and Appendices F, G, and H in the Soil and Water Resource Report, in the project record.

By prohibiting traffic on other unauthorized routes on the Forest, facilities added to the NFTS under Alternative 5 may experience increased traffic levels resulting in a slight increase in road generated erosion. However, increased maintenance attention, along with mitigations installed to prevent adverse effects to water quality, for these added facilities would reduce erosion to a greater degree.

3.5.7.5.1.3 Action Component 3: Changes to the Existing NFTS

Direct and indirect effects to soil and water resources due to allowing all motorized vehicle classes on 4.1 miles of existing NFS roads currently open only to highway-legal vehicles are expected to be negligible. Allowing narrower, non-street legal vehicles to travel existing NFS roads would not lead to a change in the width of those roads.

3.5.7.5.2 Cumulative Effects

General cumulative effects to soil and water resources under Alternative 5, and indeed for all action Alternatives (2 through 5), would be the same as cumulative effects for Alternative 2. The cumulative effect to watershed condition of Alternative 5 would be beneficial as a result of passive recovery of 873 miles of unauthorized routes currently open to motorized traffic, mitigations performed on routes added to the NFTS, and protection of areas that are currently untracked. Detailed differences from the Alternative 2 cumulative watershed effects analysis are presented below.

The addition of unauthorized routes to the NFTS as trails would not increase the percentage of land disturbed and would not increase adverse effects to soil and water resources over existing levels because these routes already exist on the landscape. Proposed mitigations for routes added to the NFTS would decrease existing adverse effects to soil and water resources. Long-term (25-30 year) benefits to soil and water resources would occur under Alternative 5 because motorized traffic would be prohibited on 873 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic. Long-term benefits to soil and water resources under Alternative 5 would be greater than Alternative 2 because an additional 127 miles of unauthorized routes would be unavailable to motorized traffic. Long-term benefits to soil and water resources under Alternative 5 would be less than Alternative 3 because an additional 234 miles of unauthorized routes would be available for motorized traffic. Long-term benefits to soil and water resources under Alternative 5 would be less than Alternative 4 because an additional 94 miles of unauthorized routes would be available for motorized traffic.

The reasonably foreseeable actions presented in Appendix C are not expected to appreciably increase or decrease the density of roads and trails open to motorized traffic on public and private lands within the analysis watersheds. Therefore, the density of motorized roads and trails calculated for each project alternative is used to analyze the risk of cumulative watershed effects. Under the existing condition, 19 of the 178 analysis watersheds (11%) have road/route densities that exceed the cautionary level of 4.0 mi/mi^2 (Table 30). For these 19 watersheds, the mean density is 4.71 mi/mi^2 and the median is 4.55 mi/mi^2. The density of roads and routes open to motorized traffic would decrease for all of these watersheds under Alternative 5. A net total of 162 miles of unauthorized routes within these 19 watersheds would be made unavailable to motorized traffic under Alternative 5, with watershed 110192 experiencing the largest decrease (over 21 miles). The average decrease in road/route density for these 19 watersheds would be 0.95 mi/mi^2 with a median decrease of 0.93 mi/mi^2. As a result, the density for 12 of the 19 watersheds would be less than the analysis cautionary level under Alternative 5. For the remaining 7 watersheds, the effects of Alternative 5 on watershed resources would also be beneficial, including improved surface water runoff timing and magnitude and reduced sediment delivery as a result of decreased road/route density. The decrease in density realized for each of the 19 watersheds will not necessarily result in full recovery of a detrimental CWE that may have occurred but will represent a step forward in the continuing recovery of the watershed.

For the three watersheds with the greatest increase in past ground disturbance from 1999–2008, watersheds 110041, 110021, and 110192, Alternative 5 would produce significant reductions in road/route density, resulting in densities of 3.75, 4.30, and 1.90 mi/mi^2, respectively. For the two watersheds that were determined to have a high risk of CWE in the 1999 HFQLG EIS, watersheds 110114 and 110159, Alternative 5 would produce significant reductions in road/route density, resulting in densities of 4.06 and 3.35 mi/mi^2, respectively.

Long-term watershed condition would improve and risk of cumulative watershed effects would decrease under Alternative 5. The net effect of past, present and reasonably foreseeable actions on each subwatershed, as indicated by the total mileage and density of proposed trails and roads open to traffic on public and private roads within the subwatershed (see the Soil and Water Resource Report, Appendix E in the project record), is generally beneficial. More than 97% of the analysis subwatersheds (174 out of 178) indicate a decrease in road/route density. The density decrease for each watershed ranges from 0.01 to 2.18 mi/mi^2 with a mean of 0.38 and a median of 0.27 mi/mi^2. The road/route density for the remaining four subwatersheds (less than 3% of the analysis subwatersheds) indicates no change in the risk of cumulative soil and water resource effects. However, the benefits of prohibition of cross-country traffic on areas that are currently untracked would be realized in all analysis subwatersheds. This long-term improvement of watershed condition and long-term decrease in the risk of cumulative watershed effects due to protection of untracked areas is identical for all action alternatives (Alternatives 2 through 5).

As with Alternative 2, cumulative watershed effects for the watershed in the area of Paradise and Magalia would be beneficial. For Alternative 5, no existing non-system routes are proposed for addition to the NFTS in this watershed Alternative 5 would result in prohibition of travel on 5.0 miles of routes that are currently open to motorized traffic. The prohibition of cross-country travel would reduce future land disturbance on the Forest and allow passive recovery of these unauthorized routes.

Reasonably foreseeable actions (Appendix C) that would affect soil and water resources at a cumulative, watershed scale are chiefly the HFQLG FRA vegetation management activities. The cumulative result of these foreseeable actions and Alternative 5 are generally the same as stated above for Alternative 2. The improvement in road/route density under Alternative 5, considered along with the watershed restoration activities associated with the reasonably foreseeable actions, would result in no increase in risk of detrimental cumulative watershed effects and would, predominantly, decrease this risk.

The cumulative effect of Alternative 5 is predicted to be beneficial at the watershed scale for all 178 watersheds (as indicated by decreases in road/route density and/or prohibition of cross-country travel on untracked areas). Unlike Alternative 2, adverse effects are not indicated at a smaller site scale along any routes proposed for addition to the NFTS. Alternative 5 does not propose to add any routes that are rated as “Extreme” for soil and water effects (routes that are currently having adverse effects on soil and water resources that cannot be feasibly mitigated). Alternative 5 proposes to add to the NFTS 55 miles of routes that are rated as “High”. Mitigations are prescribed for these routes to reduce the effects to less than adverse and the trails would remain prohibited from motorized traffic until the mitigations are satisfactorily installed.

3.5.8 Summary of Effects Analysis Across all Alternatives

Effects to soil and water resources are summarized by ranking each indicator for each alternative. Table 31 provides the numeric value of the indicator and the ranking among alternatives in parentheses (higher rankings indicate more benefits and/or less adverse effects to soil and water resources for that alternative). The rankings are averaged for each alternative.

Table 31. Summary of Soil and Water Resource effects, with subsequent ranking in parentheses.

Indicators – Soil and Water Resources	**Alt 1**	**Alt. 2**	**Alt. 3**	**Alt.4**	**Alt. 5**
Total miles of proposed trails and roads open to motorized traffic on Plumas National Forest System lands	5,023 (1)	4,301 (2)	3,941 (5)	4,087 (4)	4,173 (3)
Total miles of proposed trails and roads open to motorized traffic on Plumas National Forest System lands that are situated in hydrologically sensitive areas	2,183 (1)	1,857 (2)	1,724 (5)	1,772 (4)	1,803 (3)
Total miles of proposed trails and roads open to motorized traffic on Plumas National Forest System lands by Maximum Potential Erosion Hazard Rating (EHR) **Very High (VH), High (H), Moderate (M), Low (L)**	VH: 284 H: 2,954 M: 1,595 L: 49 (1)	VH: 245 H: 2,504 M: 1,391 L: 46 (2)	VH: 212 H: 2,292 M: 1,287 L: 45 (5)	VH: 217 H: 2,387 M: 1,330 L: 45 (4)	VH: 223 H: 2,441 M: 1,354 L: 45 (3)
Total miles of routes proposed for addition to NFTS that E08 effectiveness evaluation data indicate “fail” segment(s) for protection of water quality	N/A (1)	156 (2)	N/A (5)	28 (4)	86 (3)
Total miles of routes proposed for addition to NFTS that E08 effectiveness evaluation data indicates “fail” segment(s) and adverse effects that can’t be mitigated	N/A (1)	54 (2)	N/A (5)	0 (5)	0 (5)
Numbers of locations where routes proposed for addition to NFTS divert or have potential to divert streamflow (before/after maintenance or mitigation)	N/A (1)	122 / 28 (2)	N/A (5)	47 / 0 (5)	69 / 0 (5)
Average Density (mi/mi^2) of proposed trails and roads open to motorized traffic on public and private lands within Plumas National Forest watersheds (Mean, minimum, and maximum)	2.44 0.13 6.48 (1)	2.14 0.13 5.27 (2)	1.99 0.04 4.62 (5)	2.06 0.04 4.64 (4)	2.09 0.13 5.08 (3)
Ranking for Water and Soil	**1**	**2**	**5**	**4**	**3**

N/A – not applicable

3.5.9 Compliance with the Forest Plan and Other Direction

A list of Standards and Guidelines and best management practices (BMP) that apply to this project are included in the Soil and Water Resource Report, Appendix B in the project record. All Standards and Guidelines and BMPs apply to Alternatives 2, 4, and 5. Mitigation measures were proposed to have compliance with the Forest Plan and Clean Water Act. Alternative 1 would not be in compliance with the Forest Plan and Clean Water Act. Alternative 1 is the No-action alternative and allows for the Forest to be open to cross-country travel. If No-action is performed then the existing routes that are currently in the watershed and not a part of the NFTS would not be mitigated. Under Alternative 2, existing, site-specific adverse water quality effects along 54 miles of proposed trail cannot be mitigated within the scope of this project. Alternative 3 is only using roads and trails that are already a part of the NFTS. At the time these routes were constructed they were in compliance with the planning direction. As reconstruction occurs on the NFTS, these routes will through time be reconstructed in compliance with the Forest Plan. Alternatives 4 and 5 are fully compliant with Forest Plan and other applicable direction. The application of BMPs and MMMs, including riparian buffers, would reduce the risks to beneficial uses of water from project activities.

It is assumed that protection of headwaters and tributaries to larger watersheds, along with implementation of effective non-point source conservation measures (BMPs), would provide protection of the entire watershed. If sedimentation is controlled through implementation of BMPs, the potential for project related sediment delivery to the immediate channel and channels downstream would be small.

Impacts on water quality in the analysis area could potentially occur under the following circumstances:

1. Failure to implement Best Management Practices, Riparian and Wetland Standards and Guidelines, and other required mitigation.
2. Extreme water yields resulting from abnormally high intensity, magnitude, and duration storm events.

This project responds to the objective to minimize damage to soil and watershed under Subpart B of the Travel Management Rule as follows.

Direct and indirect effects to soil and water resources under the four action alternatives were assessed by field surveying the full length of each route that is proposed for addition to the NFTS under any of the alternatives. Many of these routes were visited a second time to further assess potential effects and to investigate the need and viability of mitigations or maintenance activities. Specific maintenance activities are prescribed for routes in which direct or indirect effects for soil and water resources are currently less than adverse but may potentially be adverse in the future. Mitigations, if feasible within the scope of this FEIS, are prescribed for routes where current adverse effects were observed. For example, 69 stream crossing locations along trails proposed under Alternative 5 were observed to have potential for capture or diversion of stream flow down the trail. After implementation of maintenance or mitigations prescribed in this FEIS, none of these crossings would hold that potential (see Table 31).

No current adverse effects for soil and water resources were observed for trails proposed under Alternative 4. For Alternative 5, current adverse effects have been observed at proposed trails totaling 55 miles. Mitigations are feasible for all of these effects and those trails will not be legal for traffic until the mitigations are in place. For Alternative 2, current adverse effects have been observed at proposed trails totaling 126 miles. Mitigations are feasible for these effects on trails totaling 72 miles. Mitigations to reduce soil and water resource effects to less than adverse are not available within the scope of this FEIS for the remaining trails (totaling 54 miles) proposed under Alternative 2, typically due to physical or topographic constraints.

3.6 Aquatic Biota

3.6.1 Introduction

Management of aquatic dependent species and habitat and maintenance and diversity of animal communities are important parts of the mission of the Forest Service (Forest and Rangeland Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on National Forest System (NFS) lands must be planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species or lead to a trend toward listing or loss of viability of Forest Service sensitive species. In addition, management activities are designed to maintain or improve habitat for Management Indicator Species (MIS) to the degree consistent with multiple-use objectives established in the Forest Land and Resource Management Plan (Forest Plan). Management decisions related to motorized travel can affect aquatic species by increasing human-caused mortality, causing changes in behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA Forest Service 2000). It is Forest Service policy to minimize damage to vegetation, avoid harassment to wildlife, and avoid significant disruption of wildlife habitat while providing for motorized public use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to motorized travel on NFS lands must consider effects to aquatic biota and their habitat.

The Plumas National Forest (PNF) aquatic species and their habitat considered include Region 5 (R5) “sensitive” herpetofauna (reptiles and amphibians) and fish, and the federal threatened California red-legged frog. Amphibian species and their habitats addressed in this section are California red-legged frog (CRLF), foothill yellow-legged frog (FYLF), and the mountain-yellow legged frog (MYLF). The northwestern pond turtle (NWPT) is an aquatic reptile. Fish species addressed include the hardhead minnow.

Road and trail associated factors will be discussed here for herpetofauna and fisheries across the PNF. Macroinvertebrates are addressed as MIS in the Terrestrial Biota section. Generally, site-specific studies on the species interaction with road and trail-associated factors are lacking in the literature. Where site-specific information or literature on road and trail associated factors to aquatic species is available, general information on potential impacts will be presented in this section. In addition, detailed information on affects of roads to downstream water quality is presented in the Soil and Watershed Resources section.

3.6.2 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant to the alternatives as they concern aquatic biota includes:

Endangered Species Act (ESA). The Endangered Species Act of 1973 (16 USC 1531 et seq.) requires that any action authorized by a federal agency not be likely to jeopardize the continued existence of a threatened or endangered species (TE), or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Section 7 of the ESA, as amended, requires the responsible federal agency to consult the USFWS and the National Marine

Fisheries Service (NMFS) concerning TE under their jurisdiction. It is Forest Service policy to analyze impacts to TE to ensure management activities are not likely to jeopardize the continued existence of a TE, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. This assessment is documented in a Biological Assessment (BA) and is summarized or referenced in this Chapter. The BA/BE is incorporated by reference here (Hopkins, 2010).

The Forest began early involvement with the USFWS in February of 2008, and completed formal consultation (Cons #84120-2009-F-0923-1) on November 3, 2009. Discussions have included the use of the USFWS Regional Programmatic Agreement (October 2006) that includes the Motorized Travel Management Project Design Criteria for ‘No effect’ or ‘May Affect Not Likely to Adversely Affect’ determination for the California red-legged frog (CRLF) .Mitigations? include incorporating the six design criteria specific to the CRLF into Alternative 4. Alternative 4 meets all the criteria to lead to a “may affect, not likely to adversely affect” determination for the CRLF. In February of 2010, the Forest made the decision to modify Alternative 5 to meet the design criteria in the PA for the CRLF. Alternative 5 in this FEIS meets all the criteria (Table 35) to lead to a “may affect, not likely to adversely affect” determination for the CRLF; thus no further consultation is required.

Forest Service Manual and Handbooks (FSM/FSH 2670). Forest Service sensitive (FSS) species are plant and animal species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered (TE) and ensure their continued viability on National Forests. It is Forest Service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE) and is summarized or referenced in this Chapter.

Sierra Nevada Forest Plan Amendment. The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment (2004 SNFPA) identified the following Standards and Guidelines applicable to motorized travel management and aquatic resources, which will be considered during this analysis process:

- Riparian Habitat (Management Standard and Guideline #92): see discussion under Soil and Water Resources.
- Ensure that management activities do not adversely affect water temperatures necessary for local aquatic and riparian dependent species assemblages (Management Standard and Guideline #96).
- Ground disturbing activities will be no more than 25% of RCAs and 15% of Critical Aquatic Refuges (CARs) (Management Standard and Guideline #98)
- As appropriate, assess and document aquatic conditions following the Regional Stream Condition Inventory (SCI) protocol prior to implementing ground disturbing activities within suitable habitat for California red-legged frog, Cascades frog, Yosemite toad, foothill and mountain yellow-legged frogs, and northern leopard frog (Management Standard and

Guideline #114). Five SCI reaches are proposed in Chapter 2 for monitoring effects of OHV activities.

- Bog and Fen Habitat (Management Standard and Guideline #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles.
- The Aquatic Management Strategy, established in the 2001 SNFPA ROD and retained in the 2004 SNFPA ROD, uses a set of land allocations, specifically RCAs and CARs, that delineate aquatic, riparian, and meadow habitats, which are to be managed consistent with riparian conservation objectives (RCOs) and associated Standards and Guidelines (Reference the Riparian Conservation Objective analysis in Appendix A of Soil and Water Resources Report).

Travel Management Directives and Regulations (Federal Register):

- DEPARTMENT OF AGRICULTURE, Forest Service, 36 CFR Parts 212.55 (b1), RIN 0596–AC11, Travel Management; Designated Routes and Areas for Motor Vehicle Use, AGENCY: Forest Service, USDA, Action: Final rule: (b) Applicable specific criteria for proposed trails and area added to the NFTS. In addition to the criteria in paragraph (a) of this section, in designating National Forest System trails and areas on NFS lands, the responsible official shall consider effects on the following, with the objective of minimizing: (1) Damage to soil, watershed, vegetation, and other forest resources; (2) Harassment of wildlife and significant disruption to wildlife habitats.
- DEPARTMENT OF AGRICULTURE, Forest Service, RIN 0596–AC39, Travel Management Directives; Forest Service Manual 2350, 7700, and 7710 and Forest Service Handbook 7709.55. Final Directives: comments: FSM 7703 in the proposed directives incorporate the phrase “minimize impacts on” from E.O. 11644 in reference to the factors to consider in designating trails and areas for motor vehicle use. Response. The phrase “the responsible official shall consider effects on the following with the objective of minimizing,” is contained in the travel management rule at 36 CFR 212.55 (b) and was not proposed for revision.

National Aquatic Organism Policy (AOP):

NFMA Implementing Regulations (36 CFR 219.19)

- “No management practices causing…blockages of water courses or deposits of sediment shall be permitted…”

Clean Water Act Silviculture road exemption (40 CFR 232.3)

- “The design, construction and maintenance of the road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body.”

California red-legged frog design criteria from the Regional Programmatic Agreement with the U.S. Fish and Wildlife Service (October, 2006).

1. Routes or areas do not have the potential to capture surface run off and then deliver sediment into a stream associated with California red-legged frog.
2. In suitable California red-legged frog habitat, routes avoid Riparian Reserve and Riparian Conservation Areas (RCAs) except where necessary to cross streams. Crossing approaches get the riders in and out of the stream channel and riparian area in the shortest distance possible while meeting the gradient and approach length standards.
3. Routes or areas do not cross any stream or waterbody within 500 feet of known occupied sites of California red-legged frog; and route or area is not within a distance of 500 feet from wetlands (i.e. springs, wet meadows, ponds, marshes). This design criteria was also used in the effects analysis of the foothill yellow-legged frog, northwestern pond turtle and mountain yellow-legged frog.
4. In habitat occupied by California red-legged frog, routes or areas do not have the potential to capture or divert stream flow. The approaches to stream crossings are downslope toward the stream on both sides.
5. Areas are located outside of Riparian Reserve, Riparian Conservation Areas, meadows, and wetlands within California red-legged frog habitat.
6. No route or areas are within CARs for California red-legged frog.

Design and minimization measures have been developed to help protect CRLF, mountain yellow-legged frog and potential habitat, as described in Chapter 2 of the FEIS (Mitigations for Aquatic Species and Habitat A detailed description is included in the Biological Assessment and Evaluation (Hopkins, 2010).

3.6.3 Effects Analysis Methodology

Impacts relevant to aquatic biota include Vehicle use on and off established routes has affected or has the potential to affect aquatic species, including threatened, endangered, and sensitive species, by increasing human-caused mortality, causing changes in behavior due to disturbance, and modifying habitat.

3.6.3.1 Assumptions Specific to the Aquatic Biota Analysis

In addition to the common assumptions mentioned in the introduction to Aquatic Biota (Chapter 3), the following assumptions apply to the aquatic biota:

- Potential habitat for CRLF is west of the crest of the Sierra Nevadas on the Feather River Ranger District, below 4,500 feet. After intensive surveys across the Plumas National Forest, the Forest Service biologist’s professional judgment is that this species occurs only on the Feather River Ranger District and below 4,500 feet. All known occurrences of CRLF are well below 4,500 feet.
- Potential habitat for FYLF and NWPT is below 4,500 feet.
- Potential habitat for MYLF is above 3,500 feet.
- All vehicle types result in the same amount of disturbance effect on aquatic dependent species (unless there is local information enabling a separate analysis by vehicle type).

- Aquatic species spend all or significant portions of their life cycles either in or moving through riparian habitats.
- Habitat is already impacted in the short term. In the long term, habitat will remain the same on added trails, but will decrease to at least some degree on non-added trails with the prohibition of cross-country travel and subsequent passive restoration (see Soil and Water Resources section for further assumptions).
- Occupancy is assumed in all non-surveyed potentially suitable habitat (Appendix 1 of Biological Assessment and Evaluation (BABE
- Proposed designated trails determined to be “extreme” for resource concerns cannot be mitigated.
- Ratings determined for soil and water resources affect water quality and the assumption is there are similar effects to TES herpetofauna and thus the same ratings apply.

3.6.3.2 Data Sources

1. GIS layers of the following information: trails; habitats; and ‘designated’ or important aquatic areas (e.g., Designated and Proposed Critical Habitat, Corporate Forest Stream Layer, Riparian Conservation Areas, Zones of Influence, and Critical Aquatic Refuges).
2. Site-specific surveys/assessment of any localized sensitive aquatic species habitats with trails proposed to be added to the NFTS (e.g., wet meadows, stream crossings, riparian corridors).
3. Amphibian survey boundaries from CRLF site assessments and USFWS - CRLF Protocol surveys completed.
4. Maps of the three Ranger Districts in the project file at the Plumas NF Supervisor’s office (Feather River, Mt. Hough, and Beckwourth Ranger Districts) that display the areas surveyed with Feller’s Freel survey protocol, USFWS CRLF site assessments and survey protocol, and the Jack’s Car with completed site assessments.
5. Map of Alternative 5 routes, stream crossings, Riparian Conservation Area (RCA) and Zone of Influence (ZOI) buffers, and CRLF occurrences.
6. Map of potentially suitable habitat with 0 to 2% and 2 to 4% gradients locations in RCAs with ½ mile buffer, perennial and intermittent streams with 300-foot and 500-foot buffers.
7. Table of CRLF occurrences (Appendix IV of BABE) on the Plumas NF.
8. Soil and Water Resources Report for the Final Environmental Impact Statement (USDA, 2010) for FEIS.
9. California Natural Diversity Database (http://www.dfg.ca.gov/biogeodata/cnddb).

3.6.3.3 Aquatic Biota Indicators

3.6.3.3.1 Mountain Yellow-Legged Frog, California Red-Legged Frog, Foothill Yellow-Legged Frog and Northwestern Pond Turtle

Each indicator is designed to be calculated using the sources of information above, using Geographic Information System (GIS) queries. They are focused on assessing the effects of adding facilities to the NFTS. The effects of prohibition of cross-country travel and adding proposed designated trails to the NFTS are assessed quantitatively and qualitatively as described below. Baseline conditions include all existing National Forest System (NFS) roads, trails and areas on the PNF. The Effects Analysis includes baseline (130 miles of designated trails) plus all unauthorized routes (Alternative 1; 1,107 miles), all proposed system trails (Alternative 2; 361 miles, Alternative 4; 140 miles, and Alternative 5; 234 miles), one 36 acre open area, and 4.1 miles of ML 3 road designated for mixed use.

Forest-wide Riparian Conservation Areas (RCAs), and zone of influence (ZOI; as described below) to amphibians were determined by buffering all perennial and intermittent streams and water-bodies by 300 and 500 feet, and then breaking these RCAs and ZOIs by elevation for species. In addition to the RCAs as described above, a larger buffer of 500 foot Zone of Influence (ZOI) is identified as the buffer width required to meet the Regional Route Designation Programmatic Agreement (PA) (USFWS, 2006).

For California red-legged frogs, foothill yellow-legged frogs and northwestern pond turtles, RCAs and ZOIs from 4,500 feet and below are identified as potentially suitable habitat. For the California red-legged frog specifically, a second filter was applied to further refine suitable CRLF habitat on the Forest. Once the first filter was applied (e.g. 4,500 feet elevation, 300-foot RCA, and a 300-to-500-foot ZOI), a second filter was applied that used slope at 0 to 4% to reveal low gradient streams (0 to 4% gradient) that would represent slow moving streams or streams that may contain pools similar to those that are defined under Primary Constituent Element 1 used by the USFWS PA?. This second filter further refined suitable CRLF habitat and eliminated more of the potentially suitable habitat found when the first filter was applied which contained mostly high gradient (>4%), fast moving water that is not known to be occupied by CRLF on the PNF (G. Garcia, personal observation).

For mountain yellow-legged frogs (*var. Sierrei*); RCAs and ZOIs, 3,500 foot and above elevation are identified as potential suitable habitat. Critical Aquatic Refuges (CARs) across the Forest were analyzed via Geographic Information Systems (GIS). GIS analysis included evaluation of the 300 and 300-to-500-foot buffers intersected with the five alternatives and their respective trail locations. In addition, a 300-to-500-foot buffer was placed around known occurrences of TES amphibians, springs, wet meadows, ponds, and marshes, and was intersected with the proposed OHV routes to evaluate effects. The frequency of perennial stream crossings within one mile[1] of each mountain yellow-legged frog (MYLF) occurrence was also analyzed.

3.6.3.3.2 Route and Trail Density within Riparian Conservation Areas, "Larger" (300-500') Zone of Influence, and Critical Aquatic Refuges

Native surface route and trail densities within RCAs, ZOIs, and CARs were evaluated to compare the overall effects of all motorized trails and unauthorized routes for the alternatives and in addition, within each 7th order watershed across the PNF. According to the Soil and Water Resources Report, native surface routes and trails have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes the density of all native surface motorized routes and trails. Density provides a relative index to measure the potential indirect effects to aquatic species

[1] MYLF Telemetry study by MGW Biological (2007) determined MYLF moved linearly along streams as far as approximately one mile.

including TES amphibians, and northwestern pond turtles. Thresholds for density have not been established, however, density provides a relative way to compare the effects of the alternatives.

The indicators for a species habitat that are affected by motorized routes (including a route plus a biologically meaningful ‘zone of influence’ (e.g., 300-foot RCA, 300-to-500-foot ZOI) include:

- Miles of existing, unauthorized routes, and proposed designated trails within or adjacent to TES aquatic biota habitat. Miles of proposed motorized trails to be added to the NFTS (proposed trails) at the Forestwide scale within the habitat for each species.
- Miles of proposed trails within herpetofauna habitat at 300 feet of perennial streams, intermittent streams, ponds and lakes above 3,500 feet elevation.
- Miles of proposed trails within herpetofauna habitat at 300 to 500 feet of perennial streams, intermittent streams, ponds and lakes above 3,500 feet elevation.
- Miles of proposed trails within herpetofauna habitat at 300 feet of perennial streams, intermittent streams, ponds and lakes below 4,500 feet elevation.
- Miles of proposed trails within herpetofauna habitat at 300 to 500 feet of perennial streams, intermittent streams, ponds and lakes below 4,500 feet elevation.
- Number of stream crossings per HUC 7 (7th order) watershed within suitable species habitat.
- Miles of proposed trails within 300 to 500 feet of TES herpetofauna.
- Number of perennial stream crossings within one mile of known MYLF occurrences.

3.6.3.3.3 Number of Stream Crossings within RCAs

The 7th order watersheds across the PNF were evaluated for the crossing density of native surface motorized routes and trails within RCAs to compare direct, indirect and cumulative effects of proposed motorized trails (Alternatives 2, 4 and 5) and unauthorized routes (Alternative 1), and the existing system trails (cumulative effects) for the project alternatives. Route crossing density provides a way to measure the potential direct and indirect effects on herpetofauna and hardhead minnows. Direct effects include potential TES aquatic species mortality as a result of use of motorized crossings. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Sediment delivery from motorized routes and trails is also a potential indirect effect of stream crossings.

3.6.3.3.4 Hardhead Minnow

3.6.3.3.4.1 Site-specific Physical Impacts and Disturbance to Hardhead Occupied Streams

Proposed designated trails were evaluated to determine site-specific impacts to hardhead occupied streams for each of the alternatives; by analyzing the number of proposed designated trail miles within RCAs of occupied hardhead streams/lakes as well as the number of stream crossings within occupied RCAs. Other indicators were evaluated forest-wide for all aquatic species.

3.6.3.3.4.2 Route Miles within Riparian Conservation Areas

Miles of proposed native surface trails within RCAs of known hardhead streams/lakes were evaluated to compare the overall effects for each alternative. The number of proposed designated trail miles within RCAs of occupied hardhead streams and lakes provides a relative index to measure the potential indirect effects to hardhead habitat from increased sedimentation from trails.

3.6.3.3.4.3 Number of Stream Crossings within Riparian Conservation Areas

The number of proposed stream crossings within RCAs of known hardhead streams/lakes was evaluated to compare the direct and indirect effects for each alternative. The number of proposed stream crossings provides a relative index to measure the potential direct and indirect effects to hardhead and habitat. Direct effects include potential hardhead mortality as a result of use of motorized crossings of occupied streams. Indirect effects include changes to channel and stream bank characteristics and changes in vegetation structure.

3.6.3.4 Aquatic Biota Methodology by Action:

Geographic Scope of the Aquatic Wildlife Resource Analysis. All “general” locations of the “action” alternatives have MYLF, FYLF and NWPT herpetofauna surveys completed to protocol (Fellers and Freel). These surveys have been completed previously for Herger-Feinstein Quincy Library Group (HFQLG) vegetation management projects or specifically for this EIS. Due to time and budgets constraints the decision was made to concentrate MYLF surveys where the highest probability of detections exists, where proposed routes crossed or were within 500 feet of perennial and intermittent streams. The Forest Fisheries Crew completed surveys across the Forest in the summer of 2008. This was a drought year and very smoky due to intensive wildfires across the Forest. Therefore, occupancy for MYLF was assumed, due to lack of confidence in surveys due to very poor environmental conditions (drought and smoke). Proposed designated trails on ridges and in unsuitable habitat for amphibians were not surveyed. The focus of these amphibian surveys was to determine presence/absence of TES amphibians, to determine suitability of habitat, and assess the condition of the routes to this habitat. The CRLF site assessment surveys were completed to US Fish and Wildlife Protocol within the Jack’s CAR. CRLF occupancy is assumed on all unsurveyed suitable habitat after application of the two habitat filters at 4,500-foot elevation and below. In addition, hydrological surveys on all new proposed NFS trails (Alternative 2 and 5) have been completed by hydrologists and technicians. These two alternatives include all unauthorized routes that are proposed to be added to the system as motorized trails under action alternatives 2, 4, and 5. The focus of these surveys is to determine the risk for the potential effects to aquatic biota, soil and water resources due to each individual route. The goal of these surveys, and subsequent field visits and discussions, was to make one of four ratings for aquatic wildlife species[2] and soil and water impacts for each route. These ratings are the same for all species (TES herpetofauna) with the exception of the increased distance northwestern pond turtles travel away from streams (up to 500 feet) for egg laying. The ratings are based on OHV stream crossings, and the routes rated moderate to high would be mitigated accordingly. The ratings are also based on the analysis made by the hydrologists, site conditions, and the potential for sedimentation into the streams. In addition, the ratings are based on known and potential populations of TES herpetofauna and suitability of habitat.

[2] The assumption is that the ratings for soils and water resources reflect the effects to water quality and thus equal effects to TES herpetofauna.

- **Low**: The route was considered, a field visit was made and the aquatic wildlife and soil and water resource effects would not be adverse (assuming routine maintenance of the trail).
- **Moderate**: The route was considered, a field visit was made and aquatic wildlife and soil and water resource effects are currently less than adverse. Site-specific measures are prescribed to prevent future potential adverse effects to the aquatic wildlife, soil and water resource. Site-specific measures may include addition or modification of route drainage features (out-sloping, rolling dips, waterbars, or ditch relief culverts); addition or modification of existing route stream crossing structures; relocation of short segments, a small distance from the existing route; and designation of acceptable seasons of use.
- **High:** The route was considered, a field visit was made and aquatic biota, soil and water resource effects are currently adverse. Site-specific measures for these routes are comprised of the same list of measures presented above for the Moderate rating. However, measures for routes rated "High" are necessary to minimize current aquatic wildlife, soil and water resource effects to less than adverse. The biologists and watershed staff recommend that these routes may be added to the NFTS after implementation of conservation measures.
  Extreme: The route was considered, a field visit was made and a determination was made that the aquatic wildlife and soil and water resource effects cannot be mitigated without additional environmental analysis. The route is not recommended by the biologists and watershed staff for inclusion on the NFTS. The reason for this recommendation is that measures to reduce aquatic wildlife, soil and water resource effects to less than adverse would not be economically feasible, meet safety standards, or would not be effective due to physical constraints (such as the route's close proximity to streams, frequent stream crossings, steep slopes, or highly erosive soils).

1. **Direct/indirect effects of the prohibition of cross-country motorized vehicle travel.**

Considerations: General discussion of direct/indirect effects if no action is taken and cross-country travel continues (with continued concentrated use of existing unauthorized routes and continued route proliferation in the long term). This includes likely degradation of riparian vegetation, increased bank erosion, nutrient loading, sedimentation, hydrocarbon pollution, which in turn increases metabolic rate, respiration crushing, and oxygen demand of fish and amphibians (Jennings 1996). Literature states sediment in spawning gravel increased by 2.6 – 4.3 times in watersheds with more than 4.1 miles of road per square mile (Cedarholm et al. 1981). When the index of biotic integrity (IBI) was analyzed on 100 Sierra Nevada watersheds, IBI scores were negatively correlated with the percentages of area containing roads associated with streams (Moyle and Randall 1996). The IBI scores consisted of measures with six metrics e.g., native *Ranid* frogs, native fishes, native fish assemblages, anadromous fishes, trout and stream fish abundance.

General discussion for all the action alternatives on the benefits of prohibiting cross-country travel and future route proliferation, include assumptions for passive recovery (increase in habitat) in the effects assessment.

2. **Direct/Indirect Effects of adding facilities (presently unauthorized routes and/or areas) to the NFTS, including identifying seasons of use and vehicle class.**

Short-term timeframe: 1 year.
Long-term timeframe: 20 years.
Spatial boundaryvaries by species and is dependent on species biology.
Indicator(s):

- Miles and Acres of potential TES amphibian habitat affected by routes within Riparian Conservation Areas and Zone of Influence of perennial streams, intermittent streams, ponds and lakes.
- Miles and Acres of potential threatened amphibian species affected within 500 feet (ZOI) of perennial streams, intermittent streams at 0-4% gradient on the Feather River Ranger District (West of the crest of the Sierra Nevada mountains).
- Miles of unauthorized routes or proposed trails to be added to the NFTS within Critical Aquatic Refuges (CARs) established for TES Amphibians.
- Number of stream crossings on unauthorized routes (Alt. 1) and proposed trails (Alts 2, 4 and 5) by alternative.
- Unauthorized route (Alt. 1) and proposed trail miles (Alts. 2, 5 and 5) within 500 feet of known or historically occupied TES herpetofauna habitat.
- Miles of proposed trails (Alt. 2, 4 and 5) and open unauthorized routes (Alt. 1) within 300' of known occupied hardhead minnow habitat.
- Number of stream crossings created by available routes (Alt. 1) and proposed trails (Alts. 2, 4 and 5) by alternative.

Methodology: GIS analysis of trails in relation to habitat and important/sensitive aquatic areas.
Rationale: Literature indicates that placement of trails in relation to habitat affects aquatic species through mortality, disturbance, and habitat modification (Moyle and Randall 1996, Trombulek and Frissell 2000, USDA Forest Service 2000).

3. Cumulative Effects

Considerations: Cumulative effects are discussed in reference to the two 'benchmark' alternatives (Alternative 1 "no-action" and Alternative 3 "cross-country travel prohibited"). Cumulative effects discussion for all alternatives combines all direct/indirect effects of the alternatives with the existing system trails. Reference Table 17, 24, and 31 for analysis of present and reasonably foreseeable future actions in the BA/BE.

For aquatic dependent species, the direct, indirect, and cumulative effects of each alternative are analyzed. Direct and Indirect effects will be assessed in both the short term (within 1 year) and the long term (approximately 20 years). Cumulative effects are assessed primarily in the long term (approximately 20 years) and incorporate direct and indirect effects, past/present (the current situation) and reasonably foreseeable future trails (quantitatively as much as possible), as well as a qualitative discussion of other past/present and reasonably foreseeable future actions potentially affecting these species (e.g., timber sales, grazing, other recreational uses, etc.). The spatial boundary of these analyses is all the proposed and existing system trails by alternative and the TES herpetofauna and fish habitat potentially affected within the Plumas National Forest. Analysis for each action alternative addresses the effects of each of the four action alternatives.

Short-term timeframe: cumulative effects analysis primarily will be analyzed in the long-term time frame.

Long-term timeframe: 20 years.

Spatial boundary: Forestwide or PNF.

Indicator(s):

Indicator(s):

- Miles and Acres of potential TES amphibian habitat affected by routes within Riparian Conservation Areas and Zone of Influence of perennial streams, intermittent streams, ponds and lakes.
- Miles and Acres of potential threatened amphibian species affected within 500 feet (ZOI) of perennial streams, intermittent streams at 0-4% gradient on the Feather River Ranger District (West of the crest of the Sierra Nevada mountains)
- Miles of unauthorized routes or proposed trails to be added to the NFTS within Critical Aquatic Refuges (CARs) established for TES Amphibians.
- Number of stream crossings on unauthorized routes (Alt. 1) and proposed trails (Alts. 2, 4 and 5) by alternative.
- Unauthorized route (Alt. 1) and proposed trail miles (Alts. 2, 4 and 5) within 500 feet of known or historically occupied by TES herpetofauna.
- Miles of proposed trails (Alt. 2, 4 and 5) and open unauthorized routes (Alt. 1) within 300' of known occupied Hardhead Minnow habitat.
- Number of stream crossings created by open routes (Alt. 1) and proposed trails (Alts. 2, 4 and 5) by alternative.

Methodology: GIS analysis of past/current, added, and future trails in relation to habitat and important/sensitive aquatic areas and in context of other past/current and future management actions affecting aquatic habitat.

Rationale: Literature indicates that placement of trails in relation to habitat may affect aquatic species through mortality, disturbance, and habitat modification (Moyle and Randall 1996, Trombulek and Frissell 2000, USDA Forest Service 2000).

3.6.4 Affected Environment

The PNF provides habitat for three species of TES amphibians and one sensitive reptile (PNF Forest Plan, 1988). There is one aquatic wildlife species currently listed as Threatened under the ESA and three species listed as Forest Service sensitive (Table 32). These species and their habitats on the PNF are described in detail in the Biological Evaluation/Biological Assessment (BE/BA) for this EIS, which can be found in the project record. In addition, there are two Aquatic Management Indicator Species (MIS) on the PNF. These species and their habitats are described in detail in the MIS section.

Existing information and knowledge about the distribution of the terrestrial and aquatic species on the PNF were used to develop the list of species and to develop species groups. Federally listed species, Forest Service sensitive species and MIS were selected and placed into species groups based on the potential for these species or their habitats to be affected by motor vehicle use on the PNF.

Local knowledge and sources included corporate databases including distribution of special status species, vegetation maps, etc., which were used to develop species or habitat groups.

Table 32 provides a list of all the special status species described by status, habitat indicator, and distribution on the PNF. Riparian Conservation Areas maintain riparian-dependent aquatic and terrestrial processes around running and still waters, and could function as corridors for movement of upland species. Riparian Conservation Areas are built around stream buffers that vary in width with the nature of the stream. Perennial streams and lakes have 300-foot buffer or top of inner gorge, whichever is greater, on each side of the stream. Seasonally flowing streams (intermittent and ephemeral streams) have a 150-foot buffer on each side of the stream, measured for the bank full edge of the stream. In addition, special aquatic features or perennial streams with riparian conditions extending more than 150 feet from edge of streambank or seasonally flowing streams with riparian conditions extending more than 50 feet from edge of streambank have a 300-foot buffer from the edge of the feature or riparian vegetation, whichever width is greater. These Riparian Conservation Areas are the existing refugia for at-risk species, or are areas with high water quality.

Table 32. List of Plumas National Forest special status aquatic species by habitat indicator and distribution.

Species	Federally Listed Threatened	Forest Service Sensitive	Management Indicator Species	Habitat Indicator	Distribution on PNF
Pacific tree frog			X	Wet meadow and freshwater emergent wetlands	Forest-wide
California red-legged frog	X			Warm water ponds and stream with slow moving water and pools with depths exceeding 0.7 meters (2.3 ft.), and with overhanging vegetation such as willows, as well as emergent and submergent vegetation.	Suitable habitat on Westside on PNF below 4,500 feet and stream gradient between 0-4%;. two known populations on PNF.
Foothill yellow-legged frog		X		Shallow, slow flowing water of rocky streams and rivers in a variety of habitats including riparian, mixed conifer, and wet meadow types below 6,000 feet elevation on the west slope of the Sierra Nevada.	Below 4,500 feet elevation on the west slope and transition zone of the PNF.
Hardhead minnow		X		Great Valley and Foothill belts, and in larger west-slope streams into the yellow pine belt.	Known within isolated stretches of the North Fork and Middle Fork Feather River.

Species	Federally Listed Threatened	Forest Service Sensitive	Management Indicator Species	Habitat Indicator	Distribution on PNF
Mountain yellow-legged frog		X		Low gradient (up to 4%) perennial streams and lakes above 3,500 feet elevation.	Locations above 3,500 feet on the PNF on the Feather River, Beckwourth and Mt. Hough Districts.
Northern leopard frog		X		Springs, slow flowing streams, marshes, bogs, ponds, canals, and reservoirs, usually in permanent and semi-permanent water in many habitat types and aquatic vegetation.	No known detections on the PNF. There will be no affect to this species by Alternative 1-5 and will not be addressed further in this analysis.
Northwestern pond turtle		X		Ponds, marshes, rivers, and streams with rocky or muddy bottom and aquatic vegetation/nest sites consist of sandy to very hard soil types, and can be as much as 325 feet from water (Zeiner et al. 1988).	Located on all Ranger Districts below 4,500' elevation.
Benthic Macro-invertebrates[3]			X	Riverine and lacustrine habitats.	Forest-wide.

A total of 7 species are included in the aquatic species group assessment. These include 4 amphibian species, 1 aquatic invertebrate group, 1 fish species and 1 reptile species. These species were divided into wildlife groups[4] (some species occurred in more than one group) as described in Table 33. Species not included in this assessment are species whose habitat does not occur on the PNF (anadromous fish and northern leopard frog).

Table 33. Wildlife group and species represented within groups

Wildlife Group	Species
Riparian and wetland species [including lacustrine (lakes) and riverine habitat (rivers, streams)].	Bald eagle, great gray owl, greater sandhill crane, willow flycatcher, hardhead, California red-legged frog, foothill yellow-legged frog, mountain yellow-legged frog, northwestern pond turtle, Sierra Nevada red fox, western red bat, yellow warbler, aquatic macroinvertebrates

3.6.5 Environmental Consequences - General Effects

3.6.5.1 Aquatic Riparian

Trail construction and use also affects adjacent vegetation. Reductions in vegetation along trails resulting trail-associated recreation use may create edge effects that alter community structure due to

3 Benthic Macro-invertebrates are analyzed in the Management Indicator Species section of the FEIS.
4 Additional Groups are described in the Terrestrial Wildlife Analysis Reports in the Project File

soil compaction and increased solar radiation and wind. Increases in soil compaction combined with increases in solar radiation have the potential to increase soil temperatures and decrease soil moisture, reducing habitat suitability for aquatic, aquatic-dependent, and riparian-dependent species.

Potential trail associated impacts to aquatic and riparian associated species include:

- Mortality or injury resulting from a motor vehicle running over or colliding with an animal.
- Loss or degradation of habitat resulting from fragmentation due to the establishment of roads, trails, or networks, and associated human activities. (Includes changes in sediment delivery, changes in water temperature, changes in channel morphology, and changes in hydrologic and vegetative condition of aquatic and riparian habitats, including streams, ponds, lakes, meadows, springs, and fens, and the associated riparian vegetation).
- Collection of live animals for use as pets (such as amphibians and reptiles) as facilitated by the physical characteristics of roads or trails or by road or trail access.
- A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise.
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young.

3.6.5.2 Fisheries

Increases in stream sediments have been correlated with decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fish. The effects of roads and trails also include barriers to migration, changes in water temperature, and changes to streamflow regime. Culverts that are placed in improper locations at stream crossings may reduce or eliminate stream passage, and road crossings may be migration barriers to fish. Roads constructed adjacent to streams may also cause adverse effects to stream condition. Loss of riparian vegetation affects stream temperature and cover, which may have both negative and positive impacts on fish. Irregularly or unpredictable streamflows have the potential to impact fish densities by affecting reproductive success and over wintering survival. High streamflow events following spawning can dislodge amphibian and fish egg masses or displace tadpoles, metamorphs, and young fry, and therefore lead to increased mortality to amphibian and fish populations.

Several studies have correlated road density or indices of roads to fish density or measures of fish diversity (Gucinski, et al. 2001). Impacts to fisheries include sedimentation of fines, changes in streamflow, changes in water temperature through loss of shade or changes in groundwater, migration barriers, introduction of exotic fish and invasive bull frogs, changes in channel geomorphology, and increased fishing pressure.

3.6.5.3 Aquatic Species and Habitat

Various studies have demonstrated that sediment delivery to stream channels in a forested environment is correlated to road surface type, physical characteristics of the adjacent areas (e.g., litter depth, coarse wood), soils (erodibility), the steepness of slope below the road, and vehicle usage (Chin and others 2004, Clinton and Vose 2003). Other factors that contribute to in-channel sediment delivery include the number of stream crossings on a channel, the condition of the stream approach, and the road length draining into the stream channel crossing. The relationships of roads and trails and effects to species are shown in Table 34.

Table 34. Road and trail impact factors of aquatic species and their habitat.

Road and Trail – Associated Factors	Activity Type	Definition of Associated Factors
Collisions	Harvest	Mortality or injury resulting from a motor vehicle running **over** or colliding with an animal
Habitat loss and fragmentation	Habitat modification	Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities
Edge effects	Habitat modification	Changes to habitat microclimate associated with the edge induced by roads or trails
Collection	Harvest	Collection of live animals for use as pets (such as amphibians and reptiles) as facilitated by the physical characteristics of roads or trails or by road or trail access
Route for competitors and predators	Habitat modification	A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise
Disturbance at a specific site	Disturbance	Displacement of individual animals from a specific location that is being used for reproduction and rearing of young
Physiological response	Disturbance	Increase in heart rate or stress hormones when near a road or trail or network of roads or trails

3.6.5.4 Herpetofauna

Potential road and trail associated risk factors to suitable habitat for California red-legged frogs (CRLF), foothill yellow-legged frogs (FYLF), mountain yellow-legged frogs (MYLF), and northwestern pond turtles (NWPT) (referred to as Herpetofauna), may cause modification or loss of habitat or habitat components, primarily aquatic and adjacent riparian environments used for reproduction, cover, foraging, and aestivation. Egg survival may be impacted by roads and trails through increases in fine sediments within aquatic habitats and crush eggs in upland habitats (NWPT). Stream crossings and roads and trails that are within close proximity to streams and ponds have the potential to impact riparian vegetation, emergent vegetation, nutrient loading, and channel morphology and hydrology that are important habitat components for frog species and NWPT.

The degree to which trails and roads affect frogs and NWPTs and their habitat depends on many factors such as road density, road type, and traffic intensity. No studies have identified the impacts of wheeled vehicle use of roads or trails on foothill yellow-legged frogs or NWPTs. Most studies on road and trail associated factors address other amphibians (e.g., Fahrig et al. 1995, Mazerolle 2003).

Several studies have shown that amphibian densities are inversely related to road density and traffic intensity (see Fahrig et al. 1995, Vos and Chardon 1998).

Direct impacts to frog populations and NWPTs from roads potentially include road mortality, direct loss of habitat, or creation of barriers. Mass mortalities of other species of frogs have been documented during dispersal where roads intersect natal/breeding habitat and non-breeding foraging habitat (Hine et al. 1981, Fahrig et al. 1995; Trombulak and Frissell 2000). Mortality from vehicles can reduce population size and reduce movement between resources and conspecific populations (Carr and Fahrig 2001). Road mortality is a potential risk factor for herpetofauna, because roads are common over the areas encompassing their historic range on the PNF, many of the roads presently have at least moderate traffic levels; and some observations suggest upslope seasonal movements by frogs likely intersect roads (Mark, T. personal communication).

Roads can also impact populations of frogs by affecting their riparian or terrestrial habitat. Trombulak and Frissell (2000) identified eight physical characteristics of the environment that may be altered by roads: soil density, temperature, soil water content, light, dust, surface-water flow, pattern of runoff, and sedimentation. The presence of roads is highly correlated with changes in the hydrologic and geomorphic processes that affect aquatic and riparian systems (Trombulak and Frissell 2000). Roads can influence both peak flows (floods) and debris flows (rapid movements of soil, sediment, and large wood stream channels) two processes, which have major influences on riparian vegetation (Jones et al. 2000) as well as aquatic and riparian patch dynamics critical to stream ecosystems (Pringle et al. 1988). California red-legged frogs, foothill yellow-legged frogs, mountain-yellow legged frogs, and Northwestern pond turtle breed in streams, which may be affected by fluctuations in the frequency or magnitude of peak and debris flows of adjacent streams. Fluctuations causing reductions or excesses in available water could severely affect recruitment. Hydrologic effects are likely to persist for as long as the road remains a physical feature altering flow routing often long after abandonment and revegetation of the road surface (Trombulak and Frissell 2000).

Increased sedimentation from roads also impacts riparian habitat used by frogs. The knowledge of the impact of increased sediment load on amphibians is limited (Gillespie 2002). However, the negative impacts of increased sediments on aquatic species, including fish, macroinvertebrates, and periphyton, are well known (Power 1990, Newcombe and MacDonald 1991, Waters 1995). The transfer of sediment to streams and other water bodies at road crossings is also a consequence of roads and trails (Richardson et al. 1975). The surfaces of unpaved roads can route fine sediments to streams, lakes, and wetlands, increasing turbidity of the water (Reid and Dunne 1984). This disrupts stream ecosystems by inhibiting aquatic plant, macro-invertebrate, and fish productivity. High concentrations of suspended sediment may directly kill aquatic organisms and impair aquatic productivity (Newcombe and Jensen 1996). The effects are heightened if the sediments contain toxic materials (Maxell and Hokit 1999). Increased sedimentation may also reduce availability of important food resources for tadpoles such as algae (Power 1990). Fine sediment deposits also tend to fill pools and smooth gravel beds, degrading habitats (Forman and Alexander 1998) and possibly the availability of oviposition sites or larval refugia (Welsh and Ollivier 1998). In addition, the consequences of past sedimentation are long term and cumulative, and cannot be mitigated effectively

(Hagans et al. 1986). The only data addressing sedimentation effects on foothill yellow-legged frogs are from Oregon, where sedimentation emerged as one of the variables affecting foothill yellow-legged frog occupancy (Borisenko and Hayes 1999 in Mark, T. 2008).

The spread of chemicals is another way in which roads may impact frog and turtles. At least five different general classes of chemicals are transferred into the environment from maintenance and use of roads: heavy metals, salt, organic molecules, ozone, and nutrients contribute (Trombulak and Frissell 2000). The change of the chemical environment by roads may affect living organisms in several ways. For example, chemicals found in road de-icers may kill (Doughtery and Smith 2006) or displace frog life stages, or they may be accumulated in plants as toxins which, in turn, may depress larval amphibian growth. Another example is the historic use of lead as a fuel additive that may have affected foothill yellow-legged frogs because lead has been shown to have sublethal effects on growth and behavior of northern leopard frog larvae (Chen et al. 2006). No data exist that specifically addresses the effects of road associated chemicals on CRLF (Mark, T. 2008), MYLF, or NWPT.

3.6.6 California Red-Legged Frog

3.6.6.1 Affected Environment

The Sierra Nevada bioregion has numerous major rivers, hundreds of lakes, and thousands of miles of streams that form 31 watersheds (Sierra Nevada Conservancy 2006). Sixty percent of California's water originates from the Sierra Nevada (Sierra Nevada Research Center). Throughout the Sierra Nevada, over the last 150 years anthropogenic disturbances such as dam construction have altered water temperatures, water volume, stream-flow patterns, and quantities of organic matter and nutrients of many streams (Kattelmann and Shilling 2004). In addition, the introduction of predatory invasive non-native bullfrogs into waterbodies and non-native fish into streams and lakes that were historically fishless has altered many aquatic systems. The Sierra Nevada Ecosystem Project (SNEP 1996) noted that across the Sierra Nevada bioregion, aquatic/riparian systems are the most altered and impaired habitats “Riparian areas have been damaged extensively by placer mining (northern and west-central Sierra) and grazing (Sierra-wide), and locally by dams, ditches, flumes, pipelines, roads, timber harvest, residential development, and recreational activities” (SNEP 1996). Similarly, herpetofauna populations have severely declined throughout the Sierra Nevada at all elevations.

Aquatic features found on the Plumas National Forest (Table 35) include both stream and lake systems. Within the administrative boundary, there are over 1,000 miles of streams, 64 lakes, reservoirs, and ponds (with an approximate aggregate surface area of 14,200 acres), and approximately 45,000 acres of riparian areas. As is the case across the Sierra Nevada, aquatic features and riparian areas within the Plumas National Forest have been affected to varying degrees by mining, dams and water impoundments, ditches, flumes, roads, timber harvest, grazing, mining, and recreation, including off-highway vehicle use. Native herpetofauna populations on the forest have been affected by introductions of non-native species such as smallmouth bass (*Micropterus dolomieu*), bullfrogs (*Rana catesbeiana*), and signal crayfish (*Pacifasticus leniusculus*).

The California red-legged frog (CRLF) is federally listed as Threatened by the USFWS on the PNF. Currently, there are two known breeding populations of CRLF on the PNF, one at Hughes Place in the French Creek watershed, and one at Little Oregon Creek in the Dobbins watershed. There are no trails proposed within the Dobbins watershed and therefore no direct or indirect effects to the CRLF or its habitat would occur. Habitat site assessments (USFWS) are completed within the French Creek watershed. All known and potential CRLF habitat below 4,500 feet and within 0-4% gradient and affected by the proposed designated trails will either be surveyed to USFWS protocol (pers. comm., USFWS, 2008), or assumed occupied.

The life history requirements are found and described in detail in the Biological Assessment (Project Record). The life history for CRLF dispersal habitats and distances is found in the Federal Register: November 3, 2005 (Volume 70, Number 212), Designation of Critical Habitat for the California Red-Legged Frog (*Rana aurora draytonii*) [Pages 66906-66913], Department of the Interior, Fish and Wildlife Service, 50 CFR Part 17, RIN 1018-AJ 16.

The historic range of the CRLF was limited to the coastal ranges, central valley, and the western slopes of the Sierra Nevada in California (Jennings 1996, Jennings and Hayes 1994). This proposed project is within this historic range. The current range of the CRLF extends into Butte County, but does not include Plumas County (USFWS 2000a, USDA-SNFPA, 2001). All federal land was initially excluded for critical habitat designation because it was determined that the Standards and Guidelines from the Sierra Nevada Forest Plan Amendment protected CRLF habitat (Federal Register 50 CFR17, pg. 19527). However, the Plumas National Forest now contains critical habitat as designated in the Final Rule for CRLF Critical Habitat (Federal Register 50 CFR 17, Volume 75, No. 51, dated March 17, 2010. The final designated critical habitat for the CRLF includes adding two critical habitat units, BUT-1 and YUB-1 (as indicated in project files and maps) on the Plumas National Forest.

Starting in 1995 to present, the Plumas NF has conducted amphibian surveys using “A Standardized Protocol for Surveying Aquatic Amphibians (Fellers and Freel 1995)”. The Plumas conducted formal amphibian surveys in 1996 (Fellers 1997) and red-legged frogs were not located. Surveys conducted from 1997-1999 used the USFWS’s protocol, as described in U.S. Fish and Wildlife Service’s Guidance on Site Assessment and Field Surveys for California Red-legged Frogs (USFWS 1997), which requires two daytime and two night-time visits, as well as the Fellers protocol. These surveys occurred in areas identified as having the highest potentially suitable habitat attributes. Formal amphibian surveys were conducted for a land exchange in 1997, and a major breeding population of California red-legged frogs was located in the French Creek watershed (Butte County) at Hughes Pond. This was the first known breeding population in the Northern Sierra Nevada. This finding then launched formal amphibian surveys in partnership with the California Academy of Science across the Plumas NF (Vindum and Koo 1999) in 1998 and 1999. These 1998 and 1999 surveys by the Academy resulted in no confirmed California red-legged frog sightings outside of Hughes Pond.

Approximately 70 percent of the Plumas NF has been surveyed for forest projects such as HFQLGFRA, Land Exchanges, Research Interest (Cal. Academy of Sciences, Jens Vindim), and other vegetation management projects. The emphasis for Herptofauna surveys on the Plumas were for “key” projects: Inventories have occurred for Hydropower relicensing (~50-60 miles of streams and lakes), cooperative agreements with California Academy of Sciences (~85 miles) and a museum record search across the country for herptofauna records, inventories for vegetation management and stream restoration projects, range allotments (~50% of the PNF), and inventories for HFQLGFRA monitoring (~48% of the PNF landbase). Approximately 259-300 miles of stream and lake habitat has been surveyed for herpetofauna on the Plumas NF, resulting in only two confirmed reproducing populations of CRLFs in the French Creek watershed (i.e. Hughes Pond) and the Dobbins Creek watershed (i.e. Little Oregon Creek). The Little Oregon Creek population was found in 2000 within the Dobbins Creek watershed (Yuba County) on the Feather River District of the Plumas NF. Suspected and unconfirmed occurrences have been reported in Pinkard Creek, Woodleaf, Howland Flat area, Slate Creek, and East Branch Slate Creek, all of which are located on the Feather River Ranger District. An analysis of confirmed and unconfirmed occurrences of the CRLF is documented in Appendix IV of the BA. The abundance and distribution of this species is not fully known, but there appears to be little suitable breeding habitat across the Forest. The two known breeding populations on the PNF are located in man-made ponds. The Hughes population exists in a pond adjacent to a historic resort, while the Little Oregon Creek population is located in “mining depressions” or “dredger ponds” that fill with water due to springs.

The Plumas NF has surveyed most of the potentially suitable habitat at 4,500 feet and below with a 0-4% gradient on the Beckwourth and Mount Hough Ranger Districts with various protocols (Fellers and Freel, 1994, USFWS CRLF Protocol, 1996) and have never located any life stages of the CRLF on these Districts. The total landbase of the Plumas National Forest is approximately 1,203,696 acres of which 589,811 acres have been surveyed (49%) for HFQLG projects alone. This included use of the USFWS CRLF Protocol on all habitats identified as suitable once site assessments were completed. The Forests’ biologists have continued to complete CRLF site assessments and followed up with CRLF protocol surveys to meet the requirements of the HFQLGFRA ROD of 1999. Professional biological judgment by the Forest Biologist is that the CRLF does not occur east of the ridge from the Feather River Ranger District onto the Mount Hough and Beckwourth Ranger Districts. The key area of concern where this species may be present is in the foothills and west slopes of the Plumas National Forest on the Feather River Ranger District. Although this document contains information of surveys completed and potential effects to the CRLF by the proposed alternatives on the potential for occurrence of this species on the two Districts “east” of the western ridge on the Forest (Mount Hough Ranger District and the Beckwourth Ranger District), it is believed that this species does not occur on the Mt. Hough or the Beckwourth Ranger Districts. The analysis for CRLF on the Plumas National Forest is west of the crest on the Feather River Ranger District. There are no OHV trails proposed within the Dobbins Creek watershed (Little Oregon Creek) and analysis of the proposed actions is not required . Habitat site assessments (USFWS) were completed within the French Creek watershed and throughout the Jack’s CAR in the summer of 2008 (reference Appendix 1 of the BA). The results of these site assessments found that of the habitat assessed, all habitats fell within the low to moderate range of suitability, and that no habitat assessed was within the range of high habitat suitability. All known and potential CRLF habitat was not surveyed to full USFWS protocol (pers. comm., USFWS, 2008), with only habitat site assessment portion of the protocol completed, and therefore occupancy was assumed.

Hughes Pond Telemetry Study - A four year-telemetry study (Wildlife Research Associates, 2008) has been completed on the Hughes Pond population. The following paragraphs in quotations are from the final telemetry study report (Tatarian, 2008): “While much is known about the life history of California red-legged frog, little is known about the phenology, demographics and habitat use of *R. draytonii* populations in the Sierra Nevada. To determine the management needs of this species we determined the population number and phenology, and tracked the movement patterns of a population in the ephemeral Hughes Pond, Butte County, within the Sierra Nevada Mountains. This fourth year report presents the results of our research of *R. draytonii* at Hughes Pond, for all years of this research project, between 2004-and 2007”. “The Hughes four-year telemetry study was focused on the habitat use, movement patterns and dispersal patterns of the Hughes Pond population within a conifer-hardwood ecosystem. In the years when the pond dried, all radio-tagged frogs moved downstream and downslope to a seep area. In years the pond was perennial, no frogs moved away from the pond. Frogs initiated movements when the pond was dry and after the first 0.5 cm of rain in the fall. Individuals typically moved aquatically 105 linear meters from the source pond. One male moved aquatically 208 meters in 2007. No additional movements were made downstream except by this same male. Adults tracked to the seep stayed in a localized area. Within the pond, frog occupied sites were canopied covered either by Carex sp. or Salix sp. No new CRF adults were detected at the pond and no migration movements were detected during radio-tracking”.

“To date, research reveals a high site fidelity to the pond and seep area. Breeding data from 2008 revealed that frogs laid their egg masses (n=7) on the branches of Salix sp. Only one egg mass was laid at the base of a Carex sp. We focused on implementing protection measures, in conjunction with the U.S. Forest Service Plumas National Forest biologists, for the egg masses and tadpoles. In 2008, we conducted a second year of sampling for *Batrachochytrium dendrobatidis* due to an emerging infectious disease of amphibians. As in 2007, we found several individuals tested positive for the fungus, while the others tested completely negative.”

“Data from this research differs from studies of *Rana draytonii* in more mesic habitats along parts of the California coast; results of these studies suggest that management for the species in similar habitats within the Sierra Nevada should include a buffer zone with several key components, including: (1) a connection between breeding habitat and non-breeding aquatic habitat, with a sufficient buffer to maintain the slope stability and riparian habitat, and (2) sufficient object cover in both breeding and aquatic habitat.”

Seasonal Patterns of Movements - The frogs remained at the pond during the winter, spring, and summer seasons until the pond dried. When the water evaporated, between July and September the frogs moved away from the pond, approximately 105 meters south and downslope of the pond into the seep. When the pond became dry in 2005 and 2007, frog movements away from the pond occurred during the first 0.5 cm of rain of the fall months (between September and November). As observed in other populations of CRF, movements from the pond occurred during periods of rain (Tatarian 2004, Bulger, et al. 2003). For the four years combined, we observed 6 individuals with radio-tags making 8 aquatic movements and we presumed all of the frogs moved between the pond and the seep when the pond dried down. No forays through upland habitat greater than 20 meters were observed during the study; however, movements were detected into upland habitat that was within the influence of the pond (e.g., under vegetation associated with the pond, such as blackberries).

"Frogs moved either to the seep area, or further downstream to areas with consistent water or moisture content. Movement from the seep back to Hughes Pond occurred after the water depth in the pond had increased to 2 feet. This movement pattern is similar to the findings of Bulger et al. (2003) in which it was found that non-migrating individuals moved the greatest distances (130 m) during summer and fall rains, with terrestrial movement distances decreasing during the breeding season, and 90% of radio-tagged frogs being reported within 6 m of water. Fellers and Kleeman (2007) also reported individuals moving from breeding ponds in Marin after the ponds began to dry."

Distances, Duration and Habitat Use During Aquatic Movements - "Radio-tracked frogs were found to have moved an average aquatic distance of 122.7 m (range 105 – 208 m). Frogs moved to different locations within the seep area and were often buried under the mud in water that was approximately 10 cm deep. When they moved around the seep area, up to 10 meters upstream, they were detected underneath willow roots and branches. When the pond attained sufficient water and soil moisture, approximately 60 cm in depth, the frogs returned to the pond."

"The male was tracked to an undercut ledge underneath a grass tussock approximately 1 meter from the edge of the creek. A large 75-cm diameter log was located within 60 cm of the refuge site. Within 2 days of detection, the male then moved a further 31 meters downstream to an area that contained three large logs that had fallen over the creek."

"Very few individuals made terrestrial forays at Hughes Pond. Although one female moved to the vegetation 1.5 meters above the water surface in 2007, no other movements were detected until the frogs moved to the seep area in August or September."

Habitat Use - "*R. draytonii* at Hughes Pond were tracked to areas beneath *Carex* sp., blackberry bushes and grasses, as well as under 1-2 inches of muddy water in the seep, and were difficult to find without the use of telemetry. Frogs were also tracked into the *Eleocharis* at the water's edge. Frogs occupied areas under logs and at the bases of *Carex* when the pond began to draw down. Daytime shelters in harsh environments are important because they provide anurans and other amphibians with opportunities for thermal regulation, and protection from desiccation and predators (Spieler and Linsenmair 1998). Frogs that select terrestrial shelters may minimize evaporative water loss by doing so.

3.6.6.2 Direct and Indirect Effects – All Alternatives[5]

As described above in general effects, the following is a list of potential direct and indirect effects to frogs and turtles by the action alternatives:

- **Direct Effect:** Mortality or injury resulting from a motor vehicle running over or colliding with an animal.

[5] There are no OHV trails proposed within the Dobbins Creek watershed (Little Oregon Creek), and therefore no direct or indirect effects to the CRLF or its habitat is expected at this known occupied site.

- **Direct Effect:** Collection of live animals for use as pets (such as amphibians and reptiles) as facilitated by the physical characteristics of roads or trails or by road or trail access.
- **Direct Effect:** A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise.
- **Direct Effect:** Displacement of individual animals from a specific location that is being used for reproduction and rearing of young.
- **Indirect Effect:** Loss or degradation resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities. (Includes changes in sediment delivery, changes in water temperature, changes in channel morphology, and changes in hydrologic and vegetative condition of aquatic and riparian habitats, including streams, ponds, lakes, meadows, springs, and fens, and the associated riparian vegetation).

Region 5 - USFWS Programmatic Agreement - Project Design Criteria

The following analysis was completed to address how the proposed action followed or did not follow the project design criteria developed from the programmatic agreement between the U. S. Forest Service, Region 5 Pacific Southwest and the USFWS for threatened and endangered species: “Route Designation: Project Design Criteria for “No Effect” or “May Affect Not Likely to Adversely Affect” determination for TE Species – October 2006 version 1 (October 2006). These criteria were quantified and evaluated for the level of effects in Table 35. A detailed analysis of Alternative 5 can be found in the biological assessment and evaluation (project record). The Forest has designed Alternative 5 to meet the programmatic agreement with a may affect not likely to adversely affect determination for the CRLF.

Table 35. California Red Legged Frog Design Criteria

California Red Legged Frog Design Criteria		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
#1. Routes or areas do not have potential to deliver sediment into stream associated with CRLF.	Meets Criteria Y/N	N	N	Y	Y	Y
	Miles of routes	14 mi (10 ac) (P) RCA 19 mi (14 ac) (I) RCA 12 mi (9 ac) (P) ZOI 18 mi (13 ac) (I) ZOI	4 mi (3 ac)(P)RCA, 5 mi (4 ac) (I) RCA, 4 mi (3 ac)(P)ZOI 6 mi (5 ac) (I) ZOI	0 mi (0 ac)(P)RCA 0 mi (0 ac) (I) RCA 0 mi (0 ac) (P) ZOI 0 mi (0 ac) (I) ZOI	0 mi (0 ac)(P) RCA 0 mi (0ac) (I) RCA 0 mi (0 ac)(P)ZOI .3 mi (.2 ac) (I) ZOI	0 mi(0 ac)(P)RCA .6 mi (.4 ac) (I) RCA .3 mi(P) (.2 ac)(P) ZOI 1.2 mi (.9 ac) (I) ZOI
	Effects H/M/L[6]	H	M	None	L	L
#2. In suitable CRLF habitat avoid Riparian Reserve, and RCAs, except to cross. Crossing approachs get rider in/out in shortest distance.	Meets Criteria Y/N	N	N	Y	Y	Y
	No. of Crossings	53 (P), 85 (I)	19 (P), 21 (I)	0	0 (P), 0 (I)	0(P), 4 (I)
	Effects H/M/L	H	M	None	L	L
#3. Routes or areas do not cross any stream or waterbody w/in 500' of known occupied sites of CRLF; & route or area not w/in 500' from wetland.	Meets Criteria Y/N	N	N	Y	Y	Y
	No. of Crossings/mi. route	0 crossings/ .5 mi. route (.4 ac)	0 crossings/ .3 mi. route (.2 ac)	0	0	0
	Effects H/M/L	H	H	None	None	None

[6] **L:** Low resource effects with routine maintenance of the trail, **M:** Moderate resource effects that require site-specific maintenance to reduce current or potential future effects. **H:** High resource effects that require site-specific mitigation to reduce effects. **E:** Extreme resource effects that cannot be mitigated without additional environmental analysis.

California Red-legged Frog Design Criteria		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
#4. In occupied CRLF habitat, routes or areas do not have the potential to capture or divert streamflow. Approaches are downsloped toward the stream in both sides.	Meets Criteria Y/N	N	N	Y	Y	Y
	Miles of routes	.5 mile	.3 mile	0	0	0
	Effects H/M/L Wetland	N(H)	H	None	None	None
#5. Areas are located outside of Riparian Reserves, RCAs, meadows, and wetlands within CRLF habitat.	Meets Criteria Y/N	Y	Y	Y	Y	Y
	No./acres of "Areas"	0	0	0	0	0
	Effects H/M/L	None	None	None	None	None
#6. No route or areas are within Critical Aquatic Refuges for CRLF.	Meets Criteria Y/N	N	N	Y	Y	Y
	Miles of routes[1]	87.0 miles	36.0 miles	0	0	0
	Effects H/M/L	H	M	None	None[2]	None

[1] No OHV area proposed in Alts. 4 & 5.

[2] 9 to 11 miles of routes are located in Rock and Bucks CARs on Mt. Hough RD, East of Crest outside of range for CRLF (below 4,500')

Alternatives 3, 4 and 5 all meet USFWS Criteria for CRLF, detailed analysis in the Biological Analysis.

P=perennial, I=intermittent, RCA=Riparian Conservation Area, ZOI=Zone of Influence

3.6.6.2.1 Route and Trail Miles and potentially affected acres within Riparian Conservation Areas and Zone of Influence

Alternative 1

With implementation of Alternative 1 there is a very high number of miles unauthorized existing routes being used under cross-country travel on the PNF and thus a greater negative effect; 14 miles (10 acres of potential habitat)[7] of routes fall within 300-foot RCA of perennial streams and 19 miles (14.0 acres of potential habitat) of routes fall within the 300-foot RCA buffer of intermittent streams (Table 36). Twelve miles of routes (9 acres of potential habitat) are within the 300-to-500-foot ZOI buffer of perennial streams and 18 miles (13 acres of potential habitat) of routes are within the 300-to-500-foot ZOI buffer of intermittent streams at 4,500 foot elevation and below on the Plumas National Forest (Table 37). With the implementation of Alternative 1, there is potential for high direct and indirect effects to the CRLF and potential CRLF habitat. These figures dramatically drop in proposed designated trail miles with all other action alternatives.

Alternative 2

A moderate to low number of trail miles and potentially affected acres are proposed for Alternative 2, with 4 miles (3 acres of potential habitat) within the 300 foot RCA of perennial streams and 5 miles (4 acres of potential habitat) within the 300 foot RCA of intermittent streams (Table 36). Four miles (3 acres of potential habitat) of routes fall within the 300-to-500-foot ZOI of perennial streams, and 6 miles (5 acres of potential habitat) within the 300-to-500-foot ZOI of intermittent streams (Table 37). With the implementation of Alternative 2, there is potential for moderate to low direct and indirect effects to the California red-legged frog and potential CRLF habitat.

Alternative 3

Alternative 3 proposes to add no new trails to the system, and therefore, no negative direct and indirect effects would occur to the California red-legged frog and potential CRLF habitat. Alternative three does eliminate cross country travel, reducing the use of 1,107 miles of user created trails, and therefore will have a positive effect on CRLF and their habitat.

Alternatives 4 and 5

As summarized in Table 35, no trail miles are proposed with Alternatives 4 and 5 within the RCA of perennial streams and zero to .06 miles (0-0.4 acres of potential habitat) respectively, within the RCA of intermittent streams (Table 36). Zero to .3 miles (0-0.2 acres of potential habitat) respectively within the 300-to-500-foot ZOI of perennial streams and .3 to 1.2 miles (.2 to .9 acres of potential habitat) respectively within the ZOI of intermittent streams (Table 37). Forestwide, this is 13 to 21% of the number of miles currently existing as unauthorized routes under cross-country travel (Alternative 1) and affecting approximately 79 to 87% less potential habitat. With the implementation of Alternative 4 and 5, there is potential for low direct and indirect effects to the California red-legged frog and potential CRLF habitat (Table 36, Table 37, Table 38, and Table 39) only include the miles of routes that occur on the Feather River Ranger District below 4,500 feet.

7 The proportion of a species habitat that is affected by motorized routes (including the routes plus a biologically meaningful ‘zone of influence’ (e.g., 300’ RCA, 500’ ZOI).

Table 36. Miles and Acres of potential California Red Legged Frog habitat affected within 300 feet (RCA) of perennial streams, intermittent streams, ponds and lakes on the Feather River Ranger District (West of the Crest)

Habitat	Acres on Forest (<4500')	Miles of unauthorized routes or proposed trails to be added to the NFTS and acres of potential habitat affected									
		Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
		Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres
Perennial Streams	152,929	14.1	10.2	4.3	3.0	0	0	0	0	0	0
Intermittent Streams	81,891	19.5	14.0	5.4	4.0	0	0	0	0	0.6	0.4
Ponds Lakes	15,029	.1	.07	0	0	0	0	0	0	0	0

Note: SNF S&G#94: Ground disturbing activity will be no more than 25% of RCA; all of the figures above total no more than 1% of the perennial and intermittent RCAs in Alternative 1. Alternative 5 is much less . Riparian Management Objectives have been met by the proposed alternative (reference Appendix A of Soil and Water Report).

Table 37. Miles and Acres of potential California Red Legged Frog habitat affected within 300-500 feet (ZOI) of perennial streams, intermittent streams, ponds and lakes on the Feather River Ranger District (West of the Crest)

Habitat	Acres on FRRD (<4500')	Miles of unauthorized routes or proposed trails to be added to the NFTS and acres of potential habitat affected									
		Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
		Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres
Perennial Streams	152,929	11.9	9.0	4.3	3.0	0	0	0	0	.3	.2
Intermittent Streams	81,891	18.3	13.0	6.2	5.0	0	0	.3	.2	1.2	.9
Ponds Lakes	15,029	0.1	.07	0.3	0	0	0	0	0	0.1	0

Potentially suitable breeding habitat is further defined as streams with a 0 to 4% gradient at 4,500 feet and below (Table 38). Based on GIS analysis, there were little to no routes that crossed through this potentially suitable habitat. GIS queries also found that in Alternative 1, four miles (3 acres of potential habitat) is affected by unauthorized routes within 500 feet of streams 0 to 4% gradient on the Feather River Ranger District. In Alternative 2; ½ mile (.3 acre of potential habitat) is affected by proposed routes within 500 feet of streams 0 to 4% gradient. Zero miles of proposed routes and no potential habitat are affected within 500 feet of streams 0 to 4% gradient with Alternatives 3, 4 and 5. In addition, less than .01% of the CARs at 4,500 feet and below are affected by routes that fall within 500 feet of perennial streams. A map of this exercise can be found in project files. For additional justification of identification of suitable habitat, reference Appendix II of the Aquatic Biological Assessment and Evaluation.

Table 38. Miles and Acres of potential California Red Legged Frog habitat affected within 500 feet (ZOI) of perennial streams, intermittent streams at 0-4% gradient on the Feather River Ranger District (West of the Crest)

Habitat	Acres on FRRD (<4,500')	Miles of unauthorized routes or proposed trails to be added to the NFTS and acres of potential habitat affected									
		Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
		0-2%	2-4%	0-2%	2-4%	0-2%	2-4%	0-2%	2-4%	0-2%	2-4%
P&I Miles	**234,820**	1.1	2.6	0.1	0.4	0	0	0	0	0	0
P&I Acres	**Acres**	0.8	1.9	.07	0.3	0	0	0	0	0	0

Road miles are used as a relative index to measure the potential indirect effects to aquatic species including the California red-legged frog. As discussed above in the general effects section that to continuation of cross country travel throughout the Forest, may have a direct effect on the CRLF by potentially crushing the frog, tadpole, or eggs by a vehicle. Indirectly, the loss of riparian cover, soil compaction, increased access by predators due to lack of cover and habitat degradation are direct and indirect effects of the implementation of Alternative 1. There is minimal impact to lakes and ponds by the No-action and all four action alternatives within the PNF and therefore there will be no further discussion regarding lakes and ponds.

3.6.6.2.2 Route and Trail Miles within Critical Aquatic Refuges

There are four Critical Aquatic Refuges (CARs) that were developed for known and suspected populations of California red-legged frogs: Woodleaf, Pinkard, Oregon, and Jacks. In addition, there are two CARs (Rock and Bucks) on the Mt. Hough Ranger District with National Forest System lands below 4,500 feet, however these CARs falls outside of the range of the California red-legged frog (CRLF) and therefore will not be analyzed in detail. Two populations of CRLF are known within the Oregon and Jack's CARs. There are no routes or proposed trails to be added to the NFTS in any alternative in the Oregon CAR and thus no direct or indirect effect to the CRLF would occur, and no additional analysis is required within this CAR.

The Jack's CAR is of concern due to a known breeding population and the number of trails proposed by the action alternatives within this CAR. Alternative 1 has the potential for the greatest impact to the CRLF with 47 miles of existing trails and unauthorized routes in the Jack's CAR with a known breeding population of CRLF (Table 39) with the potential for a very high direct and indirect effect to CRLF and its potential habitat. The high density of unauthorized routes under Alternative 1 within the Jack's CAR shows the potential impact of OHVs on a Forest open to cross-country travel. Currently, there is 0.5 mile of proposed route within 500 feet of a CRLF occupied site (Table 35 and Table 41) in the Jack's CAR. There are no proposed designated trails in Alternatives 4 and 5 in the Jack's CAR with a known population of CRLF. Twenty-two miles and 20 miles of proposed trails to be added to the NFTS in Alternatives 2 with a potential moderate to high direct and indirect effect to the CRLF population. There are zero miles of proposed trails to be added to the NFTS in Alternative

3, with no direct and indirect effect to CRLF and its population. With low quality suitable CRLF habitat scattered throughout the French Creek watershed there is a low potential of an OHV crushing a CRLF adult or metamorph and directly affecting the species.

Only 0.6 mile of unauthorized routes are included in Alternative 1 in the Woodleaf CAR with minimal impact, and no miles of proposed trails to be added to the NFTS by the action Alternatives (2 thru 5). There would be no direct or indirect effect to CRLF within the Woodleaf CAR.

The Pinkard CAR was developed for a suspected CRLF detection made in 1994; however, since then surveys have only found FYLF and one MYLF have been detected within this CAR, and no additional CRLF detections have been made. Four miles of unauthorized routes are proposed in Alternative 1 and 0.5 mile is proposed in Alternative 2 with zero miles proposed in Alternative 3 thru 5. The one 36-acre use area proposed in Alternative 2, on the Plumas NF at Sly Creek Reservoir. This use area occurs within the Pinkard CAR, however this use area does not contain suitable CRLF habitat. The 36-acre use area is essentially the old borrow pit that was used to build the Sly Creek Reservoir Dam. This 36-acre area is considered barren (no vegetation) under CHWR habitat maps and contains no habitat attributes that maybe used by CRLF, therefore this area would not impact CRLF or its habitat. Overall there is no impact to the CAR for CRLF with Alternatives 3 to 5, and a moderate direct and indirect effect to the Jack’s CAR with the implementation of Alternative 2, and a high direct and indirect effect to the Jack’s CAR with the implementation of Alternative 1.

Table 39. Miles of unauthorized routes or proposed trails within Critical Aquatic Refuges (CARs) established for California red-legged frogs, Plumas National Forest.

CARs	Total Forest Service Acres within the CAR	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Pinkard	4,907	4.3	0.5	0	0	0
Woodleaf	5,978	0.6	0	0	0	0
Oregon	5,106	0	0	0	0	0
Jacks	19,215	46.8	21.6	0	0	0

Alternatives 3, 4 and 5 meet all six of the design criteria for CRLF found in the Programmatic Agreement between Region 5 and the USFWS that was developed to minimize effects to a no effect or a may affect, not likely to adversely affect determination (Table 35). All routes that did not meet the USFWS programmatic agreement’s six criteria were excluded from Alternatives 4 and 5. In Alternative 2 conservation measures (as discussed in Chapter 2) were developed to minimize impacts to CRLF and their habitat. Proposed measures include stream crossings, hardening of the crossing approaches, interpretive signs and pamphlets, closure signs, seasonal closures, complete closures, and implementation of Best Management Practices (BMPs). All action alternatives meet the Sierra Nevada Standards and Guidelines Forest Plan Amendment (USDA, 2004). One of these Guidelines is to conduct a peer review for projects that propose ground-disturbing activities in more than 15% of a CAR. All action alternatives affect less than 1% of a CAR.

3.6.6.2.3 Number of Stream Crossings within RCAs

Alternative 1 poses a high risk to the CRLF from native surface motorized crossing densities[8] with 138 perennial and intermittent stream crossings (Table 40) on the existing unauthorized routes within Feather River Ranger District. Alternative 1 has the greatest chance of having a direct effect by potentially crushing a CRLF, tadpole or egg masses, in addition to an indirect effect to their dispersal and potential breeding habitat by some sedimentation created by OHV crossings. Alternative 2 has a potential for moderate direct and indirect effects on CRLF and its potential habitat with 41 perennial and intermittent stream crossings proposed. Alternatives 3 and 4 would have no direct or indirect effects on CRLF and its potential habitat, due to zero stream crossings from proposed trails to be added to the NFTS on perennial and intermittent streams. Alternative 5 would have very low direct or indirect effect on CRLF and its potential habitat with 4 intermittent stream crossings proposed across the Forest.

Table 40. Number of stream crossings on unauthorized routes (Alt. 1) and proposed trails to be added to the NFTS (Alts 2-5) by alternative on the Feather River Ranger District below 4,500' elevation.

Stream Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Perennial	53	19	0	0	0
Intermittent	85	21	0	0	4
Total Crossings	**138**	**40**	**0**	**0**	**4**

3.6.6.2.4 Miles of Routes within 500 feet of known CRLF occupied sites

A 500-foot buffer was placed around every occurrence of TES herpetofauna on the Forest and Table 41 displays the miles of route or trail that are within 500 feet of a known CRLF occurrence. Again Alternative 1 has a high potential for direct or indirect effects to CRLF and its habitat with 0.5 mile (0.4 acres) of unauthorized routes within 500 feet of the CRLF occurrence within the Jack's CAR . This route travels directly adjacent to known CRLF breeding habitat. Alternative 2 has the potential for a moderate direct or indirect effect to CRLF and its habitat with 0.3 miles (0.2 acres) of unauthorized routes within 500 feet of the CRLF occurrence within the Jack's CAR. Alternatives 3, 4 and 5 have no trails proposed within 500 feet of known CRLF and their habitat.

[8] Mt. Hough RD and Beckwourth RD are excluded, outside the range of CRLF.

Table 41. Unauthorized route (Alt. 1) and proposed trail miles to be added to the NFTS (Alts. 2-5) within 500 feet of a known California Red Legged Frog occupied site.

Species	Number of Known/Confirmed Occurrences	Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
		Mi.	Ac.	Mi.	Ac.	Mi.	Ac.	Mi.	Ac.	Mi.	Ac.
California Red-legged Frog	2	0.5	.4	0.3	.2	0	0	0	0	0	0

3.6.6.2.5 California red-legged frog Critical Habitat

Alternatives 1 and 2 have a range of .5 to .3 miles (.4-.2 acres of proposed trail miles within the CRLF Critical habitat with a low potential effect to CRLF and their potential habitat. There would be no effect to the two Critical Habitat Units (BUT-1, YUB-1) on the Plumas NF by the proposed action, with zero proposed routes within the boundaries of these two final Critical Habitat Units.

3.6.6.3 Cumulative Effects

3.6.6.3.1 Short vs. Long-term Effects

Alternative 1

In the short term (1 year), as described above, Alternative 1 would continue to have the potential for the greatest direct and indirect effect to CRLF and its habitat. In the long term (20 years), Alternative 1 would continue to degrade occupied and suitable CRLF habitat with a range of 43 to 70 miles of unauthorized routes, affecting approximately 31 to 50 acres of potential habitat within the RCA and ZOI of the CRLF. Under continued cross-country travel, it is likely that the existing 1,107 miles of unauthorized trails within CRLF habitat would continue to receive motorized use, in addition to the 130 miles of NFTS routes. Therefore, these unauthorized routes would continue to be used and there would be no ability for the compacted, degraded soil and vegetative conditions to recover. Alternative 1 would have a high potential for a cumulative effect to individual CRLF, their populations, and potential CRLF habitat.

Alternative 2

In the short term (as described in direct and indirect section), Alternative 2 would have a reduced potential for a direct effect to individual CRLFs by prohibiting cross country travel, including reducing the density of routes being used by motor vehicles within the RCA and ZOI’s by 70%, therefore reducing the potential of crushing a CRLF . Indirectly, there would be a minimal change in the short term for recovery of unauthorized routes that are not added to the NFTS. In the long-term (20 years), the 742 miles of unauthorized routes that are not added to the NFTS would have time to recover naturally, and reduce short term cumulative effects.

Alternative 3

Alternative 3 proposes no new OHV trails to be added to the NFTS, with no direct or indirect negative effects. Alternative 3 prohibits cross-country travel on the Forest, including the existing unauthorized routes, and, therefore, would have a positive direct and indirect effect on CRLF and their habitat. There would be a positive effect to individual CRLFs and their habitat. Again, indirectly, there would be a minimal change in the short term (1 year) for passive recovery of the 1,107 miles of unauthorized routes, yet within the long term (20 years), these unauthorized routes would have time to recover naturally, and reduce cumulative effects.

Alternatives 4 and 5

In the short term (1 year; as described in direct and indirect section), Alternatives 4 and 5 would have a reduced potential for a direct effect to individual CRLFs by prohibiting cross-country travel, including reducing the density of routes being used by motor vehicles within the RCA and ZOIs by approximately 75 to 93%, therefore reducing adverse effects to the CRLF.. Indirectly, there would be a minimal change in the short term (1 year) for recovery of the approximately 37 to 40 miles of the unauthorized routes that are not added to the NFTS within the RCA and ZOI associated with CRLF. Again, in the long term (20 years), these 845 to 958 miles of unauthorized routes that are not added to the NFTS would have time to recover naturally, and reduce cumulative effects.

3.6.6.3.2 Cumulative Actions Applicable to all Alternatives

The Plumas National Forest currently has 130 miles of motorized OHV trails within the National Forest Transportation System (NFTS). Cumulatively, there are 14 miles of NFTS OHV trails of which 11 miles (8 acres of potential CRLF habitat) are within the RCA (300-foot buffer) and ZOIs (300-to-500-foot buffer) of perennial and intermittent streams. Again, this adds cumulatively to direct, indirect and cumulative effects to the CRLF by the action alternatives. A detailed analysis of the cumulative effect of Forest road densities can be found in the Soil and Water Resources section of chapter 3 and in the Soil and Water Specialist Report.

Past and current cumulative effects to riverine and lacustrine habitats include current and historic livestock grazing; reduced suitability of habitat through catastrophic wildfires; mining activities; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use, including 4-wheel-drive vehicles, OHVs, and motorcycles.

The PNF currently has 42 active livestock grazing allotments including both cattle and sheep. Forest Plan Standards and Guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands. There are only three grazing allotments on the west side of the PNF; only one is active. Suitable CRLF habitat occurs within these allotments, and grazing activities can lead to habitat degradation and have the potential to contribute to cumulative effects to suitable CRLF habitat.

The California red-legged frog was once numerous and widely distributed in California. Initial declines of the California red-legged frog are attributed to over harvesting (Jennings and Hayes 1985), and then later to the introduction of the bullfrog, which have outcompeted and predated on the CRLF. A variety of other past cumulative impacts to California red-legged frogs have affected the distribution and abundance of the California red-legged frog on the PNF, including historic mining and grazing; urban development and mining on private land; road building, water diversions; recreation and non-native species introduction. All these activities have the potential to alter

California red-legged frog habitat through disturbance to vegetation, soils, hydrology, and the potential for introduction of invasive species. Activities (timber harvest, urban development, water diversions) on private land will continue to affect the species.

Although mining activities have the potential to adversely affect this species, suitable habitat has been created for this species (i.e. Little Oregon Creek mining tailings). Table 42 lists all the present and reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit re-issuance. In addition Table 42 summarizes cumulative impacts and the potential impact to riverine and lacustrine habitat. Some, but not all, of these activities will contribute to impacts to riverine or lacustrine habitats within the PNF boundary. Mining and dredging activities have occurred and continue to occur on the Forest. Mining and dredging activities result in sedimentation that affect CRLF habitat and decreases water quality. Between 1990 and 2007, approximately 266,963 acres burned on the PNF, some of which have affected riverine and lacustrine habitat through increased levels of sedimentation.

Currently, there is a high demand for recreational use on the PNF due to its close proximity to urban centers (e.g. Oroville, Chico, and Reno). The PNF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross-country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the PNF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the PNF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the PNF has the potential to cause an increase in negative interactions between humans and riverine and lacustrine habitats since most of the recreational facilities are located adjacent to lakes, streams and rivers. Future increase in recreational use on the PNF is expected, and therefore, increased disturbance to riverine and lacustrine habitat would be expected, particularly during the summer months.

Table 42. Direct, Indirect, and Cumulative Impact to riverine and lacustrine habitat from Present and Reasonably Foreseeable Future Projects[9]

Project type	Number of Projects	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Implement interim OHV forest orders to prohibit vehicle travel off existing inventoried roads, areas, and trails for an interim period until site specific analysis can occur utilizing appropriate levels of NEPA.	Forest wide: Temporary OHV Forest Order Project CE 31.b(1)	No additional direct and indirect effects, overall reduced potential for direct and indirect effects such as crushing or disturbance to aquatic species, decrease in sedimentation and vegetative disturbance at crossings and downstream.	Reduced inpacts from effect from open forest to cross country travel. No additional trails will be added to the Forest, and overall reduced cumulative effect compaired to the existing condition with a “open” forest. Overall benefit to herpetofauna habitat by eliminating effects to habitat quality.

[9] Reference Appendix C of FEIS for project descriptions

Project type	Number of Projects	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Designation of backcountry Discovery Motorized Trail (BCDT) to tie Plumas NF together with statewide motorized trail	Forest wide: Backcountry Discovery Trail	Minimal impacts depending on location, some additional direct and indirect effects with the potential for direct and indirect effects such as crushing or disturbance to aquatic species, increased sedimentation and vegetative disturbance.	Ongoing OHV activity and associated disturbances both physical to environment, and disturbance by noise and human activities.
Motorcycle Recreational Events- Two recreation events are planned using existing Forest Service system roads for a dual sport motorcycle (street legal) tours. One is on the Lassen and Plumas (two day event), and the other is on all three districts of the Plumas (3 day event).	Forest wide: Robert Van Court Ironman Dual Sport Motorcycle Rec Event	Potential direct and indirect effects are short term and minmal due to the use of existing road system. Short term OHV activity and associated disturbances both physical to environment, and disturbance by noise and human activities.	Minimal cumulative effect to species due to 3 day event.
Mining/Suction Dredging	4 (Copper Penny, Dredger's delight, Phat Chance, Winkeye	Direct and Indirect effects due to impacts from increased sediment delivery, decrease in water quality.	Mining/suction dredging add to cumulative impacts by decreasing habitat quality, mainly in riverine systems. Potential long term cumulative effects due to potential persistant sedimentation into riverine habitats due to mining operations.
Hazard tree removal	Ongoing Forest-wide	Minimal impact. Short-term disturbance during harvest. Reduction of LWD within riverine habitats.	Cumulative impact of loss of LWD into riverine and lacustrine habitats, but decrease in fuels and reduced risk of catastrophic wildfire.
Aquatic Organism Passage projects	Ongoing , proposals, throughout Forest including ARR projects	Direct effects of crushing of an aquatic organism by equipment. Indirect effects is a short-term sediment disturbance during project construction.	Increase herpetofauna passage and improved aquatic connectivity. Short-term cumulative impacts from sediment and habitat disturbance are minor.
Watershed Restoration	Ongoing , proposals, throughout Forest	Direct effects of crushing of an aquatic organism by equipment. Indirect effects is a short-term sediment disturbance during project construction.	Short-term cumulative impacts from sediment are minor. Improved habitat conditions from restoration project.
Range Allotment permit renewal	1 (Strawberry Valley Allotment)	Stream bank trampling from livestock resulting in increases in sediment and decrease in water surface shade from browsing riparian shrubs.	Cumulative impacts from sediment and water surface shade are expected to be within forest plan standards (<20%).

Project type	Number of Projects	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Backcountry Discovery Trail	Forest-wide	Harassment, herpetofauna collection, human disturbance, site degradation.	Short and long-term cumulative impacts on individuals and their habitat.
Integrated Noxious Weed Control Program	Forest-wide	Toxicity and potentially reduced water quality. Individual frogs and turtles could be killed. Potential loss of individuals during Rx burn.	Short-term direct and indirect effects to individual herpetofauna, long-term enhancement of habitat by maintenance of native plant species.
Fuels Reduction, Multi-product Biomass, and stand enhancement Projects.	Basin Group Selection, Slapjack, On Top DFPZ, Group Selection, Watdog, Concow Fuel Reduction, St. Louis Fuels Reduction, French MP Thin Mastication, Hughes Conifer Thinning Project, Burnt Bridge/Cottage Creek Blackoak Enhancement	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Reduced fuel and potential for future catastrophic wildfire. Riparian habitat improvement, improved micro-climate change, and improved aquatic and riparian conditions.
Concow Reforestation	Concow Fire Area, Northeast of Chico, and west of the NFFR.	Soil stabilization and reduced downstream sedimentation.	Short term sedimentation, long term conifer production and growth on 270 acres.
Water Quality Improvement Projects- Meadow improvement, road improvements.	South Fork Feather River & Lower Middle Fork	Short term sedimentation and reduced water quality during project implementation.	Long-term improved water quality, water storage capacity, and herpetofauna habitat.
Private Timber Harvest Plans (308,120 acres) to implement vegetation mgt projects. (Multi-product, thinning, salvage, stand conversion, and slash removal.	Forest wide	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction.
Hawkeye Tunnel Mining Plan of Operation	Underground mining operation, gravel washing and incidental occupancy for purpose of minerals extraction.Hawkeye Tunnel	Impacts from increased sediment delivery, decrease in water quality.	Potential for ongoing leaching of mining deposits into stream system and sedimentation from tailings post operation. In addition, potential for degradation of local site.

Project type	Number of Projects	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Challenge Work Center Invasive Species Management Project – control of non-invasive plant species utilizing IPM practices.	One project at the challenge work center.	Toxicity and potentially reduced water quality. Individual frogs could be killed. Potential loss of individuals during Rx burn.	Short-term direct and indirect effects to individual herpetofauna, long-term enhancement of habitat by maintenance of native plant species.
Trail Maintenance	ARRA Trails on FRRD	Potential sedimentation into riverine habitats.	Short-term cumulative impacts from sediment are minor. Long term improvement to water quality.
Salvage, site prep, and Reforestation projects	Canyon Complex Salvage, site prep, reforestation	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Reduced fuel and potential for future catastrophic wildfire. Riparian habitat improvement, improved micro-climate change, and improved aquatic and riparian conditions.
Campground rehabilitation at five campgrounds on the Feather River Ranger District.	Five projects: Golden Trout Crossing, Little Grass Valley, Milsap Bar, Rogers Cowcamp (note: in Jack's CAR on existing footprint of campground.	The projects consists of maintenance, rehabilitation, modernization and resource protection within the footprint of an existing developed campground. Low potential for crushing and sedimentation effects to herpetofauna by equipment. In addition to provide privacy; interplanting of conifers which provide screening within the campground. No expected direct or indirect effects to herpetofauna.	Short term sedimentation into stream. All BMPs will be met to minimize effects to stream system.
French MP Thin Mastication	Feather River Ranger District	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction.

3.6.6.3.3 Road Densities and Cumulative Effects Analysis

Watershed data was reviewed for cumulative effects for the CRLF, and the findings are there is not an appreciable cumulative effect to CRLF and their habitat. Again, a detailed analysis of the cumulative effect of Forest road densities can be found in the Soil and Water Resources section of chapter 3 and in the Soil and Water Specialist Report. The findings are the reasonably foreseeable actions as described in Table 42 above and Appendix C of the FEIS "are not expected to appreciably increase or decrease the density of roads and trails open to motorized traffic on public and private lands within the analysis watersheds" (USDA, 2010). "Therefore, the density of motorized roads and trails calculated for each project alternative is used to analyze the risk of cumulative watershed effects. Under the existing condition, 19 of the 178 analysis watersheds (11%) have road / route densities that exceed the cautionary level of 4.0 mi/mi2" (Table 2 of soil and water report, USDA 2010). The density of roads and routes open to motorized traffic would decrease for all of these watersheds under all action alternatives (other than Alternative 1); unauthorized routes would decline throughout the watersheds and would be made unavailable to motorized traffic. As a result, the road density for most watersheds would be less than the analysis cautionary level. For specific quantities; reference appendix E of Soil and Water Report. The overall effect to the watershed resources would also be beneficial, including improved surface water runoff timing and magnitude and reduced sediment delivery as a result of decreased road / route density. With the exception of alternative 1; under all the action alternatives the long-term watershed condition would improve and risk of cumulative watershed effects would decrease. "The net effect of past, present and reasonably foreseeable actions on each subwatershed, as indicated by the total mileage and density of proposed routes and roads open to traffic on public and private roads within the subwatershed (see Appendix E), is generally beneficial" (USDA, 2010). "This long-term improvement of watershed condition and long-term decrease in the risk of cumulative watershed effects due to protection of untracked areas is identical for all action alternatives (Alternatives 2 to 5)" (Soil and Water Report, USDA 2010).

3.6.6.4 Summary of Effects

With analysis of route and trail miles within RCAs, ZOIs, and CARs, stream crossings, route and trail miles within 500' of CRLF occurrences; Alternative 1 has the highest potential for direct, indirect and cumulative effects to CRLF, Alternative 2 has a moderate to high potential for direct, indirect and cumulative effects to CRLFs and potential CRLF habitat, and Alternative 4 and 5 have a moderate to low potential for direct, indirect and cumulative effects to CRLFs and potential CRLF habitat. Alternative 3 would have no direct or indirect effects to CRLF and potential CRLF habitat. Again, effects to riverine and lacustrine habitats include current and historic livestock grazing; reduced suitability of habitat through catastrophic wildfires; mining activities; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use, including 4-wheeled drive vehicles, OHVs, and motorcycles.

3.6.6.5 Determinations

Alternatives 1 and 2 may affect, and are likely to adversely affect individual California red-legged frogs and their habitat (reference Table 35). These alternatives do not meet the six criteria in the programmatic agreement with USFWS (2006) to reach a "no effect" or a "may affect, not likely to adversely affect" determination. This determination is based on the following:

- A range of 9 to 33 miles of existing unauthorized routes affecting approximately 7 to 24 acres of potential perennial and intermittent habitat within Riparian Conservation Areas, and a range of 11 to 30 miles of existing unauthorized routes affecting approximately 8 to 22 acres of perennial and intermittent habitat within the Zone of Influence (suitable CRLF habitat).
- 0.5 mile of route within 500 feet of the Hughes Pond CRLF population.
- A range of 22 to 47 miles of route within Jacks Critical Aquatic Refuge that supports Hughes Pond CRLF population. These proposed trails to be added to the NFTS have the potential to capture surface run-off and deliver sediment into streams; there are proposed trails to be added to the NFTS within Riparian Conservation Areas and Critical Aquatic Refuges and

within 500 feet of suitable habitat; there are routes within suitable habitat that have the potential to capture and divert stream flow.

- The one 36-acre OHV use area is proposed adjacent to the dam at Sly Creek Reservoir and is within the RCA, however this use area is not suitable habitat for the CRLF; and there are existing designated trails that will contribute cumulatively within the Jack's CAR which was developed for the CRLF.
- The Forest Fisheries Biologist and Forest Hydro-Engineer reviewed all perennial stream OHV route crossings in the Jack's CAR to evaluate and prescribed the type of crossing that could be constructed. Out of twelve crossings only seven crossings were identified as needed and feasible. A complete description of these crossing can be in the Biological Assessment and Evaluation in the project record.

A detailed analysis of the effects of Alternative 5 can be found in the Biological Assessment and Evaluation (project record).

The "May affect, likely to adversely affect" determination was made due to the fact that the Alternatives 1 and 2 do not meet the October 2006 Programmatic Agreement between Region 5, Pacific Southwest Region of the Forest Service and the U.S. Fish and Wildlife Service. In addition, the following findings also led to the adverse determination.

- Dispersal habitat may be impacted since the Alternatives 1 and 2 contains proposed trail that lie within the 300-foot Riparian Conservation Area containing potential CRLF habitat.
- Dispersal habitat may be impacted since Alternatives 1 and 2 proposed trail that lie within the 500-foot zone of influence (ZOI) containing potential CRLF habitat.
- Suitable habitat may be impacted since Alternatives 1 and 2 contain proposed trails to be added to the NFTS within the Jacks Critical Aquatic Refuge (CAR). However, the potential for harm to CRLF in unsurveyed suitable habitat within the Jacks CAR is expected to be minimal since USFWS site assessments found only low to moderate suitable habitat for the CRLF.
- Trails are proposed in CARs in Alternatives 1 and 2, and a moderate potential for direct and indirect effects to CRLF and potential habitat in the Jack's CAR.
- CRLF in assumed occupied habitat (unsurveyed suitable habitat) may be impacted since Alternatives 1 and 2 contain perennial stream crossings.

Alternative 3 would not affect the California red-legged frog or their habitat. This determination is based on the following:

- No additional trails would be added to the NFS motorized trail system. Alternative 3 would have no direct or indirect effect to the CRLF and potential CRLF habitat with no trails proposed to be added to the travel management system.
- In addition there would be an actual decrease in OHV activity on the Feather River Ranger District by the implementation of this alternative by the prohibition of cross-country travel.
- No impacts are anticipated to the two currently known occupied CRLF sites on the Forest.

Alternatives 4 and 5 may affect and are not likely to adversely affect individual California red-legged frogs or their habitat. This determination is based on the following:

- Alternatives 4 and 5 meet the six design criteria under the programmatic agreement between Region 5 of the Forest Service and the U.S. Fish and Wildlife Service.
- There are no proposed designated trails or existing system trails within 500 feet of a known CRLF occurrence.
- There is a prohibition of cross-country travel, including 75-93% of existing unauthorized motorized trails not being added to the NFTS within potential CRLF habitat.

3.6.7 Foothill yellow-legged frogs and Northwestern Pond Turtle

3.6.7.1 Affected Environment

3.6.7.1.1 Foothill Yellow-Legged Frog

The foothill yellow-legged frog historically occurred in foothill and mountain streams to 6,000 feet (SNFPA 2001). On the Plumas National Forest, only mountain yellow-legged frogs have been found above 4,500. Adults use both instream and riparian environments, though use of riparian areas and adjacent uplands is poorly understood. This species is found in or near rocky perennial streams and rivers in a variety of habitats, including riparian, mixed conifer and wet meadow types. It inhabits areas with moving water but tends to avoid areas with steep gradients (Zweifel 1955). These frogs prefer partial shade, shallow riffles, and cobble-sized or greater substrate (Hayes and Jennings 1988). On the PNF, this species is found in a few of the larger riverine systems, such as lower portions of the South Fork, Middle Fork and North Fork Feather River (NFFR), and Spanish Creek, but has also been found in smaller tributary streams of these larger systems, such as Bean Creek in the Meadow Valley Area.

Foothill yellow-legged frogs occur in many of the main drainages and tributaries on the PNF up to approximately 4,500 foot elevation.

Key management activities, which the Forest Service can influence, are: dams and diversions, mining, livestock grazing, recreation, vegetation management and mechanical fuel treatment, roads, and locally applied chemical toxins (pesticides and herbicides); fire can directly affect amphibians (SNFPA 2001).

3.6.7.1.1.1 Current Status (FYLF)

The FYLF is a Forest Sensitive Species and exists throughout the major drainages on the PNF in the Westside and Transition Zones.

3.6.7.1.2 Northwestern Pond Turtle

On the PNF, occupied Northwestern pond turtle habitat exists primarily on the west side (Feather River Ranger District) and central (Mt. Hough Ranger District) areas of the Forest, although a sighting was recorded in Sierra Valley. The PNF database contains 61 records for pond turtles. NWPT are primarily within aquatic habitat in spring and summer, except when they disperse to nest in the spring. In rivers, the NWPT needs slow flowing areas with deep underwater refugia and emergent basking sites. Sometime between April and August, females climb onto land to dig a nest, along stream or pond margins or upland, where they lay a clutch of 2 to 11 eggs. Some female lay two clutches in a year while others lay eggs every other year. Their young hatch in the late spring through late summer and are very susceptible to disturbance during this time. Again, in the fall and winter NWPT may disperse upland to pass the summer in a torpid or dormant state. Migration, hibernation, and nesting occur on land up to 330 feet from riparian area.

3.6.7.1.2.1 Current Status (NWPT)

The Northwestern pond turtle is a Forest Sensitive Species and exists throughout the major drainages on the PNF in the Westside and Transition Zones.

3.6.7.2 Direct and Indirect Effects-All Alternatives

Habitat for the Foothill yellow-legged frog is similar to lotic (stream) habitat as defined above for the CRLF, effects analysis is very similar as stated above for these two species. Rarely are FYLF found in lentic (pond and lake) habitats.

3.6.7.2.1 Route and Trail Miles within Riparian Conservation Areas and Zone of Influence

Potentially suitable habitat for the FYLF and the NWPT is at 4,500 feet elevation on perennial and intermittent water bodies across the Forest. There is a greater number of acres of potential habitat; and a greater number of known occurrences of both species than the CRLF and therefore more individuals and populations with potential direct and indirect effects.

Table 43. Miles of unauthorized routes (Alt. 1) or proposed trails to be added to the NFTS (Alts. 2-5) within foothill yellow-legged frogs and northwestern pond turtle habitat at 300 feet (RCA) of perennial streams, intermittent streams, ponds and lakes below 4,500 feet elevation

Habitat	Acres on Forest (<4500’)	Acres of potential habitat affected									
		Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
		Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres
Perennial Streams	346,459	42.6	31	9.9	8	0	0	2.2	1	3.4	2.1
Intermittent Streams	136,938	70.0	51.0	20.2	14.0	0	0	7.5	5.2	12.3	8.6
Ponds Lakes	18,130	0.6	0.5	0.4	0.3	0	0	0.1	.07	0.1	.07

Table 44. Miles of unauthorized routes (Alt. 1) or proposed trails to be added to the NFTS (Alts. 2-5) within foothill yellow-legged frogs and northwestern pond turtle habitat at 300-500 feet (ZOI) of perennial streams, intermittent streams, ponds and lakes below 4,500 feet elevation

Habitat	Acres on Forest (<4500')	Acres of potential habitat affected									
		Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
		Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres
Perennial Streams	346,459	28.4	21.0	8.6	6.0	0	0	2.0	1.0	3.6	2.0
Intermittent Streams	136,938	55.0	40.0	19.5	15.0	0	0	7.5	5.0	11.7	9.0
Ponds Lakes	18,130	0.6	0.4	0.2	0.1	0	0	0.2	0.1	0.2	0.1

Alternative 1

With implementation of Alternative 1 there is a very high number of miles existing trails and unauthorized existing routes on the PNF and thus a greater negative effect; 43.0 miles (31 acres of potential habitat)[10] of routes fall within 300-foot RCA of perennial streams and 70 miles (51.0 acres of potential habitat) of routes fall within the 300-foot RCA buffer of intermittent streams (Table 43). Twenty eight miles of routes (21 acres of potential habitat) are within the 300-to-500-foot ZOI buffer of perennial streams and 55 miles (40 acres of potential habitat) of routes are within the 300-to-500-foot ZOI buffer of intermittent streams (Table 44) at 4,500 feet elevation and below on the Plumas National Forest. With the implementation of Alternative 1; there is potential for very high direct and indirect effects to the FYLF and NWPT and potential FYLF and NWPT habitat. These figures dramatically drop in proposed designated trail miles with all other action alternatives.

Alternative 2

A moderate number of trail miles are proposed for Alternative 2, with 9 miles (6 acres of potential habitat) within the 300-foot RCA of perennial streams and 20 miles (15 acres of potential habitat) within the 300-foot RCA of intermittent streams (Table 43) and 10 miles (8 acres of potential habitat) within the 300-500' ZOI of perennial streams, and 20 miles (14 acres of potential habitat) within the 300-to-500-foot ZOI of intermittent streams (Table 44). Forest wide; this is approximately 30% of miles currently existing as unauthorized routes with an "open" Forest (Alternative 1) and affecting approximately 70% less potential habitat. With the implementation of Alternative 2; there is potential for moderate direct and indirect effects to the FYLF and NWPT and potential habitat.

Alternative 3

Alternative 3 proposes to add no new trails to the system, and therefore, no negative direct and indirect effects would occur to the FYLF or NWPT and potential habitat. Alternative 3 does eliminate cross country travel, reducing the use of 1,107 miles of user created trails, and therefore will have a positive effect on FYLF and NWPT and their habitat.

[10] The proportion of a species habitat that is affected by motorized routes (including the routes plus a biologically meaningful 'zone of influence' (e.g., 300' RCA, 500' ZOI).

Alternatives 4 and 5

A low number of trail miles are proposed with Alternatives 4 and 5 with 2 to 4 miles (1-2 acres of potential habitat) respectively, within the RCA of perennial streams and 8 to 12 miles (5 to 9 acres of potential habitat) respectively, within the RCA of intermittent streams (Table 43 and Table 44). There would be 2 to 4 miles (1 to 2 acres of potential habitat) respectively within the 300-to-500-foot ZOI of perennial streams and 8 to 12 miles (5 to 9 acres of potential habitat) respectively within the ZOI of intermittent streams (Table 43 and Table 44). This is 7 to 25% of the number of miles currently existing as unauthorized routes with an "open" forest (Alternative 1) and affecting approximately 75 to 93% less potential habitat. With the implementation of Alternative 4 and 5 there is potential for low to moderate direct and indirect effects to the FYLF and NWPT and potential habitat. Potentially suitable habitat is defined as streams with a 0-4% gradient at 4,500 feet and below. In addition, less than .01% of the CARs at 4,500 feet and below are affected by routes that fall within 500 feet of perennial streams. A map of this exercise can be found in project files. For additional justification of identification of suitable habitat, reference Appendix II of the Aquatic Biological Assessment and Evaluation.

Road Effects

Discussion about the effects of roads to CRLF also applies to both the FYLF and NWPT. Refer to the CRLF discussion about road miles used as a index to measure the potential indirect effects to aquatic species.

3.6.7.2.2 Route and Trail Miles within Critical Aquatic Refuges

Alternative 1 poses the greatest risk to the FYLF and NWPTs due to the greatest number of miles open for motor vehicles. Critical Aquatic Refuges with known or suspected FYLF and NWPTs occurrence are, Woodleaf, Pinkard, Oregon, Jacks, Willow, Rock, and Pinegrove (Table 45). Refer to the CRLF analysis of impacts to CAR's for Woodleaf, Oregon, and Pinchard. Alternative 1 has a high potential for direct and indirect effects to the FYLF and NWPTs with 47 miles of unauthorized routes in the Jack's CAR with a known breeding population of NWPTs.

The following analysis (Table 45) emphasized the three CARs with the greatest impacts by the five alternatives analyzed. The largest known populations of NWPTs occur in the Jack's CAR in two ponds. In the Jack's CAR there are 47 miles of unauthorized routes available for use in Alternative 1. There is a range of 22 proposed trails to be added to the NFTS in Alternatives 2 with a potential moderate to high direct and indirect effect. There are zero miles of proposed designated OHV trails in Alternatives 3, 4 and 5 with no direct and indirect effect to FYLF and the NWPT and their populations.

The Rock CAR has FYLF at lower elevations (with mountain yellow-legged frogs in the upper elevations) and known and suspected NWPT throughout in suitable habitat. There are 26 miles of unauthorized routes available for use in Alternative 1 with a potential for a high direct and indirect effect to both the FYLF and NWPT, there are approximately 12 miles of proposed trails to be added to the NFTS in Alternative 2 with a high to moderate potential for a direct and indirect effect to the

FYLF and NWPT. There are 8 to 10 miles of proposed trails to be added to the NFTS in Alternative 4 and 5 for a moderate potential for a direct and indirect effect to the FYLF and NWPT.

The Pinegrove CAR has FYLF at lower elevations (with MYLF in the upper elevation) and suspected NWPT throughout in suitable habitat. There are .6 miles of unauthorized routes available for use in Alternative 1 with the low direct and indirect effect to the FYLF and NWPT. There are zero miles of proposed designated trails in Alternatives 2, 3, 4 and 5 for no direct and indirect effect to the FYLF and NWPT.

The Bucks CAR has FYLF at lower elevations (with MYLF in the upper elevation) and suspected NWPT throughout in suitable habitat. There are 6 miles of unauthorized routes available for use in Alternative 1 with the potential for a moderate direct and indirect effect to the FYLF and NWPT. There are approximately 2.0 miles of proposed designated trails in Alternative 2 with the potential for a moderate to low direct and indirect effect to the FYLF and NWPT. There are 1.2 miles of proposed designated trails in Alternative 4 and 5 with the potential for a low direct and indirect effect to the FYLF and NWPT. There are zero miles of proposed designated trails in Alternative 3 with a potential for no direct and indirect effect to the FYLF and NWPT.

Overall; Alternative 1 shows the resulting high density of unauthorized OHV routes and the potential impact of no control of the use of OHVs and open cross-country travel. With the known population and suitable habitat scattered throughout the watershed there is a high likelihood of an OHV crushing a FYLF and NWPTs (near the streams) adult or young, directly affecting the species. NWPTs are known to travel up to 150 meters from perennial waterbodies. Alternative 1 poses a high risk to the FYLF and NWPTs due to the greatest number of miles proposed for designation. Alternative 2 has the potential for a moderate to high direct and indirect effect to FYLF and NWPT within “key” CARs on the Plumas National Forest. Alternatives 3, 4 and 5 would not have a direct or indirect effect on FYLF and NWPT in relation to miles of proposed trails to be added to the NFTS within CARs. There is minimal impact to the Critical Aquatic Refuges for FYLF and NWPT with Alternatives 4 and 5 within the CARs. A detailed analysis of the Critical Aquatic Refuges can be found in the Biological Assessment and Evaluation in the project record.

Table 45. Miles of unauthorized routes (Alt. 1) or proposed trails to be added to the NFTS (Alts. 2-5) within Critical Aquatic Refuges (CARs), Plumas National Forest (FYLF and NWPT) below 4,500’ elevation

CARs	Total Acres within the CAR	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Pinegrove	20,018	0.6	0	0	0	0
Pinkard	4,907	4.3	0	0	0	0
Woodleaf	5,978	0.6	0	0	0	0
Oregon	5,107	0	0	0	0	0
Jacks	19,216	46.8	21.6	0	0	0
Rock	35,164	25.9	11.6	0	8.2	10.3
Bucks	52,775	5.8	2.4	0	1.2	1.2
Lakes Basin	23,252	2.5	0	0	0	0

3.6.7.2.3 Number of Stream Crossing within RCAs by District and Elevation

Alternative 1 poses the greatest risk to the FYLF and the NWPT from native surface motorized crossing densities, with 96 perennial and 289 intermittent stream crossings (Table 46). Alternative 1 has the potential for very high direct and indirect effects to FYLF and its habitat. Alternative 1 has the greatest chance of having a direct effect by potentially crushing a FYLF, tadpole or egg masses and NWPT eggs and young. Alternative 2 has a potential for a moderate to high impact on FYLF and NWPT and habitat with 26 perennial and 75 intermittent stream crossings proposed across the Forest. Alternatives 4 and 5 have the potential for a moderate to low impact on FYLF and NWPT and habitat with 3 and 5 perennial and 29 and 47 intermittent stream crossings, respectively, proposed across the Forest.

Table 46. Number of stream crossings on unauthorized routes (Alt. 1) and proposed trails to be added to the NFTS (Alts 2-5) by alternative below 4500’ elevation on the Plumas National Forest by District.

	Number of Crossings by Stream Type on Beckwourth, Feather River and Mt. Hough RD’s below 4,500’ elevation														
	Alt 1			Alt 2			Alt 3			Alt 4			Alt 5		
Stream Type	Bk	Fr	Mh	Bk	Fr	Mh	Bk	Fr	Mh	Bk	Fr	Mh	Bk	Fr	Mh
Perennial xings	2	53	41	0	19	7	0	0	0	0	0	3	0	0	5
Intermittent xings	13	85	191	2	21	52	2	0	0	2	0	27	2	4	41
Total Crossings	15	138	232	2	40	59	2	0	0	0	0	30	2	4	46

3.6.7.2.4 Miles of Routes within 500 feet of known FYLF and NWPT occurrences

A 500-foot buffer was placed around every occurrence of TES herpetofauna on the Forest. Table 47 displays the miles of route or trail that are within or adjacent to occurrences.

3.6.7.2.4.1 Foothill Yellow-Legged Frog

There are 157 known occurrences (single and multiple frog sightings per occurrence). Alternative 1 has the greatest potential for a moderate direct or indirect effect to FYLF and its habitat with 2.2 miles of unauthorized routes within the 500-foot buffer of known occurrences. Alternatives 2 thru 5 have the potential for a low direct or indirect effect to FYLF and its habitat within a range of 0 to 0.5 mile proposed trails within 500 feet of known occurrences of FYLF.

3.6.7.2.4.2 Northwest Pond Turtle

There are 61 known occurrences (single and multiple pond turtle sightings per occurrence). Again, in relation to known and confirmed NWPT; Alternative 1 thru 5 have a potential for a low direct or indirect effects to NWPT and its habitat with 0-0.7 miles of unauthorized routes within the 500-foot buffer.

Table 47. Unauthorized route (Alt. 1) and proposed trail miles to be added to the NFTS (Alts. 2-5) within 500 feet of a known of FYLF and NWPT occurrences.

Species	Number of Known/Confirmed Occurrences	Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
		Mi.	Ac.	Mi.	Ac.	Mi.	Ac.	Mi.	Ac.	Mi.	Ac.
Northwestern Pond Turtle	61	0.7	.5	0.2	.1	0	0	0	0	0	0
Foothill Yellow-legged Frog	157	2.2	1.6	.1	.07	0	0	.3	.2	.3	.2

3.6.7.3 Cumulative Effects

3.6.7.3.1 Short vs. Long-term Effects

In the short term (1 year; as described in the direct and indirect section), Alternative 1 would continue to have the potential for the greatest direct and indirect effect to FYLF and NWPT and their habitats. In the long term (20 years), Alternative 1 would continue to degrade occupied and suitable FYLF and NWPT habitat from 4,500 and below with a range of 43 to70 miles of unauthorized routes, affecting approximately 31 to 50 acres of potential perennial and intermittent stream habitat (Table 43) within the RCA and a range of 28 to 55 miles of unauthorized routes, affecting approximately 21 to 40 acres of potential perennial and intermittent stream habitat (Table 44) within the ZOI (300-to-500-foot buffer. Under continued cross-country travel, it is likely that the existing 1,107 miles of unauthorized trails within FYLF and NWPT habitat would continue to receive motorized use, in addition to the 130 miles of NFTS routes. Therefore, these unauthorized routes would continue to be used and there would be no ability for the compacted, degraded soil and vegetative conditions to recover.

Alternative 1

Alternative 1 would have a high potential for a direct and indirect effect to individual FYLF and NWPT and their populations.

Alternatives 2, 4 and 5

In general with Alternatives 2, 4 and 5; there would be an immediate reduced direct effect by the closure of any routes within 500 feet of FYLF and NWPT occurrence, reducing the chance for crushing any life stage of the FYLF and NWPT.

Alternative 2

In the short term (1 year; as described in the direct and indirect section), Alternative 2 would have a reduced potential for a direct effect to individual FYLFs and NWPTs by reducing the OHV trail density within the RCA and ZOIs by 60%, therefore reducing the potential of crushing a FYLF and NWPT by this same percentage. Indirectly, there would be a minimal change in the short term for recovery of unauthorized routes. In the long term (20 years), the closure of 742 miles of unauthorized routes would have time to recover naturally and reduce the cumulative effects.

Alternatives 4 and 5

In the short term (1 year; as described in the direct and indirect section), Alternatives 4 and 5 would have a reduced potential for a direct effect to individual FYLFs and NWPTs by reducing the OHV trail density within the RCA and ZOIs by approximately 78% to 89% within the RCA and ZOI, therefore reducing the potential of crushing a FYLF and NWPT. Indirectly, there would be a minimal change in the short term (1 year) for recovery of the 66 to 64 miles (respectively) of the closed unauthorized routes within perennial RCA and ZOI and 111 to 101 miles (respectively) of the closed unauthorized routes within the intermittent RCA and ZOI of the FYLF and NWPT. In the long term (20 years), these 871 to 965 miles of unauthorized routes throughout the Forest, would have time to recover naturally and reduce the cumulative effects.

Alternative 3

Alternative 3 proposed to close the Forest to cross-country travel and add no new designated motorized trails to the current designated trail system; therefore, there would be a 100% reduction of unauthorized routes. Alternative 3 proposes no new designated trails, with no direct or indirect negative effects. OHV designated trails to the current designated trail system Alternative 3 proposed to close the Forest and therefore a 100% reduction of unauthorized routes and a positive direct and indirect effect on FYLF and NWPT and their habitat. Indirectly, there would be a minimal change in the short term (1 year) for recovery of the 1,107 miles of unauthorized routes, yet within the long term (20 years) these closed unauthorized routes would have time to recover naturally and recovery could be enhanced by manual treatment.

3.6.7.3.2 Cumulative Actions applicable to all Alternatives

The Plumas National Forest currently has 130 miles of designated motorized OHV trails. Cumulatively there are 14 miles of designated OHV trails within the RCA and ZOIs of potential habitat for the FYLF and NWPT. This adds cumulatively to direct, indirect and cumulative effects to the FYLF and NWPT by the action alternatives. A detailed analysis of the cumulative effect of Forest road densities can be found in the Soil and Water Resources section of chapter 3 and in the Soil and Water Specialist Report.

General discussions for the past and current cumulative effects to riverine and lacustrine habitats are described above in the CRLF section. Specific actions that affect the FYLF and NWPT are described in Table 42 and Table 55, which list all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit re-issuance. The cumulative impacts from present and reasonably foreseeable projects and a description of the potential impact to riverine and lacustrine habitat are described for each action (Table 48).

In addition to the following table, Reference Table 42 for projects at 4,500 feet and below on the Feather River Ranger District. These projects in addition to the following have been analyzed for cumulative effects to FYLF and NWPT.

Table 48. Direct, Indirect, and Cumulative Impact to riverine and lacustrine habitat from Present and Reasonably Foreseeable Future Projects[11]

Project type	Location	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Mining/Suction Dredging	Copper Penny, Dutch Hill Placer, Dutch Hill Tunnel, Pioneer Drift and Caribou Amend, Dredger's Delight, High Grade Placer claims, El Rico Mining Co.	Direct and Indirect effects due to impacts from increased sediment delivery, decrease in water quality.	Mining/suction dredging add to cumulative impacts by decreasing habitat quality, mainly in riverine systems. Potential long term cumulative effects due to potential persistant sedimentation into riverine habitats due to mining operations.
Hazard tree removal	Ongoing Forest-wide	Minimal impact. Short-term disturbance during harvest. Reduction of LWD within riverine habitats.	Cumulative impact of loss of LWD into riverine and lacustrine habitats, but decrease in fuels and reduced risk of catastrophic wildfire.
Aquatic species passage construction project	Ongoing , proposals, throughout Forest including ARRA Stimulus and KV, Legacy	Direct effects of crushing of an aquatic organism by equipment. Indirect effects is a short-term sediment disturbance during project construction.	Increased herpetofauna passage and improved aquatic connectivity. Short-term cumulative impacts from sediment are minor.
Watershed Restoration	Ongoing, proposals, throughout Forest	Direct effects of crushing of an aquatic organism by equipment. Indirect effects is a short-term sediment disturbance during project construction. Improved habitat conditions from restoration project.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water storage capacity and improved water quality.
Range Allotment permit renewal and NRCS Equip Projects	(Strawberry Valley Allotment), Grizzly Valley, Grizzly Valley Community, and Humbug Allotments	Stream bank trampling from livestock resulting in increases in sediment and decrease in water surface shade from browsing riparian shrubs.	Cumulative impacts from sediment and water surface shade are expected to be within Forest Plan standards (<20%).
Temporary OHV Forest Order	Forest wide	Closed forest to cross-country travel. Lessened disturbance to habitat downstream of routes within RCA and at stream crossings.	Overall benefit to herpetofauna habitat by eliminating effects to habitat quality.
Integrated Noxious Weed Control Program	Forest wide	Toxicity and potentially reduced water quality. Individual frogs could be killed. Potential loss of individuals during Rx burn.	Short-term direct and indirect effects to individual CRLF, long-term enhancement of habitat by maintenance of native plant species.

[11] Reference Appendix C of FEIS for project descriptions

Project type	Location	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Implement interim OHV forest orders to prohibit vehicle travel off existing inventoried roads, areas, and trails for an interim period until site specific analysis can occur utilizing appropriate levels of NEPA.	Forest wide: Temporary OHV Forest Order Project CE 31.b(1)	No additional direct and indirect effects, overall reduced potential for direct and indirect effects such as crushing or disturbance to aquatic species, decrease in sedimentation and vegetative disturbance at crossings and downstream.	Reduced inpacts from effect from open forest to cross country travel. Reduced inpacts from effect from open forest to cross country travel. No additional trails will be added to the Forest, and overall reduced cumulative effect compaired to the existing condition with a “open” forest. Overall benefit to herpetofauna habitat by eliminating effects to habitat quality.
Designation of backcountry Discovery Motorized Trail (BCDT) to tie Plumas NF together with statewide motorized trail	Forest wide: Backcountry Discovery Trail	Minimal impacts depending on location, some additional direct and indirect effects with the potential for direct and indirect effects such as crushing or disturbance to aquatic species, increased sedimentation and vegetative disturbance. Harrassment, collection, human disturbance, site degradation.	Ongoing OHV activity and associated disturbances both physical to environment, and disturbance by noise and human activities. Short and long-term cumulative impacts on individuals and their habitat.
Motorcycle Recreational Events- described in Table 42.	Forest wide: Robert Van Court Ironman Dual Sport Motorcycle Rec Event	Potential direct and indirect effects are short term and minmal due to the use of existing road system. Short term OHV activity and associated disturbances both physical to environment, and disturbance by noise and human activities.	Minimal cumulative effect to species due to 3 day event.
Clark's Creek Aspen Restoration and Ecosystem Enhancement Project	Situated in Clark's Creek, a 10,000 acre tributary watershed to Last Chance Creek, which flows to the North Fork of the Feather River.	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Long-term reduction of fuels. Riparian habitat improvement, improved micro-climate change, and improved aquatic and riparian conditions.
Mills Peak Trail	Lakes Basin Recreation Area Beckwourth Ranger District	Short-term sediment disturbance during project implementation.	Short-term cumulative impacts from sediment are minor. Long term improvement to water quality.
Smith Lake and Mt Elwell trails reroutes	Lakes Basin Recreation Area	Short-term sediment disturbance during project implementation.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water quality .
Water Quality Improvement Projects- Meadow improvement, road improvements.	Frenchman , Red Clover, Last Chance, Nelson-Onion.	Short-term sediment disturbance during project implementation.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water storage capacity and improved water quality.

Project type	Location	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Meadow and Stream Restoration)	ProjectsLast Chance (Meadowview) and Little Last Chance (Rowland Creek, Dotta Canyon, Sulphur Creek/Berry Creek, Red Clover/Poco, Black Gulch, Greenhorn Creek	Short-term sediment disturbance during project implementation.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water storage capacity and improved water quality.
Middle Fork Whitetop Project	Middle Fork Feather River	Toxicity and potentially reduced water quality. Individual frogs could be killed from treatment.	Short-term direct and indirect effects to individual CRLF, long-term enhancement of habitat by maintenance of native plant species.
Moonlight Road Relocation Project	The project is located about 10 miles north of Taylorsville, California on Forest Service Road 28N03	Potential sedimentation into riverine and lacustrine habitats.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water quality.
Dredger's Delight and High Grade Placer Claims	Quincy Highway, on Thompson Creek	Impacts from increased sediment delivery, decrease in water quality.	Mining decreases habitat quality, mainly in riverine systems. Potential long term cumulative effects due to potential persistant sedimentation into riverine habitats due to mining operations.
Snake Lake Meadow Thinning	East side of Snake Lake, Plumas County, California	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Short-term micro-climate change, long-term reduction of fuels and improved meadow habitat conditions.
Dutch Hill Tunnel	Along the 26N42Y road, Barker Gulch, Seneca, CA.	Potential sedimentation into riverine habitats.	Potential long term cumulative effects due to potential persistant sedimentation into riverine habitats due to mining operations.
Cascade Trailhead Improvements	Cascade Trailhead, near Quincy, CA.	Potential sedimentation into riverine habitats.	Short-term cumulative impacts from sediment are minor. Long term improvement to water quality. Recreational use, potential effects to FYLF and NWPT and their habitat.
Vegetation Regeneration Project	Buck’s Fen, Bucks Lake Wilderness, adjacent to Rt. Hand Salt Creek, Mt. Hough RD, Quincy, CA.	Positive direct and indirect impact, reduced grazing impact and reduced compaction and sedimentation.	Short and long-term improvement to habitat and water quality.
Trail Reconstruction	Greenville Campground	Concentrate personnal onto trail and reduced random impacts to habitat, overall improvement to riverine and lacustrine habitats.	Short and long-term improvement to habitat and water quality.

Project type	Location	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Cattle Exclosures/Drift Fence construction	McFarland Ravine	Positive direct and indirect impact, reduced grazing impact and reduced compaction and sedimentation.	Short and long-term improvement to habitat and water quality.
Hazardous Fuels Reduction Project, and multiproduct biomass, Group Selection & Reforestation	Keddie, American Valley, Meadow Valley , Corridor Wildand Interface, Empire, Ingalls, Jackson, Grizz, Big Hill, Freeman, Mabie, Camp 14, WUI	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Reduced fuel and potential for future catastrophic wildfire. Riparian habitat improvement, improved micro-climate change, and improved aquatic and riparian conditions.
Fires Recovery and Restoration Project	Moonlight and Wheeler, Moonlight Amendment, Silver Fire Fuel Reduction Project, Rich Fire, Moonlight Reforestation Project	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Reduced fuel and potential for future catastrophic wildfire. Riparian habitat improvement, improved micro-climate change, and improved aquatic and riparian conditions.
Upper Indian Creek Water Quality Improvement Projects	Upper Indian Creek watershed, Roads 27N25Y, 27N19Y, 27N20Y, 27N22Y, 29N43	Short-term sediment disturbance during project implementation. Meadow improvement, road improvements.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water storage capacity and improved water quality.
Private Timber Harvest Plans (308,120 acres) to implement vegetation mgt projects. (Multi-product, thinning, salvage, stand conversion, and slash removal.	Forest wide	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction.

3.6.7.3.3 Road Densities and Cumulative Effects Analysis

Watershed data was reviewed for cumulative effects for the FYLF and NWPT, and the findings are there is not an appreciable cumulative effect to FYLF and NWPT and their habitat. Reference the CRLF Cumulative Effects Analysis section for a discussion of the cumulative effects of road densities on watershed conditions. Again, the Soil and Watershed Report completed a detailed analysis of the effects of the Nation Forest System Roads on watersheds within the Project Areas (Plumas National Forest).

3.6.7.4 Summary of Effects

With analysis of route and trail miles within RCAs, ZOIs and CARs, stream crossings, route and trail miles within 500 feet of FYLF and NWPT occurrences, Alternative 1 has the highest potential for direct and indirect effects to FYLF and NWPTs; Alternative 2 has a moderate to high potential for direct and indirect effects to FYLF and NWPTs; and Alternative 4 has a low potential for direct and indirect effects to FYLF and NWPTs. Alternative 5 has a moderate to low potential for direct and indirect effects. Alternative 3 has no potential for direct and indirect effects to FYLF and NWPTs. Again, past and current cumulative effects to riverine and lacustrine habitats include current and historic livestock grazing; reduced suitability of habitat through catastrophic wildfires; mining activities; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use, including four-wheel-drive vehicles, OHVs, and motorcycles.

3.6.7.5 Determinations

3.6.7.5.1 Foothill Yellow-legged Frog

Alternative 1 may affect individuals and is likely to result in a trend toward listing or loss of viability for the foothill yellow-legged frog. This determination is based on:

1. The allowance of cross-country travel and the potential proliferation of additional unauthorized routes within RCAs, ZOIs and within 500 feet of known FYLF occurrences
2. The magnitude of effects is greater in every category for Alternative 1, including miles of route within RCAs, ZOIs, stream crossings, and route miles within known occurrences.

Alternatives 2, 4 and 5 may affect individuals, but are not likely to result in a trend toward listing or loss of viability for the foothill yellow-legged frog. This determination is based on:

1. Cross-country travel and the potential for proliferation of additional motorized routes are eliminated.
2. Miles of proposed designated trails are relatively low within CARs that contain FYLF.
3. The miles of proposed designated trails within 500 feet of known occurrences are very low (< 1 mile).

Alternatives 3 would not affect the FYLF. This determination is based on:

1. Cross-country travel and the potential for proliferation of additional motorized routes are eliminated, there are no proposed designated trails.

3.6.7.5.2 Northwestern Pond Turtle

Alternative 1 may affect individuals, and is likely to result in a trend toward listing or loss of viability for the Northwestern Pond Turtle. This determination is based on:

1. The allowance of cross-country travel and the potential proliferation of additional motorized routes within RCAs, ZOIs and within 500 feet of known NWPT occurrences,.
2. The magnitude of effects is greater in every category for Alternative 1, including miles of route within RCAs, ZOIs, stream crossings, and route miles within known occurrences.

Alternatives 2, 4 and 5 may affect individuals, but are not likely to result in a trend toward listing or loss of viability for the Northwestern Pond Turtle. This determination is based on:

1. Cross-country travel and the potential for proliferation of additional motorized routes are eliminated.
2. Miles of proposed designated trails are relatively low within CARs that contain NWPT, and (3) The miles of proposed designated trails within 500 feet of known occurrences are very low (< 1 mile).

Alternative 3 would not affect the NWPT. This determination is based on:

1. Cross-country travel and the potential for proliferation of additional motorized routes are eliminated.
2. There are no trails proposed to be added to the NFTS.

3.6.8 Mountain Yellow-Legged Frogs

3.6.8.1 Affected Environment

Mountain yellow-legged frogs in the Sierra Nevada occupy aquatic habitats for almost all their seasonal life history; they breed, rear, and overwinter in aquatic habitat. In general, habitat for the mountain yellow-legged frog is lentic (lakes and ponds), and lotic (streams) at 3,500 feet elevation and above on the Plumas National Forest. The northern species, *R. sierrae*, appears to occupy stream habitats more frequently, whereas the southern species, *R. muscosa*, often occupies lake habitats. Because mountain yellow-legged frog larvae overwinter at least one year, perennial aquatic habitats that do not freeze in the winter are needed for breeding and rearing. The species generally are thought to use perennial aquatic sites for overwintering, though this is not well-studied. Larvae and metamorphs to some level support a segment of the high-elevation food web: for example between invertebrates and garter snakes (*Thamnophis* spp.). Benthic invertebrates appear to be the primary food source of postmetamorphic life stages (juveniles and adults) in lake-dwelling populations. Postmetamorphic stages, known to move among aquatic sites seasonally, can rapidly colonize unoccupied habitat. Such movements may maintain proximate clusters of occupied sites that may function as metapopulations.

3.6.8.1.1 Prior to 1980

Historic mountain yellow-legged frog data for the PNF and vicinity are sparse. Prior to 1980, mountain yellow-legged frogs have been recorded from 6 general localities.

No data exist prior to the 1940s. In 1943, Margaret Storey collected mountain yellow-legged frogs from 3 localities in Sierra County: At the bridge over Slate Creek [CAS-SU 8602-8604]; 1 km north of Scales [CAS-SU 8611]; and Howland’s Flat [CAS-SU 8612]). In 1947, D. V. Brown collected a juvenile mountain yellow-legged frog at Camp La Porte, the Boy Scouts of America camp at La Porte (CAS-SU 9528).

One collection dates from the 1950s; Walter Howard and Ed Jameson, Jr. collected a juvenile mountain yellow-legged frog 11.2 km north of Quincy in 1950 (CAS 218482).

The only other pre-1980 records from the vicinity of the PNF date from the 1960s. In 1960, 8 mountain yellow-legged frogs were collected from near LaPorte (CSUC 1115, 1253-1259). In 1961, 5 mountain yellow-legged frogs were collected from Big Grizzly Creek (CSUC 1107-1111; Koo and Vindum 1999).

3.6.8.1.2 1980 to Present

Based on re-survey of historically occupied sites, Jennings and Hayes (1994) indicated that the species appeared extirpated from several localities. Plumas National Forest surveys conducted from 1990 through 2004 have generally followed the Fellers and Freel (1995) protocol, but significant variation in survey effort has been applied. A handful of these surveys have recorded mountain yellow-legged frogs at one to three locations, and most observations have been of individual frogs; sites with even two or three individuals are rare (Twedt and Evans 1993; USFS 1994, 2000a; Fellers and Freel 1995; Fellers 1997b; Koo and Vindum 1999, 2002; Foster Wheeler 2001; Williams 2004). A number of surveys within the appropriate elevation range and habitat have failed to detect mountain yellow-legged frogs (Fellers 1996; Ganda 2001a, 2001b, 2001c, 2001d, 2001e; Ecosystems West 2001, NSR 2001, Klamath WR 2003, Manda 2004).

Based on surveys during the 1990s, analysis of amphibian survey data, and collected positive sightings from the PNF, 54 known sites currently have mountain yellow-legged frogs, but data on numbers of individuals are largely lacking (C. Davidson, pers. comm., 2001). Nine of these sites, all in Plumas County, are specimen-documented: meadow on Pinkard Creek (CAS 203170); tributary to Rock Creek (CAS 206093); small pond north of Pine Grove Cemetery (CAS 209668); Faggs Reservoir (CAS 209370-209377); Silver Lake (CAS 209386); Rock Lake (209404) and its effluent (CAS 227668); outlet of Gold Lake (CAS 227259); upper Lone Rock Creek (CAS 227639); and Boulder Creek at Lowe Flat (CAS 227640).

Based on the most recent entries into the PNF Amphibian Database, between 2000 and 2003, of over 80 surveys conducted that included mountain yellow-legged frog as a target species, 34 surveys across 26 different sites recorded the species. Except for one site at which ca. 100 mountain yellow-legged frog larvae were found, one to 12 mountain yellow-legged frogs (various life stages) were recorded across remaining sites. The species appears to have disappeared from some of the relatively few historic sites on the PNF, and species abundance now seems low.

From 2003 to 2006, the USFS SNAMP surveyed nine watersheds on the PNF containing 50 sites. No sites had evidence of mountain yellow-legged frog breeding, and adults or juveniles were located at two (4 percent) of the sites surveyed. Only one to two mountain yellow-legged frogs were found on a given survey.

Also over the interval 2003-2006, CDFG conducted 86 surveys (see detail of survey approach in Status section) of 78 different sites with potential mountain yellow-legged frog habitat. Mountain yellow-legged frogs were detected at 16.7 percent (n = 13) of surveyed sites. The collective recent data indicate that mountain yellow-legged frogs are sparsely distributed on the PNF.

A three-year MYLF telemetry study began in July 2003 and ended in September of 2007. The objective of the study is to determine the dispersal behavior of the MYLF in relation to steams and adjacent terrestrial habitat. From this telemetry study, current findings include that the frogs are only associated directly within the drainage or just adjacent (23 meters away from stream); in the summer months each adult frog has been located very close to the same pool/territory; and in the fall, as temperatures decline, female frogs have been found to be moving downstream within the stream channel towards male frogs (Vance, personal com. 2004).

3.6.8.1.3 Current Status

Mountain yellow-legged frogs in the Sierra Nevada occur on both sides of the mountain axis between the headwaters of the Feather River and the headwaters of the Kern River between 1,100 m (3,609 feet) and 3,810 m (12,500 feet), but their eastside distribution appears to be restricted to the Tahoe

Basin southward. *Rana sierrae* occupies the northern and central Sierra Nevada south to the vicinity of Mather Pass (Fresno County), whereas *R. muscosa* occupies the Sierra Nevada south of this area.

The Forest has proposed conservation measures to reduce impacts to potential MYLF habitat on twenty-three perennial stream crossings by the construction of hardened crossings and crossing structures such as small culvert installation (reference appendix A of FEIS).

3.6.8.2 Direct and Indirect Effects

3.6.8.2.1 Route and Trail Miles within Riparian Conservation Areas and Zone of Influence

Alternative 1

With implementation of Alternative 1 there are a very high number of miles existing trails and unauthorized existing routes on the PNF and thus a greater negative effect; 108 miles of routes fall within 300-foot RCA of perennial streams and 208 miles of routes fall within the 300-foot RCA buffer of intermittent streams (Table 49). There are 64.2 miles of routes within the 500-foot ZOI buffer of perennial streams and 140 miles of routes are the 500-foot ZOI buffer of intermittent streams at 3,500 foot elevation and above on the Plumas National Forest (Table 50). These figures dramatically drop in proposed designated trail miles with all other action alternatives.

Alternative 2

A moderately high to high number of trail miles are proposed for Alternative 2, with 79 miles within the RCA of perennial streams and 151 miles within the RCA of intermittent streams and 47 miles within the ZOI (300-to-500-foot buffer) of perennial streams and 101 miles within the ZOI of intermittent streams (Table 49 and Table 50). This is approximately 28% less than the miles currently existing as unauthorized routes with an “open” Forest (Alternative 1), and a moderate to high direct and indirect effect to the mountain yellow-legged frog.

Alternative 3

Alternative 3 proposes to add no new trails to the system, and therefore, no negative direct and indirect effects would occur to the MYLF and potential MYLF habitat. Alternative 3 does eliminate cross country travel, reducing the use of 1107 miles of unauthorized trails, and therefore will have a positive effect on MYLF and their habitat. Road miles are used as a relative index to measure the potential indirect effects to aquatic species including the MYLF. As discussed above in the general effects section, to continue to allow OHV travel throughout the Forest, may have a direct effect on the MYLF by potentially crushing the frog, tadpole, or eggs by a vehicle. Indirectly, the loss of riparian cover, soil compaction, increased access by predators due to lack of cover and habitat degradation are direct and indirect effects of the implementation of Alternative 1.

Alternatives 4 and 5

A low number of trail miles are proposed with Alternatives 4 and 5 with 10 to 15 miles respectively, within the RCA of perennial streams and 20 to 36 miles respectively, within the RCA of intermittent streams (Table 49). There were 13 to 22 miles respectively within the RCA and ZOI of perennial streams and 40 to 62 miles respectively within the ZOI of intermittent streams above 3,500 feet elevation (Table 50). This is 10% to 16% of the number of miles currently existing as unauthorized routes with an “open” forest (Alternative 1) and a low to moderate direct and indirect effect to the mountain yellow-legged frog with the implementation of Alternatives 4 and 5.

There is minimal impact to lakes and ponds by the No-action and all four action alternatives within the PNF (Table 49 and Table 50). There will be no further analysis of effect to ponds.

Table 49. Miles and Acres of unauthorized routes (Alt. 1) or proposed trails to be added to the NFTS (Alts. 2-5) within potential Mountain yellow-legged frog habitat within 300 feet (RCA) of perennial streams, intermittent streams, ponds and lakes above 3,500 feet elevation

Habitat	Acres on Forest (>3500’)	Miles of unauthorized routes or proposed trails to be added to the NFTS and acres of potential habitat affected									
		Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
		Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres
Perennial Streams	88,211	108.8	79.0	25.8	19.0	0	0	8.0	5	14.3	10
Intermittent Streams	204,028	208.0	151.0	54.0	39.0	0	0	20.9	15.0	34.3	26.0
Ponds Lakes	4,376	0.6	0.4	0.4	0.3	0	0	0.1	0.07	0.1	.07

Note: SNF S&G#94: Ground disturbing activity will be no more than 25% of RCA; all of the figures above total no more than 1% of the perennial RCA, intermittent RCA, and pond/lake RCAs in Alternative 1. Alternative 5 is much less. Riparian Management Objectives have been met by all action alternatives (reference appendix A of soil and water report).

Table 50. Miles and Acres of unauthorized routes (Alt. 1) or proposed trails to be added to the NFTS (Alts. 2-5) within potential Mountain yellow-legged frog habitat within 300-500 feet (ZOI) of perennial streams, intermittent streams, ponds and lakes above 3,500 feet elevation

Habitat	Acres on Forest (>3500’)	Miles of unauthorized routes or proposed trails to be added to the NFTS and acres of potential habitat affected									
		Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
		Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres
Perennial Streams	147,941	64.2	47.0	18.0	13.0	0	0	5.4	4.0	8.0	6.0
Intermittent Streams	349,585	139.6	101.0	42.0	30.0	0	0	19.0	13.0	28.3	20.0
Ponds Lakes	6,969	0.1	.07	0.3		0		0		0.1	

3.6.8.2.2 Route and Trail Miles within Critical Aquatic Refuges

Alternative 1 poses the greatest risk to the MYLF due to the greatest number of miles proposed for addition to the NFTS. Critical Aquatic Refuges with known or suspected MYLF occurrence are, Lone Rock, Boulder/Lowe, Rowland, Lakes Basin, Pinegrove, Pinkard, Willow, Rock and Buck’s. Alternative 1 has the greatest impact to the MYLF with a range of 4 to 36 miles of unauthorized routes available for use in these CARs. The largest known populations of MYLF occur in Lone Rock, Boulder/Lowe, Lakes Basin, Rock, and Buck’s CARs. The miles of unauthorized routes within these CARs range from 7 to 35 for Alternative 1 with a high direct and indirect effect to MYLF and its habitat. With the known population and suitable habitat scattered throughout the watershed, there is a high likelihood of an OHV crushing a MYLF (near the streams) adult or metamorph directly affecting the species. MYLF are known to travel up to 23 meters from perennial waterbodies (MGW, 2007).

A detailed analysis of the Critical Aquatic Refuges can be found in the Biological Assessment and Evaluation written for this EIS, located in the project record. The Rowland, Pinegrove, Boulder/Lowe and Rock CARs are of concern to remain open (under Alternative1) with such a high density of use in Alternative 1 with a range of 22 to36 miles of open routes available for use (Table 51), and therefore the potential for a very high direct and indirect effect. Pinegrove and Rock would have a high direct and indirect effect with the implementation of Alternative 2 with a range of 15 to 18 miles of trails proposed for addition to the NFTS and with the implementation of Alternatives 4 and 5 a range of 7 to 12 miles of proposed designated trails available for use. Boulder/Lowe is of some concern of a moderate direct and indirect effect by the implementation of Alternatives 2, 4 and 5 with a range of 2 to 6 miles proposed trails to be added to the NFTS. Alternative 3 would have no direct or indirect effect on MYLF and its habitat within all the CARs with known or suspected MYLF populations. Overall, there is a predicted moderate to low direct and indirect effect to the Critical Aquatic Refuges for MYLF with all of the action alternatives (Table 51).

Table 51. Miles of proposed trails to be added to the NFTS (Alts. 2-5) and unauthorized routes (Alt. 1) within Critical Aquatic Refuges (CARs), PNF – Mountain yellow-legged frogs above 3,500' elevation

CARs	Total Acres within the CAR	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Lone Rock	16,890	6.6	2.6	0	2.3	2.8
Boulder/Lowe	18,195	21.9	6.1	0	1.7	2.4
Roland	35,570	31.6	2.2	0	0.7	2.
Lakes Basin	23,252	12.0	1.2	0	1.3	1.3
Pinegrove	20,017	36.0	18.4	0	7.0	12.2
Willow	8,478	4.6	1.4	0	0.5	0.5
Jacks	19,215	20.4	12.8	0	0	0
Pinkard	4,907	4.0	0.5	0	0	0
Rock	36,860	34.9	15.4	0	8.9	11.1
Bucks	58,138	14.3	4.2	0	1.6	1.6

3.6.8.2.3 Number of Stream Crossings within RCAs

Alternative 1 poses the greatest risk to the MYLF from native surface motorized crossing densities with 222 perennial stream crossings and 714 intermittent stream crossings (Table 52). Alternative 1 has the greatest chance of having a high direct effect by potentially crushing a MYLF, tadpole or egg masses with a potential very high impact. Alternative 2 has a potential for a high to moderate impact on MYLF and habitat with 63 perennial stream crossings and 179 intermittent stream crossings proposed across the Forest. Alternatives 4 and 5 have the potential for a moderate impact on MYLF and its habitat with a range of 14 to 29 perennial stream crossings and 74 to 138 intermittent stream crossings proposed across the Forest. Impacts would be minimized with hardening of crossings and the construction of crossing structures. Alternative 3 does eliminate cross country travel, reducing the use of user created trails and thus reduced stream crossings and potential effects to MYLF and their habitat.

Table 52. Number of stream crossings on unauthorized routes (Alt. 1) and proposed trails to be added to the NFTS (Alts 2-5) above 3500' elevation, by alternative on the Plumas National Forest.

	Number of Crossings by Stream Type on Beckwourth, Feather River and Mt. Hough RDs														
	Alt 1			Alt 2			Alt 3			Alt 4			Alt 5		
Stream Type	Bk	Fr	Mh	Bk	Fr	Mh	Bk	Fr	Mh	Bk	Fr	Mh	Bk	Fr	Mh
Perennial xings	57	100	65	10	43	10	0	0	0	1	7	6	4	18	7
Intermittent xings	322	88	304	55	27	97	0	0	0	8	7	59	17	13	79
Total Crossings	379	188	369	65	70	107	0	0	0	9	14	65	21	31	86

Table 53 displays the miles of route or trail that are within or adjacent to 500 feet of known occurrences of MYLF. There are 154 known occurrences (single and multiple frog sightings per occurrence. Alternative 1 has the greatest potential for a moderate direct or indirect effect to MYLF and its habitat with 4 miles of unauthorized routes and proposed designated trails within the 500-foot buffer. Alternatives 2 thru 5 have the potential for a low direct or indirect effect to MYLF and its habitat with a range of 0 to 0.8 mile proposed designated trails within 500 feet of known occurrences of MYLF.

Table 53. Unauthorized route (Alt. 1) and proposed trail miles to be added to the NFTS (Alts. 2-5) within 500 feet of mountain yellow-legged frog occurrences.

Species	Number of Known/Confirmed Occurrences	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Mountain Yellow Legged Frog	154	4.0	0.8	0	0.5	0.5

The Plumas National Forest completed a three-year telemetry study on MYLF on Bean Creek (~10 miles South West of Quincy, CA). The maximum linear movement of a MYLF along the stream was less than one mile. To determine a potential effect of an OHV crossing a stream, a 1 mile buffer was placed around every occurrence of MYLF herpetofauna on the Forest. Table 54 displays the number of routes that cross perennial and intermittent streams within one mile of known MYLF occurrences. There are 154 known occurrences (single and multiple frog sightings per occurrence (Table 54). Alternative 1 has the greatest potential for moderate direct or indirect effects to MYLF and its habitat with 43 perennial and intermittent stream crossings of unauthorized routes within 1 mile of known MYLF occurrences. Alternative 2 has a moderate to high direct or indirect effect to MYLF and its habitat with 31 perennial and intermittent stream crossings of proposed motorized trails within 1 mile of known MYLF occurrences. Alternatives 4 and 5 have a low to moderate direct or indirect effect to MYLF and its habitat with 10 to 17 perennial and intermittent stream crossing of proposed motorized trails within 1 mile of known MYLF occurrences. Alternative 3 has no direct or indirect effect on MYLF and its habitat.

Table 54. Number of unauthorized route (Alt. 1) or proposed trails to be added to the NFTS (Alts 2-5) that cross perennial and intermittent streams within one mile of MYLF occurrences.

Species	Number of Known/Confirmed Occurrences	Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
		P	I	P	I	P	I	P	I	P	I
Mountain Yellow Legged Frog	154	32	11	24	7	0	0	5	5	11	6
	Total	43		31		0		10		17	

3.6.8.2.4 Temporal Effects

Short-term (1 year) Alternative 1 would continue to have the potential for the greatest direct and indirect effect to MYLF and its habitat. In the long term (20 years), Alternative 1 would continue to degrade occupied and suitable MYLF habitat from 3,500 and above. A minimum of 1,107 miles of unauthorized inventoried OHV trails would continue to be used and there would be no ability for the compacted, degraded soil and vegetative conditions to recover. There would be an immediate reduced direct effect by the closure of any trails within 500 feet of MYLF occurrence, reducing the chance for crushing any life stage of the MYLF. In the short term, Alternatives 2 and 5 would have a reduced potential for a direct effect to individual MYLFs, yet a minimal change in the short term for recovery of the 742 to 880 miles of closed unauthorized routes to recover. In the long term (20 years), these 742 to 880 miles of closed unauthorized routes would have time to recover naturally. Some could be manually restored by putting the route back to the natural contour of the land, mulching, and seeding. In the short term (1 year), Alternatives 3 and 4 would have a reduced potential for a direct effect to individual MYLFs, with a short term for recovery of the 965 to 1,107 miles of closed unauthorized routes. In the long term (20 years); these 965 to 1,107 miles of closed unauthorized routes would have to recover naturally and again recovery could be enhanced by manual treatment.

3.6.8.3 Cumulative Effects

Cumulative actions applicable to all Alternatives are described in the FYLF and NWPT sections above. Again, a detailed analysis of the cumulative effect of Forest road densities can be found in the Soil and Water Resources section of Chapter 3 and in the Soil and Water Specialist Report.

General discussion for the past and current cumulative effects to riverine and lacustrine habitats are described above in the CRLF, FYLF, and NWPT sections. Specific actions that affect the MYLF are described in Table 55 listing all of the present and reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit re-issuances. Table 55 summarize cumulative impacts from present and reasonably foreseeable projects and include a description of the potential impact to riverine and lacustrine habitat.

Table 55. Direct, Indirect, and Cumulative Impact to riverine and lacustrine habitat from Present and Reasonably Foreseeable Future Projects[12].

Project type	Location	Riverine and Lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Implement interim OHV forest orders to prohibit vehicle travel off existing inventoried roads, areas, and trails for an interim period, until site specific analysis can occur utilizing appropriate levels of NEPA.	Forest wide: Temporary OHV Forest Order Project CE 31.b(1)	No additional direct and indirect effects, overall reduced potential for direct and indirect effects such as crushing or disturbance to aquatic species, decrease in sedimentation and vegetative disturbance at crossings and downstream.	Reduced inpacts from effect from open forest to cross country travel. No additional trails will be added to the Forest, and overall reduced cumulative effect compared to the existing condition with a "open" forest. Overall benefit to herpetofauna habitat by eliminating effects to habitat quality.
Designation of backcountry motorized trail to tie Plumas together with statewide trail	Forest wide: Backcountry Discovery Trail	Minimal impacts depending on location, some additional direct and indirect effects with the potential for direct and indirect effects such as crushing or disturbance to aquatic species, increased sedimentation and vegetative disturbance. Harrassment, collection, human disturbance, site degradation.	Ongoing OHV activity and associated disturbances both physical to environment, and disturbance by noise and human activities.
Motorcycle Recreational Events (Described in Table 42)	Forest wide: Robert Van Court Ironman Dual Sport Motorcycle Rec Event	Potential direct and indirect effects are short term and minmal due to the use of existing road system. Short term OHV activity and associated disturbances both physical to environment, and disturbance by noise and human activities.	Cumulative effects minimal due to two to three day events.
Mining/Suction Dredging	Cedar Mining Claim (Placer), Copper Penny and Two Penny	Impacts from increased sediment delivery, decrease in water quality.	Mining/suction dredging add to cumulative impacts by decreasing habitat quality, mainly in riverine systems.
Hazard tree removal	Ongoing Forest wide	Minimal impact. Short-term disturbance during harvest. Reduction of LWD within riverine habitats.	Cumulative impact of loss of LWD into riverine and lacustrine habitats, but decrease in fuels and reduced risk of catastrophic wildfire.
Aquatic Organism Passage Projects	Ongoing , proposals, throughout Forest, including ARRA projects	Direct effects of crushing of an aquatic organism by equipment. Indirect effects is a short-term sediment disturbance during project construction.	Increase herpetofauna passage and improved aquatic connectivity. Short-term cumulative impacts from sediment and habitat disturbance are minor.

[12] Reference Appendix C of FEIS for project descriptions

Project type	Location	Riverine and Lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Watershed Restoration	Clark's Creek Aspen Restoration and Ecosystem Enhancement Project,	Direct effects of crushing of an aquatic organism by equipment. Indirect effects is a short-term sediment disturbance during project construction.	Short-term cumulative impacts from sediment are minor. Long term improvement to water storage capacity and improved water quality. Improved habitat conditions from restoration project.
Range Allotment permit renewal	Strawberry Valley Allotment	Stream bank trampling from livestock resulting in increases in sediment and decrease in water surface shade from browsing riparian shrubs.	Cumulative impacts from sediment and water surface shade are expected to be within Forest Plan standards (<20%).
Integrated Noxious Weed Control Program	Forest wide	Toxicity and potentially reduced water quality. Individual frogs could be killed. Potential loss of individuals during Rx burn.	Short-term direct and indirect effects to individual CRLF, long-term enhancement of habitat by maintenance of native plant species.
Hazardous Fuels Reduction Projects, Site Prep, and Reforestation	Antelope Reforestation, Ingalls DFPZ, Corral Thin Addition,Rock Island, On Top	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Reduced fuel and potential for future catastrophic wildfire. Riparian habitat improvement, improved micro-climate change, and improved aquatic and riparian conditions.
Fire Restoration Projects and Reforestation	Cold Fire Recovery and Roadside Safety Project, Cold Fire Soil Stabilization and fireline rehab, Camp 14 Salvage and Reforestation	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Reduced fuel and potential for future catastrophic wildfire. Riparian habitat improvement, improved micro-climate change, and improved aquatic and riparian conditions.
Trail Maintenance and reroutes	Mills Peak Trail, Smith Lake and Mt. Elwell Trail Reroutes	Short-term sediment disturbance into riverine habitats, during project implementation.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water quality.
Corral Thin Addition	Off Forest Service System Road 24N10, west of Lake Davis.	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.
Dotta Canyon Meadow Restoration	Dotta Canyon	Short-term sediment disturbance during project implementation. Potential increase in breeding habitat for invasive species such as bull frogs.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water storage capacity and improved water quality.
Last Chance (Meadowview) and Little Last Chance (Rowland Creek) Watershed Restoration Projects	Meadowview and Rowland Creeks	Short-term sediment disturbance during project implementation. Potential increase in breeding habitat for invasive species such as bull frogs.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water storage capacity and improved water quality.
Middle Fork Whitetop Project	Middle Fork Feather River	Toxicity and potentially reduced water quality. Individual frogs could be killed. Potential loss of individuals during treatment.	Short-term direct and indirect effects to individual CRLF, long-term enhancement of habitat by maintenance of native plant species.

Project type	Location	Riverine and Lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Plinco Mine Off Site Water Developments	Plinco Unit McKesick Peak Allotment	Short-term sediment disturbance during project implementation.	Short-term cumulative impacts from sediment are minor. Long-term improvement to waterquality.
Moonlight Road Relocation Project	The project is located about 10 miles north of Taylorsville, California on Forest Service Road 28N03	Potential sedimentation into riverine and lacustrine habitats.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water quality.
Corridor Wildland Urban Interface (WUI) Fuels Reduction Project	The project is located adjacent to the community of Quincy within the ¼ mile WUI of Chandler Road and Highway 89.	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.
Snake Lake Meadow Thinning	East side of Snake Lake, Plumas County, California	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.
Dutch Hill Tunnel	Along the 26N42Y road, Barker Gulch, Seneca, CA.	Potential sedimentation into riverine habitats.	Potential sedimentation into riverine habitats due to mining operations.
Cascade Trailhead Improvements	Cascade Trailhead, near Quincy, CA.	Potential sedimentation into riverine habitats.	Recreational use, potential effects to FYLF and NWPTs and their habitat.
Upper Indian Creek Water Quality Improvement Projects	Upper Indian Creek watershed, Roads 27N25Y, 27N19Y, 27N20Y, 27N22Y, 29N43	Short-term sediment disturbance during project implementation.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water storage capacity and improved water quality.
Dixie Valley and Little Dixie Sheep Allotments	10 to 14 miles north-northeast of the city of Portola, California	Stream bank trampling from livestock resulting in increases in sediment and decrease in water surface shade from browsing riparian shrubs.	Cumulative impacts from sediment and water surface shade are expected to be within Forest Plan standards (<20%).
Red Clover and Poco Creeks Meadow Restoration	Red Clover and Poco Creeks	Short-term sediment disturbance during project implementation.	Short-term cumulative impacts from sediment are minor. Long-term improvement to water storage capacity and improved water quality.
Non-Motorized Trail Construction	Lake Davis, CA. South of Lightening Tree Campground around N. and W. Sides of Lake	Buffer around lake, minimal direct and indirect impacts.	Short-term cumulative impacts from sediment are minor. Recreational use, potential effects to herpetofauna and their potential habitat.
Aspen release, conifer thinning.	Dotta and NW Frenchman, Dixie Game Refuge, CA.	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.

Project type	Location	Riverine and Lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Wildlife Guzzler Replacement and Removal	Eureka Ridge and Frenchman Lake	No Impact, existing structures.	Potential stranding of herpetofauna drawn to water source. Existing cumulative impact, removal and replacement. This potential may decrease in the long term.
DFPZ Underburn	Red Clover Valley	Minimal impact, upland habitat	Short term microclimate change, long term reduction of fuels.
Canyon Dam Fuel Treatment Project	8 to 10 miles north of Greenville, California	Potential sedimentation into riverine and lacustrine habitats, short-term micro-climate change, long-term reduction of fuels.	Reduced fuel and potential for future catastrophic wildfire. Riparian habitat improvement, improved micro-climate change, and improved aquatic and riparian conditions.
Copper Penny and Two Penny mining Plan of Operation	On or near Lights Creek, on the Mt. Hough Ranger District; nearest town is Greenville	Impacts from increased sediment delivery, decrease in water quality.	Mining/suction dredging add to cumulative impacts by decreasing habitat quality.
Private Timber Harvest Plans (308,120 acres) to implement vegetation mgt projects. (Multi-product, thinning, salvage, stand conversion, and slash removal.	Forest wide on private land	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction.

3.6.8.3.1 Road Densities and Cumulative Effects Analysis

Watershed data was reviewed for cumulative effects for the MYLF, and the findings are there is not an appreciable cumulative effect to MYLF and their habitat. Reference the CRLF Cumulative Effects Analysis section for a discussion of the cumulative effects of road densities on watershed conditions within the project boundary. The Soil and Watershed Report completed a detailed analysis of the effects of the Nation Forest System Roads on watersheds within the Project Areas (Plumas National Forest).

3.6.8.4 Summary of Effects

With analysis of route and trail miles within RCAs, ZOIs, and CARs, stream crossings, route and trail miles within 500 feet of MYLF occurrences, Alternative 1 has the highest potential for direct and indirect effects to MYLF Alternatives 2, 4 and 5 have a low potential for direct and indirect effects to MYLFs. shas no direct or indirect effects to MYLF. Past, present and reasonably foreseeable cumulative effects to riverine and lacustrine habitats include current and historic livestock grazing; reduced suitability of habitat through catastrophic wildfires; mining activities; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use, including four-wheel-drive vehicles, OHVs, and motorcycles.

3.6.8.5 Determinations

Alternative 1 may affect individuals and is likely to result in a trend toward listing or loss of viability for the mountain yellow-legged frog. This determination is based on:

1. The allowance of cross-country travel and the potential proliferation of additional motorized routes within RCAs, ZOIs and within 500 feet of known MYLF occurrences.
2. The magnitude of effects is greater in every category for Alternative 1, including miles of route within RCAs, ZOIs, stream crossings, and route miles within known occurrences.

Alternatives 2, 4 and 5 may affect individuals, but are not likely to result in a trend toward listing or loss of viability for the mountain yellow-legged frog. This determination is based on the following:

1. Cross-country travel and the potential for proliferation of additional motorized routes are eliminated.
2. The miles of proposed designated trails are relatively low within CARs that contain MYLF.
3. The miles of proposed designated trails within 500 feet of known occurrences are very low (<1 mile).

Alternative 3 would not affect the MYLF. This determination is based on the following:

1. Cross-country travel and the potential for proliferation of additional motorized routes are eliminated.
2. There are no existing system trails within 500 feet of known occurrences for MYLF.
3. System trail densities within RCAs and ZOIs are very low and insignificant ranging from 0.5 to 0.08 mile per square mile.

3.6.9 Hardhead Minnow

3.6.9.1 Affected Environment

Hardhead minnow (*Mylopharodon conocephalus*) are listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). Hardhead are a cyprinid species endemic to California and are native to the Sacramento-San Joaquin system, Russian River and Napa River (Moyle 2002).

On the PNF, hardhead are known to inhabit the North Fork Feather River from Lake Oroville to the confluence with the East Branch North Fork Feather River, East Branch North Fork Feather River to the confluence of Rush Creek, Indian Creek from confluence with Spanish Creek to Flournoy Bridge, portions of Spanish Creek, portions of Greenhorn Creek, Middle Fork Feather River from Lake Oroville to the confluence of Humbug Creek near Portola, and South Fork Feather River from Ponderosa Reservoir to a natural migration barrier approximately 2 miles upstream. Hardhead are also known to inhabit Butt Valley Reservoir and Ponderosa Reservoir. Hardhead inhabit approximately 142 miles of stream on the PNF.

Route associated risk factors: Potential road and trail associated risk factors to hardhead include the immediate loss of individual fish at stream crossings and increases in sedimentation leading to the following: changes in water quality, changes in prey base, and changes to potential spawning bed capacity.

3.6.9.2 Direct and Indirect Effects

3.6.9.2.1 Site-Specific Physical Impacts and Disturbance to Occupied Hardhead Streams

Alternative 1 poses the greatest risk to hardhead where unauthorized routes and cross-country travel have the potential to impact occupied hardhead habitat. Cross-country travel has the potential to cause direct and indirect effects to hardhead habitat if streams are crossed by motor vehicles and if vehicles travel within the RCAs. Direct effects include potential hardhead mortality. Indirect effects include increased sedimentation and changes to channel, stream bank characteristics and vegetation structure. The remaining action alternatives indirectly affect occupied hardhead streams by the potential to deliver sediment to streams, but the indirect effects are likely limited due to low mileage of proposed trails to be added to the NFTS.

3.6.9.2.2 Route and Trail Miles within Riparian Conservation Areas

Table 56 shows the miles of unauthorized routes and proposed trails to be added to the NFTS within RCAs of known occupied hardhead habitat by alternative. Alternative 1 has the most miles of unauthorized routes within RCAs and poses the greatest risk to hardhead. Alternative 3 has no miles of proposed trails to be added to the NFTS in RCAs. Alternatives 2, 4 and 5 have less than half a mile of proposed trails to be added to the NFTS within RCAs. In Alternatives 2, 4 and 5 the effects would be limited to the Middle Fork Feather River. All action Alternatives pose lesser risk to hardhead than Alternative 1.

Table 56. Miles of proposed trails to be added to the NFTS (Alt. 2-5) and unauthorized routes (Alt. 1) within 300' of known occupied Hardhead Minnow habitat on the PNF

Habitat	Strm Miles/ Lake Acres	Acres w/in RCA	Alt 1	Alt 2	Alt 3[1]	Alt 4	Alt 5
Perennial Streams	141.8	18,565	10.05	0.43	0	0.30	0.30
Ponds Lakes	2,074	623	0.02	0	0	0	0

[1] Alternative 3 has no proposed trails to be added to the NFTS.

3.6.9.2.3 Number of Stream Crossings within RCAs

Table 57 shows the number of stream crossings by alternative for PNF. There are no stream crossings within RCAs of hardhead occupied streams in any of the alternatives. However, Alternative 1 allows cross-country travel, which could result in stream crossings which poses the greatest risk of direct impacts to hardhead.

Table 57. Number of stream crossings created by unauthorized routes (Alt. 1) and proposed trails to be added to the NFTS (Alts. 2-5) by alternative on the Plumas National Forest.

Stream Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Perennial	252	74	0	13	38
Intermittent	511	108	0	41	77
Total Crossings	**763**	**182**	**0**	**54**	**115**

[1] Alternative 3 has no proposed trails to be added to the NFTS.

3.6.9.3 Cumulative Effects

Past, current and foreseeable future actions that effects hardhead include change of habitat and water quality due to pollution and sediment inputs from past logging and mining, loss of connectivity by hydropower projects, and competition with non-native species. Appendix C provides a list and description of present and reasonably foreseeable projects on the Forest and private lands within the PNF boundary.

Alternative 1 poses the greatest risk of cumulative impacts by the increased effects to hardhead from unauthorized routes and cross-country travel that may directly and indirectly affect streams currently occupied by hardhead. Alternative 1 has the highest number of route miles within RCAs. Under Alternative 1, unauthorized route proliferation would likely continue and increase at an accelerated rate in the future, potentially increasing sediment delivery and alteration of stream bank vegetation and hydrologic condition, which may affect the abundance of hardhead within localized areas in the future. Alternatives 2, 4, and 5 would slightly increase cumulative impacts to hardhead within the Middle Fork Feather River watershed. Under Alternative 1, unmanaged cross-country travel would continue to occur and increase at an unknown rate where impacts to fisheries resources are uncertain. Under all other alternatives, cross-country travel would be prohibited. Over time, benefits to fisheries would be realized once unauthorized routes are obliterated or recover naturally.

3.6.9.4 Summary of Effects

Analysis of route and trail miles within RCAs, ZOIs, and CARs, stream crossings, route and trail miles within 300 feet of hardhead occupied streams show the following: Alternative 1 has the highest potential for direct and indirect effects to hardhead; Alternative 2 has low to moderate potential for direct and indirect effects to hardhead; Alternative 3 has no potential for direct and indirect effects to hardhead; and Alternatives 4 and 5 have very low potential for direct and indirect effects to hardhead. Past, current and foreseeable future action effects to riverine and lacustrine habitats include current and historic livestock grazing; reduced suitability of habitat through catastrophic wildfires; mining activities; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use, including four-wheel-drive vehicles, OHVs, and motorcycles. These activities along with others described above would add to the direct and indirect effects of each alternative as described above.

3.6.9.5 Determination

Alternatives, 1, 2, 4 and 5, may affect individuals, but are not likely result in a trend toward Federal listing or loss of viability for hardhead minnow. Alternative 3 would not affect the hardhead minnow.

3.6.10 Summary of Effects Analysis of All Alternatives

Table 58. Summary of effects analysis across all alternatives.

Indicators – Aquatic Biota	Rankings of Alternatives for Each Indicator[1]				
	Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Miles of unauthorized routes within or adjacent to TES aquatic biota habitat.	1	2	5	4	3
Density of motorized routes and trails as a measure of habitat effectiveness at the 7th order watershed level.	1	2	5	4	3
Miles of motorized routes and trails and acres of areas at forest-wide scale and within the habitat for each species.	1	2	5	4	3
The proportion of a species habitat that is affected by motorized routes and trails (including the routes or trails plus a biologically meaningful 'zone of influence' (e.g., 300 ft.).	1	2	5	4	3
Number hydrologically sensitive areas within 300 ft. (RCA width) of an added route or area.	1	2	5	4	3
Average for Aquatic Biota	**1**	**2**	**5**	**4**	**3**

[1] A score of 5 indicates the alternative has the least impact for aquatic biota related to the indicator. A score of 1 indicates the alternative has the greatest impact for aquatic biota related to the indicator.

3.6.11 Summary of Determinations of All Alternatives

Table 59. Summary of Effects of Proposed Action on Threatened, Endangered, Proposed, and Sensitive Aquatic Species that Potentially Occur on the Plumas National Forest.

Species	Alternative1 No-action	Alternative 2, 4 and 5	Alternative 3
FISH			
Hardhead Minnow (*Mylopharodon conocephalus*)	MAI	MAI	WNA
AMPHIBIANS			
California red-legged frog (*Rana aurora draytonii*)	MALAA	MALAA (Alt 2) MANLAA (Alts. 4&5)	NE
Foothill yellow-legged frog (*Rana boylii*)	LRTTFL	MAI	WNA
Mountain yellow-legged frog (*Rana muscosa*)	LRTTFL	MAI	WNA
REPTILES			
Northwestern pond turtle *(Clemmys marmorata marmorata*)	LRTTFL	MAI	WNA

Determinations: WNA = Will Not Affect, MAI = May Affect Individuals, but in not likely to result in a trend toward Federal listing or loss of viability, LRTTFL = May affect individuals, and is Likely to Result in a Trend Toward Federal Listing or loss of viability.
NE = No Effect, MALAA = May Affect, Likely to Adversely Affect, MANLAA = May Affect, Not likely to Adversely Affect.

3.6.11.1.1 California Red-legged Frog

Alternatives 1 and 2 may affect and is likely to adversely affect the California red-legged frogs and their habitat. Alternatives 4 and 5 meet all the criteria to lead to a "May affect, not likely to adversely affect" determination for the CRLF. Alternative 3 would not affect the California red-legged frog or its habitat.

In addition, impacts would be avoided or mitigated by complying with the Aquatic Management Strategy and assuring that all guidelines and RMOs are followed and met (Appendix A, Soil and Water Specialist Report, 2010), the Interdisciplinary Team agreed upon mitigations, in addition to the implementation of a season of use period and best management practices.

3.6.11.1.2 Foothill Yellow-legged Frog

Alternative 1 may affect individuals and is likely to result in a trend toward Federal Listing of the foothill yellow-legged frog and its habitat. Alternatives 2, 4 and 5 may affect individuals, but are not likely to result in a trend toward federal listing or loss of viability for the foothill yellow-legged frog. Alternative 3 would not affect FYLF.

3.6.11.1.3 Northwestern Pond Turtle

Alternative 1 may affect individuals and is likely to result in a trend toward Federal Listing of the northwestern pond turtle and its habitat. Alternatives 2, 4 and 5 may affect individuals, but are not likely to result in a trend toward federal listing or loss of viability for the northwestern pond turtle. Alternative 3 would not affect the NWPT.

3.6.11.1.4 Mountain Yellow-legged Frog

Alternative 1 may affect individuals and is likely to result in a trend toward Federal Listing of the mountain yellow-legged frog and its habitat. Alternatives 2, 4 and 5 may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the mountain yellow-legged frog. Alternative 3 would not affect the NWPT.

3.6.11.1.5 Hardhead Minnow

Alternatives 1, 2, 4 and 5 may affect but is not likely to adversely to result in a trend towards federal listing or loss of viability for the hardhead minnow. Alternative 3 would not affect the hardhead minnow.

3.6.12 Compliance with the Forest Plan and Other Direction

Compliance with the Forest Plan as amended (SNFPA ROD, 2004) would be met. Mitigations have been developed to minimize any adverse conditions by the proposed alternatives for TES Aquatic Species.

3.7 Terrestrial and Riparian Species

3.7.1 Introduction

Management of wildlife species and habitat and maintenance of a diversity of animal communities is an important part of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on National Forest System (NFS) lands must be planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species or lead to a trend toward listing or loss of viability of Forest Service Sensitive Species. In addition, management activities should be designed to maintain or improve habitat for Management Indicator Species (MIS) to the degree consistent with multiple-use objectives established in each Forest Plan. Management decisions related to public motorized travel can affect wildlife by increasing human-caused mortality, causing changes in behavior due to disturbance and habitat modification (Gaines et al. 2003, Trombulak and Frissell 2000, USDA Forest Service 1998). It is Forest Service policy to minimize damage to vegetation, avoid harassment to wildlife and avoid significant disruption of wildlife habitat while providing for motorized public use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to public motorized travel on NFS lands must consider minimizing effects to wildlife and their habitat. Specialist reports, including the Biological Assessment/Evaluation, Migratory Bird, Bald & Golden Eagle and Management Indicator Species, are incorporated by reference into this analysis.

3.7.2 Analysis Framework: Statute, Regulation, Forest Plan and Other Direction

Direction relevant to the alternatives and their effects to terrestrial biota includes:

Endangered Species Act (ESA). The Endangered Species Act of 1973 (16 USC 1531 et seq.) requires that any action authorized by a federal agency not be likely to jeopardize the continued existence of a threatened or endangered (TE), or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Section 7 of the ESA, as amended, requires the responsible federal agency to consult with the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service concerning TE species under their jurisdiction. It is Forest Service policy to analyze impacts to TE to ensure management activities are not be likely to jeopardize the continued existence of a TE, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. This assessment is documented in a Biological Assessment (BA) and is summarized or referenced in this Chapter. For compliance with ESA, the analysis for the Valley Elderberry Longhorn Beatle in the BA implemented the October 2006 Programmatic Agreement and Project Design Criteria agreed to by the Pacific Southwest Region of the Forest Service (R5) and the U.S. Fish Wildlife Service.

Forest Service Manual and Handbooks (FSM/H 2670). Forest Service Sensitive Species are animal and plant species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on National Forests. It is

Forest Service policy to analyze impacts to Sensitive Species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE) and is summarized or referenced in this Chapter.

Sierra Nevada Forest Plan Amendment (SNFPA). The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following Standards and Guidelines applicable to motorized travel management and terrestrial biota, which will be considered during the analysis process:

- **California spotted owl and northern goshawk**: Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, off highway vehicle route, trail and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes and recreational and other developments for their potential to disturb nest sites (Management Standard and Guideline #82).
- **Pacific fisher and American marten**: Mitigate impacts where there is documented evidence of disturbance to the den site from existing recreation, off highway vehicle route, trail and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes and recreational and other developments for their potential to disturb den sites (Management Standards and Guidelines #87 and #89).
- **Riparian Dependent Species**: Identify roads, trails, OHV trails, and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standard and guidelines or desired conditions. (Management Standards and Guidelines #116).

3.7.3 Background

In recent years, the increasing demand for motorized recreational opportunities on National Forest System (NFS) lands has lead to controversy over the potential effects of this use on wildlife. Several scientific papers and literature reviews have been written on the interaction between the motorized roads and trails on terrestrial and aquatic wildlife species. The majority of the literature and reviews describe the interactions between wildlife and roads rather than wildlife and trails. Most of the research has focused on wide-ranging carnivores (Zielinski, et al, 2007) and ungulates (hoofed animals)(Hayden et al., 2008). Most commonly, interactions included displacement and avoidance where animals were reported as altering their use patterns in response to roads. Disturbance at specific sites are also commonly reported, such as disruption at breeding or wintering sites. Collision with vehicles is another common report. Edge effects and habitat fragmentation, especially in regard to late-successional forests is another commonly identified impact of roads.

The broad general impacts of motorized trails to wildlife and riparian species are described below (Trombulak and Frissell 2000):

- Mortality from collision with vehicles.
- Modification of animal behavior.

- Alteration of the terrestrial and aquatic habitat.
- Alteration and use of habitats by humans.

3.7.3.1 Mortality from Collision with Vehicles

Animal mortality or injury from collision with vehicles is well documented in the literature. Trombulak and Frissell (2000) reported animal mortality from vehicle collisions included a wide array of wildlife including deer, wolves, bear, hawks, owls, songbirds, snakes, lizards and amphibians. Road associated mortality generally increases as traffic volume and speed increases. There is less concern for vehicle related mortality or injury on unpaved Forest roads (level 2 roads) for large mammals than for other wildlife species. Raptors may also be vulnerable to collisions on Forest roads and trails because of their foraging behavior (Loos and Kerlinger 1993); however, most reports of raptor mortality are in association with highways. Motorized routes, due to their width (e.g. 12 inches for motorcycle only and 50 inches or less on quad and/or motorcycle routes) and expected slower speed limits <15 mph (Jeep trails) are not expected to pose the same risk of collisions with wildlife as highways, paved roads or even Forest Service Level 3 (graveled, smooth surface passenger vehicle) roads.

Road and trail corridors may act as habitat sinks for wildlife that are attracted to corridors (Jalkotzy et al. 1997). However, direct mortality of animals (e.g. Barn owls) from vehicle collisions along these corridors (sinks) has been documented primarily in relation to higher speed paved roads and highways. Little scientific information is available about vehicle collisions on Forest roads or motorized trails, though some very limited mortality from use of Forest roads and motorized trails is to be expected depending on the type of trail and the amount of use a trail receives. However, we anticipate that collisions with wildlife to be lower risk on motorized routes, since use is often less and vehicle speeds are slower than on paved roads and highways.

Indirect mortality along roads and trails is associated with human access. Wildlife populations of hunted and trapped species are subject to increased mortality due to better access by humans (e.g. hunters on roads). Interior-forest birds breeding adjacent to roads and trails may receive higher nest predation by a variety of bird and mammal predators, and some songbird species have shown to have increased brown-headed cowbird parasitism rates.

3.7.3.2 Modification of Animal Behavior

A road or trail may modify the behavior of animals positively or negatively. Behavior modifications include changes or shifts in home range, changes in movement patterns, loss of reproductive success, flight or escape response and changes in physiological condition. Some wildlife species are more sensitive to well-traveled roads as opposed to motorized routes and trails that are only used by high clearance 4-wheel drive, motorcycle and all-terrain vehicles (OHVs). Other wildlife are more sensitive to the latter. In general, all roads and trails depending on the type of vehicle and the amount of use have some type of positive or negative impact to wildlife.

The most common interaction identified in literature between motorized routes and trails and wildlife species were displacement and avoidance, which altered habitat use (Kasworm and Manley 1990, Mace et al. 1996 *In* Gaines et al. 2003). Wildlife often avoid habitats in the vicinity of roads because of repeated disturbances along the corridor (Jalkotzy, et al. 1997). Studies, that provided examples of this avoidance behavior, indicated that both black bears and grizzly bears shifted their home ranges away from areas of high road density to areas of lower road densities (Brody and Pelton 1989, McLellan and Shackelton 1988). Road avoidance may vary seasonally. Both grizzly and black bears tended to avoid roads less in the spring than in the fall. Elk also avoided roads less in the spring and more in the fall. These references are provided to show how wildlife interact with roads and how wildlife on the Plumas may respond similarly to high road densities.

Roads may affect the reproductive success of some species. Bald eagles in Oregon and Illinois showed declines in nesting productivity the closer nests were to roads. Bald eagle nests were preferentially selected away from roads (Trombulak and Frissell 2000). On the Plumas NF, the response of bald eagles to human activities (i.e. road use) is variable and individual bald eagle pairs show different thresholds of tolerance for disturbance. For example, bald eagles at Antelope Lake nest close to a paved road, whereas the bald eagle territory at Snake lake (camping, OHV use) has been unoccupied for several years.

Havlick (2002) documented numerous studies that show wildlife, including birds, reptiles and large ungulates, respond to disturbance with accelerated heart rate and metabolic function and suffer from increased levels of stress. These factors can lead to displacement, mortality and reproductive failure. Wildlife was also reported to avoid areas with high levels of disturbance.

The impacts of motor vehicles to terrestrial wildlife can include disturbance from noise generated by OHVs. Determining the effects of noise on wildlife is complicated because responses vary between species. The variation in responses is based upon the type of noise and its duration, frequency, the magnitude, location, the species life history characteristics, habitat type, season, activity at time of exposure and whether other environmental stresses are occurring coincident to exposure of noise (Busnel 1978 *In* Radle 2002, Steidl and Powell 2006, Delaney and Grubb 1999, Delaney and Grubb 2003, Delaney and Grubb, 2004). Effects of noise can cause physiological responses in wildlife including increased heart rate, altering metabolism and hormone balance. Behavioral responses can include head raising, body shifting, short distance movements, flapping of wings (birds) and escape behavior. Together these effects potentially can lead to bodily injury, energy loss, decreased food intake, habitat avoidance, nest abandonment and reproductive loss. The vast majority of studies conducted on wildlife effects from motorized trail-associated noise has been done on bird species.

Many studies have reported interactions between roads and ungulates, particularly elk and deer. Some of the studies are contradictory. Rost and Bailey (1979) reported that elk and mule deer avoided roads within a 200-meter distance. Thomas et al. (1979) indicated that roads open to vehicular traffic will adversely affect the use of an area by elk and, to a lesser extent, by deer. The habitat guidelines for mule deer within the Northern Forest Ecoregion, developed by the Mule Deer Working Group recommend minimizing open road densities as much as possible and maintaining an average of less than or equal to 1.9 miles of open road per square mile of forest land, less on winter range (Hayden et al. 2008).

3.7.3.3 Alteration of the Terrestrial Wildlife Habitat

Forest roads and trails change the biological and physical conditions on and adjacent to them, creating edge effects with influences beyond the extent of the road prism (Trombulak and Frissell 2000). Trombulak and Frissell (2000) describe eight physical characteristics that are altered by roads: soil density, temperature, soil water content, light, dust, surface-water flow, pattern of runoff and sedimentation.

Long term use of roads causes soil compaction that lasts long after road use is decommissioned. Increases in soil density on decommissioned roads can persist for decades.

3.7.3.3.1 Some Potential Effects of Habitat Alteration to Species Habitats

Trombulak and Frisell (2000) report that surface temperature of a road increases as water vapor transport decreases. Heat stored on the road surface is released in the atmosphere at night, creating heat islands around roads. Small birds and snakes are attracted to warm roads and increase their risk of mortality from vehicle collisions.

Roads can change the hydrology of slopes and stream channel characteristics, which result in changes to surface-water habitats that may be detrimental to aquatic dependent species (e.g. macroinvertebrates). Roads in floodplains may redirect water, sediment and nutrients, causing degradation to wetland and riparian habitats. Erosion through channel down cutting, gully formation or head cuts may result when high concentrations of runoff on hill slopes is caused by changes in routing of shallow groundwater and surface flow. These processes can be detrimental to riparian species far downstream for a long period of time. In addition, chronic effects from fine sediment transported from unpaved roads to streams, lakes and wetlands, increases turbidity, reducing habitat quality.

3.7.3.3.2 Some Potential Effects of Habitat Alteration to Terrestrial Wildlife Habitats

Forest roads and trails can both enhance and decrease habitat for wildlife (Jalkotzy et al. 1997). The road or trail creates edge habitat for species that are habitat generalists, particularly for some mammal species (e.g., coyote and deer mice) and some songbird species. Ravens are more common along roads since carrion is more available along these corridors. For habitat specialists, such as interior dwelling species that require intact, undisturbed patches of habitat such as the American marten and the spotted owl, roads can fragment habitat. Roads and trails can also fragment or disrupt habitat indirectly by introducing exotic or noxious weeds (See Noxious Weeds section for further explanation of the effects). In addition, roads can increase pollutants like dust and vehicle emissions that can contaminate roadside vegetation that wildlife feed upon.

3.7.3.3.3 Increased Alteration and Use of Habitats by Humans

Several studies have indicated that high road densities result in adverse impacts on certain wildlife species. Impacts from high densities include excessive harvest including legal and illegal, disturbance/harassment from noise and habitat alteration. Brocke et al. (1988) reported that high road densities can elicit a variety of negative impacts of certain wildlife species. These effects include human disturbance. In Adirondack counties, the black bear population density index (based on the number of legal kill) showed a ten-fold decrease when road density increased by ten times. Other studies were cited as showing similar sensitivity to road density for other large predators and ungulates.

3.7.4 Effects Analysis Methodology

The Plumas National Forest (PNF) is one of ten National Forests within the Sierra Nevada Bioregion. The varied landscapes of the Sierra Nevada support a rich diversity of plant and animal species, some of which are found only in the Sierra Nevada. Species vary greatly in abundance and distribution, from very abundant and widespread to extremely rare and locally distributed and all combinations in between. More than 550 vertebrate species have been identified in the Sierra Nevada Bioregion, including approximately 30 amphibian, 35 reptile, 130 mammal, 270 bird and 95 fish species (SNFPA 2001, Appendix R).

The species assessment presented here is organized by **Species Groups** divided along major habitat associations or life zones (for example terrestrial or riparian). Projected effects of motor vehicle travel management on sets of species in these major groupings are described. In addition, individual species assessments are presented for federally listed species, Forest Service Sensitive Species and Management Indicator Species. More detailed information is also found in the Biological Evaluation for Terrestrial Wildlife, the Management Indicator Species project report and the Sierra Nevada Management Indicator Species report.

The major habitat associations or life zones for each species utilizes the California Wildlife Habitat Relationships (CWHR) Model—a system developed jointly by the California Department of Fish and Game that classifies forest stands by dominant species types, tree sizes and tree densities and rates the resulting classes in regard to habitat value for various wildlife species or guilds. The table below shows trees size and canopy cover classes.

Table 60. CWHR Conifer Size and Canopy Closure definitions:

CWHR Tree Size			**CWHR Canopy Cover**		
CWHR	**Conifer Crown**	**dbh**	**CWHR**	**WHR Closure Class**	**Ground Cover**
1	Seedling Tree	<1”	**S**	Sparse Cover	10-24%
2	Sapling Tree	1-6”	**P**	Open Cover	25-39%
3	Pole Tree	6-11”	**M**	Moderate Cover	40-59%
4	Small Tree	12-24”	**D**	Dense Cover	60-100%
5	Medium/Large Tree	>24”			
6	Multi-layered Tree	Size class 5 over size class 4 or 3 trees w/ a 60% CC			

This assessment consists of 5 steps: (1) identify wildlife species and groups; (2) identify motorized trail associated factors for each group; (3) develop and apply assessment processes and GIS analysis to evaluate the influence of motorized trail associated factors on each group; (4) analyze the effects of the alternatives based on outputs and analyses, and (5) implementation of measures to minimize harassment of wildlife and significant disruption of wildlife habitat.

Step 1. Identify wildlife species and groups: Existing information and knowledge about the distribution of the terrestrial and riparian species on the PNF were used to develop the list of species and to develop species groups. Federally listed species, Forest Service Sensitive Species, Management Indicator Species and other species were selected and placed into species groups based on the potential for these species or their habitats to be affected by motor vehicle use on the PNF. Local knowledge and sources included corporate databases including distribution of special status species, vegetation maps, etc., which were used to develop species or habitat groups. Table 61 provides a list of all of the special status species described by status, habitat indicator and distribution on the PNF.

A total of 22 species are included in the terrestrial and riparian species group assessment. These include thirteen bird species and nine mammal species. These species were divided into wildlife groups (some species occurred in more than one group) as described in Table 62. The Valley Elderberry longhorn beetle, Swainson's hawk, pallid bat, western red bat, Townsend's big eared bat and greater sandhill crane are not included in this assessment as they are considered either a rare occurrence, or impacts for route designation are very unlikely, or there are no records of these species nesting on the PNF. Analysis for the longhorn beetle, Swainson's hawk, pallid bat, western red bat, Townsend's big-eared bat and greater sandhill crane can be found in the project level BA/BE. For more detailed discussion of Threatened, Endangered and sensitive aquatic species, see the Aquatic Biota Section of this EIS.

Table 61 List of PNF special status species (Terrestrial wildlife and MIS) by habitat indicator and distribution (TES Aquatic species are discussed in the Aquatic Biota Section).

Species	Federally Listed Threatened	Forest Service Sensitive	Management Indicator Species	Habitat Indicator	Distribution on PNF
American marten		X		Mature and late-successional conifer forest	Exclusive to the Lakes Basin Recreation Area on the Beckwourth District (BKRD). No Den sites known on the PNF.
bald eagle		X		Mature conifer forest near large bodies of water	Nests near large reservoirs across the Forest
fox sparrow			X	Shrubland (west slope chaparral types)	Forest-wide within indicator habitat
yellow warbler			X	Riparian	Forest-wide within indicator habitat

Species	Federally Listed Threatened	Forest Service Sensitive	Management Indicator Species	Habitat Indicator	Distribution on PNF
valley elderberry longhorn beetle	X			Valley Foothill Riparian communities containing elderberry (*Sambucus* spp.)	Species found in one isolated area near NFFR FERC Project. No Critical Habitat designated on the PNF
sooty (blue) grouse			X	Late seral open canopy coniferous forest (5, S, P)	In transition zone to east side of Forest within indicator habitat
northern flying squirrel			X	Late seral closed canopy coniferous forest (5M, 5D, 6)	Forest-wide within indicator habitat
mountain quail			X	Early and mid seral coniferous forest	Forest-wide within indicator habitat
Pacific tree frog			X	Wet meadow	Forest-wide within indicator habitat
California spotted owl		X	X	Mature and late-successional conifer forest	Forest-wide
California wolverine		X		Mature and late-successional conifer forest	No confirmed detections on the PNF.
great gray owl		X		Mature and late-successional conifer forest adjacent to meadows	Several recent detections on the west side of Lake Davis on the BKRD
greater sandhill crane		X		Wet meadow, shallow lacustrine and fresh emergent wetland habitat	No known breeding populations occur on the PNF
Swainson's hawk		X		Prairies and farmland. Nests in isolated trees.	Not known to nest on the PNF.
northern goshawk		X		Mature and late-successional conifer forest	Forest-wide
mule deer			X	Early and mid-seral stage, all forest types, especially in hardwood and hardwood/conifer forest types	Forest-wide
pallid bat		X		Snags, caves, mines, rock outcrops within mixed conifer containing an oak component and pine-oak habitats.	Known or suspected Forest-wide.

Species	Federally Listed Threatened	Forest Service Sensitive	Management Indicator Species	Habitat Indicator	Distribution on PNF
Pacific fisher		X		Mature and late-successional conifer forest	Suitable habitat only. PNF falls within identified fisher distribution gap. No fishers from SPI re-introduction detected on PNF to date. No Den sites known on the PNF.
Sierra Nevada red fox		X		Mature subalpine conifer forest and riparian/montane meadow	Suitable habitat, no known or verified detections
Townsend's big-eared bat		X		Occupies caves, mines, and manmade structures (bridges, buildings, tunnels)	Known to occur on the Feather River RD.
western red bat		X		Low elevation riparian habitat containing a dominant cottonwood component.	Known or suspected Forest-wide
willow flycatcher		X		Riparian shrub (willow) and wet meadow.	Occurs at discreet willow/meadow habitat throughout the PNF.

Table 62. Wildlife group and species represented within groups from Table 61.

Wildlife group	Species
Wide-ranging carnivores	wolverine, Sierra Nevada red fox
Ungulates	Mule deer
Coniferous forest associated species (early, mid, and late seral)	California spotted owl, northern goshawk, great gray owl, American marten, Pacific fisher, sooty grouse, northern flying squirrel, mountain quail, pallid bat.
Riparian and wetland associated species [including lacustrine (lakes) and riverine habitat (rivers, streams)]	bald eagle, greater sandhill crane, willow flycatcher, Sierra Nevada red fox, Pacific tree frog, Townsend's big-eared bat, western red bat, yellow warbler, aquatic macroinvertebrates.

Step 2. Identify motorized trail-associated factors: Several studies have identified a classification or conceptual model of responses from wildlife to motorized trail-associated activities *(Knight and Cole and Liddle In* Gaines, et al. 2003). The causal factors were grouped by impact to wildlife into disturbance, habitat modification and harvest/mortality. (1) Disturbance is when an animal sees, hears, smells, or otherwise perceives the presence of a human but no contact is made and it may or may not alter its behavior. (2) Habitat modification occurs when habitat is modified through creation of a path, absence of food, or removal of vegetation. (3) Harvest/mortality is human-induced where there is a direct and negative impact on the animal as a result of hunting, fishing, collision with vehicles and other incidental contact which results in removing an individual from a population. These causal factors are used as indicators in this analysis which provide a quantified method of

comparing the relative differences between alternatives and assessing coarse magnitudes of effects. This approach is supported in Gains et al. 2003 where the author states “The information provided in this review, and subsequent development and application of cumulative effects models, improves the knowledge base that can be used to evaluate project proposals and make informed decisions.”

Based on a review of literature and local knowledge of selected species on the PNF, these three broad disturbance classifications were used for this assessment. Table 63 lists the motorized trail-associated factors along with their disturbance type, activity type effects and affected wildlife groups.

Step 3. Processes and analyses: The assessment process to analyze the effects of motorized trails on the PNF was done in two primary steps: 1) the cumulative effects of travel routes to species groups were assessed based on a similar process completed by Gaines et al. 2003, and 2) the relative environmental risk of motorized trails to riparian habitats was determined.

Table 63. Motorized trail-associated factors with disturbance and activity type and affected wildlife group

Motorized trail—associated factors[1]	Activity type[2]	Definition of associated factors	Wildlife group affected
Hunting and Trapping	Harvest	Mortality from hunting or trapping as facilitated by motorized trail access.	Ungulates Coniferous Forest Associated Species (Grouse, Quail)
Poaching	Harvest	Increased illegal take of animals as facilitated by motorized trails.	Wide-ranging carnivores Ungulates Coniferous Forest Associated Species (Grouse, Quail)
Collisions	Harvest	Mortality or injury resulting from a motor vehicle running over or colliding with an animal.	Wide-ranging carnivores Coniferous forest associated species Riparian – Wetland species Ungulates
Habitat loss and fragmentation	Habitat modification	Loss and resulting fragmentation of habitat due to the establishment of motorized trails, or networks and associated human activities.	Wide-ranging carnivores Coniferous forest associated species Riparian – Wetland species Ungulates
Edge effects	Habitat modification	Changes to habitat microclimate associated with the edge induced by motorized trails.	Coniferous forest associated species
Route for competitors and predators	Habitat modification	A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise	Wide-ranging carnivores Riparian – Wetland species Coniferous forest associated species
Disturbance at a specific site	Disturbance	Displacement of individual animals from a specific location that is being used for reproduction and rearing of young	Wide-ranging carnivores Coniferous forest associated species Riparian – Wetland species Ungulates
Physiological response	Disturbance	Increase in heart rate or stress hormones when near a motorized trail or network of motorized trails.	Ungulates Coniferous forest associated species Riparian – Wetland species Wide-ranging carnivores

[1]Based in part on Wisdom et al. 2000 In: Gaines et al. 2003 (refer to Tables 7, 11 and12)

[2]Disturbance occurs when an animal sees, hears, smells, or otherwise perceives the presence of a human but no contact is made and it may or may not alter its behavior. Habitat modification is when habitat is changed in some way. Harvest involves human actions in which there is direct and damaging contact with the animal

Step 4. Analysis of effects: The information generated in step 3 was used to analyze the direct, indirect and cumulative effects of the alternatives on the wildlife groups. The analysis of the project alternatives focuses on the effects of two actions: (1) the prohibition of cross-country motor vehicle travel (Alternatives 2-5) and (2) adding facilities (unauthorized routes, mixed use and/or use areas) to the National Forest Transportation System (NFTS).

3.7.4.1 Wildlife Analysis Assumptions

- All vehicle types result in approximately the same amount of disturbance effect to wildlife.
- The location of the route is equal to disturbance effects from that route (e.g., trail located adjacent to known nest site (<0.25mi) (high) versus trail not located adjacent to nest site (>0.25mi) (low)).
- Habitat is already impacted in the short term. In the long term, habitat will remain the same on proposed trails added to the NFTS; but will improve, at least to some degree on unauthorized routes that are not proposed for addition to the NFTS, with the prohibition of cross-country travel and subsequent passive restoration (under Alternatives 2-5).
- The estimation of route densities for Alternative 1 (no action) includes all existing unauthorized routes; this is based on the assumption that these routes would continue to be used under continued cross-country travel. Under the other alternatives (2-5), only routes proposed for addition to the National Forest Transportation System (NFTS) are included in the estimation of route densities, since under the ban for cross-country travel, motorized use would only occur on the NFTS.
- The focus is on suitable habitat. The assumption is that site-specific species wildlife surveys were not conducted on all unauthorized routes, since several unauthorized routes were eliminated from detailed study due to inconsistencies with the criteria in Subpart B of the Travel Management Rule (e.g. minimize damage to forest resources), multiple resource issues, or conflicts with private landowners. Past and recent survey information from other efforts (e.g. HFQLG) were used in the analysis. Where surveys were not conducted suitable habitat was assumed occupied.

3.7.4.2 Wildlife Sources of Information

GIS layers and other pertinent information for the following wildlife resources were used for analysis:

1. Bald Eagle – territories and nesting territory sites.
2. California spotted owl – nest sites, Activity Centers, Protected Activity Centers, Home Range Core Areas, CWHR habitat types 4M, 4D, 5M, 5D and 6.
3. northern goshawk – nest sites, Protected Activity Centers, CWHR habitat types 4M, 4D, 5M, 5D and 6.
4. Forest Carnivores (marten, fisher, Sierra Nevada red fox and wolverine) – Carnivore Detections, Draft Plumas Forest Carnivore Network, Old Forest Emphasis Areas, CWHR habitat types 4M, 4D, 5M, 5D and 6).
5. Other wildlife species (e.g. MIS) – appropriate CWHR habitat types; State deer herd maps.

6. Public input – Response to comments, Wilderness Society Maps, Public open-house meetings.

3.7.4.3 Analysis Indicators

GIS queries were utilized to assess each indicator using the sources of information mentioned above. They are focused on assessing and disclosing the effects of each alternative presented in this EIS. The effects of prohibition of cross-country travel and addition of routes and facilities are assessed as described below.

- Miles of motorized routes, mixed use and acres of areas to measure potential disturbance to a specific site (e.g. miles of route proximal to a specific site (nest, roost, PAC or Territory).
- Zone of influence [acres of a species (or species group's) key habitat that is affected by motorized routes or mixed use].
- The density of motorized routes was evaluated in relation to habitat effectiveness for a species groups - wide ranging carnivores and ungulates. (Note: this includes the 4.1 miles of mixed use under Alternatives 4 and 5).

Step 5. Measures to minimize harassment and disruption of wildlife habitats: This analysis considers efforts made in minimizing harassment of wildlife and significant disruption of wildlife habitat. This analysis evaluated routes, trails, mixed use and use areas (e.g. sly creek) based on application of distance buffers, available vegetation screening that would minimized effects of noise, and position of a route on the landscape in relation to known sites (e.g. nests, roosts), sensitive habitats (e.g. wet meadows) or seasonal habitats (deer winter range). Based on this analysis, a route, trail, mixed use or use area was either maintained without minimization measures or a minimization measure was implemented, such as limited operating periods (LOPs) or season of use, or the route or trail was eliminated entirely. These minimization efforts are reflected in changes made to routes, trails, use areas or mixed use by alternative and are reflected in Appendix A.

3.7.5 Affected Environment and Environmental Consequences by Species Groups

This section describes both the affected environment and environmental consequences of the alternatives arranged by species groups: wide-ranging carnivores, ungulates, forest associated species and riparian associated species. Selected species represented within each group include Threatened, Endangered, Proposed, and Sensitive (TEPS) species and MIS are included. While not all of the species within the groups are necessarily analyzed in detail, each species group analysis provides enough information to infer impacts.

3.7.5.1 Affected Environment Description

The Affected Environment discussion focuses on pertinent literature available for selected species within the wildlife groups and does not represent an exhaustive or comprehensive literature summary on wildlife and motorized trail interactions. For some species represented in the group, little information may be available on wildlife interaction with motorized trails. Known information on the distribution and status of the species on the Plumas National Forest is also presented in the Affected

Environment Section for each selected species, particularly species with special status (Threatened, Endangered, Sensitive or Management Indicator Species).

3.7.5.2 Environmental Consequences Description

3.7.5.2.1 Direct and Indirect Effects Boundary

Direct and indirect effects of each alternative are analyzed on National Forest System (NFS) lands within the boundary of the Plumas National Forest (PNF). The analysis area includes all motorized trails, collectively referred to as routes, mixed use and use areas that have been analyzed. Routes include existing system trails, proposed trails and unauthorized routes (unclassified or user created routes and historic routes) (all alternatives), mixed use on 4.1 miles of Forest Road 24N28 (Alternatives 4 and 5 only), and the 36-acre Sly Creek use area (Alternative 2). The 36-acre Sly Creek use area is the old borrow pit that was used to build the Sly Creek Reservoir Dam. The 36-acre area is barren and does not include suitable habitat for any species evaluated in this analysis. Therefore, the focus of direct and indirect effects will be on motorized routes and mixed use.

3.7.5.2.2 Cumulative Effects Boundary (Space and Time)

The cumulative effects analysis includes all motorized routes that occur within the boundary of the PNF on NFS lands. This cumulative effects geographic boundary pertains to all species groups.

The NFS lands encompass 1,204,225 acres and non-NFS lands encompass 273,308 acres within the boundary of the PNF. The total NFS and non-NFS lands within the boundary of the PNF comprises 1,477,533 acres. All NFS lands within the boundary of the PNF is an appropriate scale to analyze cumulative effects of terrestrial and aquatic species for activities associated with motorized roads and trails, since this area is sufficiently large to encompass wildlife habitat being influenced by routes, as well as movement patterns and home ranges for the groups of species being analyzed within the project area including coniferous forest associated species, wide-ranging carnivores, riparian and wetland species and ungulates.

Within the cumulative effects boundary, cumulative effects are analyzed on the accumulation of all past, present and reasonably foreseeable future actions including the existing NFTS motorized trails (130 miles), one 36-acre use area (Sly Creek), mixed use on 4.1 miles of Forest Road 24N28, existing unauthorized routes (1,107 miles) and any future routes that would be created within the next 20 years within the boundary of the PNF (NFS lands). Twenty years is a reasonable timeframe for estimating cumulative impacts of motorized routes in the reasonably foreseeable future. Present actions are those that are ongoing (ex: forest closure order prohibiting cross country travel) at the present time. Past actions include unauthorized routes that were created since development of the Plumas NF Forest Plan (1988) and will be incorporated into the existing condition, such as roads that are closed or decommissioned. In addition, the timeframe for analyzing past cumulative effects for other activities such as timber harvest, grazing and non-motorized recreation goes back to 2000. This year is selected since baseline conditions of past cumulative effects were updated for the species analyzed in this document as part of the Herger-Feinstein Quincy Library Group (HFQLG) Forest Plan Amendment completed in 1999.

3.7.5.2.3 Analysis Measures or Indicators

Indicators or measures are presented in the Environmental Consequences Section to compare and contrast the effects of the project alternatives. Measures or indicators were selected for project effects based on a thorough review of literature on the interaction between wildlife and motorized routes. Analysis measures were used to compare project effects of each alternative: examples include - each route was evaluated based on 1) proximity to a specific site (nest, roost, PAC, territory) and its location on the landscape (if route disturbance was minimized by vegetation or topographic position), and 2) a Zone of Influence (ZOI) from a motorized route, mixed use or the Sly Creek use area in relation to a specific habitat (e.g. meadow, stream, spring).

3.7.5.2.3.1 Density of Roads, Motorized Trails and Unauthorized Routes for Habitat Effectiveness

Road and/or motorized trail and route density has often been used as a surrogate to estimate habitat effectiveness or the direct and indirect effects of motorized travel on terrestrial wildlife. Road and/or trail and route density thresholds for wildlife have not been established on the PNF and thresholds for wildlife in the literature can vary by season, geographic location and species. Therefore, road and trail density “thresholds” will not be used to determine effects of the project alternatives, but rather the density of roads and trails is used for a relative comparison of the alternatives (Table 64) for wildlife species. The density was determined at the scale of 7th order watershed, since this scale is sufficiently large to accurately estimate road and trail densities. Road and trail densities at a larger scale could potentially mask effects and therefore, underestimate effects to wildlife species. Densities at any smaller scale may actually be amplified and therefore overestimate the effects to wildlife.

Table 64. Percent of PNF acreage with road and trail densities from 0 - >6 miles per square mile (averaged by 7th order watershed).

Alternatives		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Wildlife						
Road and Motorized Route Density Category (Percent of Forest Total)	**0 Miles/Square Mile**	0%	0%	0%	0%	0%
	0-2 Miles/Square Mile	21%	30%	35%	30%	30%
	2-4 Miles/Square Mile	59%	58%	59%	62%	58%
	4-6 Miles/Square Mile	19%	12%	6%	8%	12%
	>6 Miles/Square Mile	1%	0%	0%	0%	0%

3.7.5.2.3.2 Miles of Motorized Routes (Species-specific Disturbance Potential at a Specific Site)

The number of miles of motorized routes within a particular distance to a species reproductive site can be used to determine the potential disturbance to wildlife species. The distance from a site used to analyze disturbance potential varies by each species disturbance threshold based upon literature review, and other factors, such as natural screening (vegetation) and topography (position of route on the landscape). Species-specific disturbance potential of motorized routes were compared for California spotted owl and the northern goshawk reproductive sites (nests or activity centers). In addition, the number of miles of motorized routes occurring within spotted owl Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs) and for goshawk Protected Activity Centers (PACs) were also compared by alternatives.

3.7.5.2.3.3 Zone of Influence [Amount of a Species (or Species Group's) Key Habitat that is Influenced by Motorized Routes]

Motorized routes have a Zone of Influence within which habitat effectiveness or suitability is reduced and wildlife population densities are lower (Trombulak and Frissell 2000, Gaines, et al. 2003). The effects to wildlife extend beyond the immediate road prism itself, into what can be referred to as a Zone of Influence adjacent to motorized roads and trails. The degree of effect of the various factors associated with roads and trails can be evaluated more effectively when considering the amount of a given species habitat that occurs within this Zone of Influence of motorized routes. Wildlife species behaviors and habitats are modified within various distances from motorized routes. The distances of the Zone of Influence for individual species that are used in the analysis of effects are based upon the best available science in the literature. Because there are limited data and studies for many species, assumptions and generalizations were made for some species where no data were available. The Zone of Influence is a relative index of habitat effectiveness that is used to compare alternatives.

3.7.5.3 Wide-ranging Carnivores

Large and mid-sized carnivores are unique in their response to human-induced habitat changes due to their large spatial habitat needs and their sensitivity to landscape patterns, including road edge effects and road density (Buskirk and Zielinski 2003). The wolverine (*Gulo gulo*) and the Sierra Nevada red fox (*Vulpes vulpes necator*) are the two species included in the wide-ranging carnivore habitat assessment group. The wolverine and the Sierra Nevada red fox may be considered to be sensitive to the presence of humans and human activities (Claar et al. 1999, Grinnell et al. 1937).

Table 63 provides a summary of some of the potential motorized trail associated factors to wide-ranging carnivores based on Gaines et al. 2003.

3.7.5.3.1 Effects Common to All Wide-ranging Carnivores

3.7.5.3.1.1 Changes in Class of Vehicles

Responses to motor vehicle use varies by species and depends upon the type of vehicle, the intensity, timing, speeds and amount of motor vehicle use. For this analysis, it is assumed that all vehicle types (motorcycle, quads, jeeps, etc.) result in the same disturbance to wildlife. Therefore, changes in the class of vehicles would not vary in their effects to wide-ranging carnivores for all of the alternatives.

3.7.5.3.2 Cumulative Effects Boundary in Space and Time for Wide-ranging Carnivores

The geographic boundary for analyzing cumulative effects to wide-ranging carnivores (wolverine, Sierra Nevada red fox) are lands that fall within the boundary of the PNF including all NFS lands and non-NFS lands (private). The PNF boundary is sufficiently large to encompass the home ranges of wide-ranging species located on the PNF. In addition, the Forest boundary encompasses a wide variety of habitats used by these species - from early seral to late seral forests, subalpine and alpine habitats, meadows and riparian habitats. The timeframe for analyzing cumulative effects for wide-ranging carnivores runs from the year 2000 (the past) and twenty years into the future. This timeframe incorporates present actions, such as the forest closure order prohibiting cross country travel, as an example. The year 2000 was selected since the baseline for species evaluated in this analysis was updated as part of the 1999 HFQLG Forest Plan Amendment. Twenty years into the future is a reasonable amount of time to estimate potential cumulative impacts to wide-ranging species from future foreseeable activities.

3.7.6 Wolverine and the Sierra Nevada Red Fox: Affected Environment

The wolverine and the Sierra Nevada red fox are wide-ranging carnivores that use a variety of vegetation types, but appear to select areas that are relatively free from significant human disturbance. Both the wolverine and the Sierra Nevada red fox are designated by the Regional Forester in the Pacific Southwest Region of the Forest Service as Sensitive. Although the wolverine and Sierra Nevada red fox are not known to occur on the Plumas NF at this time, and no direct effects to individuals are expected, suitable habitat will be evaluated for indirect effects based on Forest Service manual direction (2670). Systematic carnivore surveys have been conducted on the Plumas NF over the last decade. Approximately 2,121 systematic survey stations were established over this time period, resulting in zero detections of wolverine and Sierra Nevada red fox.

In the Sierra Nevada, wolverine are known from over 4,000 feet elevation to over 10,000 feet elevation. According to Aubrey et al. (2007), wolverine natal den sites are highly correlated with subalpine and alpine regions that have late persistent snow during April and May. Until recently, there have been no verified sightings of wolverine documented within the State of California since the 1920s, though several anecdotal wolverine observations have been reported throughout the Sierra Nevada. In February and March 2008, verified wolverine photographic detections were taken from remote controlled camera stations on the Tahoe National Forest between the towns of Truckee, California and Sierraville, California. Wolverine photographs were documented from four separate baited camera locations. Genetic results indicate the DNA evidence that has been collected to date is from a single male. DNA testing also indicates this individual is related to wolverine populations in the Rocky Mountain Region. To date no wolverines have been sighted on the Plumas NF. In 2009, an individual hiking in the Lakes Basin Area of the Plumas NF reported seeing what she believed to be a wolverine. Follow-up camera station surveys conducted by the Beckwourth Ranger District in the Lakes Basin Area did not detect wolverines, but did detect black bears in the vicinity of the reported sighting.

Wolverines are known to be sensitive to humans and road associated factors, but are not necessarily affected by summer recreation trails (Gaines et al. 2003). Gaines et al. (2003) reported that wolverines may be displaced from natal dens in subalpine cirques as a result of winter recreation activities. Motorized trail-associated factors that may affect wolverine include reduction in down logs, disturbance at a specific site and vehicle collisions. Road density can be used as a relative measure of human influence on the wolverine, though no empirical data exists which correlates motorized route density with wolverine population numbers due to the scarcity of research, the low population numbers and overall difficulty in studying this species that encompasses large home ranges. Studies indicate that home ranges in North America may vary from less than 38.6 square miles to over 347.5 square miles.

The current distribution and population status of the Sierra Nevada red fox is uncertain (CDFG 2004). A small population of Sierra Nevada red fox occurs in the Lassen Peak vicinity and represents the only verified detections of the subspecies in recent years, and is the nearest known population to the Plumas NF (Perrine 2005, Perrine et al. 2006). The Sierra Nevada red fox has not been verified to occur on the PNF, though habitat for this species occurs within subalpine conifer habitats interspersed with meadows.

Road construction and increased human settlement in the Sierra Nevada has the potential to facilitate the dispersal of *non-native* red foxes into the historic range of the Sierra Nevada red fox, by providing access to areas previously unavailable to the *non-native* foxes. Roads provide a potential travel corridor for *non-native* foxes from the Sacramento Valley to move into Sierra Nevada red fox habitat. Although the tolerance of Sierra Nevada red fox to the presence of humans is unknown, it is evident that the *non-native* red foxes thrive in human-altered environments (Lewis et al. 1999, Kamler and Ballard 2002). In addition, urban development within the range of Sierra Nevada red fox may pose a risk to the species through an increased risk of predation from domestic pets, disease transmission, automobile collisions and other human-wildlife conflicts.

3.7.7 Wolverine and the Sierra Nevada Red Fox: Environmental Consequences

Route Density: Route density provides a relative measure of habitat effectiveness. Many literature references indicate that wolverine and red fox are primarily associated with remote, secluded areas and may be sensitive to human presence. Therefore, it would follow that as route density increases, human presence may also increase, which reduces "security habitat" for wolverine and red fox. To compare alternatives, route density categories from 0 to >6-miles/square mile are presented (see Table 64).

Zone of Influence: The Zone of Influence within 200 meters of routes was used as a measure for analyzing habitat fragmentation within mature to late-successional forest habitat as classified by 4M, 4D, 5M, 5D, and 6 CWHR types within the PNF. Furthermore, additional analysis of habitat fragmentation is presented within Old Forest Emphasis Areas (OFEAs) and within the Draft PNF Forest Carnivore Network which is presented in the section for Late-successional Forest Associated Species Group and Forest Carnivore Section.

Disturbance to a Specific Site: The Sierra Nevada Forest Plan Amendment (2004) directs (in Standard and Guideline #32 on p. 54 of the ROD) that upon detection of a verified wolverine or Sierra Nevada red fox, management activities within 5 miles of the verified detection be analyzed. However, no Sierra Nevada red fox or wolverine detections that have been verified by a forest carnivore specialist have occurred anywhere on the PNF. The recent Tahoe wolverine detections are more than 50 miles from the southern PNF boundary and no specific site disturbances are expected as a result of PNF management activities.

3.7.7.1 Direct and Indirect Effects

Route Density. Route density thresholds for wolverine and Sierra Nevada red fox have not been established and are hard to determine because of the rarity of these species and their elusive behavior patterns. Therefore, route densities across the PNF provides a relative measure of habitat effectiveness and/or the amount of security habitat available to the wolverine and the Sierra Nevada red fox at the broad landscape scale for which to compare the alternatives. The route density within 7th order watersheds was determined for all motorized routes including those on NFS lands and non-NFS lands. Since the wolverine is known to avoid areas within high concentrations of human presence, High security habitat and Moderately high security is best provided for where route densities are the lowest (e.g. 0 mi/sq mile or 0-2 mi/sq mile) (Table 64 and Table 65). In addition, effects to habitat were analyzed and compared using a ZOI approach within mature and late-successional habitat types (CWHR types 4M, 4D, 5M, 5D and 6), Old Forest Emphasis Areas (See Late-successional Forest Associated Species Section) and within the Draft PNF Forest Carnivore Network (See Forest Carnivore Section).

Table 65 provides data on the percent of lands within the PNF with existing system roads (which incorporates mixed use on 24N28), motorized trails and unauthorized route densities that range between 0 (High Security) and > 6-miles/square mile (Least Security). Alternative 1 has the lowest percentage of land (21%) in the High and Moderately high security categories, and the highest percentage of land (20%) in the Lower and Least security categories. For the Moderate security category, Alternative 1 is similar to all of the action alternatives at 59%. However, since Alternative 1 would allow cross country travel to continue, it poses the greatest direct and indirect risk to wolverine and Sierra Nevada red fox habitat security for all five alternatives.

All of the action alternatives (Alternatives 2-5) improve habitat security for the wolverine and Sierra Nevada red fox over Alternative 1 in that they provide a higher percentage of land (>30% for Alternatives 2-5 vs. 21% for Alternative 1), in the High and Moderately High security level categories, and would also prohibit cross-country travel. Alternatives 2 and 5 are identical in their percentage of land base in the High and Moderately high security levels (30%), Moderate Security Level (58%) and in the Lower and Least security categories (12%). Alternative 4 maintains a similar percentage of land base in the High and Moderately high security levels (30%) as Alternatives 2 and 5. However, Alternative 4 is slightly better than Alternatives 2 and 5 in that it maintains more habitat in the Moderate security level category (62%), and less land base in the Lower and Least security categories (8%). Alternative 3 presents the least direct and indirect risk to wolverine and Sierra Nevada red fox habitat security of the five alternatives evaluated. Alternative 3 provides the highest percentage of land base (35%) in the High and Moderately High security levels for the wolverine and Sierra Nevada red fox. For the Moderate security level, Alternative 3 is similar to the other four alternatives with 59%. However, Alternative 3 contains the lowest percentage (6%) of land base within the Lower and Least security levels for all five of the alternatives.

Table 65. Percent of PNF with road and trail densities between 0 and >6-miles/square mile

Motorized Route Density Category	Security Level for Carnivores	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
0 Miles/Square Mile	High Security	0%	0%	0%	0%	0%
0-2 Miles/Square mile	Moderately High Security	21%	30%	35%	30%	30%
2-4 Miles/Square mile	Moderate Security	59%	58%	59%	62%	58%
4-6 Miles/Square mile	Lower Security	19%	12%	6%	8%	12%
>6 Miles/Square mile	Least Security	1%	0%	0%	0%	0%

3.7.7.2 Cumulative Effects: Sierra Nevada Red Fox and Wolverine

3.7.7.2.1 Cumulative Effects of Motorized Routes

The geographic boundary for analyzing cumulative effects to wolverine and the Sierra Nevada red fox are lands that fall within the boundary of the PNF including all National Forest System (NFS) lands and non-NFS lands (private). The PNF boundary is sufficiently large to encompass the home ranges of the wolverine and Sierra Nevada red fox should they be present on the PNF in the future. In addition, the Forest boundary encompasses a wide variety of suitable habitats used by the wolverine and red fox—a variety of forested habitats, subalpine meadow habitats and riparian streamside habitats. The timeframe for analyzing cumulative effects for the wolverine and Sierra Nevada red fox is defined as the year 2000 for past effects, as the baseline for the wolverine and Sierra Nevada red fox were re-evaluated as part of the 1999 HFQLG Forest Plan Amendment and approximately 20 years into the future, which is a reasonable amount of time to estimate potential cumulative impacts to these species from future foreseeable activities. This timeframe incorporates present actions as well, such as the forest closure order prohibiting cross country travel, as an example.

The cumulative effects to wolverine and Sierra Nevada red fox are evaluated by analyzing the effects of the alternatives in terms of route density and habitat fragmentation from past, present and reasonably foreseeable actions (Table 66). Past and present route densities are combined to represent the current existing condition. Route density is only used to compare the relative differences between the alternatives. Route densities categories >4 miles/square mile, which represent the lower and least security levels, are used as a metric to compare the alternatives where human impacts of roads, trails and routes may render habitat less suitable and/or less secure to wolverine and SN red fox.

3.7.7.2.2 Overall Cumulative Effects to California Wolverine and Sierra Nevada Red Fox from Past, Present and Reasonably Foreseeable Future Actions

Appendix C provides a list of present and reasonably foreseeable projects on the Plumas NF. This appendix was evaluated to determine which projects had cumulative effects on the wolverine and red fox. From that list, the following ongoing (present) and future actions were selected.

The PNF currently has 42 active livestock grazing allotments including both cattle and sheep. The Forest Plan Standards and Guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands. Improved range conditions as a result of implementing the revised grazing Standards and Guidelines should benefit prey species for both the wolverine and red fox, especially as sight specific allotment management plans are updated and developed.

Since the year 2000, more than 73,345 acres of vegetation management activities have occurred on the PNF. These activities primarily thinned, masticated and/or burned vegetation to reduce the potential for catastrophic wildfires. It is uncertain how vegetation treatments actually affect the wolverine as no empirical data exists on how vegetation management affects habitat quality for both the wolverine and the red fox. In general, management treatments which maintain or enhance habitat for deer should benefit the wolverine. Vegetation and fuels treatments generally do not increase forage quality and quantity for deer (wolverine prey species) because they do not usually result in reducing the canopy cover below 40%. At 40% canopy cover, the production of understory species important for deer foraging is not necessarily increased. These treatments may result in the short-term reduction in cover for the California wolverine and the Sierra Nevada red fox, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk.

Loss of habitat by wildfires poses a significantly higher risk to habitat and habitat connectivity than designating motorized routes. Since 2000, approximately 266,963 acres burned on the PNF, some of which removed suitable forested habitat for wide-ranging carnivores, including habitat within the Draft PNF Forest Carnivore Network that provided linkages between the Plumas and Lassen (e.g. Storrie Fire, Moonlight-Wheeler Fires). This habitat will not likely be suitable for another 50 to 100+ years.

On the PNF, present and ongoing recreational impacts to the wolverine and red fox includes many forms of recreation including both passive and active recreation. Summer recreation, which includes fishing, hiking, camping at developed and dispersed sites, hunting, off-highway motor vehicle use and wildlife viewing. Winter recreation includes cross-country skiing and over-snow recreation. These activities are primarily associated with existing roads, trails and unauthorized routes, and their disturbance effects can be associated to Table 64 (above) and the habitat security levels reflected by the percent density of roads, trails and routes.

The wolverine and the red fox are considered to be primarily associated with areas with low human influence, such as remote wilderness and/or roadless areas. Increased recreational use on the PNF in the future has the potential to impact suitable denning habitat at high elevation subalpine and alpine areas, primarily after snow melt. However, use of motorized routes are generally not likely to affect suitable denning habitat for wolverine and red fox when they are covered by snow.

Table 66. Cumulative effects to Wolverine and Sierra Nevada Red Fox from route density, Habitat Fragmentation and Disturbance to a Specific Site.

Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Past, Present and Future Actions					
Route Density - Total Combined Percent of PNF Lower (4 to 6 mi/square mile) and Least secure habitat (>6 miles/square mile)	20%	12%	6%	8%	12%
Habitat Fragmentation - Total Percent of Forest within 200 meters of existing and proposed motorized routes (approximate percentage, some overlap on routes may occur)	14%	5%	3%	3.6%	4.7%
Potential for route proliferation contributing to route density and habitat fragmentation into the future	High potential for increased route density and habitat fragmentation in the future due to unmanaged cross-country travel	Low potential for increased route density and habitat fragmentation–Cross-country route proliferation would be prohibited	Low potential for increased route density and habitat fragmentation–Cross-country route proliferation would be prohibited	Low potential for increased route density and habitat fragmentation – Cross-country route proliferation would be prohibited	Low potential for increased route density and habitat fragmentation – Cross-country route proliferation would be prohibited
Overall Cumulative Effect of past, present and future actions and motorized routes to wolverine and red fox	Highest cumulative effect from route density and percent of Forest fragmented by routes	Moderate cumulative effects of route density and habitat fragmentation. (similar to Alt. 5)	Lowest cumulative effects of route density and habitat fragmentation.	Low Cumulative effects of route density and habitat fragmentation.	Moderate cumulative effects of route density and habitat fragmentation (similar to Alt. 2)

After considering all of the cumulative effects of past, present and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires and recreation, the five alternatives are ranked in order of highest to lowest cumulative effect.

Alternative 1 poses the highest cumulative effect to the wolverine and red fox based on two primary factors; 1) the allowance of cross country travel and the potential for proliferation of additional routes across of the forest, and 2) provides the highest percentage (20%) of lower (route density category 4-6 mi/sq. mi.) and least (route density category >6 mi/sq. mi.) security level habitat on the PNF.

Alternatives 2 and 5 pose a moderate cumulative effect and improve habitat conditions for the wolverine and red fox compared to Alternative 1. This is based on two primary factors; 1) Alternatives 2 and 5 would prohibit cross country travel and the proliferation of additional routes across the forest, and 2) would reduce the percent of habitat in the lower and least security levels from 20% under Alternative 1 to 12%, and increase the amount of habitat in the High and Moderately High security levels from 21% under Alternative 1 to 30% under Alternatives 2 and 5.

Alternative 4 poses a low cumulative effects and improves habitat conditions for the wolverine and red fox compared to Alternative 1. This is based on two primary factors; 1) Alternative 4 would prohibit cross country travel and the proliferation of additional routes across the forest, and 2) would reduce the percent of habitat in the lower and least security levels from 20% under Alternative 1 to 8%, and increase the amount of habitat in the High and Moderately High security levels from 21% under Alternative 1 to 30% under Alternative 4.

Alternative 3 poses the lowest cumulative effects and improves habitat conditions for the wolverine and red fox compared to Alternative 1. This is based on two primary factors; 1) Alternative 3 would prohibit cross country travel and the proliferation of additional routes across the forest, and 2) would reduce the percent of habitat in the lower and least security levels from 20% under Alternative 1 to 6%, and increase the amount of habitat in the High and Moderately High security levels from 21% under Alternative 1 to 35% under Alternative 3.

3.7.7.2.3 Sensitive Species Determinations

Alternative 1 may affect, but is not likely to adversely affect or result in a trend toward federal listing or loss of viability for the California wolverine and the Sierra Nevada red fox. This determination is based on the rationale that 1) Wolverine and red fox are not known to occur on the Plumas NF, therefore no direct affects to individuals are expected to occur, and 2) cross-country travel would continue in the future and lead to additional loss of habitat, an increase in habitat fragmentation, and result in an increase in the percent of habitat forest wide within the lower and least security level habitat categories over time. Based on route proliferation since 1988 (Forest Plan development), an average of 48 miles of unauthorized routes per year were established. When this rate is applied over the next 20 years, an additional 960 miles of unauthorized routes could be added under Alternative 1.

Alternatives 2, 3, 4 and 5 may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the California wolverine or the Sierra Nevada red fox within the planning area of the Plumas National Forest. This determination is based on the rationale that 1) Wolverine and red fox are not known to occur on the Plumas NF, therefore no direct affects to individuals are expected to occur, 2) the action alternatives would prohibit current and future cross-country travel across the PNF, 3) habitat fragmentation (9% to 11% less) and route densities (8% to 14 % less) would be reduced compared to Alternative 1 (No-action), and 4) a higher percentage (9% to 14% more) of habitat would be maintained at the High and Moderately High security level categories.

In the absence of a range wide viability assessment, this viability determination is based on local knowledge of this species as discussed previously in this evaluation and professional judgment.

3.7.8 Forest Associated Species (Late successional): Affected Environment

The late-successional forest group is comprised of the California spotted owl (*Strix occidentalis occidentalis)*, northern goshawk (*Accipiter gentilis*), great gray owl (*Strix nebulosa*), American marten (*Martes americana*) and Pacific fisher (*Martes pennanti*). These species are associated with late-successional forests that can be impacted by activities associated with trails and roads. Gaines et al. (2003), conducted a literature review where 71 late-successional forest associated wildlife species were identified that were negatively impacted by a variety of motorized trail-associated factors. These impacts include habitat loss and fragmentation, road avoidance or displacement, harassment and others. Growing concern over habitat fragmentation for late-successional associated species has been expressed by individuals, environmental groups and agency biologists. In addition, studies have shown that species within this group are sensitive to disturbance.

According to the Sierra Nevada Forest Plan Amendment (2004), which amended the PNF Forest Plan (1988), habitat types that are important for late-successional/old forest associated species (e.g. spotted owl, goshawk, marten and fisher.) are California Wildlife Habitat Relationship (CWHR) 4M, 4D, 5M, 5D and 6 vegetation types (stands of trees ≥11” dbh with >40% canopy cover). In addition, the Sierra Nevada Forest Plan Amendment provides broad management direction for Old Forest Emphasis Areas where they are “managed to maintain or develop old forest habitat in areas containing the best remaining large blocks or landscape concentrations of old forest and areas that provide old forest functions (such as connectivity of habitat over a range of elevations to allow migration of wide-ranging old-forest-associated species).”

Finally, the PNF developed a Draft Forest Carnivore Network based on suitable and potential suitable habitat for marten and fisher that is used by agency biologists as a *tool* for evaluating impacts to habitat fragmentation. The Draft Forest Carnivore Network, however, is not an official land designation on the Plumas, and therefore does not have associated standard and guidelines that apply under the forest plan.

A summary of motorized trail associated factors to late-successional forest associated species (Gaines, et al. 2003) is provided in Table 63.

3.7.9 Forest Associated Species (Late-successional): Environmental Consequences

3.7.9.1 Effects Common to All Late-successional Species

3.7.9.1.1 Changes in Class of Vehicles

Responses to motor vehicle use vary by species and depend upon the type of vehicle, the intensity, timing, speeds and amount of motorized vehicle use. For this analysis, it is assumed that all vehicle types result in the same disturbance to all late-successional forest associated species. Therefore, changes in the class of vehicles would not vary in their effects to late-successional associated species for all of the alternatives.

3.7.9.2 Analysis Measures for Direct and Indirect Effects

Two primary indicators will be used to evaluate the effects of the alternatives to late-successional forest associated species as follows:

Zone of influence: the Zone of Influence is analyzed for each alternative to measure habitat fragmentation and other zonal effects associated with motorized routes, trails and mixed use including noise disturbance, avoidance, edge effects, mortality, etc. The distance from routes and trials used to calculate the Zone of Influence for selected species in the group was determined from a thorough review of available literature (Rost and Bailey, 1979). For all species in this group, a Zone of Influence of 200-meters encompasses a greater array of potential route associated effects to old forest associated species including edge effects, habitat fragmentation and habitat effectiveness.

Disturbance at a specific site: Disturbance at a specific site was analyzed for California spotted owl and northern goshawk (see spotted owl and goshawk sections) by determining the number of miles of unauthorized routes, proposed trails and mixed use within Protected Activity Centers. Also, the number of miles occurring within ¼-mile of a reproductive site (nest site or nest grove) were evaluated by alternative under the PAC by PAC analyses for both California spotted owl and northern goshawk, since disturbances within ¼-mile of a reproductive site have been shown to disrupt or cause reproductive failure to these species. Other factors such as vegetative screening and position of the route on the landscape were considered on a case by case basis. The PAC by PAC analyses were completed for both the goshawk and spotted owl where a proposed trail (including mixed use) intersected a PAC and those findings are incorporated by reference into this analysis (see project record) and the findings of that analyses are reflected in Appendix A.

3.7.9.3 Analyzing for Cumulative Effects

This analysis of cumulative effects focuses on the cumulative effects associated with existing roads and motorized routes on NFS lands. Other cumulative effects to old forest associated species include cumulative effects of vegetation management, fuels reduction, catastrophic wildfires, recreation, grazing and others. These cumulative effects are complex and difficult to quantify over space and time.

For this analysis, cumulative effects are simply the sum total of direct and indirect effects of the project alternatives plus the past, present and reasonably foreseeable future impacts of the existing NFS motorized trails. Cumulative impacts include all of the routes proposed for addition to the NFTS as trails and the existing NFS motorized trails. This analysis assumes all motorized routes or trails have the same impact on old forest species. Reasonably foreseeable impacts from motorized use are considered by assessing the potential for motorized route proliferation for each alternative.

3.7.9.3.1 Cumulative Effects Boundary

The boundary of the PNF (NFS lands and non-NFS lands) is the geographic boundary used for analyzing cumulative effects of motorized vehicle routes on late-successional forest associated species. This area is sufficiently large enough to include home ranges for the species occurring within this group and includes an array of forest vegetation types important to old forest species from low elevations to high elevations including mixed conifer types, true fir types, yellow pine types, lodgepole pine and subalpine conifer types. The temporal scale used for analyzing cumulative effects is the year 2000 for past actions and 20 years out into the future in order for present and reasonably foreseeable actions. This timeframe sufficiently analyzes any present and reasonably foreseeable future actions on the Forest.

3.7.9.4 Late-successional Forest Habitat (CWHR types 4M, 4D, 5M, 5D and 6)

Zone of Influence: For each of the alternatives, the Zone of Influence within late-successional forest habitat (CWHR 4M, 4D, 5M, 5D, 6) was determined to be 200 meters (Table 67). Delaney et al. (1999) found that old forest species, such as the spotted owl, were shown to be sensitive to noise disturbance generated by helicopters within a distance of 100 meters, therefore a 100-meter Zone of Influence can represent habitat effectiveness for old forest species. Gaines et al. (2003) reported that brown creepers and other forest interior bird species avoided an area within 200 meters of motorized routes. Potential impacts within a 200-meter Zone of Influence to late-successional associated species includes potential negative impacts including avoidance due to noise disturbance or edge effects, habitat fragmentation, introduction of invasive species (i.e. brown-headed cowbirds), microclimate changes and others. Zone of Influence may vary by species and by species responses to route type, level of use and intensity. Since absolute thresholds of concern for any given species are difficult to determine due to limited research on effects of routes, a 200-meter Zone of Influence was selected that would represent the array of responses that route-associated factors might influence fitness or distribution of species in the group. Species-specific discussion in relation to the 200-meter Zone of Influence will be discussed in detail.

3.7.9.5 Direct and Indirect Effects

3.7.9.5.1 Zone of Influence at 200 meters

Comparing the Zone of Influence at 200 meters of unauthorized routes, proposed trails and mixed use within mature and late-successional forest as classified by CWHR types 4M, 4D, 5M, 5D and 6, provides a relative indication of how the alternatives affect habitat effectiveness for many late-successional forest associated species.

Table 67 displays the direct and indirect effects of the five alternatives analyzed and the amount of late-successional forest habitat that would be impacted by mixed use, unauthorized routes, proposed trail additions to the NFTS. Alternative 1 contributes considerably to reduced habitat effectiveness for old forest species where 126,276 acres of late-successional forest habitat would be negatively influenced by unauthorized routes. The amount of habitat affected would be expected to increase over time since cross country travel would be allowed to continue under Alternative 1. All the action alternatives (Alternatives 2-5) are expected to improve habitat effectiveness for late successional forest species compared to Alternative 1 due to the prohibition of cross country travel and the significantly reduced acres affected by each alternative. Alternative 2 reduces habitat effectiveness for old forest associated species on approximately 38,431 acres, an improvement of 87,845 acres when compared to Alternative 1. Alternative 5 reduces habitat effectiveness for old forest associated species on approximately 23,229 acres, an improvement of 103,047 acres when compared to Alternative 1. Alternative 4 reduces habitat effectiveness for old forest associated species on approximately 18,371 acres, an improvement of 107,905 acres when compared to Alternative 1. Alternative 3 would not contribute to a direct or indirect reduction in habitat effectiveness for late-successional forest associated species at 200 meters as no unauthorized routes would be added to the NFTS.

Table 67. Acres of CWHR 4M, 4D, 5M, 5D and 6 (Late-successional Forest) that lie within 200-meters of proposed trails (Alts. 2, 4 and 5) and unauthorized routes (Alt. 1).

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Acres of late-successional forest (CWHR 4M, 4D, 5M, 5D and 6) within a 200-meter Zone of Influence	126,276	38,431	0	18,371	23,229

3.7.9.6 Cumulative Effects

3.7.9.6.1 200-meter Zone of Influence

Appendix C provides a list of present and reasonably foreseeable future actions and descriptions of their project location and the actions involved that may be occurring within the PNF boundary. Some, but not all, of these activities will contribute to impacts to late-successional associated species within the cumulative effects boundary. See overall cumulative effects for spotted owl in the Management Indicator Species section for a summary of cumulative effects from past, present and reasonably foreseeable projects for all late-successional species.

Zone of Influence: The cumulative effects to mature/late-successional forests (CWHR types 4M, 4D, 5M, 5D, 6) within a 200-meter Zone of Influence are compared for the five alternatives in Table 68.

Table 68. Cumulative Effects for acres of Late-successional Forest Habitat (CWHR 4M, 4D, 5M,5D, 6) within 200-meters of unauthorized routes (Alt. 1), proposed trails (Alts. 2, 4, 5) and existing trails (Alt. 3).

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect Effects					
Existing unauthorized routes (Alt. 1) or proposed trail additions (Alts. 2-5)	126,276	38,431	0	18,371	23,229
Cumulative effects of past, present and proposed actions					
Existing motorized routes- NFS lands (130 mi of NFTS)	16,471	16,471	16,471	16,471	16,471
Total Cumulative Effects					
Overall Cumulative Effects	142,747	54,902	16,471	34,842	39,700

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

When comparing the cumulative effects to late-successional forests within a 200-meter Zone of Influence by adding up all of the direct and indirect effects of the alternatives plus the cumulative effects of past, present and future actions, Alternative 1 poses the highest cumulative effects and the greatest risk to habitat connectivity associated with routes within late-successional forest habitat due to two primary factors; 1) Alternative 1 would contribute considerably and add to the proliferation of unauthorized routes since unmanaged cross-country motorized travel would continue into the future and would have a high likelihood of increasing in future years, and 2) Alternative 1 cumulatively affects approximately 142,747 acres of late-successional forest habitat, which is significantly higher than any of the action alternatives (Alternatives 2-5).

All the action alternatives significantly reduce cumulative effects to late-successional forest habitat when compared to Alternative 1. Alternatives 2 and 5 reduce cumulative effects significantly down to 54,902 and 39,700 acres respectively, and pose a moderate risk to habitat connectivity associated with routes within late successional forest habitat. In addition to the significant reduction in acres affected under Alternatives 2 (87,845 acres less) and 5 (103,047 acres less), these action alternatives also prohibit cross country travel and the proliferation of additional routes across the Forest.

Alternative 4 further reduces cumulative effects down to 34,842 acres (107,905 acres less) and represents a low risk to habitat connectivity associated with routes within late successional forest habitat. Alternative 4 also prohibits cross country travel and the proliferation of additional routes across the Forest.

Alternative 3 represents the alternative with the lowest cumulative effect and lowest risk to habitat connectivity associated with routes within late successional forest habitat. Alternative 3 would cumulatively affect only 16,471 acres of late-successional forest habitat, which is a reduction of over 126,006 acres when compared to the cumulative effects represented by Alternative 1. In addition, Alternative 3 prohibits cross country travel and the proliferation of additional routes across the Forest. Alternative 3 would pose the best scenario for late-successional forest species.

3.7.9.7 Direct and Indirect Effects in Old Forest Emphasis Areas

3.7.9.7.1 Zone of Influence in Old Forest Emphasis Areas (OFEAs)

The zones of influence within OFEAs are analyzed for the alternatives within 200 meters of unauthorized routes and proposed trails (Table 69). Analysis of OFEAs were based on the land designation originally applied in the 2001 Framework and carried over to the 2004 SNFPA.

3.7.9.7.2 200-Meter Zone of Influence

Comparing the Zone of Influence at 200 meters of mixed use, unauthorized routes and proposed trails provide a relative indication of how the alternatives affect habitat effectiveness for late-successional forest associated species within OFEAs. Potential negative impacts within a 200-meter Zone of Influence to late-successional associated species includes avoidance due to noise disturbance or edge effects, habitat fragmentation, introduction of invasive species (i.e. brown-headed cowbirds), microclimate changes and others.

Table 69 provides data from the analysis conducted on a 200 meter zone of influence from unauthorized routes (Alternative 1) and proposed trails (Alternatives 2, 4, 5) to determine the amount of OFEAs that would have direct and indirect impacts. Alternative 1 would contribute to the highest reduced habitat effectiveness for old forest species where 91,865 acres of OFEAs would be directly and indirectly influenced by continued use of existing unauthorized routes. This level of impact would likely increase in future years due to the proliferation of additional routes across the landscape as cross country travel would be allowed under Alternative 1.

All of the action alternatives (Alternatives 2-5) significantly reduce direct and indirect impacts to late successional associated species within OFEA, plus prohibit cross country travel and the proliferation of additional routes across the landscape. Alternative 2 would have direct and indirect impacts on 22,966 acres of OFEAs, which represents a reduction of 68,899 acres from Alternative 1. Alternative 5 would have direct and indirect impacts on 14,705 acres of OFEAs, which represents a reduction of 72,652 acres from Alternative 1. Alternative 4 would have direct and indirect impacts on 9,645 acres of OFEAs, which represents a reduction of 82,220 acres from Alternative 1. Alternative 3 would not contribute to direct or indirect impacts to late successional associated species within OFEAs, since no new trails would be added.

Table 69. Acres of OFEAs occurring within the 200-meter Zone of Influence of unauthorized routes and proposed trails.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Acres of OFEAs within 200 meters of unauthorized routes and proposed trails.	91,865	22,966	0	9,645	14,705

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.9.8 Cumulative Effects from Zone of Influence in Old Forest Emphasis Areas (OFEAs)

The cumulative effects to OFEAs within a 200-meter Zone of Influence are compared for the alternatives (Table 70).

3.7.9.8.1 200-Meter Zone of Influence

Table 70 displays the data generated from analysis of cumulative effects to OFEA within a 200-meter Zone of Influence. Cumulative effects to OFEAs within a 200-meter Zone of Influence were determined by summing the direct and indirect effects of the alternatives and the cumulative effects of past, present and future actions,

Alternative 1 poses the highest cumulative effect to late successional species within OFEAs based on two primary factors; 1) the allowance of cross country travel and the potential for proliferation of additional routes across of the forest, and 2) cumulatively impacts 103,348 acres of OFEAs on the PNF.

Alternatives 2 and 5 pose a moderate cumulative effect by reducing impacts to late successional species within OFEAs when compared to Alternative 1. This is based on two primary factors: 1) Alternatives 2 and 5 would prohibit cross country travel and the proliferation of additional routes across the forest, and 2) would reduce the amount of OFEAs impacted from 103,348 acres under Alternative 1 to 34,449 acres under Alternative 2 and to 26,188 acres under Alternative 5.

Alternative 4 poses a low cumulative effect by reducing impacts to late successional species within OFEAs when compared to Alternative 1. This is based on two primary factors: 1) Alternative 4 would prohibit cross country travel and the proliferation of additional routes across the forest, and 2) would reduce the amount of OFEAs impacted from 103,348 under Alternative 1 down to 21,128 acres under Alternative 4.

Alternative 3 poses the lowest cumulative effects by reducing impacts to late successional species within OFEAs when compared to Alternative 1. This is based on two primary factors; 1) Alternative 3 would prohibit cross country travel and the proliferation of additional routes across the forest, and 2) would reduce the amount of OFEAs impacted from 103,348 under Alternative 1 down to 11,483 acres under Alternative 3. Alternative 3 would pose the best scenario for late-successional forest species within OFEAs.

Table 70. Cumulative Effects to Old Forest Emphasis Areas within a 200-meter Zone of Influence of unauthorized routes (Alt. 1), proposed trails (Alts. 2, 4, 5) and existing trails (Alt. 3) within the Boundary of the PNF.

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect Effects of the Alternatives					
Existing unauthorized routes or proposed trail additions	91,865	22,966	0	9,645	14,705
Cumulative Effects of past, present and proposed actions					
Existing motorized trails (130 mi) - NFS lands	11,483	11,483	11,483	11,483	11,483
Total Cumulative Effects					
Overall Cumulative Effects	103,348	34,449	11,483	21,128	26,188

[1]Alternative 1 includes the existing unauthorized routes, while Alternatives 2,4,5 include proposed trails.

3.7.10 Spotted Owl: Affected Environment

The California spotted owl is designated by the Regional Forester as a Sensitive Species and is selected as a Management Indicator Species on the Plumas National Forest (PNF). The PNF has 276 designated California spotted owl Protected Activity Centers. Protected Activity Centers are delineated around spotted owl territorial pairs or territorial individuals. The Sierra Nevada Forest Plan Amendment (2004) provides direction to designate Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs) by using CWHR types 6, 5D, 5M, 4D and 4M. These CWHR types are in essence considered suitable habitat (nesting and foraging) for California spotted owls. Pure eastside pine types are not considered suitable for California spotted owls. As of December 1, 2008, there are 495,071 acres of suitable California spotted owl habitat with CWHR types 6, 5D, 5M, 4D and 4M on the PNF.

The PNF has conducted surveys for spotted owl presence and reproductive status across the Forest since the early 1980s. Based on survey results to date, 276 Protected Activity Centers (PACs) and 267 Home Range Core Areas (HRCA) have been designated covering 278,747 acres within the PNF administrative boundary (Table 71). PACs and HRCAs are comprised of the best available habitat encompassing approximately 300 and 700 acres respectively.

Table 71. Number of California spotted owl Protected Activity Centers by Ranger District on the Plumas National Forest.

*Includes loss of 20 PACs as a result of the 2007 Moonlight/Wheeler Fires, and 1 PAC as a result of the 2008 Rich Fire. No PACs were lost as a result of the Cold, Canyon or Antelope fires.

Ranger District	Number of PACS
Mount Hough	115*
Feather River	124
Beckwourth	37
Total	**276**

3.7.11 Spotted Owl: Environmental Consequences

Gaines et al. (2003) reviewed studies on the Northern spotted owl and determined that motorized trail associated factors that were likely to affect spotted owls were collisions, disturbance at a specific site, physiological response, and edge effects. These same factors are expected to affect the California spotted owl in a similar way based upon available literature (Verner et al. 1992, Seamans 2005, Blakesley 2003, Delaney and Grubb 1999).

Collisions: Collisions with vehicles are known to be a source of mortality for spotted owls. The degree to which this occurs on the PNF is unknown. However, at least two spotted owls were killed by vehicles on paved roads on the Eldorado NF. However, collisions from motorized use on proposed trails are expected to extremely low to non-existent based on speeds, time of use, and applied season of use (see Appendix A) for spotted owls. The risk of spotted owl mortality from illegal shooting is also a possibility, but the degree to which this is happening is unknown as well, but this risk is also expected to be extremely low to non-existent.

Disturbance at a Specific Site and Physiological Response: The Forest Service considers activities greater than 0.25 mile from a spotted owl nest site to have little potential to affect spotted owl nesting (SNFPA 2004, S&G 75, p. 60). In addition, Delaney et al. (1999) found that Mexican spotted owls were found to show an alert response to chainsaws at distances less than 0.25 mile. Preliminary study results on a Northern spotted owl study in northern California, indicated that spotted owls did not flush from nest or roost sites when motorcycles were greater than 105 meters away during the post-fledgling period (Delaney and Grubb 2001). In addition, Delaney and Grubb (2003) found that spotted owl responses to motorcycle noise depended upon an array of complex factors including, sound level and frequency distribution, stimulus distance and event duration, motorcycle type and condition, frequency of motorcycle events, number of motorcycles per group, trail slope, topography, road substrate and condition and microphone position relative to sound source. In general, motorcycle noise did not appear to affect reproductive success. However, this study is ongoing and the impacts of motorcycle noise are not conclusive at this point.

A study by Wasser et al. (1997) found that stress hormone levels were significantly higher in male Northern spotted owls (but not females) when they were located <0.41 km (0.25 mi) from a major logging road compared to spotted owls in areas >0.41 km (0.25 mi) from a major logging road. It is not well understood how elevated stress hormones affect spotted owl populations. However, Mara and Holberton (1998) reported that chronic high levels of stress hormones (corticosterone) may have negative effects on reproduction or the physical condition of individual owls. Swartout and Steidl (2001) found hikers caused juvenile and adult spotted owls to flush at <12meters (<39 feet) and <24 meters (79 feet), respectively. Mexican spotted owls did not elicit any response from hikers that exceeded a distance of 55 meters (180 feet).

Habitat Loss, Fragmentation and Edge Effects: California spotted owls may be affected by edge effects from roads when roads and trails fragment suitable habitat. Several studies indicate that California spotted owls are sensitive to changes in forest canopy closure and habitat fragmentation (Seamans 2005, Blakesley 2003) that could result from a network of roads. Roads and trails can result in a reduction in interior forest patch size which decreases the amount of habitat available and increases the distance between suitable interior forest patches for late-successional species such as the spotted owl.

Caveats for determining proposed alternative impacts to spotted owls from motorized routes: Although the type and amount of use along the different types of routes may differ in their effects to spotted owls, all motorized routes are treated equally in this analysis because data is lacking in the amount of use received by all of the routes within the PNF, this sort of detailed analysis would be difficult and complex. In addition, the type of motorized road or trail likely varies in how they contribute to spotted owl disturbance and habitat fragmentation. For example, high clearance roads generally receive less use than roads used by passenger vehicles which would equate to less noise disturbance to owls. In addition, single track motorcycle trails would likely fragment habitat less than would a passenger road due to the narrower width of the single track motorcycle routes that would result in removing less habitat. However, noise generated from motorcycles along trails may contribute to greater noise disturbance to spotted owls than a 4x4 jeep would. Since impacts to spotted owls are not well understood, impacts from all motorized routes, regardless of route type and intensity of use, are treated the same.

3.7.11.1 Analysis Measures for Direct and Indirect Effects to Breeding Spotted Owls

Miles of mixed use, unauthorized routes and proposed trails within spotted owl Protected Activity Centers (PACs) and within 0.25-mile of spotted owl Activity Centers to assess potential disturbance to breeding spotted owls: The direct and indirect effects to breeding spotted owls may be measured by the amount of disturbance that may be generated from noise or other trail and road associated factors within 1) the designated Protected Activity Centers (PACs) and within 2) a 0.25-mile radius circle of spotted owl Activity Centers (nest or roost stand). PACs are delineated surrounding each territorial spotted owl activity center detected since 1986. PACs are delineated to include known and suspected nest stands and encompass the best available 300 acres of habitat which include 2 or more canopy layers, trees in the dominant and co-dominant crown classes averaging 24 inches dbh or greater, at least 70 percent tree canopy cover and in descending order of priority, CWHR classes 6, 5D, 5M, 4D and 4M and other stands with at least 50% canopy cover. Activity Centers are known nest sites, roost sites or suspected nest stands.

Zone of Influence within PACs and HRCAs to assess potential habitat fragmentation and edge effects: In addition, to determine the habitat fragmentation potential within suitable spotted owl habitat (CWHR types 4M, 4D, 5M, 5D, and 6), a zone of influence was applied within spotted owl PACs and HRCAs using a distance of 200-meters from unauthorized routes (Alternative 1) and proposed trails (Alternatives 2, 4 and 5).

3.7.11.2 Direct and Indirect Effects to Breeding Spotted Owls

3.7.11.2.1 Protected Activity Centers

The miles of unauthorized routes and proposed trails to be added to the travel management system are compared to determine how the various alternatives have the potential to impact breeding spotted owls from noise disturbance and other factors associated with motorized use.

Table 72 displays by alternative the analysis conducted to determine the total miles of mixed use, unauthorized routes and trails proposed for adding to the transportation system within spotted owl Protected Activity Centers (PACs), and the number and percentage of PACs affected.

Based on the data contained in Table 72, Alternative 1 results in the highest level of direct and indirect impacts within spotted owl PACs and to breeding spotted owls. Under Alternative 1, a total of 77 miles of unauthorized routes would impact approximately 139 PACS, and have the potential to directly and indirectly affect breeding across 50% of the known owl territories on the PNF. These direct and indirect effects are expected to increase under Alternative 1 since cross country travel would be allowed and the potential for proliferation of additional routes across the Forest would exist.

All action alternatives (Alternatives 2-5) significantly reduce direct and indirect impacts to spotted owl PACs and breeding owls across the PNF. In addition, under Alternatives 2-5, cross-country travel is prohibited, which further reduces any direct or indirect impacts that may result from the proliferation of additional routes across the Forest.

Alternative 2 significantly reduces direct and indirect impacts to owl PACs and to breeding owls by reducing proposed trail miles within PACs by 50 miles (from 77 to 27 miles) and impacting 88 less owl PACs (from 139 to 51 PACs) when compared to Alternative 1. Alternative 2 also reduces the direct and indirect effects to breeding from 50% under Alternative 1 to 18% of the known owl territories on the PNF.

Alternative 5 significantly reduces direct and indirect impacts to owl PACs and to breeding owls by reducing proposed trail miles within PACs by 61 miles (from 77 to 16 miles) and impacting 103 less owl PACs (from 139 to 36 PACs) when compared to Alternative 1. Alternative 5 also reduces the direct and indirect effects to breeding from 50% under Alternative 1 to 13% of the known owl territories on the PNF.

Alternative 4 significantly reduces direct and indirect impacts to owl PACs and to breeding owls by reducing proposed trail miles within PACs by 67 miles (from 77 to 10 miles) and impacting 119 less owl PACs (from 139 to 20 PACs) when compared to Alternative 1. Alternative 4 also reduces the direct and indirect effects to breeding from 50% under Alternative 1 to just 7% of the known owl territories on the PNF.

Alternative 3 does not result in direct or indirect impacts to owl PACs or breeding owls since no proposed trails will be added to the NFTS.

Table 72. Miles of proposed trails and unauthorized routes[1] within California spotted owl Protected Activity Centers, number of PACs affected and percentage of total PACs affected on the Plumas National Forest.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Miles of mixed use, proposed trails or unauthorized motorized routes within spotted owl protected activity centers (PACs)	77	27	0	10	16
Number of spotted owl PACs intersected by mixed use, proposed trails and unauthorized routes	139	51	0	20	36
Percent of PACs affected by additions to the NFTS or unauthorized routes (Total PNF PACs = 276)	50%	18%	0%	7%	13%

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.11.2.2 Within 0.25-Mile Radius Circle of Activity Centers (Nest Site or Nest Stand)

Table 73 displays the potential direct and indirect effects of the five alternatives on breeding spotted owls by showing the miles of mixed use, unauthorized routes and proposed trails that lie within a 0.25-mile radius circle of a nest site or nest stand (e.g. Activity Center).

Based on the analysis conducted and the data displayed in Table 73, Alternative 1 results in the highest direct and indirect effects to breeding owls as a result of noise disturbance by allowing cross country travel to continue and the potential for proliferation of additional routes across the landscape, plus approximately 25.4 miles of unauthorized routes occur within a 0.25 mile distance of owl activity centers.

All of the action alternatives (Alternatives 2-5) significantly reduce the magnitude of direct and indirect effects to breeding spotted owls as the result of two primary factors: 1) the prohibition of cross country travel and 2) the significantly reduced miles of proposed trail that would occur within 0.25 miles of an Activity Center. Alternative 2 would have direct and indirect effects to breeding owls by containing 9 miles of proposed trails that would lie within 0.25 miles of an owl activity center. This represents a reduction of 16.4 miles when compared to Alternative 1.

Alternative 5 would have direct and indirect effects to breeding owls by containing 5.2 miles of proposed trails that would lie within 0.25 miles of an owl activity center. This represents a reduction of 20.2 miles when compared to Alternative 1. Mixed use does not affect breeding owls within 0.25 miles of an activity center under alternative 5.

Alternative 4 would have direct and indirect effects to breeding owls by containing 3.5 miles of proposed trails that would lie within 0.25 miles of an owl activity center. This represents a reduction of 21.9 miles when compared to Alternative 1. Mixed use does not affect breeding owls within 0.25 miles of an activity center under alternative 4.

Alternative 3 would have no effect on breeding spotted owls, as no trails are proposed to be added under this alternative.

Table 73. Miles of proposed trails and unauthorized routes[1] within 0.25-Mile radius circle of California spotted owl Activity Center (nest site or nest stand)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Miles of proposed trails and unauthorized routes within 0.25-mile radius circle of Activity Centers (nest site or nest stand)	25.4	9	0	3.5	5.2

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.11.3 Cumulative Effects to Spotted Owl Breeding Sites

3.7.11.3.1 Cumulative Effects Boundary (Space and Time)

The cumulative density of motorized routes increases within the larger cumulative effects analysis area that includes private lands within the Forest. The cumulative effects geographic boundary for the California spotted owls includes all spotted owl Protected Activity Centers and their associated Activity Centers (nest site or nest stand) within the boundary of the PNF. This is an appropriate scale for determining cumulative effects to spotted owls, since the PNF boundary is sufficiently large and includes 276 spotted owl territories and their home ranges across the Forest. In addition, the PNF boundary encompasses an array of spotted owl habitat conditions from low elevation to high elevation, including several vegetation types from westside mixed conifer, ponderosa pine, and true fir. The cumulative effects timeframe is the same as other species—20 years out into the future and to the year 2000 for past actions.

3.7.11.3.2 General Cumulative Effects of Past and Future Vegetation Management Projects and Wildfires

Appendix C provides a list of present and reasonably foreseeable future actions and descriptions of their project location and the actions involved that may be occurring within the PNF boundary. Some, but not all, of these activities will contribute to impacts to the California spotted owl within the cumulative effects boundary. In its Notice of Finding on a petition to list the California spotted owl, the U.S. Fish and Wildlife Service indicated that loss of habitat to stand-replacing wildfires and habitat modification for fuels reduction were the primary risk factors to California spotted owls occurring on NFS lands (USDI Fish and Wildlife Service 2006).

Since 2000, wildfires resulted in burning approximately 266,963 acres of various habitats across the PNF. Some, but not all have resulted in impacts to spotted owl habitats. A total of 21 PACs have been lost due to wildfires during this timeframe. Since 2000, more than 73,345 acres of forest vegetation and fuels thinning and mastication projects were completed, which were designed to reduce the risk of additional habitat loss to wildfires. These treatments generally do not result in habitat removal, but may result in changes to habitat quality (e.g. from nesting to foraging). These wildfires and vegetation treatment projects have resulted in a reduction in the amount of and quality of spotted owl habitat on the PNF since 2000.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting spotted owl habitat on the Plumas (Appendix C). Although these treatments may reduce habitat quality (e.g. nesting habitat reduced to foraging habitat), it expected that suitable habitat will be maintained in the long term, and it is anticipated that these treatments will reduce the amount of spotted owl habitat potentially lost from future stand-replacing wildfires (USDA Forest Service 2004).

3.7.11.3.3 Assessing Cumulative Effects from Routes

Cumulative effects to breeding spotted owls are assessed by determining the sum total miles of all motorized trails and unauthorized routes on PNF within spotted owl PACs and within 0.25-mile radius of spotted owl Activity Centers. For each alternative, cumulative effects are calculated by adding the total miles of proposed trails (Alternatives 2, 4, and 5) and unauthorized routes (Alternative 1) (direct and indirect impacts) with existing motorized trails (Alternative 3) (NFS lands).

3.7.11.3.4 Cumulative Effects to Breeding Owls within Protected Activity Centers

When considering the cumulative effects of all motorized NFS trails and unauthorized routes, Alternative 1 has the highest cumulative miles of routes (89.4 miles) within spotted owl PACs on the PNF and therefore poses the greatest overall potential risk and cumulative impacts to breeding spotted owls on the PNF (Table 74). Given the magnitude of potential effects upon spotted owl nest sites and habitat and considering the projections for future increases in recreation uses and OHV activity, Alternative 1 may, over time, contribute to cumulative effects upon spotted owl populations. Because Alternative 1 does not prohibit cross-country travel, there is a potential that route proliferation may add additional routes across the PNF and increase associated cumulative impacts upon spotted owls over time.

All of the action alternatives (Alternatives 2-5) result in significantly less cumulative effects to breeding spotted owls when compared to Alternative 1. This is due to two primary factors: 1) cross-country travel is prohibited under all four of the action alternatives (Alternatives 2-5), and 2) all the action alternatives (Alternatives 2-5) have significantly reduced miles of proposed trails within spotted owl PACs.

Alternative 2 presents a moderate risk to breeding spotted owls, which cumulatively has approximately 39.4 miles of proposed trails and existing NFS motorized trails. This risk is significantly reduced compared to Alternative 1 and represents a reduction of 50 miles of routes within PACs.

Alternative 5 presents a moderate risk to breeding spotted owls, which cumulatively has approximately 28.4 miles of proposed trails and existing NFS motorized trails. This risk is significantly reduced compared to Alternative 1 and represents a reduction of 61 miles of routes within PACs.

Alternative 4 presents a low risk to breeding spotted owls, which cumulatively has approximately 22.4 miles of proposed trails and existing NFS motorized trails. This risk is significantly reduced compared to Alternative 1 and represents a reduction of 67 miles of routes within PACs.

Alternative 3 presents the lowest risk to breeding spotted owls, which cumulatively has approximately 12.4 miles of existing NFS motorized trails. This risk is significantly reduced compared to Alternative 1 and represents a reduction of 77 miles of routes within PACs. Alternative 3 would pose the best scenario for breeding spotted owls and PACs.

Table 74. Cumulative miles of unauthorized routes (Alt. 1), proposed trails (Alts. 2, 4, 5) and existing trails (Alt. 3) within spotted owl Protected Activity Centers

Route Miles	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Direct and indirect effects of the alternatives					
Miles of unauthorized routes or proposed trail additions	77	27	0	10	16
Cumulative effects of past, present and proposed actions					
Miles of existing motorized trails on NFS lands (130 miles)	12.4	12.4	12.4	12.4	12.4
Total Cumulative Effect					
Total cumulative impact (miles of all routes)	**89.4**	**39.4**	**12.4**	**22.4**	**28.4**

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.11.4 0.25-mile Radius Circle of Activity Centers (Nest Site or Nest Stand)

Table 75 presents the analysis of cumulative effects of route or trail miles that lie within the 0.25-mile radius circle of spotted owl activity centers (nest or roost stand). The cumulative effects analysis for activity centers results in a similar conclusion and ranking of alternatives as the cumulative effects found for PACs.

Alternative 1 has the highest cumulative miles (29.8 miles) of motorized trails and unauthorized routes when compared to the four action alternatives (Alternatives 2-5). Alternative 1 clearly poses the greatest cumulative risk to nesting spotted owls by allowing continued cross-country travel and the potential for proliferation of additional routes across the PNF which could increase routes miles within 0.25 miles of an activity centers in the future.

All action alternatives (Alternatives 2–5) significantly reduce cumulative effects to breeding owls by having less routes and miles within the 0.25-mile radius circle of activity centers, and by prohibiting cross country travel and the potential of additional routes across the PNF.

Alternative 2 poses a moderate risk to breeding spotted owls by having 13.4 miles of proposed and existing trails within 0.25 miles of an activity center. The risk under Alternative 2 is moderated due to the reduction of 16.4 miles of route when compared to Alternative 1.

Alternative 5 poses a moderate risk to breeding spotted owls by having 9.6 miles of proposed and existing trails within 0.25 miles of an activity center. The risk under Alternative 5 is moderated due to the reduction of 20.2 miles of route when compared to Alternative 1.

Alternative 4 poses a low risk to breeding spotted owls by having 7.9 miles of proposed and existing trails within 0.25 miles of an activity center. The risk under Alternative 4 is lowered due to the reduction of 21.9 miles of route when compared to Alternative 1.

Alternative 3 poses the lowest risk to breeding spotted owls by having only 4.4 miles of existing trail within 0.25 miles of an activity center. The risk under Alternative 3 is low due to the reduction of 25.4 miles of route when compared to Alternative 1. Alternative 3 would pose the best scenario for breeding spotted owls and activity centers.

Table 75. Cumulative miles of unauthorized routes (Alt. 1), existing trails (Alt. 3) or proposed trails (Alts. 2, 4, 5) within a 0.25 Mile Radius Circle of spotted owl Activity Centers (Nest Sites/Stand).

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of the alternatives					
Miles of unauthorized routes or proposed trail additions [1]	25.4	9.0	0	3.5	5.2
Cumulative effects of past, present and proposed actions					
Miles of existing motorized trails - NFS lands	4.4	4.4	4.4	4.4	4.4
Total Cumulative Effects					
Overall Cumulative Impact	29.8	13.4	4.4	7.9	9.6

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.11.5 Summary of Cumulative Effects to Breeding Spotted Owls

An analysis of breeding spotted owls on the PNF at two scales (within PACs and within a 0.25-mile radius circle), indicates that cumulative effects are significantly greater under Alternative 1 (No action) compared to all of the four action alternatives (Alternatives 2-5). In addition, under Alternative 1, unmanaged cross-country travel would continue to occur and potentially pose even greater threats to breeding spotted owl populations on the PNF as the potential for route proliferation adds additional routes in the future. Based on route proliferation since 1988 (Forest Plan development), an average of 48 miles of unauthorized routes per year were established. When this rate is applied over the next 20 years, an additional 960 miles could be added under Alternative 1.

Under all of the other alternatives (Alternatives 2-5), cross-country travel would be prohibited and cumulative effects would be significantly reduced. All alternatives are equally affected by existing road densities. Forest Service System Roads currently exists within PACs, since development of PACs included roads by default due to existing road density levels across the forest. LOP's are applied to our system roads when anticipated use levels increase due to logging activities or when concentrated use levels are anticipated. Effects from our system roads are mitigated (e.g. LOP applied) on a case by case project basis and contribute relatively low cumulative effects to existing spotted owl PACs.

3.7.11.6 Direct and Indirect Effects to Fragmentation and Edge Effects within California Spotted Owl Protected Activity Centers

Habitat fragmentation and edge effects were described for late-successional associated species within late-successional forest types (CWHR types 4M, 4D, 5M, 5D, and 6) and within Old Forest Emphasis Areas (OFEAs) under the section "Effects Common to All Late-successional Associated Species." Those analyses provided a forest-wide view of how the project alternatives affect spotted owl habitat fragmentation within late-successional habitats and OFEAs. This section provides a focused analysis of spotted owl habitat fragmentation and edge effects (including noise disturbance) from motorized routes at the site-specific PAC scale, where known spotted owl nest territories are located.

3.7.11.6.1 Zone of Influence at 200 meters

Spotted owl Protected Activity Centers (PACs) are delineated land allocations (SNFPA 2004), comprised of the best available spotted owl habitat, which are managed specifically for sustaining viable populations of spotted owls (see previous section on Protected Activity Centers). For all spotted owl PACs on the PNF, the effects of the project alternatives are also analyzed for the amount of habitat fragmentation and edge effects occurring by considering the Zone of Influence within PACs at the spatial scale of within 200 meters of mixed use, proposed trails or unauthorized routes (Table 76). The 200-meter Zone of Influence represents all impacts which could occur to spotted owls. Since absolute noise disturbance thresholds of concern for California spotted owls have not been established, the best available science indicates that 100 meters and 200 meters may be important noise disturbance thresholds for spotted owls and other birds of prey (Delaney 1999, Delaney and Grubb 2001, Delaney and Grubb 2003, Delaney and Grubb 2004).

Table 76 displays the direct and indirect effects by showing the amount of PAC acres that fall within the 200-meter Zone of Influence of proposed trails and unauthorized routes. Direct and indirect effects of Alternative 1 within spotted owl PACs show that 14,127 acres would have reduced habitat effectiveness for spotted owls. These acres would be expected to increase under Alternative 1 over time as cross-country travel would still be allowed, and the potential for route proliferation and additional routes to be added across the PNF would still exist.

All of the action alternatives (Alternatives 2-5) significantly reduce impacts to PACs within the 200-meter zone of influence when compared to Alternative 1. In addition all of the action alternatives prohibit cross country travel and would further reduce any future potential impacts to PACs.

Alternative 2 would directly and indirectly affect habitat effectiveness on 3,740 acres within PACs. When compared to Alternative 1, this is a reduction of 10,387 acres.

Alternative 5 would directly and indirectly affect habitat effectiveness on 2,931 acres within PACs. When compared to Alternative 1, this is a reduction of 11,196 acres.

Alternative 4 would directly and indirectly affect habitat effectiveness on 1,508 acres within PACs. When compared to Alternative 1, this is a reduction of 12,619 acres.

Alternative 3 does not propose any new trails, therefore no direct and indirect effects to habitat effectiveness within PACs would occur under this alternative.

Table 76. Acres of California spotted owl PACs affected by a 200-meter Zone of Influence of proposed trails and unauthorized routes that would have a reduction in habitat effectiveness.

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Acres of spotted owl PACs within a 200-meter Zone of Influence of proposed trails, mixed use and unauthorized routes.	14,127	3,740	0	1,508	2,931

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.11.7 Cumulative Effects

3.7.11.7.1 Zone of Influence at 200 meters

The cumulative effects of unauthorized routes and proposed trails and their 200-meter Zone of Influence within spotted owl PACs are compared for the five alternatives (Table 77). Table 77 displays the results of the cumulative effects analysis for the five alternatives analyzed for impacts to habitat effectiveness within PACs that result from motorized trails and unauthorized routes on NFS lands. When comparing the cumulative effects of trails and/or routes and their 200-meter zone of influence to spotted owl PACs (by summing the direct and indirect effects of the alternatives and the cumulative effects of past, present and future actions), Alternative 1 has the highest overall cumulative impact to PACs by affecting habitat effectiveness on 15,789 acres. Alternative 1 also poses additional risk to habitat connectivity and other negative cumulative impacts associated (including noise disturbance) by allowing cross-country travel to continue into the future.

All action alternatives significantly reduce impacts to habitat effectiveness within PACs by prohibiting cross-country travel and reducing acres affected within PACs by over 10,000 acres, when compared to Alternative 1. For example, Alternative 2 contributes to overall cumulative impacts within PACs on just 5,402 acres. Alternative 5 has slightly less cumulative effects than Alternatives 2, with only 4,593 acres affected. Alternative 4 affects the lesser amount of spotted owl habitat with 3,170 acres. Alternative 3 represents the least impact to habitat effectiveness within PACs with 1,662 acres affected.

Table 77 Cumulative effects--proportion of spotted owl Protected Activity Centers (PACs) within a 200-meter Zone of Influence of existing trails (Alt. 3), proposed trails (Alt. 2, 4, 5) and unauthorized routes (Alt. 1).

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of the alternatives					
Unauthorized routes, mixed use or proposed trail additions [1]	14,127	3,740	0	1,508	2,931
Cumulative effects of past, present and proposed actions					
Existing motorized trails - NFS lands	1,662	1,662	1,662	1,662	1,662
Total Cumulative Effects	15,789	5,402	1,662	3,170	4,593

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.11.8 Cumulative Effects Summary to PACs at 200-meter Zone of Influence

Cumulative effects of habitat effectiveness within California spotted owl PACs were assessed by determining the amount of spotted owl PACs that are influenced by motorized trails and unauthorized routes on NFS lands. A 200-meter Zone of Influence was used to determine potential effects from the influence of noise, edge effects and habitat alteration associated with unauthorized routes, proposed trails and motorized trails.

Alternative 1 poses the highest cumulative effects and greatest risk to habitat effectiveness within PACs at the 200-meter of Zone of Influence scale. Under Alternative 1 cumulative effects would result in 15,789 acres of PAC habitat with reduced habitat effectiveness. In addition, the risk is increased since Alternative 1 would still allow cross country travel and the potential for route proliferation to add additional routes across the PNF.

Alternative 2 significantly reduces cumulative effects to habitat effectiveness and poses about half the risk to habitat effectiveness within PACs compared to Alternative 1. Alternative 2 results in 5,402 acres of cumulative effects to PACs and would prohibit cross country travel. The prohibition of cross country travel would reduce the risk of route proliferation into the future.

Alternative 5 significantly reduces cumulative effects to habitat effectiveness and poses about a quarter of the risk to habitat effectiveness within PACs compared to Alternative 1. Alternative 5 results in 4,497 acres of cumulative effects to PACs and would prohibit cross country travel. The prohibition of cross country travel would reduce the risk of route proliferation into the future.

Alternative 4 significantly reduces cumulative effects to habitat effectiveness and poses about one fifth the risk to habitat effectiveness within PACs compared to Alternative 1. Alternative 4 results in 3,075 acres of cumulative effects to PACs and would prohibit cross country travel. The prohibition of cross country travel would reduce the risk of route proliferation into the future.

Alternative 3 significantly reduces cumulative effects to habitat effectiveness and poses a lowest risk (about 1/10) to habitat effectiveness within PACs compared to Alternative 1. Alternative 3 results in 1,662 acres of cumulative effects to PACs and would prohibit cross country travel. The prohibition of cross country travel would reduce the risk of route proliferation into the future. Alternative 3 would pose the best scenario for habitat effectiveness within PACs for the spotted owl.

3.7.11.9 Home Range Core Areas—Direct and Indirect Effects

3.7.11.9.1 Zone of Influence at 200 meters

Delineated California spotted owl Home Range Core Areas (HRCAs) are comprised of approximately 700 acres of the best available spotted owl habitat (SNFPA 2004) surrounding the ~300-acre core nest area (PAC). The HRCAs are delineated to represent spotted owl foraging habitat, whereas, PACs are delineated as the best available nesting and foraging habitat around an activity center.

The purpose of using a Zone of Influence is to evaluate habitat fragmentation, noise disturbance and edge effects on spotted foraging habitat or HRCAs. The Zone of Influence within 200-meters of mixed use, proposed motorized trails and unauthorized routes within spotted owl HRCAs was determined for each alternative (Table 78). Table 78 displays the results of the direct and indirect impacts of unauthorized routes and proposed trails within spotted owl HRCAs.

Alternative 1 directly and indirectly reduces habitat effectiveness on 35,607 acres within spotted owl HRCAs. All action alternatives (2-5) significantly reduce impacts to habitat effectiveness within HRCAs by over 25,000+ acres. Alternatives 2 results in a reduction of habitat effectiveness within spotted owl HRCAs on 9,391 acres. Alternative 5 results in a reduction of habitat effectiveness within spotted owl HRCAs on 5,883 acres. Alternative 4 results in a reduction of habitat effectiveness within spotted owl HRCAs on 3,920 acres. Alternative 3 proposes no additional proposed trails and therefore, would have no direct and indirect effects within the 200-meter Zone of Influence in spotted owl HRCAs.

Table 78. Acres of California spotted owl Home Range Core Areas (HRCAs) within a 200-meter Zone of Influence of unauthorized routes and proposed trails.

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Acres of spotted owl HRCAs within a 200-meter Zone of Influence of unauthorized routes, mixed use and proposed trails	35,607	9,391	0	3,920	5,883

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.11.10 Cumulative Effects Summary of Habitat Fragmentation and Edge Effects within Spotted Owl HRCAs

3.7.11.10.1 Zone of Influence at 200 meters

The cumulative effects to spotted owl HRCAs within a 200-meter Zone of Influence are compared for the alternatives (Table 79). As previously discussed, the cumulative effects analysis presented here only provides a relative comparison of cumulative effects to spotted owl habitat in HRCAs from unauthorized routes and proposed trails. Table 79 displays the cumulative effects of the alternatives of motorized routes on NFS lands within spotted owl HRCAs. When comparing the cumulative effects to HRCAs from routes and their associated 200-meter Zone of Influence (i.e., summing the direct and indirect effects of the alternatives and the cumulative effects of past, present and future actions), Alternative 1 has the highest cumulative impact where approximately 39,520 acres of habitat within HRCAs would be affected, either by increased disturbance to owls or avoidance by owls (e.g. not used). Alternative 1 would pose the highest risk to habitat connectivity and other negative cumulative impacts (i.e., noise disturbance) within spotted owl HRCAs due to continued route proliferation since unmanaged cross-country travel would continue into the future.

Alternative 2 poses a moderate cumulative effect and risk to spotted owl HRCAs. This is based on two primary factors: 1) the amount of acres affected which total 13,304 acres, and 2) the prohibition of cross country travel and reduced risk of route proliferation across the PNF.

Alternative 5 poses a moderate cumulative effect and risk to spotted owl HRCAs. This is based on two primary factors: 1) the amount of acres affected which total 9,796 acres, and 2) the prohibition of cross country travel and reduced risk of route proliferation across the PNF.

Alternative 4 poses a low cumulative effect and risk to spotted owl HRCAs. This is based on two primary factors: 1) the amount of acres affected is low, 7,833 acres, and 2) the prohibition of cross country travel and reduced risk of route proliferation across the PNF.

Alternative 3 poses the lowest cumulative effect and risk to spotted owl HRCAs. This is based on two primary factors: 1) the amount of acres affected are the lowest at 3,913 acres, and 2) the prohibition of cross country travel and reduced risk of route proliferation across the PNF.

Table 79. Cumulative effects—acres of California spotted owl Home Range Core Areas that lie within a 200-meter zone of influence of unauthorized routes (Alt. 1), existing trails (Alt. 3) or proposed trails (Alts. 2, 4, 5).

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of the alternatives					
Unauthorized routes, mixed use or proposed trail additions[1]	35,609	9,391	0	3,920	5,883
Cumulative effects of past, present and proposed actions					
Existing motorized routes - NFS lands	3,913	3,913	3,913	3,913	3,913
Total Cumulative Effects					
Overall Cumulative Effects	39,520	13,304	3,913	7,833	9,796

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.11.10.2 Sensitive Species Determinations

Based on the spotted owl analysis of effects, the Biological Evaluation for this EIS made a determination for the California spotted owl.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the California spotted owl. This determination is based on the rationale that cross country travel would continue in the future and lead to additional loss of habitat, an increase in habitat fragmentation, and result in high risk to spotted owl PACs and HRCAs. Based on route proliferation since 1988 (Forest Plan development), an average of 48 miles of unauthorized routes per year were established. When this rate is applied over the next 20 years, an additional 960 miles could be added under Alternative 1, resulting in increased cumulative effects (e.g. disturbance during reproduction period, abandonment of territories, etc.) over time.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the California spotted owl within the planning area of the Plumas National Forest. This determination is based on the rationale that 1) the action alternatives would prohibit current and future cross-country travel across the PNF, 2) risks to spotted owl PACs and HRCAs would be significantly reduced compared to Alternative 1 (No-action), and 3) a higher amount of owl nesting and foraging habitat would remain undisturbed for owl use.

In the absence of a range wide viability assessment, this viability determination is based on local knowledge of this species as discussed previously in this evaluation, best available scientific information and professional judgment.

3.7.12 Northern Goshawk: Affected Environment

The northern goshawk is designated as a Forest Service Sensitive Species in Region 5. There are currently 495,071 acres of suitable goshawk habitat on the PNF as defined by CWHR types 4 M, 4D, 5M, 5D and 6. All northern goshawk territories are managed on the Plumas National Forest as Protected Activity Centers (PACs) as prescribed by the Sierra Nevada Forest Plan Amendment (2004). To date, the Plumas National Forest has 148 existing northern goshawk PACs (Table 80).

Table 80. Number of northern goshawk Protected Activity Centers by Ranger District on the Plumas National Forest.

Ranger District	Number of PACs
Feather River	60
Beckwourth	48
Mount Hough	40
Total Number of PACs	**148**
Total Acres of PACs	**31,395**

(*includes loss of PACs as a result of the Moonlight and Rich Fires. No PACs lost as a result of Canyon, Butte, Cold and Antelope Fires)

Disturbance at a Specific Site: Human disturbance has the potential to cause goshawk to abandon nesting during the nesting and post fledging period (February 15 through September 15). Goshawk initiate breeding when the ground is still covered in snow and sometimes nests are located along roads and trails when they are not yet in use. Additionally, roads and trails provide flight access for goshawk. When the snow melts, these sites can potentially be areas of conflict as these roads and trails are used by people. Joslin and Youmans (1999) recommends maintaining low road densities to minimize disturbance to goshawk. Dunk et. al, 2007 (abstract) provided preliminary results from his 2004 to 2006 data where he compared the effects OHV use on juvenile goshawk survival in a control and treatment scenario. The preliminary study results did not indicate differences in juvenile survival between the two test methods. However, this data is preliminary with analysis is still ongoing and final results not currently available. Therefore, the Grubb et al. (1998) study was used for this analysis. Grubb et al. (1998) reported that vehicle traffic from roads did not elicit any discernable behavioral response from goshawk at distances exceeding 400-meters (0.25 mile) from nests. Based on these study results, the disturbance at a specific site analysis for goshawks was conducted at a distance of less or equal to 400 meters or 0.25 miles.

Habitat Loss and Fragmentation and Edge Effects: a network of roads and trails can fragment goshawk habitat by reducing canopy closure (Beir and Drennan 1997, Daw and DeStefano 2001) and by reducing forest interior patch size. However, how habitat fragmentation from roads and trails affects goshawk habitat suitability is not well understood. Generally, the wider the road, the more the fragmentation. Maintenance level 2 roads and trails probably do not pose as much a risk to habitat fragmentation compared to maintenance level 3, 4, and 5 roads, since level 2 roads are more narrow than level 3, 4, and 5 roads. For obvious reasons, state and federal highways create the greatest habitat fragmentation due to the width of the road and associated edge effects.

3.7.13 Northern Goshawk: Environmental Consequences

3.7.13.1 Analysis Measures

Miles of mixed use, proposed trails and unauthorized routes within northern goshawk Protected Activity Centers (PACs) and within 0.25 mile of northern goshawk Activity Centers to assess disturbance to breeding northern goshawk: The direct and indirect effects to breeding northern goshawk will be measured by the amount of disturbance that may be generated from noise or other trail and road associated factors within (1) the designated Protected Activity Centers (PACs) and (2) within a 0.25-mile radius circle of goshawk Activity Centers (nest or nest stand). The PACs are delineated surrounding all known and newly discovered breeding territories on NFS lands on the PNF. The PACs are designated to include the latest documented nest site and location of alternate nests (SNFPA 2004). The PACs encompass the best available 200 acres of forested habitat which include two or more canopy layers, (1) trees in the dominant and co-dominant crown classes averaging 24 inch dbh or greater; (2) in westside conifer and eastside mixed conifer forest types, stands have at least 70 percent tree canopy cover; and (3) in eastside pine forest types, stands have at least 60 percent tree canopy cover. Activity Centers are known nest sites or suspected nest stands. Nest abandonment and failure can result from excessive noise disturbance, that may be associated with use of motorized routes.

Zone of Influence within PACs to assess potential habitat fragmentation and edge effects: In addition, to determining the habitat fragmentation potential from zones of influence within suitable goshawk habitat within CWHR types 4M, 4D, 5M, 5D, and 6 (See effects to late-successional forest habitats in effects common to all late-successional forest associated species), zones of influence were determined within goshawk PACs at 400 meters (0.25-mile) of unauthorized routes, mixed use and proposed trails.

3.7.13.2 Direct and Indirect Effects to Breeding Northern Goshawks

3.7.13.2.1 Protected Activity Centers

The miles of unauthorized routes and proposed trails to be added to the NFTS are compared to determine how the various alternatives have the potential to impact breeding northern goshawks from noise disturbance and other factors associated with motorized use.

Table 81 displays the total miles of unauthorized routes or proposed trails that are within goshawk Protected Activity Centers (PACs) by alternative. Northern goshawks PACs are not affected by mixed use on 4.1 miles of Forest Road 24N28. It also displays the number and percentage of PACs affected by proposed trails or unauthorized routes for each alternative. There are a total of 148 goshawk PACs designated on the PNF.

Alternative 1 contributes significantly to direct and indirect effects to breeding goshawk, where cross-country motorized travel would continue, including motorized use on over 45 miles of unauthorized routes, where 57% of goshawk PACs (84 PACs) on the PNF would be subjected to disturbance from the continued use of unauthorized routes.

All action alternatives (2-5) significantly reduce impacts to breeding goshawks within PACs. Alternative 2 proposes approximately 13 miles of proposed trails to be added to the PNF transportation system that would contribute to direct and indirect effects to 17% of the PNF goshawk PACs (26 PACs). This is a reduction of over 30 miles and approximately 58 PACs, when compared to Alternative 1.

Alternative 5 proposes approximately 8 miles of proposed trails to be added to the PNF transportation system that would contribute to direct and indirect effects to 11% of the PNF goshawk PACs (16 PACs). This is a reduction of over 37 miles and approximately 68 PACs, when compared to Alternative 1.

Alternative 4 proposes approximately 5 miles of proposed trails to be added to the PNF transportation system that would contribute to direct and indirect effects to 7% of the PNF goshawk PACs (10 PACs). This is a reduction of over 40 miles and approximately 74 PACs, when compared to Alternative 1.

Alternative 3 does not propose any trails within goshawk PACs and therefore would not cause direct or indirect effects to breeding goshawk within PACs.

Table 81. Miles of proposed trails and unauthorized routes within northern goshawk Protected Activity Centers on the Plumas National Forest.

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Miles of proposed trails and unauthorized routes within goshawk Protected Activity Centers (PACs)	45.1	13	0	5	8
Number of goshawk PACs Intersected by proposed trails and unauthorized routes	84	26	0	10	16
Percent of goshawk PACs affected by proposed trails and unauthorized routes (Total PNF goshawk PACs = 148)	57%	17%	0%	7%	11%

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.13.2.2 0.25-Mile Radius Circle of goshawk Activity Centers (Nest Site or Nest Stand)

Table 82 displays the potential direct and indirect effects of the alternatives on breeding goshawk within a 0.25-mile radius circle of goshawk Activity Centers (nest site or nest stand). Alternative 1 poses the greatest risk from noise disturbance to breeding goshawk by allowing continued cross-country motorized travel, including motorized use on over 29 miles of unauthorized routes within the 0.25-mile of goshawk Activity Centers.

All action alternatives (Alternatives 2-5) significantly reduce impacts to breeding goshawks by reducing route miles within 0.25 miles of goshawk activity centers. Alternative 2 would contribute to noise disturbance from motor vehicles to breeding goshawk on approximately 10.4 miles of proposed trails that would be added within the 0.25-mile radius circle of goshawk activity centers. Alternatives 5 would contribute direct and indirect impacts on 7 miles of proposed trails that would be added within 0.25 miles of goshawk activity centers. Alternative 2 would contribute 3.9 miles of proposed trails within the 0.25-mile radius circle of goshawk Activity Centers. Alternatives 3 does not directly or indirectly affect breeding goshawk within a 0.25-mile radius circle of known or suspected goshawk activity centers.

Table 82. Miles of proposed trails and unauthorized routes within a 0.25-mile radius circle of northern goshawk Activity Center (nest site or nest stand).

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Miles of proposed trails and unauthorized routes within a 0.25-mile radius circle of Activity Centers (nest site or nest stand)	29.8	10.4	0	3.9	7

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.13.3 Cumulative Effects to Breeding Goshawk

3.7.13.3.1 Cumulative Effects Boundary (Space and Time)

The cumulative effects geographic boundary for breeding goshawks includes all goshawk Protected Activity Centers and their associated Activity Centers (nest site or nest stand) within the boundary of the Plumas National Forest (PNF). This is an appropriate scale for determining cumulative effects to the goshawk, since the PNF boundary is sufficiently large and includes 148 goshawk territories. In addition, the PNF boundary encompasses an array of goshawk habitat conditions from low elevation to high elevation, including several vegetation types including westside mixed conifer, ponderosa pine, true fir (red fir and white fir), eastside mixed conifer, pure eastside pine, lodgepole pine and subalpine conifer. The cumulative effects timeframe is the same as other species—20 years out into the future and back to the year 2000 for past actions. In addition, cumulative effects of all past actions are incorporated into the existing condition (e.g. wildfires) for determining PAC status.

3.7.13.3.2 Assessing Cumulative Effects

Cumulative effects to breeding goshawk are assessed by determining the sum total miles of all motorized trails (proposed and existing) and unauthorized routes on the PNF within goshawk PACs and within 0.25-mile radius of goshawk Activity Centers. For each alternative, cumulative effects are calculated by adding the total miles of proposed trails or unauthorized routes (direct and indirect impacts) with existing motorized trails (NFS lands only).

3.7.13.3.3 Protected Activity Centers

Table 83 displays the cumulative effects of all unauthorized routes, proposed trails and existing motorized trails on NFS lands. The data indicates that Alternative 1 has the most cumulative miles of routes (49 miles) within goshawk PACs on the PNF. Alternative 1 also continues the allowance of cross country travel, and therefore poses the greatest overall potential risk and cumulative impacts to breeding goshawk on the PNF.

All of the action alternatives significantly reduce cumulative effects to goshawk PACs as a result of significantly less trail miles within PACs and the prohibition of cross country travel. Based on proposed and existing motorized trails, Alternative 2 has 16.9 miles that lie within goshawk PACs. Alternative 5 results in less cumulative miles within PACs within 11.9 miles. Alternative 4 results in 8.9 cumulative miles within goshawk PACs. Alternative 3 results in the least amount cumulative effects to goshawk PACs within only 3.9 miles of existing trails.

Table 83. Cumulative miles of all unauthorized routes (Alt. 1), proposed trails (Alts. 2, 4, 5) and the existing trails (Alt. 3) within goshawk Protected Activity Centers on PNF.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and indirect effects of the alternatives					
Miles of unauthorized routes or proposed trails to be added to system[1]	45.1	13	0	5	8
Cumulative effects of past, present and proposed actions					
Miles of existing NFS motorized trails	3.9	3.9	3.9	3.9	3.9
Total cumulative effects					
Total cumulative impact	49	16.9	3.9	8.9	11.9

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

Forest Service System Roads currently exists within PACs, since development of PACs included roads by default due to existing road density levels across the forest. LOP's are applied to our system roads when anticipated use levels increase due to logging activities or when concentrated use levels are anticipated. Effects from our system roads are mitigated (e.g. LOP applied) on a case by case project basis, and contribute relatively low cumulative effects to existing goshawk PACs.

3.7.13.3.4 0.25-mile Radius Circle of Activity Centers (Nest Site or Nest Stand)

Table 84 displays data from the analysis of cumulative effects within the 0.25-mile radius circle of goshawk Activity Centers (nest site or nest stand).

Alternative 1 has the most cumulative unauthorized route/trail miles (32.3 miles) and represents the highest cumulative effect to goshawk activity centers. In addition, risk to goshawk Activity Centers is increased under Alternative 1 since cross country travel would continue and the potential for route proliferation would add additional routes across the PNF.

All action alternatives (Alternatives 2-5) reduce cumulative effects significantly compared to Alternative 1. Alternative 2 reduces impacts to goshawk activity centers down to 12.9 miles. Alternative 5 further reduces cumulative effects down to 9.5 miles. Alternative 4 contains 6.4 miles of proposed trail within 0.25 miles of Activity Centers representing low cumulative effects to goshawks. Alternative 3 does not add to the existing trail miles, but does represent 2.5 miles of existing trails that lie within 0.25 miles of a goshawk Activity Center. Alternative 3 represents the least risk to nesting goshawk compared to all other alternatives.

Table 84. Miles of all unauthorized routes (Alt. 1), proposed trails (Alts. 2, 4, 5) and the existing trails (Alt. 3) within 0.25-mile of goshawk Activity Centers (nest site or nest stand) on the Plumas National Forest.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of the alternatives					
Miles of unauthorized routes or proposed trail additions[1]	29.8	10.4	0	3.9	7
Cumulative effects of past, present and proposed actions					
Miles of existing motorized trails - NFS lands	2.5	2.5	2.5	2.5	2.5
Total cumulative effects	32.3	12.9	2.5	6.4	9.5

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.13.4 Direct and Indirect Effects to Fragmentation and Edge Effects within Northern Goshawk Protected Activity Centers

Habitat fragmentation and edge effects were described for late-successional associated species within late-successional forest types (CWHR types 4M, 4D, 5M, 5D, and 6) and within Old Forest Emphasis Areas (OFEAs) under the section “Effects Common to All Late-successional Associated Species.” Those analyses provided a Forest-wide view of how the project alternatives affect goshawk habitat fragmentation within late-successional habitats and OFEAs. This section provides a focused analysis of goshawk habitat fragmentation and edge effects (including noise disturbance) from motorized trails and unauthorized routes at the site-specific goshawk PAC scale, where known goshawk nest territories are located.

3.7.13.4.1 Zone of Influence at 400 meters (0.25 mile)

Goshawk Protected Activity Centers (PACs) are delineated land allocations (SNFPA 2004), comprised of the best available goshawk habitat, which are managed specifically for sustaining viable populations of goshawks. For all goshawk PACs on the PNF, the effects of the project alternatives are analyzed for the amount of habitat fragmentation and edge effects occurring by considering the Zone of Influence within goshawk PACs within 400 meters (0.25 mile) of unauthorized routes and proposed trails (Table 85). Although, absolute disturbance thresholds for goshawk are not readily available in the literature, Grubb et al. (1998) reported that goshawk were found to react negatively (flush) when noise associated with logging trucks were less than 400 meters (0.25 mile) from nests. Determining the acres of a goshawk PAC that is influenced by unauthorized routes or proposed trails within 400 meters (0.25 mile) gives a relative index of habitat fragmentation or habitat effectiveness at the site-specific goshawk PAC scale.

Table 85 displays the direct and indirect effects to goshawk PACs within a 400-meter Zone of Influence of unauthorized routes and proposed trails. The data indicates that Alternative 1 reduces habitat effectiveness and associated habitat fragmentation (including noise disturbance) within 14,181 PAC acres.

All the action alternatives (Alternatives 2-5) result in significantly reduced direct and indirect effects to goshawk PACs. Alternative 2 reduces habitat effectiveness of within goshawk PACs by 3,952 acres. Alternatives 4 and 5 reduce habitat effectiveness within goshawk PACs on 1,643 and 2,623 acres, respectively. Of the action alternatives that add trails to the NFTS, Alternative 4 represents the least impact to goshawk PACs within the 400-meter zone of influence. Habitat effectiveness within goshawk PACs would not be affected by implementing Alternative 3, since to trails will be added under this alternative.

Table 85. Acres of PNF goshawk Protected Activity Centers that lie within a 400-meter Zone of Influence of unauthorized routes or proposed trails.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of the alternatives					
Acres of PNF goshawk PACs within a 400 meter zone of influence.[1]	14,181	3,952	0	1,643	2,623

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.13.4.2 Cumulative Effects within a 400-meter Zone of Influence

Table 86 displays the cumulative effects of the alternatives of proposed trails and unauthorized routes on NFS lands. When comparing the cumulative effects of routes of goshawk PACs within a 400-meter Zone of Influence (by summing the direct and indirect effects of the alternatives and the cumulative effects of past, present and future actions), Alternative 1 has the greatest overall cumulative impact to goshawk PACs (15,838 acres) and poses the greatest risk to habitat connectivity and other cumulative impacts associated (including noise disturbance) with unauthorized routes within goshawk PACs. In addition, Alternative 1 would contribute to continued route proliferation because unmanaged cross-country motorized travel would allowed to continue into the future.

All the action alternatives significantly reduce cumulative effects to goshawk PACs as a result of two primary factors: 1) the prohibition of cross country travel, and 2) the significantly reduced amount of habitat affected within goshawk PACs when compared to Alternative 1. Alternative 2 contributes to overall cumulative impacts within goshawk PACs on 5,602 acres, which represents a reduction from Alternative 1 of over 10,000 acres. Alternative 5 contributes to cumulative impacts on 4,273 acres, which represents a reduction of over 11,500 acres. Alternative 4 contributes to cumulative impacts on 3,293 acres which represents a reduction of over 12,000 acres. Alternative 3 contributes to cumulative effects on only 1,650 primarily due to existing trails.

Table 86. Cumulative effects—acres of goshawk Activity Centers that lie within a 400-meter (0.25-mile) Zone of Influence of unauthorized routes (Alt. 1), proposed trails (Alts. 2, 4, 5) and existing trails (Alt. 3).

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of the alternatives Unauthorized routes or proposed trail additions [1]	14,181	3,952	0	1,643	2,623
Cumulative effects of past, present and proposed actions Existing motorized trails - NFS lands	1,650	1,650	1,650	1,650	1,650
Total Cumulative Effects Overall Cumulative Effects	15,831	5,602	1,650	3,293	4,273

[1]Alternative 1 includes the unauthorized routes, while Alternatives 2,4, 5 include proposed trails.

3.7.13.5 Cumulative Effects from Past, Present and Future Vegetation/Fuels and Past Wildfires

Appendix C provides a list of present and reasonably foreseeable future actions and descriptions of their project location and the actions involved that may be occurring on NFS lands within the PNF boundary. Some, but not all, of these activities will contribute to impacts to the northern goshawk within the cumulative effects boundary.

Since 2000, wildfires burned approximately 266,963 acres of various habitats across the PNF. Some, but not all, have resulted in impacts to goshawk habitats. Since 2000, more than 73,345 acres of forest vegetation and fuels thinning and mastication projects were completed, which were designed to reduce the risk of additional habitat loss to wildfires. These treatments generally do not result in habitat removal, but may result in habitat quality changes. These wildfires and vegetation treatment projects have resulted in a reduction in the amount of and quality of goshawk habitat on the PNF since 2000.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting goshawk habitat on the Plumas (Appendix C). Although these treatments may reduce habitat quality (i.e. nesting habitat reduced to foraging habitat), it is expected that suitable habitat will be maintained in the long term and it is anticipated that these treatments will reduce the amount of goshawk habitat potentially lost from future stand-replacing wildfires (USDA Forest Service 2004).

3.7.13.6 Sensitive Species Determinations

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the northern goshawk.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the northern goshawk. This determination is based on the rationale that cross country travel would continue in the future and lead to additional loss of habitat, an increase in habitat fragmentation, and result in high risk to goshawk PACs and Activity Centers. Based on route proliferation since 1988 (Forest Plan development), an average of 48 miles of unauthorized routes per year were established. When this rate is applied over the next 20 years, an additional 960 miles could be added under Alternative 1, resulting in increased cumulative effects (e.g. disturbance during reproduction period, abandonment of territories, etc.) over time.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the northern goshawk within the planning area of the Plumas National Forest. This determination is based on the rationale that 1) the action alternatives would prohibit current and future cross-country travel across the PNF, 2) that risks to northern goshawk PACs and Activity Centers would be significantly reduced compared to Alternative 1 (No-action), and 3) higher amounts of nesting and foraging habitat would be maintained for the goshawk.

3.7.14 Forest Carnivores: American Marten, Pacific Fisher, Sierra Nevada Red Fox and Wolverine

Forest carnivores include the American marten, Pacific fisher, the Sierra Nevada red fox and wolverine. The Sierra Nevada red fox and the wolverine are addressed under the Wide-ranging Carnivore Group. This section will focus on the marten and fisher. Impacts to the marten and fisher will be considered together, since effects to these species are similar. More detailed information for these species can be found in the Biological Evaluation. Limited research or information on motorized trail impacts to forest carnivores is available in the literature, but some information is available as described below for species considered here.

The PNF developed a Draft Forest Carnivore Network in 1998 by evaluating suitable marten and fisher habitat. The purpose of the Draft Forest Carnivore Network is to provide forest biologists a tool to evaluate linkages and connectivity for forest carnivore species such as the marten and fisher during project level analysis. The Draft Forest Carnivore network is not a formal land designation under the Plumas NF Plan, as amended. Forest carnivores are considered to be interior forest species where habitat fragmentation is a concern.

3.7.15 American Marten and Pacific Fisher (Forest Carnivores): Affected Environment

3.7.15.1 American Marten

Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure interspersed with riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest, snags, dispersal cover and large woody debris (Allen 1987). Martens selected stands with 40-60% canopy closure for both resting and foraging and avoided stands with less than 30% canopy closure (Spencer et al. 1983). Martens generally avoid habitats that lack overhead cover, presumably because these areas do not provide protection from avian predators (Allen 1982, Bissonette et al 1988, Buskirk and Powell 1994, Spencer et al. 1983).

At a landscape scale, patches of preferred habitat and the distribution of openings with respect to habitat patches may be critical to the distribution and abundance of martens (Buskirk and Powell 1994). While marten use small openings and particularly meadows for foraging, these openings must occupy a small percent of the landscape. Martens have not been found in landscapes with greater than 25 percent of the area in openings (Hargis and Bissonette 1997; Potvin et al. 2000). As landscapes become fragmented, the combination of increasing isolation and decreasing patch size of suitable habitat compounds the effects of simple habitat loss (Andren 1994). For species like marten, this is likely to result in a decrease of greater magnitude than can be explained solely by the loss of suitable habitat. Marten may be a species that demonstrate exponential population declines at relatively low levels of fragmentation (Bisonette et al. 1997, *in* USDA Forest Service 2004). Zielinski, et al. 2008, evaluated the effects of off-highway vehicle use (OHV) on the Marten within the Sierra Nevada, and suggested “placing routes so they avoid high quality marten habitat (late-successional conifer forests near meadows and riparian areas; Spencer et al. 1983) will minimize the possibility that martens encounter OHV stimuli when they are actively engaged in foraging or social behavior”. The study also found that the degree of OHV use is important in regards to Marten occupancy and habitat fragmentation. Zielinski, et al. 2008 found that the level of OHV use (high mean 0.46 vehicles/hour) in their study did not affect occupancy and, therefore, did not appear to be contributing to fragmentation.

The Plumas NF has been extensively surveyed for Marten since 1999, with approximately 2,121 systematic survey stations established over this time period. The distribution of Marten on the Plumas NF is well known based on extensive surveys and are known to occur within a limited range in the Lakes Basin Area of the Beckwourth Ranger District.

3.7.15.2 Pacific Fisher

The Pacific fisher is a Forest Service Sensitive Species as designated by the Regional Forest. It is also listed as candidate species by the U.S. Fish and Wildlife Service (see FWS species list in the project record). Roads can impact fisher in ways similar to the marten through direct mortality and habitat fragmentation. Vehicular collision is a known source of fisher mortality (Heinemeyer 1993). Approximately 3.4 percent of 147 radio-collared fishers studied in Massachusetts (York 1996) and

Maine (Krohn et al. 1994) were killed by vehicles. The risk of collision mortality increases with road density, but possibly increases with the density of highways and freeways where vehicle speeds are highest.

Suitable habitat for the fisher occurs primarily on the west side of the PNF. Roads can contribute to habitat fragmentation where the fisher generally avoids entering open areas that have no overstory or shrub cover; and roads and the associated presence of vehicles and humans, can cause animals to modify their behavior near roads (USDA Forest Service 2001). These indirect effects on fisher habitat could negatively affect the ability for fishers to be successfully reintroduced to the PNF. Previous studies have reported a negative correlation between detections of fisher and roads (Dark 1997, Golightly et al. 1997). Road construction associated with timber harvest activities could directly and indirectly affect fishers. If fishers avoid areas in proximity of roads, then these areas constitute habitat loss. Indirect effects would also include the effects on prey populations that may also avoid or be killed by motorized use.

The PNF falls within an area that was considered to be a distribution gap within the range of the fisher (Zielinski et al. 2005). The Plumas NF has been extensively surveyed for fisher since 1999, with approximately 2,121 systematic survey stations established over this time period and no Fisher have been found or confirmed on the Forest. A joint partnership between the California Department of Fish and Game (CDFG), Sierra Pacific Industries (SPI), U.S. Fish and Wildlife Service (USFWS) and North Carolina State University (NCSU) has embarked on an fisher re-introduction effort within the distribution gap identified by Zielinski (2005), specifically within SPI's Sterling Management Tract (Butte County). This re-introduction effort began during November 2009 with a total 14 animals being trapped and 13 animals (1 fatality) actually released onto SPI lands. To date, no fisher have moved onto or are suspected to be occupying or denning on the Plumas NF based on tracking information provided by the joint partners (A. Facka, personal communication).

For a summary of motorized trail associated factors associated with marten and fisher, please refer to Table 63.

Human-caused Mortality: Marten are known for their vulnerability to trapping in many parts of their range. In California, however, body-gripping traps have been banned since 1998 and, as a result, the likelihood of incidental capture of marten by legal fur trapping has been dramatically reduced. Illegal harvest threats remain and could increase in relation to greater accessibility. At present, illegal trapping or shooting of marten is not known to be a substantial source of mortality (USDA Forest Service 2001). The increased opportunity for poaching provided by increased public access may represent a substantial risk for fisher, based upon findings in the southern Sierra Nevada. Of nine recently documented fisher mortalities, two were suspected of being the result of poaching (USDI Fish and Wildlife Service 2004).

Collision: Highways and roads can result in the direct and indirect mortality of individual martens. Road collisions with vehicles have been identified as a source of marten mortality (Buskirk and Ruggerio 1994), including in the Sierra Nevada (Spencer 1981, Martin 1987). Marten road mortality on the PNF, may be of concern since State Highways 89, 70 and Forest Service Route 24

(Lakes Basin Highway) bisects their habitat. Collisions are much less likely to occur along the slower-speed native surface routes that are being proposed as motorized trails in this project.

Habitat Loss and Fragmentation, Edge Effects, Movement Barriers, Displacement or Avoidance: Martens are known to be sensitive to changes in overhead cover, which can result from roads or trails (Hargis and McCullough 1984, Buskirk and Powell 1994). Roads and trails can fragment habitat, thus affecting the ability of marten to use otherwise suitable habitat on either side of the route.

The loss and fragmentation of suitable habitat by roads and development is thought to have played a significant role in both the loss of fishers from the central Sierra Nevada and its failure to recolonize this area (USFWS 2004). Campbell (2004, *in* USFWS 2004) found that sample units within the central and southern Sierra Nevada region occupied by fishers were negatively associated with road density. This relationship was significant at multiple spatial scales (from 494 to 7,413 acres). The USFWS (2004) concluded that, “vehicle traffic during the breeding season in suitable habitat may impact foraging and breeding activity” and that “hiking, biking, off-road vehicle and snowmobile trails, may adversely affect fishers.” Dark (1997) found that fishers in the Shasta-Trinity National Forest used landscapes with more contiguous, unfragmented forests and less human activity.

Roads can fragment habitat and affect the ability of the animals to use otherwise suitable habitat on either side of the road and the associated presence of vehicles and humans, can cause animals to avoid otherwise suitable habitats near roads. Robitaille and Aubrey (2000), studied marten in an area of low road density and traffic (primarily logging roads) and found that marten use of habitat within 300 and 400 meters of roads was significantly less than habitat use at 700 or 800 meters distance. Although marten are detected in close proximity to roads, it appears that significantly less marten activity occurs within these zones.

If highways, with their high traffic speeds, jersey barriers and often steep side-slopes, limit the success and frequency of marten crossings, then the implications to marten dispersal may be of concern. State Highways 89 and 70 and Forest Route 24 bisect marten habitat. If marten avoid these highways, then marten populations could become fragmented into small isolated populations.

Roads may decrease prey and food availability for marten and fisher (Allen 1987) due to prey population reductions from road kills and/or behavioral avoidance of roads. Occasionally one and two lane Forest roads with moderate levels of traffic should not limit marten movements.

Standards and Guidelines in the Sierra Nevada Forest Plan Amendment ROD (2004), provide management direction for habitat connectivity for old forest associated species to “minimize old forest habitat fragmentation” and “assess the potential impacts of projects on the connectivity of habitat for old forest associated species,” particularly marten and fisher.

Routes for Competitors: Martens avoid habitats that lack overhead cover presumably because these areas do not provide protection from avian predators. Roads that are driven during the winter months may allow coyotes to enter into marten winter habitat, affecting marten through competition or direct mortality from predation. Since marten have unique morphologies that allow them to occupy deep snow habitats where they have a competitive advantage over carnivores, such as coyotes and bobcats, human modifications of this habitat, such as winter road use, over-the-snow travel and snowmobile trails, can eliminate this advantage and increase access for predators and competitors. This has been identified as a potentially significant risk factor in the Sierra Nevada worthy of further investigation.

Disturbance at a Specific Location (Meadows)—Marten Only: Various studies in the Sierra Nevada indicate marten have a strong preference for meadows and forest-meadow edges for foraging (Spencer et al. 1983, USDA Forest Service 2001). Microtine rodents (meadow voles) are important for the Marten diet and therefore, the quality of meadow habitat (especially meadows surrounded by mature lodgepole and red fir forests) influences the quality of marten habitat (Spencer et al. 1983). Routes that are adjacent to and intersect meadows can alter meadow hydrology and vegetation which may have a negative effect on prey abundance. The combination of route use and increased human activity, as well as the potential impacts of routes upon meadow vegetation, may result in loss of these more easily exploitable “prey patches.”

3.7.16 American Marten and Pacific Fisher (Forest Carnivores): Environmental Consequences

Based upon a review of the literature, fisher were found likely to be affected by the same road and motorized trail-associated factors as marten: human caused mortality, collisions, displacement or avoidance, habitat loss or fragmentation, edge effects, movement barrier or filter and route for competitors (Gaines et al 2003, Buskirk and Rugerrio, 1994). The current absence of fisher on the PNF eliminates these risk factors, but this analysis will be conducted to analyze impacts of the alternatives to fisher if populations or individuals were to be re-established on the PNF.

Environmental consequences for marten and fisher are analyzed at three different scales - within late-successional habitat (CWHR types 4M, 4D, 5M, 5D and 6), Old Forest Emphasis Areas (OFEAs) and PNF Draft Forest Carnivore Network. Late-successional habitat (CWHR types 4M, 4D, 5M, 5D and 6) is considered to be suitable for marten (USDA 2004). The OFEAs, as previously described, are land allocations designated to manage for old forest dependent species, including marten. Although no management direction is specifically designated within the PNF Draft Forest Carnivore Network, the network provides a tool for analyzing habitat connectivity issues for forest carnivores, including the marten and fisher. These three scales are used for comparison, since habitat connectivity within these habitats are important considerations for marten and fisher. Although all three scales have considerable overlap because older forest types are included in all of them, there are slight differences between them because they were derived in different manners. The late-successional habitat types are comprised of individual patches of habitat types that may not necessarily be connected. Whereas, both the OFEAs and the Draft Carnivore Network incorporates larger blocks of older forest types.

3.7.16.1 Analysis Measures

Zone of Influence: Studies indicate marten and fisher habitat use declines within a distance exceeding 300 meters from roads. For this analysis, a Zone of Influence of 300 meters from motorized routes was determined and the proportion of habitat occurring within this zone was analyzed. Within this zone, changes to habitat such as fragmentation and edge effects would occur. These factors would be expected to influence a smaller area (probably about 60 meters) adjacent to motorized routes. Thresholds associated with this measure have not been established, but relative changes in habitat effectiveness for marten and fisher can be evaluated and compared.

3.7.16.2 Direct and Indirect Effects—American Marten and Pacific Fisher (Forest Carnivores) 300-meter Zone of Influence within Carnivore Network, OFEAs and Old Forest CWHR types (4M, 4D, 5M, 5D, and 6) and Cumulative Effects

3.7.16.2.1 Direct and Indirect Effects

Table 87 displays the acres of the Draft Carnivore Network, OFEAs and Old Forest CWHR types (4M, 4D, 5M, 5D, and 6) that fall within a 300-meter Zone of Influence from mixed use, unauthorized routes and proposed trails.

When increasing the Zone of Influence to 300 meters, higher amounts of marten and fisher habitat are influenced by proposed trails or unauthorized routes. Based on unauthorized routes within a 300-meter Zone of Influence, Alternative 1 results in the greatest amount of habitat fragmentation and reduced habitat connectivity within the Carnivore Network, late-successional habitat and within OFEAs, where marten and fisher habitat suitability may be reduced. Alternative 1 results in a reduction in habitat connectivity within 70,828 acres of the Carnivore Network, a 155,023 acre reduction in habitat connectivity in Old Forest Emphasis Areas and a 137,257 acre reduction in habitat connectivity in Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6).

All the action alternatives (Alternatives 2-5) significantly reduce direct and indirect effects to habitat connectivity within the three habitat categories found in Table 87 when compared to Alternative 1. Based on proposed trails and a 300-meter Zone of Influence, Alternative 2 would reduce habitat connectivity for marten and fisher by 15,947 acres in the Carnivore Network, 40,191 acres in the Old Forest Emphasis Areas and 71,374 acres in the Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6). Alternative 5 has slightly less impact to habitat connectivity for marten and fisher by having direct and indirect effects to 10,042 acres in the Carnivore Network, 22,662 acres in the Old Forest Emphasis Areas and 34,651 acres in the Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6). Alternative 4 further reduces impacts to habitat connectivity for marten and fisher by having direct and indirect effects to only 5,316 acres in the Carnivore Network, 18,602 acres in the Old Forest Emphasis Areas and 29,624 acres in the Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6). Under Alternatives 4 and 5, mixed use does not affect the draft Carnivore Network nor Old Forest Emphasis Areas, and acres of Old Forest types affected by mixed use are included in Table 87. Alternative 3 would not reduce habitat connectivity for marten or fisher from existing conditions, since no proposed trails will be added under this alternative.

Table 87. Acres of the Draft Carnivore Network, OFEAs and Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6) within a 300-meter "Zone of Influence" of Unauthorized Routes or Proposed Trails

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Carnivore Network	70,828	15,947	0	5,316	10,042
Old Forest Emphasis Areas (OFEA's)	155,023	40,191	0	18,602	22,662
Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6)	137,257	71,374	0	29,624	34,651

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.16.3 Cumulative Effects to Carnivore Network, OFEAs and Old Forest CWHRs within the 300-meter Zone of Influence

The acres of Carnivore Network, OFEAs and Old Forest CWHR occurring within a 300-meter Zone of Influence for unauthorized routes, proposed trails and existing motorized trails on NFS lands for all five of the alternatives are shown in Table 88, Table 89 and Table 90.

Based on the cumulative effects analysis, Alternative 1 would pose the highest risk to habitat fragmentation within the Carnivore Network, OFEAs and Old Forest habitat types, where considerable cumulative impacts would be added to existing cumulative effects to marten and fisher. Future route proliferation could substantially add to cumulative impacts due to unmanaged cross-country travel which would further add to habitat fragmentation which could seriously limit the distribution of marten and the future reestablishment potential of the fisher on the PNF. Alternative 1 would cumulatively affect 166,871 acres within the draft carnivore network, 338,754 acres within OFEAs, and 323,927 acres within Old Forest CHWR types.

All of the action alternatives (Alternatives 2-5) result in less cumulative effects to the draft carnivore network, OFEAs and Old Forest CWHR types. In addition, Alternatives 2-5 would prohibit cross country travel and reduce the risk of route proliferation adding routes to within these three key habitat categories. Compared to Alternative 1, Alternative 2 reduces acres impacted within the draft carnivore network by 54,000+ acres, within OFEAs by over 100,000+ acres and within Old Forest CWHR Types by over 60,000+ acres. Alternatives 5, 4 and 3 reduces cumulative effects to much lower levels (see the following three tables).

Table 88. Acres of Carnivore Network within a 300-meter Zone of Influence of unauthorized routes (Alt. 1), proposed trails (Alts. 2, 4, 5) and existing trails (Alt. 3).

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect Effects of the alternatives					
Unauthorized routes or proposed trail additions[1]	70,828	15,974	0	5,316	10,042
Cumulative Effects of Past, Present and Proposed Actions					
Existing motorized NFS trails (130 miles) - NFS lands	96,043	96,043	96,043	96,043	96,043
Total Cumulative Effects					
Overall Relative Cumulative Impact (Note: Some overlap may occur where route categories intersect)	166,871	112,017	96,043	101,359	106,085

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

Table 89. Acres of Old Forest Emphasis Areas within a 300-meter Zone of Influence unauthorized routes (Alt. 1), proposed trails (Alts. 2, 4, 5) and existing trails (Alt. 3).

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect Effects of the alternatives					
Unauthorized routes or proposed trail additions[1]	155,023	40,191	0	18,602	22,662
Cumulative Effects of Past, Present and Proposed Actions					
Existing motorized NFS trails (130 miles) - NFS lands	183,731	183,731	183,731	183,731	183,731
Total Cumulative Effects					
Overall Relative Cumulative Impact (Note: Some overlap may occur where route categories intersect)	338,754	223,922	183,731	202,333	206,393

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

Table 90. Acres of Forest-wide old forest (CWHR 4M/D, 5M/D, 6) within 300-meter “Zone of Influence” of unauthorized routes (Alt. 1), proposed trails (Alts. 2, 4, 5) and existing trails (Alt. 3).

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect Effects of the alternatives					
Unauthorized routes or proposed trail additions[1]	137,257	71,374	0	29,624	34,651
Cumulative Effects of Past, Present and Proposed Actions					
Existing motorized NFS trails (130 miles) - NFS lands	186,670	186,670	186,670	186,670	186,670
Total Cumulative Effects					
Overall Relative Cumulative Impact (Note: Some overlap may occur where route categories intersect)	323,927	258,044	186,670	216,294	221,321

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.16.3.1 Cumulative Effects Summary

Appendix C provides a list of present and reasonably foreseeable future actions and descriptions of their project location and the actions involved that may be occurring on NFS lands within the PNF boundary. Some, but not all, of these activities have contributed to effects on forest carnivores and have the potential to impact forest carnivores in the near future (see Terrestrial Wildlife BE for a breakdown of projects affecting Marten and Fisher). In 2001 and 2004, the Forest Service amended Sierra Nevada Forest Plans to better address the needs of old forest-associated species (USDA Forest Service 2001 and 2004). In this assessment, the following key risk factors were identified for forest carnivores in the Sierra Nevada: (1) habitat alteration, particularly the removal of overhead cover, large diameter trees, or coarse woody material and (2) the use of roads and associated human access. A discussion of road density was provided under the wide ranger carnivore sections, and similar impacts associated with road density would apply to these species. Habitat effectiveness for species such as marten and fisher is influenced based on road densities forest-wide. Currently, 65% to 79% of the forest contains road densities that are greater than 2mi/sq mi, providing moderate, low and least levels of security for these species.

On the PNF, several activities have influenced these risk factors for forest carnivores. Past timber harvest and more recent fuels reduction treatments have reduced important habitat components for forest carnvores. Since 2000, vegetation treatments (including timber harvest) and fuels treatments (including mastication) on NFS lands have occurred on approximately 73,345 acres. These vegetation treatments have reduced habitat quality for marten and fisher by reducing canopy cover, structural complexity and coarse woody material within treated units. At the larger landscape scale, these treatments may affect the size and connectivity of patches of high quality habitat.

Alternative 1 has the greatest likelihood of contributing to substantial adverse cumulative effects upon marten populations and may affect the ability to reestablish fisher over time. This cumulative effects determination is based on the rationale that a significant number of acres are affected under the draft carnivore network, OFEAs and Old Forest CHWR types, and magnified by the allowance of continued cross country travel and the potential for route proliferation to add additional routes across the PNF.

Alternatives 2, 3, 4 and 5, result in substantially lower adverse cumulative effects to the draft carnivore network, OFEAs and Old Forest CWHR types. The cumulative effects under Alternatives 2, 3, 4 and 5, however, are expected be significantly lower than Alternative 1 over time, due to the prohibition of cross country travel and the reduced potential for route proliferation over time due to a formally designated trail system.

3.7.16.4 Marten and Fisher Determinations

3.7.16.4.1 American Marten

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the American Marten.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the American Marten. This determination is based on the rationale that cross country travel would continue in the future and lead to additional loss of habitat, an increase in habitat fragmentation, and result in high risk to key habitat within the Draft Carnivore Network, OFEAs and Old Forest CWHR types. Based on route proliferation since 1988 (Forest Plan development), an average of 48 miles of unauthorized routes per year were established. When this rate is applied over the next 20 years, an additional 960 miles could be added under Alternative 1.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the American Marten within the planning area of the Plumas National Forest. This determination is based on the rationale that 1) the action alternatives would prohibit current and future cross-country travel across the PNF, 2) risks to Marten habitat within the Draft Carnivore Network, OFEAs and Old Forest CWHR types would be significantly reduced compared to Alternative 1 (No-action), and 3) that a higher amounts of suitable habitat would be maintained for the Marten.

3.7.16.4.2 Pacific Fisher

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the Pacific Fisher.

Alternative 1 – This alternative may affect, but is not likely to adversely affect or result in a trend toward federal listing for the Pacific Fisher. Since no Fisher have been found on the Plumas NF to date, no individuals are expected to be impacted. However this alternative does present a risk to existing suitable habitat on the PNF since cross country travel would continue in the future and lead to additional loss of habitat, an increase in habitat fragmentation, and result in high risk to key habitat within the Draft Carnivore Network, OFEAs and Old Forest CWHR types. Based on route proliferation since 1988 (Forest Plan development), an average of 48 miles of unauthorized routes per year were established. When this rate is applied over the next 20 years, an additional 960 miles could be added under Alternative 1.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but is not likely to adversely affect or result in a trend toward federal listing for the Pacific Fisher. Since no Fisher have been found on the Plumas NF to date, no individuals are expected to be impacted. However these alternatives would present a lower risk to existing suitable fisher habitat on the PNF since they would 1) prohibit current and future cross-country travel across the PNF, 2) significantly reduce the risks to suitable habitat within the Draft Carnivore Network, OFEAs and Old Forest CWHR types compared to Alternative 1 (No-action), and 3) higher amounts of suitable habitat would be maintained under these alternatives.

3.7.17 Riparian Associated Species

The Riparian group includes both terrestrial and aquatic species that spend a part or their entire life cycle within or adjacent to riparian habitats. These include a large number of special status species on the PNF (Table 61 and Table 62). This section will provide general information on route and trail-associated impacts to bald eagles, willow flycatchers, great gray owls and general riparian habitats that may be associated with this group. Species not included in detail here (e.g. greater sandhill crane) will be addressed in the Biological Evaluation or Management Indicator Species reports and are hereby incorporated by reference.

3.7.17.1 Effects Common to All Riparian Associated Bird Species

Changes in Class of Vehicles: Responses to motor vehicle use varies by species and depends upon the type of vehicle, the intensity, timing, speeds and amount of motorized vehicle use. For this analysis, it is assumed that all vehicle types result in the same disturbance to riparian associated bird species. Therefore, changes in the class of vehicles would not vary in their effects to riparian associated bird species for all of the alternatives.

3.7.18 Bald Eagle: Affected Environment

On July 9, 2007, USDI Fish and Wildlife Service in a Final Rule announced that the bald eagle would be removed (delisted) from the Federal List of Endangered and Threatened Wildlife in the lower 48 states. Official delisting of the bald eagle occurred 30 days from the date of the Final Rule. The bald eagle will continue to be protected by the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. Upon delisting, the bald eagle was placed on the Regional Forester’s list of Sensitive Species.

Bald eagles nest near or adjacent to large bodies of water. Within the Plumas National Forest, twenty three bald eagle breeding territories have been identified within the PNF boundary including NFS lands and private land in recent years (Table 91). Sixteen bald eagle territories with recent nesting activity are located on NFS lands. Two territories occur partially or entirely on private land at Round Valley Reservoir (eagle nest on NF Lands) and Poe Powerhouse on the North Fork of the Feather River.

Table 91. Known bald eagle nest territories on the Plumas National Forest and private land within the Forest boundary.

Territory Name	Ranger District	Ownership
Antelope Lake	Mt. Hough Ranger District	PNF
Antelope Lake II	Mt. Hough Ranger District	PNF
Antelope Lake III	Mt. Hough Ranger District	PNF
Bucks lake	Mt. Hough Ranger District	PNF
Butt Valley Dam	Mt. Hough Ranger District	PNF
Butt Valley Dam II	Mt. Hough Ranger District	PNF
Cool Springs	Mt. Hough Ranger District	PNF

Territory Name	Ranger District	Ownership
Gravel Island	Mt. Hough Ranger District	PNF
Grizzly Forebay	Mt. Hough Ranger District	PNF
Rocky Point Complex	Mt. Hough Ranger District	PNF
Round Valley	Mt. Hough Ranger District	Private
Snake Lake	Mt. Hough Ranger District	PNF
Cow Creek	Beckwourth Ranger District	PNF
Frenchman Reservoir	Beckwourth Ranger District	PNF
Bagley Pass	Beckwourth Ranger District	PNF
Mosquito Slough	Beckwourth Ranger District	PNF
French Creek	Feather River Ranger District	PNF
Little Butte Creek	Feather River Ranger District	PNF
Little Grass Valley	Feather River Ranger District	PNF
Little Grass Valley Reservoir	Feather River Ranger District	PNF
Sly/Lost Creek Reservoir	Feather River Ranger District	PNF
Poe Powerhouse	Feather River Ranger District	Private
Feather Falls	Feather River Ranger District	PNF

The motorized trail-associated factors that have been identified for the bald eagle are summarized in Table 63. The response of bald eagles to human activities is variable. Individual bald eagles show different thresholds of tolerance for disturbance. A good example on the Plumas NF are the Antelope Lake territories that have eagle use and presence on a fairly consistent level, whereas the Snake Lake territory has been vacant for several years. The distance at which a disturbance causes bald eagles to modify their behavior also is affected by the site distance of the motorized use. For example, forested habitat can reduce the noise generated by motorized activity. In addition, if the noise-generating activity is hidden from the nest site due to topographic or landscape features, disturbance thresholds may be reduced. Some studies report that bald eagles seem to be more sensitive to humans afoot than to vehicular traffic (Grubb and King 1991, Hamann 1999). Anthony et al. (1989) found that the mean productivity of bald eagle nests was negatively correlated with their proximity to main logging roads and the most recently used nests were located in areas farther from all types of roads and recreational facilities when compared to older nests in the same territory. However, in 2005, a new bald eagle nest was discovered at Grass Valley reservoir which is used for recreational activities including fishing and boating. In addition, other studies indicate bald eagles can tolerate a certain amount of human disturbance (Harmata and Oakleaf 1992 In Gaines et al. 2003). Disturbance is most critical during: nest building, courtship, egg laying and incubation (Dietrich 1990). In general, recommended buffer distances to reduce potential disturbance to bald eagles during the breeding season have ranged from 300 to 800 meters (Anthony and Isaacs 1989, Fraser et al. 1985, McGarigal 1988, Stalmaster 1987, Mathisen et al. 1997). Grubb et al. (1992) found that eagles are disturbed by most activities that occur within 1,500 feet; and they take flight when activities occur within 600 feet. Grubb and King (1991) assessed pedestrian traffic and vehicle traffic on bald eagle nesting activities and recommended buffers of 550 meters for pedestrians and 450 meters for vehicles. The USDA Forest Service routinely institutes a Limited Operating Period for ground disturbing projects within 0.25 mile (400 meters) of bald eagle nest sites.

Nest site protection through area closures is one of the primary ways that the Forest Service has implemented measures to prevent the potential for nest failure and/or abandonment due to human disturbances (USFWS 1986). There is currently one seasonal area closure for a bald eagle nest site protection at Little Grass Valley Reservoir on the Feather River Ranger District.

Routes and trails have the potential to indirectly affect bald eagles by degrading water quality, which may impact the distribution and abundance of fisheries upon which bald eagles prey.

3.7.19 Bald Eagle: Environmental Consequences

3.7.19.1 Analysis Measures

Disturbance at a Specific Site (Motorized Route Miles): Motorized route miles within a ¼-mile (400 meters) and a ½-mile (800 meters) of known bald eagle nest sites were determined to be sufficient enough to assess direct, indirect and cumulative effects. Effects to Bald Eagle wintering habitat are expected to be negligible, since motorized use is extremely limited due to route closures from snow accumulation or inaccessibility of routes during the winter months.

3.7.19.2 Direct and Indirect Effects to Nesting Bald Eagles

Cross-country Travel: Cross-country travel will be prohibited within bald eagle habitat for all action alternatives. The prohibition of cross-country travel will prevent the proliferation of new unauthorized routes and will reduce disturbance associated with motorized use on these routes within foraging and nesting habitat for bald eagles. The prohibition of cross-country travel also results in a reduction of the total amount of roads and trails available for motorized use by closing all of the unauthorized routes in all of the action alternatives. The prohibition of cross-country travel will reduce the potential for disturbance to nesting bald eagles that may be vulnerable to activities associated with motorized cross-country travel. Alternative 1 does not prohibit cross-country motorized use and may result in increased disturbance to nesting bald eagles.

3.7.19.2.1 Additions to the National Forest System

3.7.19.2.2 Miles of Unauthorized Routes (Alternative 1) and Proposed Trails (Alternatives 2, 4, 5) within 0 to 400 Meters of Nest Sites

The direct and indirect effects of the project alternatives contribute to two of the four risk factors described above - degradation of breeding habitat through human development or habitat alteration and disturbance at nest and roost sites. Disturbance to bald eagle nest sites from project alternatives is analyzed by determining the number of miles of unauthorized routes occurring between 0 and 400 meters and between 400 and 800 meters for nest sites within each bald eagle territory. Factors associated with motorized routes at a distance between 0 to 400 meters of bald eagle nest sites will likely cause the greatest potential disturbance to nesting bald eagles during the nesting season. Disturbance from motorized routes between 400 and 800 meters away from nest sites will likely have a lesser effect since noise associated with vehicles diminishes at greater distances, but may still modify behavior of nesting eagles, particularly for foraging eagles.

Under Alternative 1, cross-country travel would continue, including travel on approximately 3.3 miles of unauthorized routes within 0 to 400 meters of bald eagle nest sites, which would potentially result in direct disturbance to nesting bald eagles at three eagle territories (Little Grass Valley, Snake Lake, Rocky Point). At 400 to 800 meters, Alternative 1 would allow travel on an additional 4.51 miles of unauthorized routes resulting in a potential direct disturbance to nesting bald eagles at five eagle territories (Snake Lake, Rocky Point, Frenchman, Butt II and Antelope Lake I). Because Alternative 1 does not prohibit motor vehicle cross-country travel, it is highly likely that future route proliferation and associated cumulative impacts would likely increase. Therefore the effects of Alternative 1, when combined with the effects of current and future recreation activity, may result in significant adverse cumulative effects to nesting bald eagles.

Action alternatives 2, 4 and 5 are expected to result in less direct and indirect effects to bald eagles than Alternative 1 since the cross country travel would be prohibited, and four less territories would be affected in total. Alternatives 2, 4 and 5 add 1.41 miles between 0-400 meters and 1.07 (Alternative 4) and 1.24 miles (Alternatives 2 and 5) of proposed trails within distance category 400-800 meters that would contribute to direct and indirect impacts to nesting bald eagles at two eagle territories (Snake Lake and Rocky Point). Mixed use under Alternatives 4 and 5 does not affect nesting bald eagles nor does mixed use occur within any bald eagle territory.

Alternative 3 would not add trails to the NFTS, therefore no direct and indirect impacts to bald eagles would occur under Alternative 3.

3.7.19.2.3 Cumulative Effects Boundary

The cumulative effects for the bald eagle include all of the bald eagle nest territories and surrounding bald eagle habitat that occur within the boundary of the PNF including both NFS lands and private lands. This geographic boundary is sufficiently large enough to analyze cumulative effects to bald eagles since their home ranges lie entirely within the boundary of the PNF. The spatial timeframe for analyzing cumulative effects incorporates past actions from 2000 to present and approximately 20 years into the future.

3.7.19.3 Cumulative Effects to Nesting Bald Eagles

Cumulative effects to the bald eagle analyzes unauthorized routes, proposed trails and the existing motorized NFS trails that occur on the PNF. Under Alternative 3, existing NFTS trails contribute very small cumulative impacts from existing motorized use by contributed 0 miles within the 0 to 400 meters of bald eagle nest sites and only 0.33 miles within 400 to 800 meters of bald eagle nest sites. The existing 0.33 miles occur within the Snake Lake bald eagle territory. No other territory is affected by existing authorized use under Alternative 3. The past authorized use at Snake Lake when added to the proliferation of unauthorized routes under Alternative 1 (3.52 mi) within the Snake Lake territory may be contributing factors to the absence of nesting bald eagles in that territory since the late 1980s. However, Alternative 3 as a standalone alternative would also prohibit cross country travel which would benefit bald eagles by ultimately preventing additional disturbance to nesting bald eagles on the PNF.

3.7.19.3.1 Summary of Cumulative Effects Summary of Past, Present and Reasonably Foreseeable Actions

Appendix C provides a list of present and reasonably foreseeable future actions and descriptions of their project location and the actions involved that may be occurring on NFS lands within the PNF boundary. The development of reservoirs across the Forest on both NFS and non-NFS lands have created bald eagle foraging habitat. Cumulative effects to the bald eagle habitat around these reservoirs include disturbance from a variety of recreational activities including developed and dispersed camping, hiking, fishing, boating, motor vehicle use and others. A seasonal closure at Little Grass Valley Reservoir has been instituted to minimize potential adverse recreational disturbance to nesting bald eagles in that territory. Bald eagles appear to be able to adapt to a certain amount of human disturbance and appear to be increasing on the Forest. The loss of nesting and foraging habitat from high levels of disease and drought-related bark beetle infestations has also affected the quality and quantity of bald eagle habitat. Present and future fuels and vegetation management prescriptions are designed to retain the larger tree component, so that bald eagle nest tree components should be available in the future. In addition, large snags used for roost trees would also be retained where public health and safety is not a factor. Forest thinning and fuels treatment projects are designed to prevent loss of bald eagle habitat over the long term.

Alternative 1 poses the greatest risk to nesting bald eagles on the Plumas NF. Alternative 1 would potentially impact up to six bald eagle territories in total. Three territories (Snake Lake, Rocky Point, and Little Grass Valley) would be impacted cumulatively by 3.3 miles of unauthorized routes that would be within 400 meters of bald eagle nest sites. At a distance of 400 to 800 meters, five territories (Snake Lake, Rocky Point, Frenchman, Butt II and Antelope Lake I) would be impacted cumulatively by 4.84 miles (4.51 miles direct and indirect and 0.33 mile cumulative).

Alternatives 2, 4, 5 are similar in the amount of direct, indirect and cumulative impacts to nesting eagles, where only two (Snake Lake and Rocky Point) of the PNF’s 16 territories, respectively, would be impacted by proposed trails in the range of 1.41 mi (1.41 direct and indirect, and 0 cumulative) at 0-400 meters and up to 1.57 miles (1.24 direct and indirect , plus 0.33 cumulative) at 400 to 800 meters. The proposed trail (9M44) within the Snake Lake territory that lies within 0-400 meters (<0.25mi) will not be subject to a limited operating period or a season of use since the main factor affecting bald eagles at Snake Lake is a lack of foraging base (i.e. trout/fish) within the lake. A limited operating period or a season of use is applied to the sole route (8M52) within the Rocky Point Territory in order to minimize impacts to nesting bald eagles (see Appendix A – Route List).

Alternative 3 would pose the least impact (0.33 miles to one territory), since it does not contain or add any proposed trails. All action alternatives (Alternatives 2-5) also prohibit cross-country travel within nesting and foraging Bald Eagle habitat which further reduces the risk to nesting bald eagles over Alternative 1.

3.7.19.3.2 Bald Eagle Determination

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the Bald Eagle.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the Bald Eagle. This determination is based on the rationale that cross country travel would continue in the future and lead to additional impacts to nesting bald eagles over time. Based on route proliferation since 1988 (Forest Plan development), an average of 48 miles of unauthorized routes per year were established. When this rate is applied over the next 20 years, an additional 960 miles could be added under Alternative 1, resulting in increased cumulative effects (e.g. disturbance during reproduction period, abandonment of territories, etc.) over time.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the Bald Eagle within the planning area of the Plumas National Forest. This determination is based on the rationale that the action alternatives would prohibit current and future cross-country travel across the PNF, and that risks to Bald Eagles and eagle nest sites would be significantly reduced compared to Alternative 1 (No-action).

3.7.20 Willow Flycatcher: Affected Environment

On the PNF, the willow flycatcher (*Empidonax traillii* ssp. *trailii* and *E.t. brewsteri*) is designated by the Regional Forester as a Sensitive Species. In California, the willow flycatcher is a rare to locally uncommon, summer resident in wet meadow and montane riparian habitats at 600-2,500 meters (2,000-8,000 feet) in the Sierra Nevada and Cascade Range (CWHR 2005). Willow flycatcher populations in the Sierra Nevada are considered to be at risk (USDA Forest Service 2001). Historically, willow flycatchers were once common throughout the Sierra Nevada. The current distribution of the willow flycatcher has been drastically reduced compared to historic distributions. A ten year demographic analysis indicate the Sierra Nevada willow flycatcher populations are continuing to decline. With the exception of a few sites, the majority of areas where willow flycatchers have been located support low numbers of breeding territories and some as low as 1 to 2 pairs of breeding individuals.

Willow flycatcher breeding habitat is characterized as montane wetland shrub habitat where there is a prevalence of willows and montane meadows with standing or flowing water, or highly saturated soils throughout the nesting season (Green, et al. 2003). A study by Cain (2001) indicated that meadow wetness may assist in successful nesting by willow flycatcher, by inhibiting potential forest and edge predators from accessing willow flycatcher nests. Meadow wetness may also be important for willow flycatcher insect prey species.

The Willow Flycatcher Conservation Assessment (Green, et al. 2003) identified roads as one of the leading contributing factors responsible for the loss and degradation of willow flycatcher habitat. Specifically, roads (dirt-surfaced or paved), intercept surface and subsurface hydrologic flow. Meadow desiccation takes place when hydrologic flows become intercepted and redirected resulting in long-term habitat loss or degradation. Roads may have a negative impact on meadow hydrology, especially when roads bisect meadows and have associated drainage structures to maintain road conditions. Human disturbance associated with motorized trail motorized use may also affect willow flycatcher nesting success. Roads also provide increased access to humans, which may directly and indirectly affect willow flycatcher productivity. Roads provide access for livestock grazing and often meadows occupied by willow flycatchers are key forage areas for livestock. Livestock grazing has long been identified as contributing to the decline in willow flycatcher populations as it relates to grazing impacts on willow and meadow habitat, as well as potential direct impacts from cattle coming in direct contact or destroying nest sites. Furthermore, brown-headed cowbirds are strongly associated with cattle. Cowbirds are known to parasitize willow flycatcher nests and ultimately may reduce overall willow flycatcher nesting success. Several grazing allotments on the PNF overlap “Occupied” and “Emphasis” willow flycatcher sites.

3.7.21 Willow Flycatcher: Environmental Consequences

3.7.21.1 Analysis Measures

Number of “Occupied” and “Emphasis” Willow Flycatcher Sites with Routes: To evaluate the effects of motorized routes on willow flycatcher habitat, the number of willow flycatcher “Occupied” and “Emphasis” habitat sites intersected by motorized routes was determined. The Sierra Nevada Framework Plan Amendment ROD (2004) designated “Occupied” and “Emphasis” habitats for willow flycatcher. “Occupied” habitat is defined by the presence or suspected presence of willow flycatcher(s) during the breeding season (between 15 June and August 1) (See SNFPA ROD 2004 for more detailed definition). “Emphasis” habitat are currently not occupied by breeding willow flycatchers, but are considered suitable nesting habitat, defined by meadows larger than 15 acres that have standing water on them June 1 and a deciduous shrub component. “Emphasis” habitats are particularly important so that willow flycatchers may have future refugia where their population can be distributed and expanded in the future.

3.7.21.2 Direct and Indirect Effects

Direct and indirect effects of the alternatives are evaluated by determining the number of proposed trails that intersect delineated willow flycatcher habitat sites on the PNF. Table 92 displays the direct and indirect effects to willow flycatcher “Occupied” and “Emphasis” habitat sites on the PNF that are potentially affected by the five project alternatives. Mixed use on Forest Road 24N28 does not affect willow flycatcher occupied or emphasis habitat on the PNF.

Under Alternative 1, unauthorized routes (7.46 miles) would intersect 68 (25%) willow flycatcher habitat sites, resulting in both direct and indirect disturbance. Of these sites, 10 out of 28 habitats (36%) have been identified as “Occupied” willow flycatcher sites, where approximately 1.4 miles of unauthorized routes have the potential to adversely affect breeding willow flycatchers, including both direct disturbance to nesting willow flycatchers and indirect impacts to willow flycatcher habitat alteration and/or degradation where routes potentially affect vegetation and hydrology.

The action alternatives significantly reduce impacts to Occupied and Emphasis habitat sites compared to Alternative 1. Implementation of Alternatives 2, 4 and 5 would have no direct and indirect impacts to breeding willow flycatchers at “Occupied” sites. Within “Emphasis” habitat sites. Alternatives 2, 4 and 5 affect from 7 to 17 willow flycatcher “Emphasis” sites (3% and 8%). This represents a reduction of impacts from Alternative 1 that range from 41 to 51 less emphasis sites impacted by Alternatives 2, 4, and 5. Alternative 3 would not affect any willow flycatcher habitat sites. This alternative does not add any trails.

Table 92. Number of willow flycatcher habitat sites intersected by proposed trails and unauthorized routes[1] on the Plumas National Forest.

	# of Sites	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
"Occupied" Habitat Sites (Miles of Unauthorized route and proposed trail)	28	10 (1.40)	0	0	0	0
"Emphasis" Habitat Sites (Miles of Unauthorized route and proposed trail)	242	58 (6.06)	17 (1.95)	0	7 (0.46)	10 (1.74)
Total	270	68 (7.46)	17 (1.95)	0	7 (0.46)	10 (1.74)

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.21.3 Cumulative Effects Boundary for Willow Flycatcher

The cumulative effects analysis geographic boundary for the willow flycatcher includes all willow flycatcher sites occurring within the PNF boundary, within NFS lands. The temporal scale for analyzing cumulative effects to willow flycatcher is from 2000 for past actions (updated status based on HFQLG EIS, 1999) and 20 years out into the future.

3.7.21.4 General Cumulative Effects to Willow Flycatcher Meadows

Cumulative impacts to the willow flycatcher include past, present and future impacts from livestock grazing, roads and recreational activities. The Forest Service has completed a Conservation Assessment of the Willow Flycatcher in the Sierra Nevada (Green et al. 2003), which identified meadow drying, loss of nesting and foraging substrates (riparian shrubs), increased predator access to meadow interiors and potential cowbird parasitism as among the key factors likely to be responsible for the decline of the willow flycatcher. Livestock management, recreation, water developments and roads are described as causative factors.

Historic livestock grazing has impacted montane meadows and is considered to be a primary factor that has influenced the suitability of willow flycatcher habitat and meadow habitat for birds in the Sierra Nevada (Graber 1996, Green et al. 2003, Menke et al. 1996). Many of the landbird species utilizing these meadows feed upon insects that decline in response to removal of this herbaceous growth (Graber 1996). Poorly managed grazing in riparian areas can impact nesting densities of many bird species and particularly of habitat specialists such as the willow flycatcher, Lincoln's sparrow and white-crowned sparrow (RHJV 2004).

3.7.21.4.1 Cumulative Effects from Motorized Routes to Willow Flycatcher Meadows

Factors responsible for the decline of willow flycatcher populations in the Sierra Nevada are primarily thought to be the result of habitat change, particularly the alteration of riparian habitat hydrology, specifically caused by roads (Green et al. 2003). Table 93 displays the cumulative impacts of existing trails, proposed trails and unauthorized routes within habitats that are designated as either willow flycatcher "Occupied" or "Emphasis" habitat. Routes or trails intersecting "Occupied" habitat have the highest potential to impact breeding willow flycatchers.

3.7.21.5 "Occupied" Habitat

Alternative 1 poses the highest cumulative impact to breeding willow flycatchers. Alternative 1 directly affects 10 occupied habitat sites with 1.4 miles of unauthorized routes. Existing routes cumulatively add an additional 0.45 miles that affect 2 additional occupied habitat sites where direct impacts to meadow vegetation and hydrology could occur. Hydrologic condition is an important habitat component to consider for successful willow flycatcher breeding. Given the uncertainty of future route proliferation under Alternative 1, the future habitat alteration within "Occupied" habitat sites is potentially at risk and may ultimately affect willow flycatcher breeding success within "Occupied" habitats.

All of the action alternatives significantly reduce cumulative impacts to Occupied habitat sites. None of the remaining action alternatives (Alternatives 2-5) add direct or indirect impacts to "Occupied" willow flycatcher sites. However, existing trails under Alternative 3 will affect 2 Occupied habitat sites with 0.45 miles. The significant benefit to Occupied habitat under these alternatives is that cross country travel would be prohibited and future effects to occupied habitat would be precluded.

3.7.21.6 "Emphasis" Habitat

Alternative 1 poses the highest cumulative impact to the future colonization by willow flycatcher within "Emphasis" habitats, since unauthorized routes would intersect a total of 62 "Emphasis" sites for a total of about 6.7 miles.

All the remaining action alternatives (Alternatives 2-5) would result in substantially less cumulative impacts to willow flycatcher "Emphasis" habitats. The action alternatives (Alternatives 2-5) propose trail additions and would add that existing trails that would cumulatively affect from 4 (Alternative 3) to 21 (Alternative 2) willow flycatcher "Emphasis" habitat sites with 0.60 (Alternative 3) to 2.55 (Alternative 2) miles of proposed and existing trails. The significant benefit to Emphasis habitat sites under these alternatives is that cross-country travel would be prohibited.

3.7.21.7 Summary of Cumulative Effects to Willow Flycatcher Habitat: "Occupied" and "Emphasis" Meadows

Appendix C provides a list of present and reasonably foreseeable future actions and descriptions of their project location and the actions involved that may be occurring on NFS lands within the PNF boundary. Alternative 1 poses the highest cumulative effects and the greatest overall risk to known nesting sites (Occupied) and potentially suitable nesting sites (Emphasis) from unauthorized routes and existing motorized NFS trails. Alternative 1 results in willow flycatcher habitat being intersected 74 times for a total of about 8.5 miles of routes. Over 42% of habitats identified as "Occupied" are impacted by unauthorized routes, which could substantially alter the willow flycatcher habitat vegetation and hydrology and reduce breeding success at known nesting sites of a species that is at risk of extirpation. Alternative 1 would also allow cross country travel and the potential for additional routes to be added to Occupied and Emphasis habitat sites.

All the action alternatives (Alternatives 2-5) result in significantly less cumulative impacts to occupied and emphasis habitat sites, plus have the added benefit of prohibiting cross country travel.

Overall cumulative impacts to “Occupied” and “Emphasis” habitats result in a proposed or existing trail intersecting a site 6 to 23 times for a total of between 1.05 and 3.0 miles.

Table 93. Willow Flycatcher Habitat Sites - Number of “Occupied” and “Emphasis” Habitats Intersected by Unauthorized Routes (Alt. 1), Proposed Trails (Alts. 2, 4, 5) and Existing Trails (Alt. 3).

	Alt.1[1]	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Direct and Indirect effects of the alternatives (Alts. 1, 2, 4, 5)					
# “Occupied” Sites	10	0	0	0	0
Miles within “Occupied”	1.40	0.00	0	0.00	0.00
# “Emphasis” Sites	58	17	0	7	10
Miles within “Emphasis”	6.06	1.95	0	0.46	1.74
Total Number of Willow Flycatcher Sites Intersected by Unauthorized routes or proposed trail additions	68	17	0	7	10
Total Miles (Alts. 1, 2, 4, 5)	**7.46**	**1.95**	**0**	**0.46**	**1.74**
Cumulative effects from Existing NFTS trails (Alt. 3)					
# “Occupied” Sites	2	2	2	2	2
Miles within “Occupied”	0.45	0.45	0.45	0.45	0.45
# “Emphasis” Sites	4	4	4	4	4
Miles within “Emphasis”	0.60	0.60	0.60	0.60	0.60
Total Number of Willow Flycatcher Sites Intersected by Existing NFS motorized trails	6	6	6	6	6
Total Miles (Alt. 3)	**1.05**	**1.05**	**1.05**	**1.05**	**1.05**
Grand Total Miles (total miles under Direct, Indirect and Cumulative for all Alts.**)**	8.51	3.00	1.05	1.51	2.79

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.21.8 Willow Flycatcher Determination

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the Willow Flycatcher.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the Willow Flycatcher. This determination is based on the rationale that cross country travel would continue in the future and lead to additional impacts to Occupied and Emphasis habitat sites, loss of habitat, and result in high risk to Willow Flycatcher viability. Based on route proliferation since 1988 (Forest Plan development), an average of 48 miles of unauthorized routes per year were established. At this rate over the next 20 years, an additional 960 miles could be added under Alternative 1, resulting in increased cumulative effects (e.g. disturbance during reproduction period, abandonment of territories, etc.) over time.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the Willow Flycatcher within the planning area of the Plumas National Forest. This determination is based on the rationale that 1) the action alternatives would prohibit current and future cross-country travel across the PNF, 2) risks to Flycatcher Occupied and Emphasis habitat sites would be significantly reduced compared to

Alternative 1 (No-action), and 3) a higher amount of nesting and foraging habitat would be maintained for the flycatcher into the future.

3.7.22 Great Gray Owl: Affected Environment

The great gray owl is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). In the Sierra Nevada, great gray owls are found in mixed coniferous forest from 2,400 to 9,000 feet elevation where such forests occur in combination with meadows or other vegetated openings. Nesting usually occurs within 600 feet of the forest edge and adjacent open foraging habitat. Most nests are made in broken top snags (generally firs), but platforms such as old hawk nests, mistletoe infected limbs, etc. are also used. Nest trees or snags are generally greater than 21 inches dbh and 20 feet tall.

In the Sierra Nevada, pocket gophers and voles appear to be important prey species (Winter 1982, Reid 1989). Meadows appear to be the most important hunting habitat for great gray owls, where approximately 93% of their prey is taken (Winter 1981).

Recent great gray owl sightings in our area include several detections from 2004 to 2007 on the west side of Lake Davis on the Beckwourth Ranger District. A total of 45 great gray owl detections were recorded by contract survey crew Klamath Wildlife Resources, Inc. which included 14 pair detections. There were also two adults found on the Feather River Ranger District of the Plumas (August 1997).

Roads and trails can potentially affect great gray owl habitat by affecting the condition of suitable great gray owl habitat in similar ways that affect willow flycatcher habitat, primarily through changes in meadow hydrology or when damage to meadow vegetation occurs. Compaction and meadow drying can cause changes in vegetation composition which can lead to changes in prey species abundance and distribution. Changes in prey availability and abundance can affect the reproductive success of great gray owls.

3.7.23 Great Gray Owl: Environmental Consequences

3.7.23.1 Analysis Measures

Great gray owl nesting habitat: miles of proposed, existing and unauthorized routes within great gray owl nesting habitat, using a 600 foot zone of influence from the forest edge of adjacent owl Meadows: Since nesting usually occurs within 600 feet of forest/meadow edge, a ZOI was applied to forested habitat to determine impacts to GGO nesting habitat. The number of route miles were analyzed within this 600 foot ZOI to determine potential disturbance to nesting habitat by alternative.

Number of Great Gray Owl Meadows Intersected by Miles of Proposed Trails and Unauthorized Routes: meadows identified as suitable for great gray owl foraging that are adjacent to suitable breeding habitat were assessed to determine the potential impact from unauthorized routes or trails. The number of great gray owl meadows intersected by unauthorized routes or trails were assessed for the alternatives.

3.7.23.2 Direct and Indirect Effects

3.7.23.2.1 Addition of Proposed Trails

Currently, great gray owls are not known to breed on the PNF. Although great gray owl sightings have been reported on the Forest, no confirmation of nesting has been identified at this time. Therefore, the action alternatives would have no direct impacts to breeding great gray owls, since great gray owls are not currently known to breed on the PNF. This analysis focuses on effects to nesting and foraging habitat of great gray owls by unauthorized routes and proposed trails. Mixed use does not affect GGO nesting or foraging habitat on the PNF.

Potential great gray owl habitat has been identified on the PNF. A total of 200 meadow sites on the Forest are considered suitable foraging habitat areas for the great gray owl. These 200 meadow sites were buffered using a 600 foot zone of influence to determine effects to nesting great gray owl habitat . Potential foraging and nesting areas were evaluated to determine the potential direct and indirect effects to meadow vegetation and hydrology and forested habitat which may affect the suitability of potential great gray owl foraging and nesting habitat.

Alternative 1 poses the highest direct and indirect effects to potential great gray owl meadows where 38 meadows (19%) are intersected by unauthorized routes totaling approximately 8 miles. This amount of motorized routes could alter meadow vegetation and hydrology that would indirectly affect great gray owl breeding habitat where great gray owls forage, and where the potential for future occupancy of these areas may be limited. Nesting habitat would also be affected to the greatest extent under Alternative 1 as 31.7 miles of route would fall within the 600-foot zone of influence. Potential future nesting opportunities would be at greater risk with this alternative.

Under the action alternatives (Alternatives 2-5) the direct and indirect effects to meadows and nesting habitat are significantly reduced. The number of meadows affected are reduced by 29 when Alternatives 2-5 are compared to Alternative 1 (Table 94). In addition the number of proposed trail miles within great gray owl meadows fall significantly as well. Alternatives 2-5 have 6.7 miles less of trail intersecting meadows than Alternative 1. For nesting habitat, Alternatives 2-5 represent significant reductions in the miles of routes affecting nesting habitat (Table 95). Over a 23 mile reduction in routes are provided with Alternatives 2-5, posing lower risk to potential future nesting opportunities.

Table 94. Number of Great Gray Owl Meadows Intersected by Unauthorized routes or Proposed Trails

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Number of Meadows with Intersections	38	7	0	3	9
Number of Meadows without Intersections	162	193	200	197	191
Unauthorized route or proposed trail miles	8.0	1.0	0	0.4	1.3

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

Table 95. Miles of proposed trail or unauthorized routes within GGO Nesting habitat (using a 600' Zone of Influence from the forest/meadow edge adjacent to GGO Meadows).

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Miles of unauthorized routes or proposed trails	31.7	8.0	0	4.7	6.9

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.23.3 Cumulative Effects

The geographic boundary for analyzing great gray owl cumulative effects of the alternatives are the suitable great gray owl meadow habitat sites and a corresponding 600-foot buffer for nesting within the boundary of the PNF. Approximately 200 meadow sites have been identified as being suitable foraging habitat for the great gray owl that are adjacent to suitable great gray owl nesting habitat (600-foot ZOI), which would provide a sufficient area to analyze impacts to great gray owls on the PNF. These meadows and adjoining nesting habitat encompass a wide geographic distribution from eastside to westside and encompass a variety of vegetation diversity. The adjacent forest habitat (nesting) surrounding these great gray owl meadow areas range from eastside pine, eastside mixed conifer, true fir types and, westside mixed conifer forests. Appendix C provides a list of present and reasonably foreseeable future actions and descriptions of their project location and the actions involved that may be occurring on NFS lands within the PNF boundary.

Great gray owls currently are not known to breed on the PNF; however, recent sightings on the Forest, indicate that the potential for breeding great gray owls is a reasonable expectation. Surveys are currently ongoing on the Plumas NF. The action alternatives, do not currently pose adverse direct or indirect effects to known breeding great gray owls and therefore, no cumulative impacts to great gray owls would occur. However, the project alternatives are analyzed for cumulative effects of motorized routes to suitable great gray owl foraging and nesting habitat that may affect the ability for great gray owls to occupy these sites in the future.

Alternative 1 poses the highest cumulative risk to suitable great gray owl foraging habitat where these suitable great gray owl meadows are intersected by unauthorized routes or existing motorized NFS trails on NFS lands 41 times for a total of 9 miles, and where nesting habitat is affected by 34.8 miles of unauthorized routes and existing trails. The uncertainty of future motorized route proliferation could alter meadow vegetation and hydrology and additional nesting habitat that would impact habitat conditions for great gray owl prey species in the long term. Considering the rate at which OHV activities occur on the PNF, and the potential for future route proliferation, this alternative could adversely affect the potential for great gray owls to occupy these sites in the near and distant future.

All of the action alternatives (Alternatives 2-5) significantly reduce cumulative impacts to owl foraging habitat and meadow areas by having 29 to 38 less meadows intersected and 6.7 to 8 less trail miles (Table 96). Impacts to owl nesting habitat are also significantly reduced under the action alternatives which range from 3.1 (Alternative 3) to 11.1 (Alternative 2) miles. In addition, these alternative have the added benefit that they prohibit cross country travel and reduce the potential of route proliferation to add additional routes to the PNF. For example, Alternative 2 contributes to cumulative impacts to suitable great gray owl meadow sites, where these sites would be intersected by proposed and existing trails 10 times for a total of about 2 miles, and nesting habitat would be affected by 11.1 miles of routes. Alternatives 4 and 5 add cumulative impacts to great gray owl meadows where intersection by a proposed and existing trail occurs 6 and 12 times, respectively, to great gray owl habitat, impacting 1.4 and 2.3 miles, respectively. Impacts to nesting habitat under Alternatives 4 and 5 would range between 7.8 and 10 miles, which is a reduction from Alternative 2. Alternative 3 would have no direct or indirect effects to great gray owl meadows or nesting habitat as there are no proposed trail additions to the NFTS. Alternative 3 would only impact great gray owl meadows with existing routes where 1 mile intersects 3 meadows, and nesting habitat with a total of 3.1 miles.

Table 96. Great gray owl suitable sites—number of meadows/meadow complexes intersected by unauthorized routes (Alt. 1), existing trails (Alt. 3) and proposed trails (Alts. 2, 4, 5)[1].

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of the alternatives					
Unauthorized routes or proposed trail additions [1]					
Number of Potential GGO Meadow Sites Intersected by Routes	38	7	0	3	9
Miles	8	1	0	0.4	1.3
Cumulative effects of past, present and proposed actions					
Existing motorized routes - NFS lands					
Number of Potential GGO Meadow Sites Intersected by Routes	3	3	3	3	3
Miles	1	1	1	1	1
Total Cumulative Effects					
Number of Times GGO Meadows Intersected by Unauthorized Routes	41	10	3	6	12
Total Miles	9	2	1	1.4	2.3

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

Table 97. Cumulative miles of proposed trail (Alts. 2, 4, 5), unauthorized routes (Alt. 1), and existing trails (Alt. 3) within GGO Nesting habitat (using a 600' Zone of Influence from the forest/meadow edge adjacent to GGO Meadows).

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Miles of unauthorized routes or proposed trails[1]	31.7	8.0	0	4.7	6.9
Existing motorized routes – NFS lands	3.1	3.1	3.1	3.1	3.1
Total Cumulative miles within nesting habitat	34.8	11.1	3.1	7.8	10.0

[1]Alternative 1 includes the unauthorized routes, while alternatives 2,4, 5 include proposed trails.

3.7.23.3.1 Great Gray Owl Determination

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the great gray owl.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the great gray owl. This determination is based on the rationale that cross country travel would continue in the future and lead to additional impacts to owl meadow sites, loss of habitat, and result in high risk to owl occupancy. Based on route proliferation since 1988 (Forest Plan development), an average of 48 miles of unauthorized routes per year were established. At this rate over the next 20 years, an additional 960 miles could be added under

Alternative 1, resulting in increased cumulative effects (e.g. disturbance during reproduction period, abandonment of territories, etc.) over time.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the great gray owl within the planning area of the Plumas National Forest. This determination is based on the rationale that 1) the action alternatives would prohibit current and future cross-country travel across the PNF, 2) risks to meadow sites and nesting habitat would be significantly reduced compared to Alternative 1 (No-action), and 3) a higher amounts of suitable meadow and adjacent forested habitat would be maintained for the owl in the long term.

3.7.24 Migratory Landbird Conservation on the Plumas National Forest

Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for land management activities.

As part of the Travel Management process, the Plumas National Forest has conducted an assessment of existing roads and trails within Forest boundaries. Any new construction, reconstruction and maintenance of system roads or trails will be conducted under a separate NEPA analysis and decision. Because current travel management efforts are directed at identifying which existing unauthorized routes will be formally added to the National Forest Transportation System while prohibiting cross-country travel (Alternatives 2-5), and because there is no expectation of new construction or development, no changes in the distribution or abundance of habitats available to migratory birds are anticipated. Changes in authorization are not anticipated to contribute to measurable increase in use levels, but the prohibition of cross-country travel is expected to result in less use across the landscape. Therefore habitat functionality and levels of disturbance related to use are expected to remain similar to or less than pre-decisional levels.

Protection of both bald and golden eagles is currently governed by the Bald and Golden Eagle Protection Act which prohibits take of bald and golden eagles without authorization by the U.S. Fish and Wildlife Service. None of the alternatives analyzed as part of the Travel Management process are expected to result in the take of a bald or golden eagle on the Plumas National Forest. This expectation is based on the fact that changes in authorization are not anticipated to contribute to increase in use levels, but the prohibition of cross-country travel is expected to result in less use across the PNF landscape. Since no take has been documented as a result of ongoing OHV activities, and less use across the PNF landscape is expected, no future take of a bald or golden eagle is anticipated to occur under the alternatives analyzed.

3.7.25 Summary of Species Determinations

Table 98. Comparison of Species Determinations for the Alternatives

Species	Alternative 1 No-action	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Threatened and Endangered					
valley elderberry longhorn beetle	MALAA	NE	NE	NE	NE
Sensitive Species					
American marten	MAI-LT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
Pacific fisher	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
California wolverine	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
Sierra Nevada red fox	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
bald eagle	MAI-LT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
California spotted owl	MAI-LT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
great gray owl	MAI-LT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
greater sandhill crane	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
Swainson's hawk	WNA	WNA	WNA	WNA	WNA
northern goshawk	MAI-LT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
willow flycatcher	MAI-LT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
western red bat	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
Townsend's big eared bat	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT
pallid bat	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT	MAI-NLT

Determinations: Sensitive Species: WNA = Will Not Affect; MAI-NLT = May Affect Individuals, but is Not Likely to result in a Trend toward Federal listing or loss of viability, MAI-LT = May Affect Individuals, and is Likely to result in a Trend toward Federal listing or loss of viability. Threatened and Endangered Species: NE = No Effect, MALAA = May Affect, Likely to Adversely Affect, MANLAA = May Affect, Not likely to Adversely Affect.

3.7.26 Summary of Effects Analysis Across All Alternatives

Table 99: Comparison of Effects to Terrestrial Wildlife.

Indicators – Terrestrial Wildlife	**Rankings of Alternatives for Each Indicator[1]**				
	Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Number of sensitive sites for TES species within ¼ mile of an added route or area. **(Disturbance to a Specific Site)**	1	2	5	4	3
The proportion of a species (or species group's) habitat that is affected by motor vehicle routes. **(Zone of Influence, Density of Routes @ 7th field watershed level)**	1	2	5	4	3
Average for Terrestrial Wildlife	1	2	5	4	3

[1] A score of 5 indicates the alternative has the least impact for terrestrial wildlife related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial wildlife related to the indicator.

3.7.27 Compliance with the Forest Plan and Other Direction.

Table 100. Comparison of alternatives in relation to compliance with Forest Plan, Forest Service Manual, Migratory Bird Act, Bald and Golden Eagle Protection Act and Endangered Species Act.

Direction for Terrestrial Wildlife	Alternative Compliance				
	Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Endangered Species Act (VELB)	No	Yes	Yes	Yes	Yes
Forest Service Manual Direction (Sensitive Species)	No	Yes	Yes	Yes	Yes
Migratory Bird Treaty Act	Yes	Yes	Yes	Yes	Yes
Bald and Golden Eagle Protection Act	Yes	Yes	Yes	Yes	Yes
Forest Plan Standard and Guidelines					
Management Standard and Guideline #82 (Disturbance to a Specific Site – Nest Site/Nest Stand)	No	Yes	Yes	Yes	Yes
Management Standards and Guideline #87 (fisher)	Yes	Yes	Yes	Yes	Yes
Management Standards and Guideline #89 (marten)	No	Yes	Yes	Yes	Yes
Management Standards and Guidelines #116 (Riparian Species)	No	Yes	Yes	Yes	Yes

3.7.28 Deer Herd Analysis

The PNF has four main deer herds within its administrative boundaries: Sloat, Bucks Mountain, Mooretown and Doyle. Two other deer herds that occur on the Plumas NF have relatively small amounts of their boundaries that overlap the Forest. The Eastern Tehama and Loyalton/Truckee deer herds overlap small portions of the PNF in the extreme north and south ends of the Forest. Deer herd habitat types are displayed in Table 101.

Table 101. Acreage of deer habitat by type and property ownership on the Plumas National Forest.

Deer Habitat Type	National Forest System Land	Non-National Forest System Land	Total within the Forest Boundary
Critical Winter	13,221	3,188	16,409
Fawning	21,658	2,780	24,438
Holding Area	1,187	2,355	3,542
Summer	1,037,427	167,821	1,205,248
Critical Summer	5,665	7,053	12,718
Winter	115,151	53,916	169,067
Total	1,194,309	237,113	1,431,422

Table 102 shows deer habitat acreage on NFS lands within deer habitat types for each of the deer herds (Sloat, Bucks Mountain, Mooretown, Eastern Tehama, Loyalton/Truckee and Doyle) occurring within the boundary of the PNF.

Table 102. Acreage of deer habitat by type for each deer herd on the Plumas National Forest.

Deer Herd	Habitat Type	Acres
Sloat	Critical Winter	13,221
	Holding Area	1,187
	Summer	284,563
	Winter	42,943
Bucks Mountain	Summer	231,992
	Winter	72,208
Mooretown	Summer	145,089
Eastern Tehama	Summer	10,529
	Critical Summer	5,665
Loyalton/Truckee	Summer	3,386
Doyle	Fawning	21,658
	Summer	361,868

Many studies have been conducted on the interaction of motorized trail-associated activities. Mule deer have shown that motorized trail-associated factors have the potential to impact mule deer populations directly and indirectly, including mortality from vehicle-collisions, modification of behavior (avoidance or flight), mortality from hunting and poaching, habitat fragmentation, edge effects of roads and trails and others. Roads and trails can result in the disturbance or disruption of individuals in a deer population. Deer inhabiting areas near roads and trails may move away from the area when disturbed by humans. Several factors affect the degree to which trail and road associated human activities disrupt deer. This section will highlight some examples of the way in which roads and trails can affect individual deer and deer populations. Although white-tailed deer do not occur on the Plumas NF, studies on both white-tailed deer and mule deer are included in the summaries to illustrate the general nature of expected responses of deer to roads and trails.

3.7.28.1.1 Displacement or Avoidance

In general, mule deer will move away from, or flush, from an approaching person and will usually allow a person in or on a vehicle to get closer than a person on foot (Freddy et al. 1986, Wisdom et al. 2004). Wisdom et al. (2004) found that mule deer showed little measurable flight response to experimental OHV treatments but cautioned that deer may well be responding with fine-scale changes in habitat use (i.e. avoidance), rather than substantial increases in movement rates and flight responses. Several studies have found that mule deer avoid areas in proximity to roads. Deer avoid primary roads more than secondary or tertiary roads and also avoid roads more in open habitats as opposed to areas with vegetative or topographic cover (deVos et al. 2003).

Various studies have shown that mule deer have displacement distances that vary between 200 and 800 meters, depending upon the road type and traffic level and the surrounding habitat (Perry and Overly 1977, Rost and Bailey 1979, Johnson et al. 2000). One study showed that if habitat was available away from a linear road or trail, then deer avoided the disturbance corridor (Jalkotzy et al. 1997). However, when no suitable deer habitat was available away from the road or trail, then deer used the habitat adjacent to the road or trail. Rost and Bailey (1979) reported that deer and elk in Colorado avoided roads, especially within 200 meters of a road. Perry and Overly (1977) reported that deer were displaced up to 800 meters from roads.

Main roads were found to reduce deer use up to 0.5 miles (800 meters), whereas secondary and primitive roads reduced deer densities from between 200 to 400 meters in these studies. Additional variables such as the amount and frequency of traffic and the spatial distribution of roads in relation to deer use, influence the degree of negative effects that roads have on deer use in forested habitats (Perry and Overly 1977, Johnson et al. 2000, deVos et al. 2003). Where disturbance causes deer to avoid areas within preferred habitats, animals may be forced into less preferred or lower quality habitats. Such shifts, particularly if repeated, can result in adverse impacts to the energy balance of individual deer and ultimately can decrease population productivity, especially on winter ranges (deVos et al. 2003).

Comments received during issuance of the draft EIS raised the issue of noxious weed spread as a result of motorized use which may result in loss of habitat or displacement of deer from certain areas that contain noxious weeds. Although noxious weeds are an important management concern and will be monitored as part this travel management project, the Plumas NF has a relatively low occurrence of noxious weed compared to other areas throughout the west. Levels of infestation and management prescriptions on the Plumas NF are similar to those represented in low category by the Mule Deer Working Group (Hayden et. al 2008). Based on noxious weed occurrence forest-wide and the monitoring proposed under this project, noxious weeds are not considered a limiting factor to deer on the Plumas NF.

3.7.28.1.2 Hunting and Poaching

Greater human access can increase opportunities for hunting as well as poaching of deer. During the hunting season, deer may become more wary of humans and disturbance to deer is greater when being hunted. In New York State, antlered deer were found to have longer flight distances than deer that were not hunted (Jalkotzky et al. 1997). Hunted deer populations tend to have stronger reactions to people on foot than motor vehicles. This may be due to the fact the deer can detect a vehicle from greater distances rather than getting surprised by humans on foot. Roads and trails can facilitate deer harvest success. A study using 143 radio-collared deer in Minnesota revealed that deer mortality during the hunting season was 2 to 4 times higher for deer that lived 0.2 km from a road versus those that were at >0.3 km from a road. Major access routes radiating from urban centers into deer range provide increased opportunities for hunters.

Since hunting levels for deer are controlled through hunting zone quotas and tag limits established by the California Department of Fish and Game (CDFG), an increase in hunting opportunity or hunter success is unlikely to impact deer populations (deVos 2003). Hunting limits also take into account estimates of the amount of illegal kill and road kill occurring. Levels of illegal harvest are not presently described as a significant source of mortality for deer herds on the PNF (CDFG 2003, CDFG 1998).

Thomas et al. (1979) used Perry and Overly’s data to develop a habitat effectiveness model based on road densities. The model indicated that a 20% loss in habitat effectiveness occurred when road densities were about 2 miles per square mile for summer range habitat. At road densities of 6 miles per square mile, habitat effectiveness declined by 50% to 95% depending on the type of road. The habitat guidelines for mule deer within the Northern Forest Ecoregion (includes the Plumas NF), developed by the Mule Deer Working Group recommend minimizing open road densities as much as possible and maintaining an average of less than or equal to 1.9 miles of open road per square mile of forest land, less on winter range (Hayden et al. 2008).

One study found that all terrain vehicles altered deer feeding and use patterns and these deer produced fewer young the following year (Yarmaloy 1988). An Arizona study using deer and elk decoys reported that illegal road hunting was widespread (Bancroft *in* Watson 2005). Eleven of 19 archery elk and deer hunters and 41 of 53 firearm hunters committed violations by attempting illegal take after observing a decoy from their vehicle.

3.7.28.1.3 Collisions

Vehicle collisions with deer can contribute considerably to direct deer mortality. Deer are probably the most frequently killed large mammal along North America’s roads. The Insurance Institute for Highway Safety commissioned a study which estimated that more than 1.5 million deer/vehicle collisions occur annually, resulting in more than 29,000 human injuries and 150 deaths. Romin and Bissonette (1996), conservatively estimated that the US national deer road kill in 1991 totaled at least 500,000 deer. Deer road kills vary considerably by region and by season. In California, mule deer road kill along a 3-mile stretch of secondary highway was estimated at 3.7 and 4.8 per kilometer per year during spring and fall migrations, respectively (Jalkotzy et al. 1997).

Deer and vehicle collisions probably differ by the type of road or trail, so care must be given when considering deer-vehicle collisions. The majority of deer-vehicle collisions occur in the early morning or late afternoon and evening hours, around dawn and sunset, when the deer are most active and when visibility is poor. More deer-vehicle collisions occur during the spring and fall when deer are migrating. In the fall, hunting may cause deer to be more wary and increase movement of deer. In the spring, vegetation tends to green up along roadsides and attract deer to roads. Several studies indicated that mortality from deer-vehicle collisions differed by sex and age. In Pennsylvania, vehicle-caused mortality was significantly higher for fawns and yearlings than adults; and more adult females were killed than adult males (Jakotzy et al. 1997). Jakotzy et al. (1997) also cited that female deer in South Dakota were killed more often, except during the fall when male deer mortality was higher. Deer herd management plans for deer herds in Plumas County (e.g. Bucks, Mooretown, etc.) indicate that deer fatalities along highways, such as Hwy 70, 89 and 395 contribute to loss of individuals and are a factor affecting deer. There are little to no data on deer road kills along Forest roads. Deer-vehicle collisions on roads and trails which are maintained for high clearance vehicles (maintenance level 2 roads) are probably not appreciable in number due to the lower speeds and the amount of use received on these roads. Forest roads maintained at a higher standard for passenger vehicle (maintenance levels (ML) 3, 4 and 5) travel, where vehicle speeds are greater, have the most potential to contribute to a deer-vehicle collision. However, the motorized trails analyzed under the action alternatives are not expected to equal the fatality rates of the higher speed paved roads (ML 3, 4, 5) and much less that of highways, such as Highways 70, 89 or 395.

For a summary of trail and road associated impacts to mule deer, see the terrestrial wildlife section.

3.7.28.2 Mule Deer: Environmental Consequences

3.7.28.2.1 Analysis Measures

3.7.28.2.1.1 Proposed Trail and Unauthorized Route Density

Road density has traditionally been used as an indicator for habitat effectiveness models (Overly and Perry 1977, Thomas, et al. 1979). These models indicate that as open road density increases deer use declines (Thomas et al. 1979, Witmer et al 1985). Factors such as hunting pressure, poaching and other human disturbances are also likely to relate to open road densities. Critical winter range, summer range and fawning habitats represent key habitats for deer where heavier use and higher quality habitats for wintering and summer use are expected to occur. The route densities within critical winter range, summer range and fawning habitat for each deer herd within the PNF was determined.

3.7.28.2.1.2 Miles of Proposed Trail and Unauthorized Routes

To assess the potential direct and indirect impacts to deer from motorized route associated disturbance including noise, hunting, poaching, etc., the miles of motorized routes to be added to National Forest

Transportation System (NFTS) were determined for each alternative by key deer habitat type (summer, fawning, winter and critical winter) within each of the deer herds—Sloat, Bucks Mountain, Mooretown, Eastern Tehama, Loyalton/Truckee and Doyle.

3.7.28.2.1.3 Seasonal Restrictions for Motor Vehicles

The 1988 Forest Plan recognizes that the restriction of motorized vehicle access within certain deer habitat areas is important to deer. Seasonal vehicle restrictions have occurred in the Diamond Mountain area since 1984. A portion of the Diamond Mountain area is closed to motorized vehicles before and during deer hunting season within Hunt Zone X-6A. Selected roads within the Diamond Mountain Area are closed and vehicles are prohibited both on and off roads and trails. The closure has been implemented due to the high volume of vehicles in the Diamond Mountain area during deer season. This closure has been an ongoing cooperative effort between the California Department of Fish and Game, Plumas County Fish and Game Commission and the Plumas National Forest. This closure within the Diamond Mountain area would continue under all of the action alternatives in the future.

Range herd areas (e.g. critical winter range, holding areas, etc.) were reviewed under this deer herd analysis and limited operating periods or seasons of use were applied on routes in order to minimize impacts to deer (see Appendix A – Route list).

3.7.28.2.2 Direct and Indirect Effects—Class of Vehicles

Mule deer responses to motor vehicle use vary depending upon the type of vehicle, the intensity, timing, speeds and amount of motor vehicle use. For this analysis, it is assumed that all vehicle types result in the same disturbance to mule deer. Therefore, changes in the class of vehicles would not vary in their effects to mule deer for all of the proposed alternatives.

3.7.28.2.3 Direct, Indirect and Cumulative Effects— Proposed Trail and Unauthorized Route Miles and Route Density

Table 103 displays miles of unauthorized routes, existing trails and proposed trails (including mixed use) for each deer herd, which provides a way to compare alternatives to assess the direct and indirect impacts to deer from motorized trails where access for hunting and poaching and disturbance and avoidance may occur. Existing trail, proposed trail and unauthorized route miles in key deer habitat (summer, fawning, critical winter, winter ranges) by deer herd are discussed below. In addition, motorized route density was calculated by deer herd and range type (i.e. summer, winter, etc.) Table 103 shows the average unauthorized route (Alternative 1), existing motorized trail (Alternative 3) and proposed trail (Alternatives 2, 4 and 5) densities within deer herd ranges under each alternative (calculated by dividing the total route, existing and proposed trail miles within deer ranges by the square miles of deer ranges on NFS land).

Table 103. Miles of unauthorized route (Alt 1), existing trails (Alt 3) and proposed trails (Alt 2, 4, 5) and corresponding route densities (miles/square mile) on NFS lands within deer herd ranges on the PNF.

Deer Herd	Range Type	Alt 1	Alt 2	Alt 3*	Alt 4	Alt 5
Sloat	Summer[1]	219 mi (0.49 mi/mi²)	83 mi (0.18 mi/mi²)	53 mi (0.12 mi/mi²)	40 mi (0.08 mi/mi²)	68 mi (0.15 mi/mi²)
	Holding Area	0	0	0	0	0
	Critical Winter	27 mi 1.31 (mi/mi²)	8 mi 0.39 (mi/mi²)	3 mi 0.14 (mi/mi²)	2 mi 0.10 (mi/mi²)	6 mi 0.29 (mi/mi²)
	Winter	88 mi 1.31 (mi/mi²)	26 mi 0.39 (mi/mi²)	3 mi 0.04 (mi/mi²)	15 mi 0.22 (mi/mi²)	19 mi 0.28 (mi/mi²)
Bucks Mountain	Summer[1]	227 mi 0.63 (mi/mi²)	101 mi 0.28 (mi/mi²)	27 mi 0.07 (mi/mi²)	33 mi 0.08 (mi/mi²)	63 mi 0.17 (mi/mi²)
	Winter	50 mi 0.44 (mi/mi²)	14 mi 0.12 (mi/mi²)	21 mi 0.18 (mi/mi²)	2 mi 0.02 (mi/mi²)	6 mi 0.05 (mi/mi²)
Mooretown	Summer	78 mi 0.34 (mi/mi²)	28 mi 0.12 (mi/mi²)	9 mi 0.04 (mi/mi²)	11 mi 0.05 (mi/mi²)	16 mi 0.07 (mi/mi²)
Eastern Tehama	Critical Summer	17 mi 1.89 (mi/mi²)	8 mi 0.89 (mi/mi²)	0	6 mi 0.67 (mi/mi²)	7 mi 0.77 (mi/mi²)
	Summer	10 mi 0.62 (mi/mi²)	1 mi 0.06 (mi/mi²)	1 mi 0.06 (mi/mi²)	1 mi 0.06 (mi/mi²)	1 mi 0.06 (mi/mi²)
Loyalton/Truckee	Summer	5 mi 1.00	1 mi 0.20	0	2 mi 0.40	2 mi 0.40
Doyle	Summer	349 mi 0.62 (mi/mi²)	81 mi 0.14 (mi/mi²)	11 mi 0.02 (mi/mi²)	28 mi 0.05 (mi/mi²)	46 mi 0.08 (mi/mi²)
	Fawning	18 mi 0.53 (mi/mi²)	6 mi 0.17 (mi/mi²)	0.4 mi 0.01 (mi/mi²)	2 mi 0.06 (mi/mi²)	2 mi 0.06 (mi/mi²)

* Alt 3 represents PNF's 130 miles of existing motorized trails.[1] Includes mixed use on FR 24N28.

3.7.28.2.3.1 Sloat Deer Herd – Direct and Indirect Effects

Within summer range, implementing Alternative 1 would have unauthorized route miles that exceed Alternative 2 by a two to one margin and exceed Alternatives 2 and 4 by nearly 150 miles for the Sloat Deer Herd. There are no unauthorized route or trail miles within the Holding Area for the Sloat herd under any of the five alternatives, therefore no impacts are anticipated for this herd range.

Within critical winter range, Alternative 1 has the most unauthorized route miles at 27 miles, followed by Alternative 2 with 8 miles of proposed trail. Alternatives 4 and 5 range from 2 to 6 miles and would have less of an impact on deer using this critical winter range. For winter range, Alternative 1 (88 miles) exceeds all other alternatives by a three to one margin. Alternatives 2, 4 and 5 represent significantly less trails miles (15 to 26 miles) than Alternative 1 and would pose less risk to deer. Alternative 1 poses the greatest risk to the Sloat Deer Herd on the summer and both winter ranges, followed next by Alternative 2, 5 and 4.

The route and trail miles discussed can be converted to route or trail densities for each deer herd range category. The results indicate that implementing Alternative 1 would have unauthorized route densities that exceed trail densities proposed under Alternatives 2, 4 and 5 by about two to one within both summer, critical winter and winter range for the Sloat Deer Herd. Alternative 2 has the next highest level of proposed trail densities for all deer herd range categories; summer, critical winter and winter. Alternative 5 exhibits slightly less direct and indirect effects than Alternative 2, but represents higher trail densities than Alternative 4 in all range type categories. Alternative 4 has the least proposed trail densities of the alternatives with trails in all ranges: summer, critical winter and winter. A holding area occurs within the PNF boundary for the Sloat Deer Herd. For all alternatives, there were no existing trails, unauthorized routes or proposed trails in this deer holding area. For the Sloat Deer Herd, Alternative 1 has the most direct and indirect effects to the herd, risk to habitat and habitat use. Alternative 4 has the least direct and indirect effects to the herd, habitat and habitat use based on trail miles and densities.

3.7.28.2.3.2 Sloat Deer Herd - Cumulative Effects

Routes miles and densities under Alternatives 1, 2, 4 and 5 are increased when Alternative 3 densities are added. Alternative 3 does not add any routes, but represents the 130 miles of existing motorized. Therefore, these routes currently exist on the landscape, and route densities represented by Alternatives 1, 2, 4 and 5 would be additive. Cumulative effects would then be increased for all alternatives. Alternative 1 route miles and densities for Sloat summer range would increase from 219 miles (0.49 mile per square mile) to 272 miles (0.61 mile per square mile), an increase of 53 miles (0.12 mile per square mile) by adding existing routes (Alternative 3). A similar increase of 53 miles (0.12 mile per square mile) would occur with Alternatives 2, 4 and 5 in the Sloat summer range. Therefore route densities in critical winter range would increase for all alternatives by 3 miles (0.14 mile per square mile), and for winter range by 3 miles (0.04 mile per square mile). Existing motorized trails, existing open road densities across the Plumas NF also contribute to cumulative effects to mule deer and their use of summer or winter ranges. Decrease in habitat effectiveness for deer becomes a factor when road densities exceed 2 miles per square mile. Habitat effectiveness for deer has been reduced on the Plumas NF based on existing road densities forest wide. Currently 65% to 79% of the forest contains densities greater than 2 miles per square mile (see Table 66, TES Wildlife Section). Therefore existing road densities when added to existing motorized trails (Alternative 3) would range between 2.04 and 2.14 miles per square mile and exceed the road densities recommended by the Mule Deer Working Group of 1.9 miles per square mile. Motorized trails that would be added under Alternatives 1, 2, 4 or 5 would add cumulatively to the existing density of roads and existing trails (Alternative 3) by a range of 0.08 (Alternative 4) to 1.31 (Alternative 1) miles per square mile for the Sloat Deer Herd. Therefore, since all alternatives would maintain existing road, trails and proposed trail densities above 2 miles per square mile, it would be expected that habitat effectiveness for deer would decline on within the Sloat Deer Herd across all range types, with exception of the Holding Area (no direct, indirect or cumulative effects).

3.7.28.2.3.3 Bucks Mountain Deer Herd – Direct and Indirect Effects

For the Bucks Deer Herd, summer range is impacted the most by route miles and route densities. Within summer range, Alternative 1 has 227 miles (0.63 mile per square mile) of unauthorized routes with Alternatives 2 and 5 ranging from 101 miles (0.28 mile per square mile) to 63 miles (0.17 mile per square mile) of proposed trails. Alternative 4 has the least amount of proposed trails with 33 miles (.08 mile per square mile).

Within winter range, Alternative 1 has 50 miles (0.44 mile per square mile) of unauthorized route, almost three times as much as Alternative 2, with 14 miles (0.12 mile per square mile) of proposed trails. Alternatives 4 and 5 are significantly less with a range of 2 (.02 mile per square mile) to 6 miles (.05 mile per square mile). Within winter range, Alternative 1 has the highest number of route miles, where direct and indirect disturbance associated with motorized routes could occur when deer are stressed during the winter. In summary, Alternative 1 poses the greatest risk to the Bucks Deer Herd on winter ranges where resources may be scarce and deer may be stressed during the winter months. Alternative 4 presents the least risk to deer.

Implementing Alternative 1 would have existing trail and unauthorized route densities that exceed proposed trail densities under Alternatives 2, 4 and 5 by about two to one within both summer and winter range for the Bucks Mountain Deer Herd. Alternative 2 has the next highest level of trail densities for all deer herd range categories; summer and winter. Alternative 4 has the second lowest proposed trail densities in summer and winter range of all of the alternatives. Alternative 5 falls within the range of route densities of Alternatives 2 (higher) and 4 (lower) (see Table 103). For the Bucks Deer Herd, Alternative 1 has the most impact to the herd and Alternative 4 would have the least impact as a result of trail densities in both summer and winter range. Of the action alternatives with proposed trails, Alternative 4 presents the least risk to habitat and habitat use followed by Alternative 5 and Alternative 2.

Overall, Alternative 1 has the greatest risk to both summer and winter range, while Alternative 4 has the least risk when trail miles and route densities in both summer and winter ranges are combined.

3.7.28.2.3.4 Bucks Mountain Deer Herd - Cumulative Effects

Route miles and densities under Alternatives 1, 2, 4 and 5 are increased when Alternative 3 trail miles densities are added. Alternative 3 does not add any routes, but represents the 130 miles of existing motorized trials. Therefore, these routes currently exist on the landscape, and route densities represented by Alternatives 1, 2, 4 and 5 would be additive. Cumulative effects would then be increased for all alternatives. For example, Alternative 1 route miles and densities for Bucks summer range would increase from 227 miles (0.63 mile per square mile) to 254 miles (0.70 mile per square mile), an increase of 27 miles (0.07 mile per square mile) (see Table 103). A similar increase to Bucks summer range would occur with Alternatives 2, 4 and 5. Therefore route miles and densities in winter range would increase for all alternatives by 21 miles (0.18 mile per square mile). Existing motorized trails, existing open road densities across the Plumas NF also contribute to cumulative effects to mule deer and their use of summer or winter ranges. Decrease in habitat effectiveness for deer becomes a factor when road densities exceed 2 miles per square mile. Habitat effectiveness for deer has been reduced on the Plumas NF based on existing road densities forest wide. Currently 65% to 79% of the forest contains densities greater than 2 miles per square mile mi/sq mi (see Table 66, TES Wildlife Section). Therefore existing road densities when added to existing motorized trails (Alternative 3) would range from 2.07 to 2.18 miles per square mile and appear to exceed the road densities recommended by the Mule Deer Working Group (1.9 mile per square mile). Motorized trails that would be added under Alternatives 1, 2, 4 or 5 would add cumulatively to the existing density of roads and existing trails by a range of 0.02 (Alternative 4) to 0.63 (Alternative 1) miles/square mile for the Bucks Mountain Deer Herd. Therefore, since all alternatives would maintain existing road, trails and proposed trail densities above 2 miles per square mile, it would be expected that habitat effectiveness for deer would decline within the Bucks Mountain Deer Herd across both summer and winter ranges.

3.7.28.2.3.5 Mooretown Deer Herd – Direct and Indirect Effects

Alternative 1 unauthorized route miles exceed those proposed under Alternative 2 by a two-to-one ratio (78 miles vs. 28 miles) in summer range for the Mooretown Deer Herd. The remaining action alternatives (Alternatives 4 and 5) propose significantly less with a range between 11 and 16 proposed trail miles. Alternative 1 poses the greatest risk to the Mooretown Deer Herd on summer range, where Alternative 4 poses the least risk to summer range habitat for deer.

Implementing Alternative 1 would have unauthorized route densities that exceed proposed trail densities under Alternatives 2, 4 and 5 by about three-to-one ratio within summer range for the Mooretown Deer Herd. Alternative 2 has the second highest level of trail densities (0.12 mile per square mile) for summer range. Alternative 4 has less trail density (0.05 mile per square mile) than Alternatives 1, 2 and 5. Alternative 5 has route densities that fall between the range of Alternatives 4 and 2 with 0.07 mile per square mile. For the Mooretown Deer Herd, Alternative 1 has the most impact to the herd, habitat and habitat use and Alternative 4 would have the least impact.

3.7.28.2.3.6 Mooretown Deer Herd - Cumulative Effects

Route miles and densities under Alternatives 1, 2, 4 and 5 are increased when Alternative 3 densities are added. Alternative 3 does not add any routes, but represents the 130 miles of existing motorized trails. Therefore, these routes currently exist on the landscape, and route densities represented by Alternatives 1, 2, 4 and 5 would be additive. Cumulative effects would then be increased for all alternatives. Alternative 1 route miles and densities for Mooretown summer range would increase from 78 miles (0.34 mile per square mile) to 87 miles (0.38 mile per square mile), an increase of 9 miles and 0.04 mile per square mile (see Table 103). A similar increase would occur with Alternatives 2, 4 and 5. Existing motorized trails, existing open road densities across the Plumas NF also contribute to cumulative effects to mule deer and their use of summer ranges. Decrease in habitat effectiveness for deer becomes a factor when road densities exceed 2 miles per square mile. Habitat effectiveness for deer has been reduced on most the Plumas NF based on existing road densities forest-wide. Currently 65% to 79% of the forest contains densities greater than 2 miles per square mile (see Table 66, TES Wildlife Section). Therefore existing road densities when added to existing motorized trails (Alternative 3) would equal 2.04 miles per square mile and appear to narrowly exceed the road densities recommended by the Mule Deer Working Group (1.9 miles per square mile). Motorized trails that would be added under Alternatives 1, 2, 4 or 5 would add cumulatively to the existing density of existing roads and trails by a range of 0.05 (Alternative 4) to 0.34 (Alternative 1) mile per square mile for the Mooretown Deer Herd. Therefore, since all alternatives would maintain existing road, trails and proposed trail densities above 2 miles per square mile, it would be expected that habitat effectiveness for deer would decline within summer range for the Mooretown Deer Herd.

3.7.28.2.3.7 Eastern Tehama Deer Herd – Direct and Indirect Effects

For the Eastern Tehama Deer Herd, critical summer range is impacted the most by route miles and route densities. Within critical summer range, Alternative 1 adds 17 miles (1.89 miles per square mile) of unauthorized routes with Alternatives 2 and 5 ranging from 8 miles (0.89 mile per square mile) to 7 miles (0.77 mile per square mile) of proposed trails. Alternative 4 has the least amount of proposed trails with 6 miles (.67 mile per square mile). Although route and trail miles appear small, the route densities are relatively high, indicating that the miles of route and trails occur within a relatively small area of critical summer range for the Eastern Tehama Deer Herd.

Within summer range, Alternative 1 has 10 miles (0.62 mile per square mile) of unauthorized routes, while Alternatives 2, 4 and 5 add only 1 mile (0.06 mile per square mile) of proposed trail. Within summer range, Alternative 1 has the highest number of route miles, where direct and indirect disturbance associated with motorized routes could occur. In summary, Alternative 1 poses the greatest risk to the Eastern Tehama Deer Herd on both types of summer ranges. Alternatives, 2, 4 and 5 present an equal and least risk to deer.

Implementing Alternative 1 would have unauthorized route densities of 1.89 miles per square mile in critical summer range that approach the level of 1.9 miles per square mile that is recommended by the Mule Deer Working Group. In summer range, Alternative 1 route densities drop to 0.62 mile per square mile. All other alternatives have lower densities in both critical summer and summer ranges within the Eastern Tehama Deer Herd. Alternative 2 has the next highest level of trail densities for critical summer range at 0.89 mile per square mile, followed by Alternative 5 at 0.77 mile per square mile and Alternative 4 at 0.67 mile per square mile. For summer range Alternatives 2, 4 and 5 have equal densities at 0.06 mile per square mile. For the Eastern Tehama Deer Herd, Alternative 1 has the most impact to the herd and Alternative 4 would have the least impact as a result of trail densities proposed to be added in both critical summer and summer range. Of the action alternatives that propose adding trails, Alternative 4 presents the least risk to habitat and habitat use followed by Alternative 5 and Alternative 2.

3.7.28.2.3.8 Eastern Tehama Deer Herd - Cumulative Effects

For *critical* summer range category, cumulative route miles and densities under Alternatives 1, 2, 4 and 5 do not change since Alternative 3 does not contribute any existing motorized trail miles or densities. There are no existing motorized trails within *critical* summer range for the Eastern Tehama

Deer Herd. However for the summer range category, Alternatives 1, 2, 4 and 5 route miles and densities would be additive to the 1 mile of an existing motorized trails that occur in this range category. Therefore, Alternative 1 route miles and densities for the Eastern Tehama summer range would increase slightly from 10 miles (0.62 mile per square mile) to 11 miles (0.68 mile per square mile), an increase of just the one mile (0.06 mile per square mile) (see Table 103). A similar increase to Eastern Tehama summer range would occur with Alternatives 2, 4 and 5. Therefore route miles and densities in summer range would increase for all alternatives by 1 mile (0.06 mile per square mile). Existing motorized trails, existing open road densities across the Plumas NF also contribute to cumulative effects to mule deer and their use of summer or winter ranges. Decrease in habitat effectiveness for deer becomes a factor when road densities exceed 2 miles per square mile. Habitat effectiveness for deer has been reduced on the Plumas NF based on existing road densities forest wide. Currently 65% to 79% of the forest contains densities greater than 2 miles per square mile (see Table 66, TES Wildlife Section). Therefore existing road densities when added to existing trails (Alternative 3) would range from 2.0 to 2.06 miles per square mile and appear to slightly exceed the road densities recommended by the Mule Deer Working Group (1.9 miles per square mile). Motorized trails that would be added under Alternatives 1, 2, 4 or 5 would add cumulatively to the existing density of roads and existing trails by a range of 0.06 (Alternatives 2, 4, and 5 summer range) to 1.89 (Alternative 1 critical summer range) miles per square mile for the Eastern Tehama Deer Herd. Therefore, since all alternatives would maintain existing road, trails and proposed trail densities above 2 miles per square mile, it would be expected that habitat effectiveness for deer would decline within the Eastern Tehama Deer Herd across critical summer and summer ranges. Critical summer range would be impacted to a higher level than summer ranges since densities are higher for critical summer range across all alternatives.

3.7.28.2.3.9 Loyalton/Truckee Deer Herd – Direct and Indirect Effects

Alternative 1 unauthorized route miles exceed those proposed under Alternatives 4 and 5 by a two-to-one ratio (5 miles vs. 2 miles) in summer range for the Loyalton/Truckee Deer Herd. Alternative 2 proposes only 1 mile of trail. Alternative 1 poses the greatest risk to the Loyalton/Truckee Deer Herd on summer range where Alternative 2 poses the least risk to summer range habitat for deer.

Implementing Alternative 1 would have unauthorized route densities that exceed proposed trail densities under Alternatives 2, 4 and 5 by about two to one ratio within summer range for the Loyalton/Truckee Deer Herd. Alternatives 4 and 5 have the second highest level of trail densities (0.40 mile per square mile) for summer range. Alternative 2 has less trail density (0.20 mile per square mile) than Alternatives 1, 4 and 5. For the Loyalton/Truckee Deer Herd, Alternative 1 has the most impact to the herd, habitat and habitat use and Alternative 2 would have the least impact.

3.7.28.2.3.10 Loyalton/Truckee Deer Herd - Cumulative Effects

Routes miles and densities under Alternatives 1, 2, 4 and 5 do not change since Alternative 3 does not have existing motorized trails within the Loyalton/Truckee Deer Herd. Since Alternative 3 does not contribute to cumulative effects, existing open road densities across the Plumas NF do contribute to cumulative effects to mule deer and their use of summer ranges. Decrease in habitat effectiveness for deer becomes a factor when road densities exceed 2 miles per square mile. Habitat effectiveness for deer has been reduced on most of the Plumas NF based on existing road densities forest wide. Currently 65% to 79% of the Forest contains densities greater than 2 miles per square mile (see Table 66, TES Wildlife Section). Therefore existing road densities combined with unauthorized routes in Alternative 1 or proposed trail additions under Alternatives 2, 4 and 5 would range between 2.20 miles per square mile (Alternative 2) and 3.0 miles per square mile (Alternative 1) and appear to exceed the road densities recommended by the Mule Deer Working Group (1.9 miles per square mile). Motorized trails that would be added under Alternatives 1, 2, 4 or 5 would add cumulatively to the existing density of existing roads within the Loyalton/Truckee Deer Herd. Therefore, since all alternatives would maintain existing road and proposed trail densities above 2 miles per square mile, it would be expected that habitat effectiveness for deer would decline within summer range for the Loyalton/Truckee Deer Herd.

3.7.28.2.3.11 Doyle Deer Herd – Direct and Indirect Effects

Route miles for the Doyle Deer Herd are greatest under Alternative 1, where unauthorized route miles exceed all of the action alternatives by at least 268 miles within summer ranges. Within fawning habitat, trail miles are similar for Alternatives 4 and 5 with Alternative 1 exceeding the remaining alternatives by at least 12 miles. Alternative 1 poses the greatest concern and risk to the Doyle Deer Herd on both summer ranges and fawning habitat that are important to reproduction and rearing of young during the summer months.

Implementing Alternative 1 would have unauthorized route densities that exceeded existing and proposed trail densities within Alternatives 2, 4 and 5 by about three to one within both summer and fawning habitat for the Doyle Deer Herd. Alternative 2 has the second highest level of trail densities for all deer herd range categories; summer and fawning. Alternative 4 has the least impact to summer range of the action alternatives that add trails to the NFTS and is similar to Alternative 5 in proposed trail densities (0.06 mile per square mile) in fawning habitat. For the Doyle Deer Herd, Alternative 1 has the most impact to the herd and Alternative 4 would have the least impacts as a result of route miles and trail densities proposed to be added in both summer range and fawning habitat.

3.7.28.2.3.12 Doyle Deer Herd - Cumulative Effects

Route miles and densities under Alternatives 1, 2, 4 and 5 are increased when trail miles and densities are added. Alternative 3 does not add any routes, but represents the existing NFTS motorized trail network. Therefore, these trails currently exist on the landscape, and unauthorized route (Alternative 1) and proposed trail densities represented by Alternatives 2, 4 and 5 would be additive. For example, Alternative 1 route miles and densities for Doyle summer range would increase from 349 miles (0.62 mile per square mile) to 360 miles (0.64 mile per square mile), an increase of 11 miles (0.02 mile per square mile) (see Table 103). A similar increase to Doyle summer range would occur with Alternatives 2, 4 and 5. In fawning habitat, all alternatives (1, 2, 4 and 5) would contribute to the 0.4 miles (0.01 mi/sq mi) of existing route miles and densities. Existing motorized trails, existing open road densities across the Plumas NF also contribute to cumulative effects to mule deer and their use of summer or winter ranges. Decrease in habitat effectiveness for deer becomes a factor when road densities exceed 2 miles per square mile. Habitat effectiveness for deer has been reduced on the Plumas NF based on existing road densities forest wide. Currently 65% to 79% of the forest contains densities greater than 2 miles per square mile (see Table 66, TES Wildlife Section). Therefore existing road densities when added to existing NFTS motorized trails (Alternative 3) would range from 2.01 (fawning) to 2.02 (summer) miles per square mile and appear to slightly exceed the road densities recommended by the Mule Deer Working Group (1.9 miles per square mile). Motorized trails that would be added under Alternatives 1, 2, 4 or 5 would add cumulatively to the existing density of roads and existing trails by a range of 0.05 (Alternative 4, summer range) to 0.62 (Alternative 1, summer range) miles per square mile for the Doyle Deer Herd. Therefore, since all alternatives would maintain existing road, trails and proposed trail densities above 2 miles per square mile, it would be expected that habitat effectiveness for deer would decline within the Doyle Deer Herd across both summer and fawning ranges.

3.7.28.2.3.13 Trail and Unauthorized Route Miles and Density Summary

For all major deer herds occurring within the boundaries of the PNF, Alternative 1 would have the greatest existing trail and unauthorized route miles and densities compared to all of the action alternatives within essential summer (fawning) and winter (critical winter and winter) ranges. Alternative 2 would have the next highest level of trail densities within the deer ranges for all the deer herds. Within critical summer and fawning areas, Alternative 1 poses a somewhat higher risk to all deer herds on the PNF and may therefore pose a greater risk in the ability for these deer herds to successfully reproduce and rear fawns, as compared to all of the action alternatives. Alternatives 3 and 4 have the least impacts to the Plumas deer herds within summer and winter ranges. Alternative 1 also has the greatest direct and indirect effects to winter ranges, especially within the Sloat Deer Herd, where Alternative 1 unauthorized route densities exceed the action alternatives by almost 1 mile per square mile. Habitat effectiveness would be reduced to the greatest extent under Alternative 1, to the least extent under Alternatives 3 and 4, with Alternatives 2 and 5 having a moderate impact on habitat effectiveness.

3.7.29 Selection of Project level Management Indicator Species

Management Indicator Species (MIS) for the Plumas National Forest (PNF) are identified in the 2007 Sierra Nevada Forests Management Indicator Species (MIS) Amendment (USDA Forest Service 2007a), which is incorporated by reference. The habitats and ecosystem components and associated MIS analyzed for this project were selected from this list of MIS, as indicated in Table 104. In addition to identifying the habitat or ecosystem components (1^{st} column), the CWHR type(s) defining each habitat/ecosystem component (2^{nd} column) and the associated MIS (3^{rd} column), the table discloses whether or not the habitat of the MIS is potentially affected by this project (4^{th} column).

Table 104. Selection of Management Indicator Species for project-level habitat analysis for this Project.

Habitat or Ecosystem Component	CWHR Type(s) defining the habitat or ecosystem component	Sierra Nevada Forests Management Indicator Species *Scientific Name*	Category for Project Analysis [1]
Riverine and Lacustrine	lacustrine (LAC) and riverine (RIV)	aquatic macroinvertebrates	3
Shrubland (west-slope chaparral types)	montane chaparral (MCP), mixed chaparral (MCH), chamise-redshank chaparral (CRC)	fox sparrow *Passerella iliaca*	3
Oak-associated Hardwood and Hardwood/conifer	montane hardwood (MHW), montane hardwood-conifer (MHC)	mule deer *Odocoileus hemionus*	3
Riparian	montane riparian (MRI), valley foothill riparian (VRI)	yellow warbler *Dendroica petechia*	3
Wet Meadow	wet meadow (WTM), freshwater emergent wetland (FEW)	Pacific tree frog *Pseudacris regilla*	3
Early Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2 and 3, all canopy closures	mountain quail *Oreortyx pictus*	3
Mid Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 4, all canopy closures	mountain quail *Oreortyx pictus*	3
Late Seral Open Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P	sooty (blue) grouse *Dendragapus obscurus*	3
Late Seral Closed Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D) and tree size 6.	California spotted owl *Strix occidentalis occidentalis*	3
		northern flying squirrel *Glaucomys sabrinus*	3
Snags in Green Forest	medium and large snags in green forest	hairy woodpecker *Picoides villosus*	2
Snags in Burned Forest	medium and large snags in burned forest (stand-replacing fire)	black-backed woodpecker *Picoides arcticus*	2

[1] Category 1: MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.

Category 2: MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.

Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

Black-backed Woodpecker (Category 2)–This Project is within a burned forest or within a portion of a recent wildland fire area; however, no burnt snags will be affected as a part of the proposed action or alternatives. No removal of snags in burnt forests is proposed or planned under this project as an action. In addition, Gaines et al. 2003 did not identify motorized trails as a factor affecting snags for primary excavators such as the black-backed woodpecker. No effects to black-backed woodpecker habitat (burnt snags) as defined in Table 104 would occur as a result of this project.

Hairy Woodpecker (Category 2)–This Project does contain snags in green forests; however, this habitat or ecosystem component will not be affected as a part of the proposed action or alternatives.

No removal of snags in green forests is proposed or planned under this project as an action. In addition, Gaines et al. 2003 did not identify motorized trails as a factor affecting snags for primary excavators such as the hairy woodpecker. No effects to hairy woodpecker habitat as defined in Table 104 would occur as a result of this project.

The MIS whose habitat would be either directly or indirectly affected by the actions being evaluated as part of this project, identified as Category 3 in Table 104, are carried forward in this analysis. This analysis will evaluate the direct, indirect and cumulative effects of the proposed action and alternatives on the habitat of these MIS. The MIS selected for project-level MIS analysis for this project are: aquatic macroinvertebrates, fox sparrow, mule deer, yellow warbler, Pacific tree frog, mountain quail, sooty grouse, California spotted owl and northern flying squirrel. The project level MIS analysis is incorporated by reference.

3.7.29.1 Oak Associated Hardwood and Hardwood Conifer – Mule Deer – Affected Environment

The mule deer is the only species in the Ungulate Group. Mule deer is selected as MIS on the PNF and the rest of the Sierra Nevada. The Plumas Land Resource Management Plan (Forest Plan) (USDA Forest Service 1988) and subsequent amendments indicate that mule deer use a mix of all successional stages, but the defining habitat or ecosystem component for mule deer habitat includes oak-associated montane hardwood and montane hardwood-conifer (MHW and MHC). Most deer on the PNF migrate seasonally between higher elevation summer range and low elevation winter range. Although not required under the MIS analysis, a deer herd analysis is incorporated into the EIS since it responds to an internal issue of concern. In general, critical winter range, summer range and fawning habitats represent key habitats for deer where heavier use and higher quality habitats for wintering and summer use are expected to occur.

Zone of Influence - Mule deer were selected as a MIS for oak associated hardwood and hardwood-conifer. The defining CWHR habitat types or ecosystem component is montane hardwood (MHW) and montane hardwood-conifer (MHC). These habitat types will be evaluated to determine the amount of habitat influenced within a 200-meter zone of influence. This zone of influence is based upon the Rost and Bailey’s study in Colorado, which indicated that deer were displaced within a 200-meter distance of secondary roads. A distance of 200 meters was applied to represent the zone of influence related to motorized trails, since the majority of PNF roads and trails are likely most similar to those roads addressed in the Colorado study area. The proportion of MHW and MHC habitat occurring within this zone of influence was determined for each alternative. Thresholds associated with this measure have not been established, but relative changes in affected habitat can be evaluated and compared between the alternatives.

3.7.29.1.1 Direct and Indirect Effects—Zone of Influence (Oak Associated Hardwood and Hardwood Conifer)

As stated above, deer were found to respond to disturbance associated with secondary motorized roads and trails within a 200-meter distance. Although, because deer may respond differently, depending on the type of route and the type of surrounding vegetation, analyzing for these variables can be complex. The amount of disturbance to deer depends upon the type of route, the intensity of use and the degree to which motorized activities overlap with deer use. The project alternatives only consider the addition of motorized trails and mixed use to the National Forest Transportation System (NFTS) that are native surface, which have less volume of traffic and receive lower rates of speed. Therefore, a zone of influence within 200 meters of proposed trails (includes mixed use) and unauthorized routes was used by to compare differences in the direct and indirect impacts between alternatives for oak associated hardwood and hardwood/conifer habitat used by deer as represented by CWHR types MHW and MHC. Habitat influenced was then compared to the amount of habitat available Sierra Nevada wide. Although major roads (i.e., paved and surfaced roads used by passenger vehicles which may receive higher use levels and rates of speed, including county roads, state highways, etc.) may have a greater zone of influence to deer than secondary motorized routes, a 200-meter zone of influence was used to analyze all existing motorized trails and routes consistently because using a greater zone of influence may result in excessive overlap in habitat when considering all motorized routes and therefore, overstate the effects of motorized routes. In addition, regardless of the amount of impact from a particular type of route (major or secondary), the impacts from existing trails and routes remain constant across all of the alternatives and therefore, the direct and indirect effects of adding new routes to the NFTS is demonstrated by the relative difference between each of the project alternatives.

Areas that are less influenced by motorized routes are considered “security habitat,” whereas, areas influenced by routes are considered “zones of influence” where deer are less secure. For alternative comparison purposes, a simple ranking system, such as the one developed by Gaines et al. (2003), is used. For this purpose, less than 5 percent of MHW and MHC habitat influenced was ranked as a low level of road or trail influence, 5 to 10 percent of MHW and MHC habitat influenced was ranked as a moderate level of influence and greater than 10 percent of MHW and MHC habitat influenced was ranked as a high level of influence. Using this ranking system, all alternatives ranked low in the level of motorized trail and route influence on deer’s use of MHW and MHC habitat, where the effectiveness of MHW and MHC habitat would be minimally affected. The section below describes how the alternatives rank in their influence on MHW and MHC habitats.

Alternative 1 poses the greatest risk to MHW and MHC habitats by affecting 1.5% (11,883 acres on the PNF) of the habitat type Sierra Nevada wide. These 11,883 acres will result in reduced habitat effectiveness from potential disturbance or avoidance behavior as a result of factors associated with motorized routes. Motorized proposed trails under Alternatives 4 and 5 are similar in the level of influence MHW and MHC habitats for deer. Within the 200-meter zone of influence MHW and MHC habitat are affected from 0.1% (1,127 acres) to 0.5% (3,817 acres). The effects from Alternatives 4 and 5 represent almost 10,000 acres less of an impact on MHW and MHC habitat than Alternative 1. Alternative 2 represents the second highest level of impact to MHW and MHC habitats, but represents 8,000 acres less of an impact than Alternative 1.

Table 105. Proportion of Oak-associated hardwood and hardwood/conifer habitat within a 200-meter "Zone of Influence" of proposed trails (Alt 2, 4, 5) and Unauthorized Routes (Alt 1) by alternative.

Mule Deer MIS Habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3*	Alt 4	Alt 5
	Oak-associated Harwood and Hardwood/Conifer	809,000	11,883	3,817	2,121	1,127	1,617
	Proportion of Habitat		1.5%	0.5%	0.3%	0.1%	0.2%
	Overall Habitat Ranking (High >10%, Moderate 5%-10%, Low < 5%)		Low	Low	Low	Low	Low

* Alt 3 represents PNF's 130 miles of existing motorized trails. Alts. 4 and 5 include mixed use on Forest Road 24N28.

3.7.29.1.2 Overall Cumulative Effects from Present and Reasonably Foreseeable Future Actions

Cumulative effects to mule deer include current and historic grazing of mule deer habitat; changes in habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; and recreational activities including hunting, camping and general recreation activities including all forms of motorized use including 4-wheel-drive vehicles, vehicles 50" or less and motorcycles.

Appendix C of this EIS provides a list and description of present and reasonably foreseeable projects on the Forest and private lands within the PNF boundary. Some, but not all, of these activities will contribute to impacts to the mule deer within the PNF boundary. Table 106 lists only those projects that affect deer habitat. The PNF currently has 42 active livestock grazing allotments including both cattle and sheep. Forest Plan Standards and Guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands. Since 2000, over 73,345 acres of forest vegetation and fuels projects were completed, which consisted primarily of thinning, group selection, mastication and/or burned vegetation to reduce the potential for catastrophic wildfires. The thinning treatments may result in the short-term reduction in cover for deer, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. These treatments generally do not increase forage condition for deer because they do not usually result in reducing the canopy cover below 40%, except for group selection harvest treatments on the Forest. Group selection harvests are expected to increase foraging habitat for mule deer. Many recent, current and future vegetation and fuels reduction projects are emphasizing habitat improvement for deer by removing competing conifers within oak habitats and aspen habitats which are designed to enhance mule deer foraging condition. Since 2000, approximately 266,963 acres burned on the PNF, some of which have removed mule deer habitat initially, but in the long term created habitat for deer as natural succession progresses post fire.

Currently, there is a high demand for recreational use on the PNF due to its close proximity to urban centers (e.g. Oroville, Chico, and Reno). The PNF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (e.g. downhill skiing, cross-country skiing, snowmobiling), summer OHV use and a variety of other non-motorized use (e.g. equestrian use, mountain biking). Recreational use on the PNF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the PNF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting and OHV use. This is evident due to planned recreational events (Backcountry Discovery Trail, Dual sport Motorcycle Recreation Event) and proposals for campground rehabilitation, trailhead improvements and trail projects (see Appendix C) Generally, the increase in recreational use on the PNF has the potential to cause an increase in negative interactions between humans and mule deer. Future increase in recreational use on the PNF is expected and therefore, increased disturbance to mule deer would be expected, particularly during the summer months. Table 106 lists present and reasonably foreseeable future actions taken after a review of Appendix C and summarizes cumulative impacts from present and reasonably foreseeable projects with a description of the potential impact to mule deer and their habitat.

Table 106. Direct, indirect and cumulative impact to mule deer from present and reasonably foreseeable future projects.

Project type	Number of Projects	Mule Deer Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction–thinning, group select, aspen enhancement	30 (Empire, Slapjack, Basin, Grizz, Snake Lake, Webber's, Freeman, Mabie, Clarks, Hungarian, Genesee, Jackson, Ingalls, Big Hill, LaPorte, Watdog, Concow,French, Burnt Bridge, OnTop, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie, Hopper, Corral, Am Valley, Hughes, St. Louis)	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in aspen, meadow and oak habitats.	• Short-term adverse impacts during harvest. • Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires. • Beneficial cumulative effects from Group selection (increase in foraging habitat). • Improved Oak and Aspen habitat for Deer.
Hazard tree removal	4 (Moonlight, Camp 14, Rich, Cold)	Minimal impact. Short-term disturbance/displacement during harvest.	None to minimal cumulative impact
Watershed Restoration	21 (Sulphur-Barry, Cold Fire, Last Chance, Red Clover (3),Frenchman, Lake Davis, Nelson-Onion, Sulphur, Poco, Dotta, Meadowview, Lower Middle Fork, South Fork, Upper Indian, Black Gulch, Greenhorn, Wildcat/Boulder)	Short-term disturbance during implementation. Improve riparian and meadow habitat quality used for forage and fawning.	Beneficial cumulative impact by improving long-term forage and fawning habitat quality.
Range Allotment permit renewal and Allotment Changes	3 (Grizzly Valley, Grizzly Valley Community, Humbug, Dixie Valley Sheep)	Impacts from incidental browsing of oak/hardwoods by livestock	Cumulative impact restricted to browsing of no more than 20% of annual growth of hardwood seedlings and advanced regeneration.
Temporary OHV Forest Order	1 (Forest-wide)	Closed Forest to cross-country travel. Lessened disturbance and displacement of deer.	Overall benefitted deer by reducing level of disturbance from OHV and preventing impacts to deer habitat within summer, winter and fawning fawning habitats

Project type	Number of Projects	Mule Deer Direct and Indirect Impact	Overall Cumulative Impact
Energy Related SUP	3 (Plumas-Sierra Rural Electric Co-op, Horizon Wind Energy Site Testing, Pike County Peak Microwave relay)	Reduction of deer habitat from access road construction.	Reduction of deer habitat on 3 miles of road and disturbance/displacement of deer from road use.
Fire Recovery/ Restoration	5 (Moonlight Wheeler, Antelope, Portwine, Canyon Complex, Concow)	Temporary disturbance/displacement during project implementation.	None to minimal. Project will result in temporary displacement and disturbance. Overall restoration will be beneficial in accelerating cover for deer.
Private Land Timber Activities	Timber harvest plans, Coversions, Fire Hazard, Public Utility, Emergency Ops, Dead Fuelwood, Other (308,221 acres)	Habitat changes from denser forest conditions to more open canopies and changes to understory.	Anticipated increase in forage habitat, reduction in hiding or cover habitat. Overall, positive improvement in forage to cover ratios.
Alternative 3 Existing OHV Routes (Table 103)	130 miles	Existing trails influence 2,121 acres of MHW and MHC habitat or 0.3% of the habitat Sierra Nevada wide.	Acres are additive to those shown for Alternatives 1, 2, 4 and 5, however habitat ranking remains in the Low category.
Open Road Densities	Forestwide	Decrease in habitat effectiveness for road densities in categories of > 2mi/Sq Mi.	Habitat effectiveness for Deer is reduced based on road densities forest wide. 65% to 79% of the forest contains densities >2mi/sq mi
Wildlife Water Developments	4 Guzzlers (Johnson Hill, Massack, Will Fire, Rich)	Guzzlers provide a reliable year around water source for wildlife.	Overall a benefit to deer. Provides a reliable water source and increase habitat capacity in vicinity of water source.

When considering all of the cumulative effects of present and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires and recreation, Alternative 1 poses the greatest risk to the 6 major deer herds on the PNF, where impacts from unauthorized route densities and the number of miles of unauthorized routes, as well as the impacts to oak-associated hardwood and hardwood/conifer are the greatest. Alternative 2 represents the second highest level of impact and poses a moderate risk to deer as a result of adding cumulative effects to the effects of proposed trail densities, proposed trail miles and impacts to oak-associated hardwood and hardwood conifer. Alternatives 3, 4 and 5 pose the lowest risk to deer as a result of adding cumulative effects to the effects of proposed trail densities, proposed trail miles and impacts to oak-associated hardwood and hardwood conifer.

3.7.29.1.3 Summary of Mule Deer Status and Trend at the Bioregional Scale

The Forest Plan (as amended by the Sierra Nevada Forests MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mule deer; hence, the oak-associated hardwood and hardwood/conifer effects analysis for this Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mule deer. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008.

3.7.29.1.3.1 Habitat Status and Trend

There are currently 809,000 acres of oak-associated hardwood and hardwood/mixed conifer habitat on National Forest System (NFS) lands in the Sierra Nevada. The trend is slightly increasing (within the last decade, changing from 5% to 7% of the acres on NFS lands).

3.7.29.1.3.2 Population Status and Trend

The mule deer has been monitored in the Sierra Nevada at various sample locations by herd monitoring (spring and fall) and hunter survey and associated modeling (CDFG 2007). California Department of Fish and Game (CDFG) conducts surveys of deer herds in early spring to determine the proportion of fawns that have survived the winter and conducts fall counts to determine herd composition (CDFG 2007). This information, along with prior year harvest information, is used to estimate overall herd size, sex and age rations and the predicted number of bucks available to hunt (ibid). These data indicate that mule deer continue to be present across the Sierra Nevada and current data at the range-wide, California and Sierra Nevada scales indicate that, although there may be localized declines in some herds or Deer Assessment Units (DAU), the distribution of mule deer populations in the Sierra Nevada is stable.

3.7.29.1.3.3 Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mule Deer Trend

The cumulative range of habitat influenced consists of a low of 2,121 acres (Alternative 3) to a high of 14,004 acres (Alternative 1) of oak-associated hardwood and hardwood/conifer habitat. The other three alternatives fall within this range. This amount of habitat influenced equals 0.3% to 1.8% of the habitat available Sierra Nevada wide. Based on the small percentage of habitat influenced, this project will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion.

3.7.30 Spotted Owl: MIS Analysis

Aside from its listing as a Regional Forester as a Sensitive Species, the California spotted owl is designated as an MIS on the PNF. The Sierra Nevada MIS Amendment defined Late Seral Closed Canopy Coniferous Forest as the habitat component for the spotted owl. The corresponding CWHR types that define the habitat component are ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), with tree and canopy cover classes 5M, 5D and 6. Pure eastside pine types are not considered suitable for California spotted owls. Currently, there are 994,000 acres of these CWHR types on NFS lands in the Sierra Nevada (USDA Forest Service 2007a). These habitat types, for the purpose of this MIS analysis, will be analyzed based on the amount of habitat influenced within a 200-meter zone of influence.

3.7.30.1.1 Direct and Indirect Effects

Late seral closed canopy coniferous forest do occur in close proximity to unauthorized routes, existing motorized trails and proposed trails (Table 107). Of the five alternatives analyzed for impacts to this MIS habitat type, Alternative 1 posed the highest level of impact affecting approximately 4.2% of the habitat Sierra Nevada wide. Under this alternative, 41,703 acres of late seral closed canopy coniferous forest habitat occurs within 200 meters of unauthorized routes. The quality and use of this habitat type by spotted owls will be affected through increased noise levels, disturbance and displacement. Alternative 2 has the second highest level of effects (1.5%) to late seral closed canopy coniferous forest habitat. Alternative 4 poses the lesser risk than Alternatives 2 and 5 by affecting only 0.8% of the habitat.

Table 107. Proportion of California spotted owl Management Indicator Species habitat within a 200-meter "Zone of Influence" by motorized unauthorized routes, existing trails and proposed trails.

California spotted owl MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3*	Alt 4	Alt 5
	Late Seral Closed Canopy Coniferous forest	994,000	41,703	14,533	6,214	7,971	9,221
	Proportion of Habitat		4.2%	1.5%	0.6%	0.8%	0.9%
	Overall Habitat Ranking (High >10%, Moderate 5%-10%, Low < 5%)		Low	Low	Low	Low	Low
* Alt. 3 represents PNF's 130 miles of existing motorized trails. Alts. 4 and 5 include mixed use on Forest Road 24N28.							

3.7.30.2 Overall Cumulative Effects from Present and Reasonably Foreseeable Future Actions

Cumulative effects to late seral closed canopy coniferous forests include loss of habitat through catastrophic wildfires; timber and fuels management where canopy cover and nesting and foraging habitat has been reduced or removed.

Appendix C of this EIS provides a list and description of present and reasonably foreseeable projects on the Forest and private lands within the PNF boundary. Some, but not all, of these activities will contribute to impacts to late seral closed canopy coniferous forests within the PNF boundary. Projects of a small isolated scale found in Appendix C, such as hazard tree removal, trail maintenance, recreation improvements or special uses, are not included due the fact that they are insignificant and discountable and do not present a risk to spotted owls. Since 2000, over 73,345 acres of forest vegetation and fuels projects were completed, which consisted of group selection, understory thinning, mastication and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments affect less than 10% of late seral closed canopy coniferous forest. These thinning treatments may result in the short-term reduction of late seral closed canopy coniferous forest, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Since 2000, approximately 266,963 acres have burned on the PNF, some of which has removed late seral closed canopy coniferous forest for the next 50 to 70 years.

Table 108 lists present and reasonably foreseeable future actions taken after a review of Appendix C and summarizes cumulative impacts from present and reasonably foreseeable projects and a description of the potential impact to late seral closed canopy coniferous forests.

Table 108. Direct, indirect and cumulative impact to spotted owls from present and reasonably foreseeable projects.

Project type	Number of Projects	spotted owl Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction–thinning, group select, aspen enhancement	30 (Empire, Slapjack, Basin, Grizz, Snake Lake, Webber's, Freeman, Mabie, Clarks, Hungarian, Genesee, Jackson, Ingalls, Big Hill, LaPorte, Watdog, Concow,French, Burnt Bridge, OnTop, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie, Hopper, Corral, Am Valley, Hughes, St Louis)	Small decreases (<10%) in late seral closed canopy coniferous forest outside of PACs/SOHAs.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	4 (Moonlight, Camp 14, Rich, Cold)	Minimal impact or disturbance during harvest.	No impact to late seral closed canopy coniferous forest
Temporary OHV Forest Order	1 (Forest-wide)	Closed Forest to cross-country travel. Lessened disturbance and displacement of owls.	Overall benefit to late seral closed canopy coniferous forest by eliminating effects to habitat quality.
Private Land Timber Activities	Timber harvest plans, Coversions, Fire Hazard, Public Utility, Emergency Ops, Dead Fuelwood, Other (308,221 acres)	Habitat changes from denser forest conditions to more open canopies and changes to understory.	Anticipated decrease in nesting habitat, and increases towards foraging habitat or non-suitable habitat.
Alternative 3 Existing OHV Routes (Table 108)	130 miles	Existing trails influence 6,214 acres of Late Seral Closed Canopy habitat or 0.6% of the habitat Sierra Nevada wide.	Acres are additive to those shown for Alternatives 1, 2, 4 and 5, however habitat ranking remains in the Low category for all alternatives.
Fire Recovery/ Restoration	5 (Moonlight Wheeler, Antelope, Portwine, Canyon Complex, Concow)	Short term impacts limited to presence of planting crews. Direct and indirect impacts non-detectable.	None to minimal. Overall restoration will be beneficial in accelerating future habitat for owl.

When considering all of the cumulative effects of present and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires and miscellaneous projects, Alternative 1 poses the greatest risk to late seral closed canopy coniferous forest (PPN, SMC, WFR, RFR, 5M, 5D and 6) by affecting more of this habitat type within the 200-meter zone of influence than any other alternative (47,917 acres). Alternative 3 poses the least risk when all cumulative effects are considered. All other action alternatives (2, 4 and 5) pose a moderate to low risk to late seral closed canopy coniferous forest, with cumulative effects ranging from 14,185 acres under Alternative 4 to 20,747 acres under Alternative 2.

3.7.30.2.1 Summary of California spotted owl Status and Trend at the Bioregional Scale

The Forest Plan (as amended by the Sierra Nevada Forests MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the California spotted owl; hence, the late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir and red fir) habitat effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008).

3.7.30.2.1.1 Habitat Status and Trend

There are currently 994,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir and red fir) habitat on NFS lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on NFS lands).

3.7.30.2.1.2 Population Status and Trend

California spotted owl has been monitored in California and throughout the Sierra Nevada through general surveys, monitoring of nests and territorial birds and demography studies (Verner et al. 1992; USDA Forest Service 2001, 2004, 2006; USFWS 2006; Sierra Nevada Research Center 2007). Current data at the range-wide, California and Sierra Nevada scales indicate that, although there may be localized declines in population trend (i.e. localized decreases in “lambda” the estimated annual rate of population change), the distribution of California spotted owl populations in the Sierra Nevada is stable.

3.7.30.2.1.3 Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends

This project will have a total cumulative effect of 47,917 acres of late seral closed canopy coniferous forest habitat under Alternative 1 (high) and 6,214 acres under Alternative 3 (low). Based on the acres affected within the 200-meter zone of influence, which range from 0.6% to 4.8% of the total habitat Sierra Nevada wide, this project area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of California spotted owl across the Sierra Nevada bioregion.

3.7.31 Northern Flying Squirrel: MIS Analysis

The northern flying squirrel is designated as a MIS on the PNF. The Sierra Nevada MIS Amendment defined late seral closed canopy coniferous forest as the habitat component for the northern flying squirrel. The corresponding CWHR types that define the habitat component are ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), with tree and canopy cover classes 5M, 5D and 6. Currently, there are 994,000 acres of these CWHR types across NFS lands in the Sierra Nevada. These habitat types, for the purpose of this MIS analysis, will be analyzed based on the amount of habitat influenced within a 200-meter zone of influence.

3.7.31.1.1 Direct and Indirect Effects

Late seral closed canopy coniferous forest occurs in close proximity to unauthorized routes, existing motorized trails and proposed trails. Of the five alternatives analyzed for impacts to this MIS habitat type, Alternative 1 posed the highest level of impact affecting approximately 4.2% of the habitat Sierra Nevada wide (Table 109). Under this alternative, 41,703 acres of late seral closed canopy coniferous forest habitat occurs within 200 meters of unauthorized routes. The quality and use of this habitat type by spotted owls would be affected through increased noise levels, disturbance and displacement. Alternative 2 has the second highest level of effects (1.5%) to late seral closed canopy coniferous forest habitat. Alternative 4 poses the lesser risk than Alternatives 2 and 5 by affecting only 0.8% of the habitat.

Table 109. Proportion of Northern Flying Squirrel MIS habitat within a 200-meter "Zone of Influence" of unauthorized routes, existing motorized trails and proposed trails.

Northern flying squirrel MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3*	Alt 4	Alt 5
	Late Seral Closed Canopy Coniferous Forest	994,000	41,703	14,533	6,214	7,971	9,221
	Proportion of Habitat		4.2%	1.5%	0.6%	0.8%	0.9%
	Overall Habitat Ranking (High >10%, Moderate 5%-10%, Low < 5%)		Low	Low	Low	Low	Low
* Alt. 3 represents PNF's 130 miles of existing motorized trails. Alts. 4 and 5 include mixed use on Forest Road 24N28.							

3.7.31.1.2 Overall Cumulative Effects from Present and Reasonably Foreseeable Future Actions

Cumulative effects to late seral closed canopy coniferous forests include loss of habitat through catastrophic wildfires; timber and fuels management where canopy cover and nesting and foraging habitat has been reduced or removed.

Appendix C of this EIS provides a list and description of present and reasonably foreseeable projects on the Forest and private lands within the PNF boundary. Some, but not all, of these activities will contribute to impacts to late seral closed canopy coniferous forests within the PNF boundary. Projects of a small isolated scale found in Appendix C, such as hazard tree removal, trail maintenance, recreation improvements or special uses, are not included due the fact that they are insignificant and discountable and do not present a risk to flying squirrels.

Since 2000, over 73,345 acres of forest vegetation and fuels projects were completed, which consisted of group selection, understory thinning, mastication and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments affect less than 10% of late seral closed canopy coniferous forest. These thinning treatments may result in the short-term reduction in late seral closed canopy coniferous forest, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Since 2000, approximately 266,963 acres have burned on the PNF, some of which has removed late seral closed canopy coniferous forest for the next 50-70 years.

Table 110 lists present and reasonably foreseeable future actions taken after a review of Appendix C and summarizes cumulative impacts from present and reasonably foreseeable projects and a description of the potential impact to late seral closed canopy coniferous forests.

Table 110. Direct, indirect and cumulative impact to Northern flying squirrel from present and reasonably foreseeable projects.

Project type	Number of Projects	Northern Flying Squirrel Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction–thinning, group select, aspen enhancement	30 (Empire, Slapjack, Basin, Grizz, Snake Lake, Webber's, Freeman, Mabie, Clarks, Hungarian, Genesee, Jackson, Ingalls, Big Hill, LaPorte, Watdog, Concow,French, Burnt Bridge, OnTop, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie, Hopper, Corral, Am Valley, Hughes, St. Louis)	Small decreases (<10%) in late seral closed canopy coniferous forest outside of PACs/SOHAs.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	4 (Moonlight, Camp 14, Rich, Cold)	Minimal impact or disturbance during harvest.	No impact to late seral closed canopy coniferous forest
Temporary OHV Forest Order	1 (Forest-wide)	Closed Forest to cross-country travel. Lessened disturbance and displacement of squirrels.	Overall benefit to late seral closed canopy coniferous forest by eliminating effects to habitat quality.
Private Land Timber Activities	Timber harvest plans, Coversions, Fire Hazard, Public Utility, Emergency Ops, Dead Fuelwood, Other. (308,221 acres)	Habitat changes from denser forest conditions to more open canopies and changes to understory.	Anticipated decrease in nesting habitat, and increases towards foraging habitat or non-suitable habitat.
Alternative 3 Existing OHV Routes (Table 109)	130 miles	Existing trails influence 6,214 acres of Late Seral Closed Canopy habitat or 0.6% of the habitat Sierra Nevada wide.	Acres are additive to those shown for Alternatives 1, 2, 4 and 5, however habitat ranking remains in the Low category for all alternatives.
Fire Recovery/ Restoration	5 (Moonlight Wheeler, Antelope, Portwine, Canyon Complex, Concow)	Short term impacts limited to presence of planting crews. Direct and indirect impacts non-detectable.	None to minimal. Overall restoration will be beneficial in accelerating future habitat for Northern Flying Squirrel.

When considering all of the cumulative effects of present and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires and miscellaneous projects, Alternative 1 poses the greatest risk to late seral closed canopy coniferous forest (PPN, SMC, WFR, RFR, 5M, 5D and 6) by affecting more of this habitat type within the 200-meter zone of influence than any other alternative (47,917 acres). Alternative 3 poses the least risk when all cumulative effects are considered. All other action alternatives (2, 4 and 5) pose a moderate to low risk to late seral closed canopy coniferous forest, with cumulative effects ranging from 14,185 acres under Alternative 4 to 20,747 acres under Alternative 2.

3.7.31.1.3 Summary of Northern Flying Squirrel Status and Trend at the Bioregional Scale

The Forest Plan (as amended by the Sierra Nevada Forests MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the northern flying squirrel; hence, the late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir and red fir) habitat effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008).

3.7.31.1.3.1 Habitat Status and Trend

There are currently 994,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir and red fir) habitat on NFS lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on NFS lands).

3.7.31.1.3.2 Population Status and Trend Northern Flying Squirrel

The northern flying squirrel has been monitored in the Sierra Nevada at various sample locations by live-trapping, ear-tagging, camera surveys, snap-trapping and radio telemetry: 2002-present on the Plumas and Lassen National Forests (Sierra Nevada Research Center 2007) and 1958-2004 throughout the Sierra Nevada in various monitoring efforts and studies (see USDA Forest Service 2008, Table NOFLS-IV-1). These data indicate that northern flying squirrels continue to be present at these sample sites and current data at the range-wide, California and Sierra Nevada scales indicate that the distribution of northern flying squirrel populations in the Sierra Nevada is stable.

3.7.31.1.3.3 Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends.

This project will have a total cumulative effect of 47,917 acres of late seral closed canopy coniferous forest habitat under Alternative 1 (high) and 6,214 acres under Alternative 3 (low). Based on the acres affected within the 200-meter zone of influence, which range from 0.6% to 4.8 % of the total habitat Sierra Nevada wide, this project will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of northern flying squirrel cross the Sierra Nevada bioregion.

3.7.31.2 Sooty (Blue) Grouse: MIS Analysis

The sooty grouse is designated as a MIS on the PNF. The Sierra Nevada MIS Amendment defined late seral open canopy coniferous forest as the habitat component for the sooty grouse. The corresponding CWHR types that define the habitat component are ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), with tree and canopy cover classes 5S and 5P. Currently, there are 75,000 acres of these CWHR types on NFS lands across the Sierra Nevada. These habitat types, for the purpose of this MIS analysis, will be analyzed based on the amount of habitat influenced within a 200-meter zone of influence.

3.7.31.2.1 Direct and Indirect Effects

Based on the analysis conducted, Alternative 1 affects the most late seral open canopy coniferous forest within the 200-meter zone of influence (Table 111). Alternative 1 affects approximately 1,541 acres or 2.0% of the habitat available Sierra Nevada wide. Effects will be displayed in the form of disturbance, displacement or through avoidance of available late seral open canopy coniferous forest. Alternative 2 has the second highest effect with 499 acres (0.6%) of late seral open canopy coniferous forest being influenced by proposed trails. Alternatives 4 and 5 appear to have similar effects that range from 220 acres (0.3%) to 314 acres (0.4%).

Table 111. Proportion of sooty grouse MIS habitat within a 200-meter "Zone of Influence" of Unauthorized Routes, Existing Motorized Trails and Proposed Trails

Sooty Grouse MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3*	Alt 4	Alt 5
	Late Seral Open Canopy Coniferous Forest	75,000	1,541	499	508	220	314
	Proportion of Habitat		2.0%	0.6%	0.6%	0.3%	0.4%
	Overall Habitat Ranking (High >10%, Moderate 5%-10%, Low < 5%)		Low	Low	Low	Low	Low

* Alt. 3 represents PNF's 130 miles of existing motorized trails. Alts. 4 and 5 include mixed use on Forest Road 24N28.

3.7.31.2.2 Overall Cumulative Effects from Present and Reasonably Foreseeable Future Actions

Cumulative effects to sooty grouse include loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage have been reduced or removed.

Appendix C of this EIS provides a list and description of present and reasonably foreseeable projects on the Forest and private lands within the PNF boundary. Some, but not all, of these activities will contribute to impacts to sooty grouse within the PNF boundary. Projects of a small isolated scale found in Appendix C, such as hazard tree removal, trail maintenance, recreation improvements or special uses, are not included due the fact that they are insignificant and discountable and do not present a risk to sooty grouse. Since 2000, over 73,345 acres of forest vegetation and fuels projects were completed, which consisted of group selection, thinning, mastication and/or burned vegetation to reduce the potential for catastrophic wildfires. These vegetation treatments may have resulted in some limited increases in late seral open canopy coniferous forest since canopy cover is generally not reduced below 40%, except in group selection units where at least 10% of the canopy cover has been retained. However, these treatments are expected in the longer term to benefit this habitat type by reducing wildfire risk. Since 2000, approximately 266,963 acres burned on the PNF, some of which has removed late seral open canopy coniferous forest. Table 112 lists present and reasonably foreseeable future actions taken after a review of Appendix C and summarizes cumulative impacts from present and reasonably foreseeable projects with a description of the potential impact to sooty grouse and their habitat.

Table 112. Direct, indirect and cumulative impact to sooty grouse from present and reasonably foreseeable projects.

Project type	Number of Projects	Sooty Grouse Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select and aspen enhancement	30 (Empire, Slapjack, Basin, Grizz, Snake Lake, Webber's, Freeman, Mabie, Clarks, Hungarian, Genesee, Jackson, Ingalls, Big Hill, LaPorte, Watdog, Concow,French, Burnt Bridge, OnTop, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie, Hopper, Corral, Am Valley, Hughes, St. Louis)	Direct and Indirect impacts limited due to treatments not reducing habitat below 40% canopy cover.	• Short-term adverse impacts during harvest. • Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	4 (Moonlight, Camp 14, Rich, Cold)	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Temporary OHV Forest Order	1 (Forest-wide)	Closed Forest to cross-country travel. Lessened disturbance and displacement of Grouse.	Overall benefit to late seral open canopy coniferous forest by eliminating effects to habitat quality.
Private Land Timber Activities	Timber harvest plans, Conversions, Fire Hazard, Public Utility, Emergency Ops, Dead Fuelwood, Other (308,221 acres)	Habitat changes from denser forest conditions to more open canopies and changes to understory.	Anticipated increase in open forest habitat conditions that would benefit the Sooty Grouse.
Alternative 3 Existing OHV Routes (Table 111)	130 miles	Existing trails influence 508 acres of late seral open canopy habitat or 0.6% of the habitat Sierra Nevada wide.	Acres are additive to those shown for Alternatives 1, 2, 4 and 5, however habitat ranking remains in the Low category.
Fire Recovery/ Restoration	5 (Moonlight Wheeler, Antelope, Portwine, Canyon Complex, Concow)	Short term impacts limited to presence of planting crews. Direct and indirect impacts non-detectable.	None to minimal. Overall restoration will be beneficial in accelerating hiding cover and promoting future habitat.

When considering all of the cumulative effects of present and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires and miscellaneous resource projects, Alternative 1 poses the greatest risk to late seral open canopy coniferous forest habitat on the PNF, when direct, indirect and cumulative effects are considered. Alternative 2 poses a slightly higher risk than Alternatives 4 and 5 to late seral open canopy coniferous forest, but all three are considered to pose a moderate risk when direct, indirect and cumulative effects are considered. Alternative 3 has the least risk to this habitat type when direct, indirect and cumulative effects are considered.

3.7.31.2.3 Summary of Sooty Grouse Status and Trend at the Bioregional Scale

The Forest Plan (as amended by the Sierra Nevada Forests MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the sooty grouse; hence, the late seral open canopy coniferous forest effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the sooty grouse. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008).

3.7.31.2.3.1 Habitat Status and Trend

There are currently 75,000 acres of late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir and eastside pine) habitat on NFS lands in the Sierra Nevada. The trend is slightly decreasing (from 3% to 1% within the last decade on NFS lands).

3.7.31.2.3.2 Population Status and Trend

The sooty grouse has been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, point counts and breeding bird survey protocols, including California Department of Fish and Game Blue (Sooty) Grouse Surveys (Bland 1993, 1997, 2002, 2006); California Department of Fish and Game hunter survey, modeling and hunting regulations assessment (CDFG 2004a, CDFG 2004b); multi-species inventory and monitoring on the Lake Tahoe Basin Management Unit (LTBMU 2007); and from 1968 to present–BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that sooty grouse continue to be present across the Sierra Nevada, except in the area south of the Kern Gap and current data at the range-wide, California and Sierra Nevada scales indicate that the distribution of sooty grouse populations in the Sierra Nevada north of the Kern Gap is stable.

3.7.31.2.3.3 Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trend

This project will have a total cumulative effect of 2,049 acres of late seral open canopy coniferous forest habitat under Alternative 1 (high) and 508 acres under Alternative 3 (low). Based on the acres affected, which range from 0.6% to 2.6% of the total habitat Sierra Nevada wide, this project area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of sooty grouse across the Sierra Nevada bioregion.

3.7.32 Mountain Quail: MIS Analysis

The mountain quail is designated as a MIS on the PNF. The Sierra Nevada MIS Amendment defined two habitat components; early seral coniferous forest and mid seral coniferous forest for the mountain quail. The corresponding CWHR types that define the habitat component for early seral are ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR) and eastside pine (EPN) with tree sizes 1, 2 and 3 and all canopy closures. The corresponding CWHR types that define the habitat component for mid seral are ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR) and eastside pine (EPN) with tree size 4 and all canopy closures. Currently, there are 546,000 acres of early seral coniferous forest habitat and 2,766,000 acres of mid seral coniferous forest on NFS lands Sierra Nevada wide. These habitat types, for the purpose of this MIS analysis, will be analyzed based on the amount of habitat influenced within a 200-meter zone of influence.

3.7.32.1.1 Direct and Indirect Effects

Based on the amount of habitat influenced within the 200-meter zone of influence, Alternative 1 affects the most habitat for both early seral (15,087 acres) and mid seral (74,616 acres) coniferous forest (Table 113 and Table 114). For early seral coniferous forest habitat, Alternative 2 affects 4,962 acres (0.9%), the second most habitat of all of the action alternatives. Alternatives 4 and 5 have a similar level of effects to early seral coniferous forest that range from 2,864 acres (0.5%) to 3,914 acres (0.7%). For mid seral coniferous forest, Alternative 2 has the second highest effect on this habitat type with 22,355 acres (0.8%). Alternatives 4 and 5 have less of an effect on mid seral habitats than Alternative 2 and range from 12,910 acres (0.5 %) to 15,600 (0.5%).

Table 113. Proportion of mountain quail MIS habitat (early seral) within a 200-meter "Zone of Influence" of unauthorized routes, existing motorized trails and proposed trails.

Mountain quail MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3*	Alt 4	Alt 5
	Early Seral Coniferous Forest	546,000	15,087	4,962	1,414	2,864	3,914
	Proportion of Habitat		2.7%	0.9%	0.2%	0.5%	0.7%
	Overall Habitat Ranking (High >10%, Moderate 5%-10%, Low < 5%)		Low	Low	Low	Low	Low
* Alt. 3 represents PNF's 130 miles of existing motorized trails. Alts. 4 and 5 include mixed use on Forest Road 24N28.							

Table 114. Proportion of mountain quail MIS habitat (mid seral) within a 200-meter "Zone of Influence" of unauthorized routes, existing motorized trails and proposed trails.

Mountain quail MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3*	Alt 4	Alt 5
	Mid Seral Coniferous Forest	2,766,000	74,616	22,355	5,843	12,910	15,600
	Proportion of Habitat		2.7%	0.8%	0.2%	0.5%	0.5%
	Overall Habitat Ranking (High >10%, Moderate 5%-10%, Low < 5%)		Low	Low	Low	Low	Low
* Alt. 3 represents PNF's 130 miles of existing motorized trails. Alts. 4 and 5 include mixed use on Forest Road 24N28.							

3.7.32.2 Overall Cumulative Effects from Present and Reasonably Foreseeable Future Actions

Cumulative effects to early and mid seral coniferous forest includes loss of habitat through catastrophic wildfires; timber and fuels management where habitat has been reduced or removed.

Appendix C of this EIS provides a list and description of present and reasonably foreseeable projects on the Forest and private lands within the PNF boundary. Projects of a small isolated scale found in Appendix C, such as hazard tree removal, trail maintenance, recreation improvements or special uses, are not included due the fact that they are insignificant and discountable and do not present a risk to mountain quail. Since 2000, over 73,345 acres of forest vegetation and fuels projects were completed, which consisted of group selection, thinning, mastication and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally modified some early or mid seral habitat for quail either through group selection or thinning. Group selection harvests generally increase the early seral habitat for quail. After group selection, the units or acres harvested result in a tree size 1 condition (early seral). Thinning treatments overall, modify some size class 4 stands to size class 3 stands, essentially moving mid seral habitat to early seral habitat. The burning and mastication treatments may result in the short-term reduction in cover for quail, though it is expected that in the longer term, early seral habitat will be created and protected by reducing wildfire risk. Since 2000 approximately 266,963 acres burned on the PNF, most of which has created early seral conditions that have benefited quail.

Table 115 lists present and reasonably foreseeable future actions taken after a review of Appendix C and summarizes cumulative impacts from present and reasonably foreseeable projects with a description of the potential impact to mountain quail and their habitat.

Table 115. Direct, indirect and cumulative impact to mountain quail from present and reasonably foreseeable projects.

Project type	Number of Projects	Mountain Quail Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select and aspen enhancement	30 (Empire, Slapjack, Basin, Grizz, Snake Lake, Webber's, Freeman, Mabie, Clarks, Hungarian, Genesee, Jackson, Ingalls, Big Hill, LaPorte, Watdog, Concow,French, Burnt Bridge, OnTop, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie, Hopper, Corral, Am Valley, Hughes, St. Louis)	Short-term disturbance from harvest activities, increases in early seral habitat from group selection harvest and shifts in mid seral habitat toward early seral.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	4 (Moonlight, Camp 14, Rich, Cold)	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Temporary OHV Forest Order	1 (Forest-wide)	Closed Forest to cross-country travel. Lessened disturbance and displacement of quail.	Overall benefit to early and mid seral coniferous forest by eliminating effects to habitat quality.
Private Land Timber Activities	Timber harvest plans, Coversions, Fire Hazard, Public Utility, Emergency Ops, Dead Fuelwood, Other (308,221 acres)	Habitat changes from denser forest conditions to more open canopies and changes to understory.	Anticipated increases in foraging habitat.
Alternative 3 Existing OHV Routes (Table 113)	130 miles	Existing trails influence 1,414 acres of early seral habitat or 0.2% of the habitat Sierra Nevada wide.	Acres are additive to those shown for Alternatives 1, 2, 4 and 5, however habitat ranking remains in the Low category.
Alternative 3 Existing OHV Routes (Table 114)	130 miles	Existing trails influence 5,843 acres of mid seral habitat or 0.2% of the habitat Sierra Nevada wide.	Acres are additive to those shown for Alternatives 1, 2, 4 and 5, however habitat ranking remains in the Low category.
Wildlife Water Developments	4 Guzzlers (Johnson Hill, Massack, Will Fire, Rich)	Guzzlers provide a reliable year around water source for wildlife.	Overall a benefit to Mt. Quail. Provides a reliable water source and increases habitat capacity in vicinity of water source for quail
Fire Recovery/ Restoration	5 (Moonlight Wheeler, Antelope, Portwine, Canyon Complex, Concow)	Short term impacts limited to presence of planting crews. Direct and indirect impacts non-detectable.	MIS most benefitted by reovery and restoration actions since early and mid seral haibtats will be accelerated.

When considering all of the cumulative effects of present and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires and miscellaneous resource projects, Alternative 1 poses the greatest risk to early and mid seral coniferous forest habitat, where 2.9% of early and mid seral coniferous forest habitat is affected and added with cumulative effects. Alternatives 2, 4 and 5 are similar in their effects to early and mid seral coniferous forest habitat when direct, indirect and cumulative effects are combined. Alternative 3 poses the least risk to early and mid seral habitat when direct, indirect and cumulative effects are combined.

3.7.32.2.1 Summary of Mountain Quail Status and Trend at the Bioregional Scale

The Forest Plan (as amended by the Sierra Nevada Forests MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mountain quail; hence, the early and mid seral coniferous forest effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mountain quail. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008).

3.7.32.2.1.1 Habitat Status and Trend

There are currently 546,000 acres of early seral and 2,766,000 acres of mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir and red fir) habitat on NFS lands in the Sierra Nevada. Within the last decade, the trend for early seral is slightly decreasing (from 9% to 5% of the acres on NFS lands) and the trend for mid seral is slightly increasing (from 21% to 25% of the acres on NFS lands).

3.7.32.2.1.2 Population Status and Trend

The mountain quail has been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling and breeding bird survey protocols, including California Department of Fish and Game hunter survey, modeling and hunting regulations assessment (CDFG 2004a, CDFG 2004b) and 1968 to present–BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that mountain quail continue to be present across the Sierra Nevada and current data at the range-wide, California and Sierra Nevada scales indicate that the distribution of mountain quail populations in the Sierra Nevada is stable.

3.7.32.2.1.3 Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mountain Quail Trend

This project will have a total cumulative effect of 96,960 acres of early and mid seral coniferous forest habitat under Alternative 1 (high) and 7,257 acres under Alternative 3 (low). Based on the acres affected, which range from 0.4% to 5.8% of the total early and mid seral habitat Sierra Nevada wide, this project would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of mountain quail across the Sierra Nevada bioregion.

3.7.32.3 Pacific Tree Frog: MIS Analysis

The Pacific tree frog is designated as a MIS on the PNF. The Sierra Nevada MIS Amendment defined wet meadow as the habitat component for the Pacific tree frog. The corresponding CWHR types that define the habitat component are wet meadow (WTM) and freshwater emergent wetland (FEW).

Currently, there are 66,000 acres of these CWHR types on NFS lands throughout the Sierra Nevada. These habitat types, for the purpose of this MIS analysis, will be analyzed based on the amount of habitat influenced within a 200-meter zone of influence on unauthorized routes, existing motorized trails and proposed trails.

3.7.32.3.1 Direct and Indirect Effects

Based on the analysis conducted, direct and indirect effects in the form of disturbance, displacement and/or decrease in habitat quality based on the proximity of unauthorized routes is greatest under Alternative 1, which results in effects to 1,469 acres of wet meadow or 2.2% of the habitat Sierra Nevada wide (Table 116). Alternatives 2, 4 and 5 all pose a similar level of effects to wet meadow habitat by affecting 390 acres (0.6%) to 71 acres (0.1%) of wet meadow habitat available Sierra Nevada wide.

Table 116. Proportion of Pacific tree frog MIS habitat that lies within a 200-meter "Zone of Influence" of unauthorized routes, existing motorized trails and proposed trails.

Pacific tree frog MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Wet Meadow	66,000	1,469	390	28	71	132
	Proportion of Habitat		2.2%	0.6%	0.04%	0.1%	0.2%
	Overall Habitat Ranking (High >10%, Moderate 5%-10%, Low < 5%)		Low	Low	Low	Low	Low
* Alt. 3 represents PNF's 130 miles of existing motorized trails. Alts. 4 and 5 include mixed use on Forest Road 24N28.							

3.7.32.3.2 Overall Cumulative Effects from Present and Reasonably Foreseeable Future Actions

Cumulative effects to Pacific tree frog habitat include current and historic livestock grazing; watershed/stream restoration projects and recreational activities including hunting, camping and general recreation activities including all forms of motorized use including 4-wheel-drive vehicles, vehicles 50" or less and motorcycles.

Appendix C of this EIS provides a list and description of present and reasonably foreseeable projects on the Forest and private lands within the PNF boundary. Some, but not all, of these activities will contribute to impacts to wet meadows within the PNF boundary. Miscellaneous resource projects, such as watershed restoration or fish passage projects have a beneficial impact to wet meadow habitat and to Pacific tree frogs.

The PNF currently has 42 active livestock grazing allotments including both cattle and sheep. Forest Plan Standards and Guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands. Wet meadows that are grazed are often maintained in the lower herbaceous height levels (i.e. 4 to 6 inches) affecting habitat quality in wet meadows.

Currently, there is a high demand for recreational use on the PNF due to its close proximity to urban centers (e.g. Oroville, Chico, and Reno). The PNF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (e.g. downhill skiing, cross-country skiing, snowmobiling), summer OHV use and a variety of other non-motorized use (e.g. equestrian use and mountain biking). Recreational use on the PNF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the PNF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting and OHV use. This is evident due to planned recreational events (Backcountry Discovery Trail, Dual sport Motorcycle Recreation Event) and proposals for campground rehabilitation, trailhead improvements and trail projects (see Appendix C). This increase is expected to affect wet meadows through encroachment of recreational use, dispersed camping and general public use.

Table 117 lists present and reasonably foreseeable future actions taken after a review of Appendix C and summarizes cumulative impacts from present and reasonably foreseeable projects and a description of the potential impact to wet meadow habitat.

Table 117. Direct, indirect and cumulative impact to Pacific tree frogs from present and reasonably foreseeable projects.

Project type	Number of Projects	Pacific tree frog Direct and Indirect Impact	Overall Cumulative Impact
Watershed Restoration	21 (Sulphur-Barry, Cold Fire, Last Chance, Red Clover (3),Frenchman, Lake Davis, Nelson-Onion, Sulphur, Poco, Dotta, Meadowview, Lower Middle Fork, South Fork, Upper Indian, Black Gulch, Greenhorn, Wildcat/Boulder)	Short-term disturbance during implementation. Improved riparian and meadow habitat quality.	Beneficial watershed and habitat quality.
Range Allotment permit renewal and Allotment Changes	4 (Grizzly Valley, Grizzly Valley Community, Humbug, Dixie Valley Sheep)	Maintenance of lower herbaceous height levels (4-6 inches)	Wet meadow habitat maintained at lower habitat quality.
Temporary OHV Forest Order	1 (Forest-wide)	Closed forest to cross-country travel. Lessened disturbance and displacement of Pacific tree frogs.	Overall benefit to wet meadow habitat by eliminating effects to habitat quality.
Alternative 3 Existing OHV Routes (Table 116)	130 miles	Existing trails influence 28 acres of wet meadow habitat or 0.04% of the habitat Sierra Nevada wide.	Acres are additive to those shown for Alternatives 1, 2, 4 and 5, however habitat ranking remains in the Low category.

When considering all of the cumulative effects of present and reasonably foreseeable future impacts from grazing, recreation and miscellaneous resource projects and adding those effects to direct and indirect effects, Alternative 1 poses the greatest risk to wet meadow habitats (1,497 acres). Alternative 3 poses the least risk to wet meadow habitat, as it maintains only those routes authorized under the Plumas NF Plan. Alternatives 2, 4 and 5 have a slightly higher impact than Alternative 3, since the effects of Alternative 3 are added to each of the three alternatives.

3.7.32.3.3 Summary of Pacific tree frog Status and Trend at the Bioregional Scale

The Forest Plan (as amended by the Sierra Nevada Forests MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the Pacific tree frog; hence, the wet meadow effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the Pacific tree frog. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008).

3.7.32.3.3.1 Habitat Status and Trend

There are currently 66,000 acres of wet meadow habitat on NFS lands in the Sierra Nevada. Within the last decade, the trend is stable.

3.7.32.3.3.2 Population Status and Trend

Since 2002, the Pacific tree frog has been monitored on the Sierra Nevada Forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2006, 2007b; Brown 2008). These data indicate that Pacific tree frog continues to be present at these sample sites and current data at the range-wide, California and Sierra Nevada scales indicate that the distribution of Pacific tree frog populations in the Sierra Nevada is stable.

3.7.32.3.3.3 Relationship of Project-Level Habitat Impacts to Bioregional-Scale Pacific tree frog Trend

This project will have a total cumulative effect of 1,497 acres of wet meadow habitat (WTM and FEW) under Alternative 1 (high) and 28 acres under Alternative 3 (low) that lie within a 200 meter zone of influence from proposed, existing and unauthorized routes. Based on the acres affected, which range between 0.04% and 2.24% of the total habitat Sierra Nevada wide, this project would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of Pacific tree frogs across the Sierra Nevada bioregion.

3.7.33 Yellow Warbler: MIS Analysis

The yellow warbler is designated as a MIS on the PNF. The Sierra Nevada MIS Amendment defined Riparian as the habitat component for the yellow warbler. The corresponding CWHR types that define the habitat component are montane riparian (MRI) and valley foothill riparian (VRI). Currently, there are 29,000 acres of these CWHR types on NFS lands throughout the Sierra Nevada. These habitat types, for the purpose of this MIS analysis, will be analyzed based on the amount of habitat influenced within a 200-meter zone of influence on unauthorized routes, existing motorized trails and proposed trails.

3.7.33.1.1 Direct and Indirect Effects

Based on the analysis conducted of riparian habitat and the amount of habitat influenced directly and indirectly as a result of habitat disturbance, displacement and/or reduced habitat quality, Alternative 1 affects 1,818 acres of riparian habitat or 6.3% of the habitat available Sierra Nevada wide (Table 118).

Alternatives 2 and 5 are similar in their effects to riparian habitat, were direct and indirect effects range from 427 acres (1.5%) to 351 acres (1.2%). Alternative 4 represents the least risk to riparian habitat by affecting only 195 acres (0.7%).

Table 118. Proportion of yellow warbler MIS habitat within a 200-meter "Zone of Influence" on unauthorized routes, existing motorized trails and proposed trails.

Yellow warbler MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3*	Alt 4	Alt 5
	Riparian	29,000	1,818	427	274	195	351
	Proportion of Habitat		6.3%	1.5%	0.9%	0.7%	1.2%
	Overall Habitat Ranking (High >10%, Moderate 5%-10%, Low < 5%)		Moderate	Low	Low	Low	Low

* Alt. 3 represents PNF's 130 miles of existing motorized trails. Alts. 4 and 5 include mixed use on Forest Road 24N28.

3.7.33.1.2 Overall Cumulative Effects from Present and Reasonably Foreseeable Future Actions

Cumulative effects to yellow warbler include current and historic livestock grazing; loss of habitat through catastrophic wildfires; recreational activities including hunting, camping and general recreation activities including all forms of motorized use including 4-wheel- drive vehicles, vehicles 50 inches or less and motorcycles.

The PNF currently has 42 active livestock grazing allotments including both cattle and sheep. Forest Plan Standards and Guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix C of this EIS provides a list and description of present and reasonably foreseeable projects on the Forest and private lands within the PNF boundary. Some, but not all, of these activities will contribute to impacts to riparian habitat within the PNF boundary. Since 2000 approximately 266,963 acres have burned on the PNF, some of which have temporarily removed or set back riparian habitat to earlier seral stages.

Currently, there is a high demand for recreational use on the PNF due to its close proximity to urban centers (e.g. Oroville, Chico, and Reno). The PNF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (e.g. downhill skiing, cross-country skiing, snowmobiling), summer OHV use and a variety of other non-motorized use (e.g. equestrian use, mountain biking). Recreational use on the PNF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the PNF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting and OHV use. Generally, the increase in recreational use on the PNF has the potential to cause an increase in negative interactions between humans and riparian habitats. Future increase in recreational use on the PNF is expected and therefore, increased disturbance to riparian habitat would be expected, particularly during the summer months. The following table lists present and reasonably foreseeable future actions taken after a review of Appendix C and summarizes cumulative impacts from present and reasonably foreseeable projects with a description of the potential impact to the yellow warbler and riparian habitat.

Table 119. Direct, indirect and cumulative impact to yellow warbler riparian habitat from present and reasonably foreseeable projects

Project type	Number of Projects	Yellow Warbler Riparian Habitat Direct and Indirect Impact	Overall Cumulative Impact
Watershed Restoration	21 (Sulphur-Barry, Cold Fire, Last Chance, Red Clover (3),Frenchman, Lake Davis, Nelson-Onion, Sulphur, Poco, Dotta, Meadowview, Lower Middle Fork, South Fork, Upper Indian, Black Gulch, Greenhorn, Wildcat/Boulder)	Short-term disturbance during implementation. Improved riparian and meadow habitat quality.	Beneficial cumulative impact by improving long-term riparian habitat quality.
Range Allotment permit renewal and Allotment Changes	4 (Grizzly Valley, Grizzly Valley Community, Humbug, Dixie Valley Sheep)	Impacts to riparian shrubs and seedlings from livestock browsing. Reduction in available habitat.	Cumulative impact from livestock grazing on riparian shrubs and seedlings up to 20% (2004 SNFPA Standard and Guideline)
Tall Whitetop Treatments	2 (Tall Whitetop Herbicide and Goat Grazing)	Short term impacts during treatments, but long term benefits to riparian habitat from eradication of Tall Whitetop.	Cumulative impact should be minimal and short term. Long term benefits outweigh any short term impacts.
Temporary OHV Forest Order	1 (Forest-wide)	Closed Forest to cross-country travel. Lessened disturbance and displacement of yellow warblers.	Overall benefit to wet meadow habitat by eliminating effects to riparian habitat quality.
Alternative 3 Existing OHV Routes (Table 118)	130 miles	Existing trails influence 274 acres of riparian habitat or 0.9% of the habitat Sierra Nevada wide.	Acres are additive to those shown for Alternatives 1, 2, 4 and 5. Habitat rankings remain Moderate for Alternative 1 and Low for Alternatives 2, 4 and 5.

When considering all of the cumulative effects of present and reasonably foreseeable future impacts from grazing, wildfires, recreation and watershed/stream projects, Alternative 1 poses the greatest risk to riparian habitat where 2,092 acres are impacted directly, indirectly and cumulatively. Alternatives 2 and 5 are all similar in impacts when direct, indirect and cumulative effects are considered. Alternative 4 is the lowest risk of the action alternatives, while Alternative 3 represents the least risk to riparian habitats when direct, indirect and cumulative effects are considered since no new trails will be added under Alternative 3.

3.7.33.1.3 Summary of Yellow Warbler Status and Trend at the Bioregional Scale

The Forest Plan (as amended by the Sierra Nevada Forests MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the yellow warbler; hence, the riparian habitat effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the yellow warbler. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008).

3.7.33.1.4 Habitat Status and Trend

There are currently 29,000 acres of riparian habitat on NFS lands in the Sierra Nevada. Within the last decade, the trend is stable.

3.7.33.1.5 Population Status and Trend

The yellow warbler has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including Lassen NF (Burnett and Humple 2003, Burnett et al. 2005) and Inyo NF (Heath and Ballard 2003) point counts; on-going California Partners in Flight monitoring and studies (CPIF 2004); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present– BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that yellow warblers continue to be present at these sample sites and current data at the range-wide, California and Sierra Nevada scales indicate that the distribution of yellow warbler populations in the Sierra Nevada is stable.

3.7.33.1.6 Relationship of Project-Level Habitat Impacts to Bioregional-Scale Yellow Warbler Trend

This project will affect a cumulative total of 2,092 acres of riparian habitat under Alternative 1 (high) and 274 acres under Alternative 3 (low). Based on the acres affected, which range from 0.9% to 7.2% of the total habitat Sierra Nevada wide, this Project Area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of yellow warbler across the Sierra Nevada bioregion.

3.7.33.2 Fox Sparrow: MIS Analysis

The fox sparrow is designated as a MIS on the PNF. The Sierra Nevada MIS Amendment defined shrubland (west-slope chaparral types) as the habitat component for the fox sparrow. The corresponding CWHR types that define the habitat component are montane chaparral (MCP), montane hardwood-conifer (MCH) and chamise-redshank chaparral (CRC). There is no chamise-redshank chaparral on the PNF. Currently, there are 922,000 acres of these CWHR types on NFS lands across the Sierra Nevada. These habitat types, for the purpose of this MIS analysis, will be analyzed based on the amount of habitat influenced within a 200-meter zone of influence on existing and proposed motorized trails and unauthorized routes.

3.7.33.2.1 Direct and Indirect Effects

Based on the analysis conducted for shrubland habitat, Alternative 1 affects the most habitat within the 200-meter zone of influence (Table 120). Direct and Indirect effects from unauthorized routes include decrease in habitat quality from disturbance, displacement and/or avoidance of habitat as a result of motor vehicle use. Approximately 7,504 acres of shrubland habitat or 0.8% of the habitat Sierra Nevada wide will be affected by existing trails and unauthorized routes. Alternative 2 has the second highest effect on shrubland habitat, resulting in direct and indirect effects to habitat on 2,441 acres. Alternatives 4 and 5 have less effects on shrubland habitat than Alternative 2 with 1,056 acres and 1,631 acres of shrubland habitat influenced Sierra Nevada wide.

Table 120. Proportion of fox sparrow MIS habitat within a 200-meter "Zone of Influence" of existing and proposed trails and unauthorized routes.

Fox sparrow MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3*	Alt 4	Alt 5
	Shrubland (west-slope chaparral types)	922,000	7,504	2,441	834	1,056	1,631
	Proportion of Habitat		0.8%	0.3%	0.1%	0.1%	0.2%
	Overall Habitat Ranking (High >10%, Moderate 5%-10%, Low < 5%)		Low	Low	Low	Low	Low

* Alt. 3 represents PNF's 130 miles of existing motorized trails. Alts. 4 and 5 include mixed use on Forest Road 24N28.

3.7.33.2.2 Overall Cumulative Effects from Present, and Reasonably Foreseeable Future Actions

Cumulative effects to shrubland include current and historic livestock grazing; loss of habitat through catastrophic wildfires; timber and fuels management where shrubland habitat has been reduced or removed.

The PNF currently has 42 active livestock grazing allotments including both cattle and sheep. Forest Plan Standards and Guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix C of this EIS provides a list and description of present and reasonably foreseeable projects on the Forest and private lands within the PNF boundary. Some, but not all, of these activities will contribute to impacts to shrubland habitat within the PNF boundary. Since 2000, over 73,345 acres of forest vegetation and fuels projects were completed, which primarily included group selection, thinning, mastication and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally affect shrubland habitat through prescribed burning of the DFPZ understory and mastication of shrubland for fuels reduction. With the exception of group selection silviculture treatments do not usually result in an increase in shrubland habitat since canopy cover is not reduced below 40%. Group selection harvests are expected to increase shrubland habitat on a small scale across the landscape. These vegetation treatments may result in the short-term reduction in isolated pockets of shrubland, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Since 2000, approximately 266,963 acres burned on the PNF, some of which removed shrubland habitat initially, but over time shrubland habitat is expected to increase as post fire succession progresses.

The table below lists present and reasonably foreseeable future actions taken after a review of Appendix C and summarizes cumulative impacts from present and reasonably foreseeable projects with a description of the potential impact to shrubland habitat.

Table 121. Direct, indirect and cumulative impact to fox sparrow from present and reasonably foreseeable future projects.

Project type	Number of Projects	Fox Sparrow Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select and aspen enhancement	30 (Empire, Slapjack, Basin, Grizz, Snake Lake, Webber's, Freeman, Mabie, Clarks, Hungarian, Genesee, Jackson, Ingalls, Big Hill, LaPorte, Watdog, Concow,French, Burnt Bridge, OnTop, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie, Hopper, Corral, Am Valley, Hughes, St. Louis)	Short-term disturbance from harvest activities (mastication, prescribed burning) and future development of habitat from Group Selection.	Short-term adverse impacts during masitication, prescribed burning. Creation of habitat from Group Selection units that are not re-planted. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	4 (Moonlight, Camp 14, Rich, Cold)	Minimal impact, limited to disturbance during harvest.	None to minimal cumulative impact
Temporary OHV Forest Order	1 (Forest-wide)	Closed Forest to cross-country travel. Lessened disturbance to habitat and displacement of fox sparrows.	Overall benefit to shrubland habitat by eliminating effects to habitat quality.
Range Allotment Permit Renewal and Allotment Changes	4 (Grizzly Valley, Grizzly Valley Community, Humbug, Dixie Valley Sheep)	Impacts from incidental browsing of shrubland by livestock	Miminal cumulative impact from incidental browsing
Private Land Timber Activities	Timber harvest plans, Coversions, Fire Hazard, Public Utility, Emergency Ops, Dead Fuelwood, Other (308,221 acres)	Habitat changes from denser forest conditions to more open canopies and changes to understory.	Anticipated increases in shrubland habitat.
Alternative 3 Existing OHV Routes (Table 120)	130 miles	Existing trails influence 834 acres of Shrubland habitat or 0.1% of the habitat Sierra Nevada wide.	Acres are additive to those shown for Alternatives 1, 2, 4 and 5, however habitat ranking remains in the Low category.

When considering all of the cumulative effects of present and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires and miscellaneous resource projects, Alternative 1 poses the greatest risk to shrubland habitat where 8,338 acres are impacted directly, indirectly and cumulatively. Alternative 2 poses the second highest impact to shrubland habitat when direct, indirect and cumulative effects are considered. Alternatives 4 and 5 pose the lowest risk of the action alternatives, while Alternative 3 represents the least risk to shrubland habitats when direct, indirect and cumulative effects are considered since no new trails will be added under Alternative 3.

3.7.33.2.3 Summary of Fox Sparrow Status and Trend at the Bioregional Scale

The Forest Plan (as amended by the Sierra Nevada Forests MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the fox sparrow; hence, the shrubland effects analysis for this project must be informed by both habitat and distribution population monitoring data.

The sections below summarize the habitat and distribution population status and trend data for the fox sparrow. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008).

3.7.33.2.3.1 Habitat Status and Trend

There are currently 922,000 acres of west-slope chaparral shrubland habitat on NFS lands in the Sierra Nevada. Within the last decade, the trend is stable.

3.7.33.2.3.2 Population Status and Trend

The fox sparrow has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including: 1997 to present–Lassen National Forest (Burnett and Humple 2003, Burnett et al. 2005); 2002 to present–Plumas and Lassen National Forests (Sierra Nevada Research Center 2007); on-going monitoring through California Partners in Flight Monitoring Sites (CPIF 2002); 1992 to 2005–Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present–BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that fox sparrows continue to be present at these sample sites and current data at the range-wide, California and Sierra Nevada scales indicate that, although there may be localized declines in the population trend, the distribution of fox sparrow populations in the Sierra Nevada is stable.

3.7.33.2.3.3 Relationship of Project-Level Habitat Impacts to Bioregional-Scale Fox Sparrow Trend

This project will affect a cumulative total of 8,338 acres of shrubland habitat under Alternative 1 (high) and 834 acres under Alternative 3 (low). Based on the acres affected, which range from 0.1% to 0.9% of the total habitat Sierra Nevada wide, this project would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of fox sparrow across the Sierra Nevada bioregion.

3.7.34 Aquatic Macroinvertebrates: MIS Analysis

The aquatic macroinvertebrates are designated as a MIS on the PNF. The Sierra Nevada MIS Amendment defined lacustrine and riverine as the habitat component for macroinvertebrates. The corresponding CWHR types that define the habitat component are lacustrine (LAC) and riverine (RIV). Currently, there are 658 miles of perennial stream and 341 miles of intermittent stream (RIV) and approximately 14,200 acres of lakes, ponds and reservoirs (LAC) with these CWHR types on the PNF. These habitat types, for the purpose of this MIS analysis, riverine (RIV) will be analyzed based on effects to habitat which is defined as the miles of stream affected by proposed route stream crossings on intermittent and perennial streams and the amount of lacustrine habitat influenced within a 200-meter zone of influence on proposed routes. Effects to riverine and lacustrine habitat include; elevated sediment delivery to aquatic systems that affect water quality (i.e. increases in turbidity) and changes in substrate morphology that potentially could influence in-stream primary production and macroinvertebrate assemblages that provide forage for trout. Aquatic macroinvertebrates assemblages have been shown to be negatively impacted by stream crossings. One study found (Hawkins et al. *In*:

Gucinski, et al. 2001) that aquatic insect larvae (mayflies, stoneflies and caddisflies) assemblages were negatively related to the number of stream crossings above a site. Another study (Newbold et al. 1980 *In*: Gucinski, et al. 2001) found that macroinvertebrate assemblages differed significantly above and below stream crossings. Landscape analyses suggests that motorized trail associated factors can affect the frequency, timing and magnitude of disturbance to habitat, which may influence aquatic invertebrate community structure and species diversity.

3.7.34.1.1 Direct and Indirect Effects

As discussed above, habitat quality will be reduced as a result of increases in sediment and a decrease in water quality as a result of stream miles affected by route stream crossings and acres of lacustrine habitat that fall within a 200-meter zone of influence. Based on the analysis conducted, Alternative 1 has the highest level of impact to macroinvertebrate habitat (Table 122). Alternative 1 affects habitat on 27.6 miles of perennial stream, 88.2 miles of intermittent stream and 84 acres of lacustrine habitat within a 200-meter zone of influence of lakes, ponds and reservoirs. Alternatives 4 and 5 have similar effects to riverine habitat, affecting 5.5 to 7.0 miles of perennial stream habitat and 19.7 to 25.5 miles of intermittent stream habitat. Alternative 2 represents the second highest scale of effects to riverine habitat by affecting 11.4 miles of perennial stream and 34 miles of intermittent stream. Effects to lacustrine habitat follow similar trends to riverine habitat in that Alternative 2 represents the second highest level of impacts by affecting 33 acres of lacustrine habitat, followed by Alternative 5 (16.5 acres) and finally Alternative 4 at only 4 acres. Mixed use under Alternatives 4 and 5 does not affect riverine or lacustrine habitat.

Table 122. Proportion of aquatic macroinvertebrate MIS habitat intersected by proposed routes (riverine) and within a 200-meter “Zone of Influence” (lacustrine) on existing and proposed trails and unauthorized routes.

Aquatic Macroinvertebrate MIS habitat	Habitat Type	Stream Miles/Acres	Alt 1	Alt 2	Alt 3*	Alt 4	Alt 5
	RIV – Perennial (miles)	658	27.6	11.4	3.4	5.5	7.0
	RIV – Intermittent (miles)	341	88.2	34	11.7	19.7	25.5
	LAC –Lacustrine (acres)	14,200	84	33	71	4	16.5
	Proportion of Habitat	RIV	11.6%	4.5%	1.5%	2.5%	3.2%
		LAC	0.6%	0.2%	0.5%	0.03%	0.1%
	Overall Habitat Ranking (RIV + LAC) (High >10%, Moderate 5%-10%, Low < 5%)		High	Moderate	Low	Low	Low

* Alt 3 represents PNF’s 130 miles of existing motorized trails.

3.7.34.1.2 Overall Cumulative Effects from Present and Reasonably Foreseeable Future Actions

Cumulative effects to riverine and lacustrine habitats include current and historic livestock grazing; reduced suitability of habitat through catastrophic wildfires; mining activities; and recreational activities including hunting, camping and general recreation activities including all forms of motorized use including 4-wheeled drive vehicles, vehicles 50 inches or less and motorcycles.

The PNF currently has 42 active livestock grazing allotments including both cattle and sheep. Forest Plan Standards and Guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix C of this EIS provides a list and description of present and reasonably foreseeable projects on NFS land and private lands within the PNF boundary. Some, but not all, of these activities will contribute to impacts to riverine or lacustrine habitats within the PNF boundary. Mining and dredging activities have occurred and continue to occur on the Forest. Mining and dredging activities result in sedimentation that affect macroinvertebrate habitat and decreases water quality. Since 2000, approximately 266,963 acres burned on the PNF, some of which have affected riverine and lacustrine habitat through increased levels of sedimentation.

Currently, there is a high demand for recreational use on the PNF due to its close proximity to urban centers (e.g. Oroville, Chico, Reno). The PNF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (e.g. downhill skiing, cross-country skiing, snowmobiling), summer OHV use and a variety of other non-motorized use (e.g. equestrian use, mountain biking). Recreational use on the PNF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the PNF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting and OHV use. This is evident due to planned recreational events (Backcountry Discovery Trial, Dual sport Motorcycle Rec Event) and proposals for campground rehabilitation, trailhead improvements and trail projects (see Appendix C). Generally, the increase in recreational use on the PNF has the potential to cause an increase in negative interactions between humans and riverine and lacustrine habitats since most of the recreational facilities are located adjacent to lakes, streams and rivers. Future increase in recreational use on the PNF is expected and therefore, increased disturbance to riverine and lacustrine habitat would be expected, particularly during the summer months.

Table 123 lists present and reasonably foreseeable future actions taken after a review of Appendix C and summarizes cumulative impacts from present and reasonably foreseeable projects with a description of the potential impact to riverine and lacustrine habitat.

Table 123. Direct, indirect and cumulative impact to riverine and lacustrine habitat from present and reasonably foreseeable future projects.

Project type	Number of Projects	Riverine and Lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Mining/Suction Dredging	16 (Cedar, Copper Penny, Two Penny, Advance Geologic (6), Hawkeye, Dutch (2), Pioneer, El Rico, Dredger’s Delight &High Grade)	Impacts from increased sediment delivery, decrease in water quality.	Mining/sution dredging add to cumulative impacts by decreasing habitat quality, mainly in riverine systems.
Hazard tree removal	4 (Moonlight, Camp 14, Rich, Cold)	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact

Project type	Number of Projects	Riverine and Lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Watershed Restoration	21 (Sulphur-Barry, Cold Fire, Last Chance, Red Clover (3),Frenchman, Lake Davis, Nelson-Onion, Sulphur, Poco, Dotta, Meadowview, Lower Middle Fork, South Fork, Upper Indian, Black Gulch, Greenhorn, Wildcat/Boulder)	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor.
Range Allotment permit renewal and Allotment changes	4 (Grizzly Valley, Grizzly Valley Community, Humbug, Dixie Valley Sheep)	Stream bank trampling from livestock resulting in increases in sediment and decrease in water surface shade from browsing riparian shrubs.	Cumulative impacts from sediment and water surface shade are expected to be within Forest Plan Standards (<20%).
Temporary OHV Forest Order	1 (Forest-wide)	Closed Forest to cross-country travel. Lessened disturbance to habitat downstream of stream crossings	Overall benefit to macroinvertebrate habitat by eliminating effects to habitat quality.
Tall Whitetop Treatments	2 (Tall Whitetop Herbicide and Goat Grazing)	Short term impacts during treatments, but long term benefits to riverine habitat from eradication of Tall Whitetop.	Cumulative impact should be minimal and short term. Long term benefits outweigh any short term impacts.
Alternative 3 Existing OHV Routes (Table 122)	130 miles	Existing trails influence 15.1 miles of riverine habitat (1.5%) and 71 acres of Lacustrine habitat.	Acres are additive to those shown for Alternatives 1, 2, 4 and 5. Therefore, Alt 1 remains in the High Category; Alt 2 remains in the Moderate Category; Alt 4 remains in the Low Category and Alt 5 moves from the Low category to the Moderate Category when Alt 3 is added.

When considering all of the cumulative effects of present and reasonably foreseeable future impacts from mining, grazing, wildfires, recreation and watershed/stream projects, Alternative 1 poses the greatest risk to riverine and lacustrine habitat where 130.9 miles and 155 acres are impacted directly, indirectly and cumulatively. Alternatives 2 and 5 are all similar in impacts when direct, indirect and cumulative effects are considered as both alternatives remain or are moved to the moderate category (5 to 10%). Alternative 4 is the lowest cumulative risk of the action alternatives (40.3 miles, 75 acres), while Alternative 3 represents the least risk to riparian habitats when direct, indirect and cumulative effects are considered, since no new trails will be added under Alternative 3.

3.7.34.1.3 Summary of Aquatic Macroinvertebrates Status and Trend at the Bioregional Scale

The Forest Plan (as amended by the Sierra Nevada Forests MIS Amendment) requires bioregional-scale Index of Biological Integrity and Habitat monitoring for aquatic macroinvertebrates; hence, the lacustrine and riverine effects analysis for this project must be informed by these monitoring data. The sections below summarize the biological integrity and habitat status and trend data for aquatic macroinvertebrates. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008).

3.7.34.1.3.1 Habitat and Index of Biological Integrity Status and Trend

Aquatic habitat has been assessed using Stream Condition Inventory (SCI) data collected since 1994 (Frasier et al. 2005) and habitat status information from the Sierra Nevada Ecosystem Project (SNEP) (Moyle and Randall 1996). Index of Biological Integrity is assessed using the River Invertebrate Prediction and Classification System (RIVPACS) and macroinvertebrate data collected since 2000 (see USDA Forest Service 2008, Table BMI-1). These data indicate that the status and trend in the RIVPACS scores is stable.

3.7.34.1.3.2 Relationship of Project-Level Habitat Impacts to Bioregional-Scale Habitat Trend

This project will have a total cumulative effect of 155 acres of lacustrine habitat (LAC) under Alternative 1 (high) and 71 acres under Alternative 3 (low). This project will have a total cumulative effect of 130.9 miles of riverine habitat (RIV) under Alternative 1 (high) and 15.1 miles of habitat under Alternative 3 (low). Based on the acres of lacustrine habitat influenced and miles of riverine habitat influenced, this project area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of macroinvertebrates across the Sierra Nevada bioregion.

3.7.35 Summary of Effects Analysis Across all Alternatives

Table 124: Comparison of Effects to Management Indicator Species.

Indicators – Terrestrial Wildlife	Rankings of Alternatives for Each Indicator[1]				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
The proportion of a species (or species group's) habitat that is affected by motor vehicle routes. **(Zone of Influence, Deer Herd Analysis)**	1	2	5	4	3
Average for Terrestrial Wildlife	1	2	5	4	3

[1] A score of 5 indicates the alternative has the least impact for terrestrial wildlife related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial wildlife related to the indicator.

3.7.36 Compliance with the Forest Plan and Other Direction.

Table 125. Comparison of alternatives in relation to compliance with Forest Service Manual direction.

Forest Plan Direction for Terrestrial Wildlife	Alternative Compliance				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Forest Service Manual Direction (Management Indicator Species)	Yes	Yes	Yes	Yes	Yes

3.8 Botanical Resources

3.8.1 Introduction

The purpose of this section is to present a summary of the effects of the proposed trails on botanically sensitive resources on the PNF. Throughout this section, the term “rare species” is used to refer to Federally Endangered, Threatened and Candidate plant species and Forest Service Region 5 Sensitive vascular plants, bryophytes and fungi. A complete discussion of effects to these species, as well as to PNF special interest species, is provided in the Biological Assessment/Evaluation of Potential Effects to Threatened, Endangered and Sensitive Plant Species located in the project record.

Of the Forest Service Regions, the Pacific Southwest Region contains the largest assemblage of sensitive plant species in relation to its land base. Of the more than 8,000 vascular plant species that occur in California, well over half have been documented on National Forest System (NFS) lands. In addition, over 100 of these plant species are found only on NFS lands and nowhere else in the world (Powell 2001). This high level of botanical diversity is due in large part to the wide range of environmental conditions (i.e. topography, geology, soils, climate and vegetation) found on National Forests in California.

An important part of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976) is the management of rare species and their associated habitats. Management activities on NFS lands must be planned and implemented so that they do not jeopardize the continued existence of Federally Threatened or Endangered species or lead to a trend toward listing or loss of viability for Forest Service Sensitive species. In addition, management activities should be designed to maintain or improve habitat for rare species and natural plant communities to the degree consistent with the multiple-use objectives established in the Forest Plan.

Motor vehicle travel has the potential to affect rare species and their associated habitats. Effects include, but are not limited to: death or injury to individuals; habitat modification or fragmentation; decreased habitat quality; increased risk of weed introduction and spread; elevated risk to pollinators; loss of native vegetation; over collection; and other factors that reduce or eliminate plant growth and reproduction (Trombulek and Frissell 2000). It is Forest Service policy to minimize damage to soils and vegetation and to avoid significant disruption to plant and wildlife habitat while providing for motorized use on NFS lands (FSM 2353.03(2)); therefore, management decisions related to motorized travel on NFS lands must consider the effects to rare species and their habitats.

3.8.2 Analysis Framework: Statute, Regulation, Forest Plan and Other Direction

Direction relevant to the alternatives as they affect botanical resources includes:

E.O. 13112 Invasive Species 64 FR 6183 (February 8, 1999). To prevent and control the introduction and spread of invasive species. The Forest Service will not authorize, fund or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless the agency has determined that the benefits of such actions clearly outweigh the potential harm caused by invasive species and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

Forest Service Manual and Handbooks (FSM/H 2670). Forest Service Sensitive species are plant species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on National Forests. It is Forest Service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE) and is summarized or referenced in this Chapter.

Sierra Nevada Forest Plan Amendment (SNFPA). The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following direction applicable to motorized travel management and botanical resources:

- **Noxious weeds management** (Standards and Guidelines #36-49). See Noxious Weed section.
- **Wetland and Meadow Habitat** (Standards and Guidelines #70): See Water Resources section.
- **Riparian Habitat** (Standards and Guidelines #92): See Water Resources section.
- **Bog and Fen Habitat** (Standards and Guidelines #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans and wheeled vehicles.
- **Sensitive Plant Surveys** (Corrected Errata, April 19, 2005): Conduct field surveys for Threatened, Endangered and Sensitive plant species early enough in the project planning process that the project can be designed to conserve or enhance Threatened, Endangered and Sensitive plants and their habitat. Conduct surveys according to procedures outlined in the Forest Service Handbook (FSH 2609.25.11). If additional field surveys are to be conducted as part of project implementation, survey results must be documented in the project file (Standards and Guidelines #125). The standards and guidelines provide direction for conducting field surveys, minimizing or eliminating direct and indirect impacts from management activities and adherence to the Regional Native Plant Policy (USDA Forest Service 2004).

Plumas National Forest Land and Resource Management Plan (USDA Forest Service 1988). The Forest Plan provides management direction for all Plumas National Forest Sensitive plants; that direction is to “maintain viable populations of sensitive plant species” (USDA Forest Service 1988, page 4-34). The Forest Plan also provides forest-wide standards and guidelines to:

- protect Sensitive and Special Interest plant species as needed to maintain viability;
- inventory and monitor Sensitive plant populations on an individual project basis; and

- develop species Management Guidelines to identify population goals and compatible management activities/prescriptions that will maintain viability.

3.8.3 Effects Analysis Methodology

3.8.3.1 Geographic Area Evaluated for Impacts on Botanical Resources

Two geographic areas were chosen to analyze the effects of the proposed trails on botanical resources:

- Direct and indirect effects to rare species under the four action alternatives were assessed using the area within 100 feet of proposed trails. In general, direct effects are most likely to occur within a zone of 30 feet on either side of the trail due to the need for parking and pulling off to allow for another vehicle to pass. Indirect effects are most likely to occur within a zone of 100 feet or an additional 70 feet beyond the 30-foot zone.
- The No-action alternative, which allows for cross-country travel, was assessed using the entire PNF. The Forest boundary was also used to analyze cumulative effects to rare species for all alternatives.

Those species located within these two geographic areas were considered to have the highest potential to be impacted or influenced by adding trails to the NFTS. Conversely, species outside of the analysis area (that is, those species that are only considered to have “potential” to occur on the PNF) were not considered to have a high likelihood of being impacted by the proposed project either directly, indirectly or cumulatively.

3.8.3.2 Analysis Methodology

The analysis of effects on rare plant species was a three-step process (FSM 2672.43). In the first step, all listed or proposed rare species that were known or were believed to have potential to occur in the analysis area were identified. This list was developed by reviewing the U.S. Fish and Wildlife List for the Plumas National Forest (U.S. Fish and Wildlife Service 2008), USDA Forest Service Region 5 Sensitive Species List (USDA Forest Service 2006), Plumas National Forest rare plant records and vegetation maps and California Natural Diversity Database records (CNDDB 2008).

The second step was field reconnaissance surveys. To date, field surveys have been conducted on approximately 287 miles of proposed trails (Vollmar 2007, USDA Forest Service 2007, USDA Forest Service 2008 a, b and c). An additional 66 miles of proposed system trail and 10 miles of existing system trails (USDA Forest Service 2003a) have also been surveyed under past management projects. For those 25 miles of trail that had not been surveyed at the time of this analysis, information from the PNF rare plant records and CNDDB were used to analyze the potential effects to known rare species occurrences. In addition, potential habitat was estimated for each sensitive species using (a) the known range of the species, (b) an estimated potential dispersal distance, (c) broad vegetation types and (d) existing available data representing more refined habitat types (i.e. serpentine, fens, streams, etc.).

Field surveys were designed around the flowering period and ecology of the rare plant species identified in step one. For each rare plant site found, information was collected that described the size of the occurrence and habitat characteristics and identified any existing or potential threats. Location information was collected using a Global Positioning System (GPS).

All of this information was used in step three of the analysis—conflict determination. Data were imported into a Geographic Information System (GIS) and used to analyze proximity to trails, identify detrimental effects and develop protection measures.

3.8.3.3 Data Sources

1. Route-specific botanical data (e.g. rare species, meadows, special aquatic features, habitats, etc.), including results of route-specific surveys of rare species.
2. Route inventories collected in Step 1 of Travel Management and associated tabular data sets.
3. GIS layers of the following data: routes, habitats, plant communities, soils, geology, meadows, etc.
4. CNDDB records
5. Scientific literature

3.8.3.4 Assumptions Specific to Botanical Resources Analysis

In addition to those listed at the beginning of Chapter 3, the following assumptions were used in the analysis of botanical resources:

1. Vehicle use on and off established trails has affected or has the potential to affect rare plant populations, either directly by damage or death to individual plants from motor vehicles (stem breaking, crushing, etc.) or indirectly by altering the habitat through soil disturbance, changes in hydrologic function or by the introduction of non-native, invasive plant species that can out-compete sensitive species for water, sunlight and nutrients.
2. Motor vehicle use is unlikely to impact certain rare plant habitats due to the steep or rocky nature of the surrounding terrain; motor vehicle use is more likely to impact other rare plant habitats, such as meadows, which exist on gentle slopes or flat terrain with little or no vegetation or natural barriers to motor vehicles.
3. Without specific prevention and/or control measures, invasive non-native plants (weeds) will continue to spread along and within surfaced and un-surfaced motor vehicle roads/trails/areas.
4. Motor vehicle use of un-surfaced roads/trails/areas will increase sediment production and erosion. As use increases, sediment production and erosion will increase.

3.8.3.5 Botanical Resources Methodology by Action

1. Direct/indirect effects of the prohibition of cross-country motorized vehicle travel.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Indicator(s):

- Miles of unauthorized routes within or adjacent to rare plant sites.
- Acres of rare plant sites within 100 feet of an existing unauthorized route.
- Total number of rare plant sites within 100 feet of an existing unauthorized route.

- Miles of unauthorized routes within fen, wet meadow, serpentine, riparian, barren, interior forest and open forest habitats.

In addition, the following indicator measures were used to analyze the impacts to Research Natural Areas and proposed and existing Special Interest Areas on the Forest:

- Miles of existing unauthorized routes within Research Natural Areas or Special Interest Areas.

Methodology: GIS analysis of existing unauthorized routes.

2. **Direct/Indirect Effects of adding facilities (presently unauthorized roads, trails and/or areas) to the NFTS, including identifying seasons of use and vehicle class.**

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Plumas National Forest. In general, direct effects are most likely to occur within a zone of 30 feet on either side of the trail and indirect effects are most likely to occur within a zone of 100 feet.

Indicator(s):

Summary of Indicator Measures

- Number and miles of proposed trails open for public motor vehicle use within or adjacent to Sensitive rare species sites.
- Acres of rare plant sites within 100 feet of a proposed trail.
- Total number of rare plant sites within 100 feet of a proposed trail.

In addition, the following indicator measures were used to analyze the impacts to designated Research Natural Areas and proposed and existing Special Interest Areas on the Forest:

- Miles of proposed trails open for public motor vehicle use within Research Natural Areas or Special Interest Areas.

Methodology: GIS analysis of proposed trails and sensitive plant locations.

3. **Changes to the existing NFTS [this can include deletions of facilities and changing the vehicle class and season of use].**

The timeframe, spatial boundary, indicators and methodology would be the same as those listed under number 2 above.

4. **Cumulative Effects**

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years.

Spatial boundary: Plumas National Forest.

Indicator(s):

- The percentage of sensitive species sites impacted by the proposed trails, in comparison to the total number of known sites on the Forest.
- The number of rare plant locations documented along existing motorized NFS trails.

Methodology: GIS analysis of all trails and sensitive plant sites/habitat.

3.8.4 Affected Environment

The Plumas National Forest is situated at the northern end of the Sierra Nevada mountain range, just south of the Cascades. The lower elevation foothills of the Forest are characterized by oak woodlands on the south-facing slopes, which are dominated by interior live oak (*Quercus wislizenii*), canyon oak (*Quercus chrysolepis*), manzanita (*Arctostaphylos* sp.) and gray pine (*Pinus sabiniana*). The lower elevation north-facing slopes are characterized by mixed conifer forests with a diverse understory of tanoak (*Lithocarpus densiflorus*), black oak (*Quercus kelloggii*), big leaf maple (*Acer macrophyllum*) and madrone (*Arbutus menziesii*). Moving eastward, the elevation increases and the foothills quickly give way to montane chaparral and mixed conifer forests that line the deep canyons of the North, Middle and South forks of the Feather River and its tributaries.

Closer to the crest of the Sierra Nevada, the vegetation type transitions to a mixed conifer forest characterized by ponderosa pine (*Pinus ponderosa*), sugar pine (*Pinus lambertiana*), white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*) and incense cedar (*Calocedrus decurrens*) in the overstory and scattered black oak and dense white fir in the understory. Jeffery pine (*Pinus jeffreyi*) and lodgepole pine (*Pinus contorta*) are occasionally found occupying shallower soils. Red fir (*Abies magnifica*) forests occur above 5,500 feet in elevation and are often mixed with sugar pine. In some of the higher elevation stands, red fir may co-occur with lodgepole pine, western white pine (*Pinus monticola*) and mountain hemlock (*Tsuga mertensiana*). On the drier, eastern slope of the Sierra, the heavily forested stands give way to broad valleys surrounded by sagebrush scrub, scattered juniper, eastside pine and mixed conifer forest.

Within these broader vegetation types there are a number of other, less geographically defined, plant communities that provide important habitat for rare plant species. These include: riparian corridors, meadows, seeps, fens, rock outcrops and serpentine soils.

3.8.5 Rare Species

Table 126 lists all Federally Threatened, Candidate and Region 5 Sensitive vascular plant, moss, lichen and fungi species that are known or thought to have potential to occur on the Plumas National Forest. Also included are the listing, number of PNF occurrences and habitat grouping for each species.

Table 126. Federally Threatened, Candidate and Region 5 Sensitive plant and fungi species known or thought to have potential to occur on the Plumas National Forest.

Species	Common Name	PNF Status[1]	Global Rank/ CNPS Rank[2]	Number of PNF Occurrences[3]	Habitat Guild[4]
Allium jepsonii	Jepson's onion	S	G1 / 1B.2	15	S
Arabis constancei	Constance's rock cress	S	G3 / 1B.1	55	S
Astragalus lemmonii	Lemmon's milkvetch	S	G2 / 1B.2	P	MS
Astragalus lentiformis	lens-pod milk-vetch	S	G2 / 1B.2	67	O
Astragalus pulsiferae* var. *coronensis	Modoc Plateau milk vetch	S	G4T3 / 4.2	3	O
Astragalus pulsiferae* var. *pulsiferae	Pulsifer's milk-vetch	S	G4T2 / 1B.2	12	O
Astragalus webberi	Webber's milk-vetch	S	G1 / 1B.2	12	O
Balsamorhiza macrolepis* var. *macrolepis	big-scale balsamroot	S	G3G4T2 / 1B.2	HI	MS, O, S
Botrychium ascendens	upswept moonwort	S	G2G3 / 2.3	P	MS, R, F
Botrychium crenulatum	scalloped moonwort	S	G3 / 2.2	P	MS, R, F
Botrychium lineare	Moonwort	S	G1 / 1B.3	P	MS, R
Botrychium lunaria	common moonwort	S	G5 / 2.3	P	MS, R, F
Botrychium minganese	Mingan moonwort	S	G4 / 2.2	4	MS, R
Botrychium montanum	western goblin	S	G3 / 2.1	3	MS, R, F
Botrychium pinnatum	northern moonwort	S	G4 / 2.3	P	MS, R
Bruchia bolanderi	Bolander's bruchia	S	G3 / 2.2	10	MS, R
Buxbaumia viridis	buxbaumia moss	S	None	1	R
Calycadenia oppositifolia	Butte County calycadenia	S	G3 / 4.2	7	O, S
Calystegia atriplicifolia* ssp. *buttensis	Butte County morning-glory	S	G5T3 / 1B.2	3	O
Clarkia biloba* ssp. *brandegeae	Brandegee's clarkia	S	G4G5T2 / 1B.2	1	O
Clarkia gracilis* ssp. *albicaulis	white-stemmed clarkia	S	G5T2 / 1B.2	2	O

Species	Common Name	PNF Status[1]	Global Rank/ CNPS Rank[2]	Number of PNF Occurrences[3]	Habitat Guild[4]
Clarkia mildrediae* ssp. *mildrediae	Mildred's clarkia	S	G3T3 / 1B.3	30	O
Clarkia mosquinii	Mosquin's clarkia	S	G1 / 1B.1	45	O
Cudonia monticola	large cudonia (fungi)	S	None	P	IF
Cypripedium fasciculatum	clustered lady's-slipper	S	G3 / 4.2	135	IF
Cypripedium montanum	mountain lady's-slipper	S	G4 / 4.2	22	IF, R
Dendrocollybia racemosa	branched collybia (fungi)	S	None	P	IF
Eleocharis torticulmis	California twisted spikerush	S	G1 / 1B.3	1	F, MS
Eriogonum umbellatum* var. *ahartii	Ahart's sulphur flower	S	None	11	S
Fissidens aphelotaxifolius	brook pocket-moss	S	GU / 2.2	P	R
Fissidens pauperculus	fissidens moss	S	G3? / 1B.2	2	R
Fritillaria eastwoodiae	Butte County fritillary	S	G3Q / 3.2	69	O
Helodium blandowii	Blandow's bog-moss	S	G5 / 2.3	P	F, MS
Hydrothyria venosa	hydrothyria lichen	S	None	20	R
Ivesia aperta* var. *aperta	Sierra Valley ivesia	S	G2T2 / 1B.2	18	MS
Ivesia sericolueca	Plumas ivesia	S	G2 / 1B.2	14	MS
Ivesia webberi	Webber's ivesia	FC	G2 / 1B.1	HI	MS
Lewisia cantelovii	Cantelow's lewisia	S	G3 / 1B.2	27	B
Lewisia kelloggii* ssp. *hutchisonii	Hutchison's lewisia	S	G4T2T3 / 3.3	5	B, O
Lewisia kelloggii* ssp. *kelloggii	Kellogg’s lewisia	S	None	P	O
Lomatium roseanum	adobe parsley	S	G2G3 / 1B.2	4	B
Lupinus dalesiae	Quincy lupine	S	G3 / 4.2	260	O
Meesia longiseta	meesia moss	S	None	P	F, MS
Meesia triquetra	three-ranked hump-moss	S	G5 / 4.2	10	F, MS
Meesia uliginosa	broad-nerved hump-moss	S	G4 / 2.2	1	F, MS
Mielichhoferia elongata	elongate copper-moss	S	None	P	B, S
Monardella follettii	Follett's monardella	S	G1 / 1B.2	34	S
Monardella stebbinsii	Stebbin's monardella	S	G1 / 1B.2	7	S

Species	Common Name	PNF Status[1]	Global Rank/ CNPS Rank[2]	Number of PNF Occurrences[3]	Habitat Guild[4]
Oreostemma elatum	Plumas alpine-aster	S	G2Q / 1B.2	14	F, MS, R
Packera eurycephala* var. *lewisrosei	cut-leaved ragwort	S	G4T2 / 1B.2	31	S
Packera layneae	Layne's ragwort	FE	G2 / 1B.2	4	S
Penstemon personatus	closed-throated beardtongue	S	G2 / 1B.2	23	O
Penstemon sudans	Susanville beardtongue	S	G2G3 / 1B.3	3	O
Phaecollybia olivacea	olive phaeocollybia (fungi)	S	G2 / None	P	IF
Pyrrocoma lucida	sticky pyrrocoma	S	G3 / 1B.2	46	MS
Sedum albomarginatum	Feather River stonecrop	S	G2 / 1B.2	15	S

Status: FE – Federally listed Endangered, FC – Federal Candidate species, S – Forest Service Sensitive

Global Rank: G1-Critically Imperiled; G2-Imperiled; G3-Vulnerable; G4-Apparently secure; G5-Secure (NatureServe 2008)/CNPS Rank: 1B- Rare, Threatened or Endangered in California and Elsewhere; 2-Rare, Threatened or Endangered in California, But More Common Elsewhere, 3-About Which We Need More Information, 4-Plants of Limited Distribution (California Native Plant Society 2008).

Occurrences are defined as plants of the same species estimated to be separated by less than a quarter mile. HI=Historic Locations. P=Potential species (i.e. it has not been documented on the PNF).

[4]. Habitat guilds: Fens (F), Meadows and Seeps (MS), Riparian areas (R), Serpentine (S), Barren (B), Interior Forest (IF), Open habitat (O)

3.8.5.1 Rare Vascular Species

The PNF provides habitat for over 2,000 vascular plant taxa (Clifton 2005), which represents approximately 35 percent of the California flora (Hickman 1993). Of these, 43 are on the PNF Sensitive Species List.

The only Federally Threatened plant species known to occur on the PNF is *Packera layneae* (Layne's butterweed). This species grows in open rocky areas on gabbro and serpentine-derived soils that are between 650 and 3,300 feet in elevation. The PNF has four occurrences, totaling approximately 12 acres. In 2006, the U.S. Fish and Wildlife Service developed route designation design criteria for *Packera layneae* in order to achieve a "No effect" or "May affect not likely to adversely affect" determination. This design criterion stated that no unauthorized or unclassified routes or areas would be added to the NFTS that were "within Layne's butterweed occupied habitat, adjacent unoccupied habitat and a 500 foot buffer" (U.S. Fish and Wildlife Service 2006). This criterion has been met under all of the action alternatives; none of the proposed trails are within 500 feet of occupied or adjacent unoccupied habitat.

Two additional species of federal concern that have the potential to occur on the PNF are the Federally Threatened *Orcuttia tenuis* (slender Orcutt grass) and the Candidate species *Ivesia webberi* (Webber's ivesia). *Orcuttia tenuis* is limited to relatively deep vernal pools with clay soil. *Ivesia webberi* is found in open areas of sandy volcanic ash to gravelly soils in sagebrush and eastside pine. Based on soil and geology maps and field surveys, no suitable habitat for these two species occurs within 100 feet of a proposed trail.

3.8.5.1.1 Existing Conditions Related to Direct and Indirect Impacts to Rare Vascular Plants

- There are 24 Sensitive vascular plant species (306 locations) documented within 100 feet of an existing system trail or unauthorized route on the Forest (Table 127).
- All of the Sensitive vascular plant species with known occurrences on the PNF (34 of the 43 rare vascular species) have the potential to be affected by cross-country motorized vehicle travel.

Table 127. Number of rare species locations within 100 feet of an unauthorized route or existing system trail on the Plumas National Forest.

Species	Species Type[1]	Habitat Grouping[2]	Number of rare species locations within 100'	
			Unauthorized Routes	Existing System Trail
Allium jepsonii	V	S	7	
Arabis constancei	V	S	18	
Astragalus lentiformis	V	O	37	
Astragalus pulsiferae* var. *coronensis	V	O	3	
Astragalus pulsiferae* var. *pulsiferae	V	O	7	
Astragalus webberi	V	O	2	
Botrychium sp.	V	MS, R	1	
Calycadenia oppositifolia	V	S, O	4	

Species	Species Type¹	Habitat Grouping²	Number of rare species locations within 100’	
			Unauthorized Routes	Existing System Trail
Calystegia atriplicifolia ssp. buttensis	V	O	1	
Clarkia mildrediae* ssp. *mildrediae	V	O	36	6
Clarkia mosquinii	V	O	13	1
Cypripedium fasciculatum	V	IF	17	1
Cypripedium montanum	V	R, IF	2	
Eriogonum umbellatum* var. *ahartii	V	S	7	
Fritillaria eastwoodiae	V	O	9	
Hydrothyria venosa	B	R	4	
Ivesia aperta* var. *aperta	V	MS	7	
Ivesia sericolueca	V	MS	7	
Lewisia cantelovii	V	B	2	
Lewisia kelloggii* ssp. *hutchisonii	V	O, B	1	1
Lupinus dalesiae	V	O	54	
Monardella follettii	V	S	16	1
Packera eurycephala* var. *lewisrosei	V	S	15	
Penstemon personatus	V	O	11	
Pyrrocoma lucida	V	MS	19	
		TOTAL	**300**	**10**

¹Vascular (V); Bryophyte (B)

² Fens (F), Meadows and Seeps (MS), Riparian areas (R), Serpentine (S), Barren (B), Interior Forest (IF), Open habitat (O)

3.8.5.2 Rare Bryophytes (Mosses and Lichens)

There are currently nine Sensitive mosses known or thought to have potential to occur on the PNF. These mosses are generally habitat specific and occur in wetland/riparian areas or in rocks with heavy metals (e.g. *Mielichhoferia elongata*). Lichens are a combination of two different types of organisms (fungi and algae) growing together in a symbiotic relationship. One rare lichen *Hydrothyria venosa* is known to occur on the PNF.

3.8.5.2.1 Existing Conditions Related to Direct and Indirect Impacts to Rare Bryophytes

- There is one Sensitive lichen (4 locations) documented within 100 feet of an unauthorized route on the Forest (Table 127).
- All of the Sensitive bryophyte species with known occurrences on the PNF (six of the 10 rare bryophyte species) have the potential to be affected by cross-country motorized vehicle travel.

3.8.5.3 Rare Fungi

Fungi are organisms without chlorophyll that digest other organic matter. There are three rare fungi known to occur on or adjacent to PNF lands; these are *Cudonia monticola*, *Dendrocollybia racemosa* and *Phaeocollybia olivacea*. Information regarding the distribution and ecology of these fungi on the PNF is incomplete.

3.8.5.3.1 Existing conditions related to direct and indirect impacts to rare bryophytes

- There are no known fungi documented within 100 feet of an existing system trail or unauthorized route on the Forest.
- All of the fungi with known occurrences on the PNF (one of the three rare fungi species) have the potential to be affected by cross-country motorized vehicle travel.

3.8.6 Aggregating Rare Species for Analysis of Effects

While the 56 rare species on the PNF vary widely in their ecological requirements and life history characteristics, many occur in similar broad habitat types where the effects of motor vehicle use are comparable. For purpose of this analysis, PNF rare species were assigned to plant-habitat groupings or “guilds” (USDA Forest Service 2003b). Rare species often occur in more than one habitat grouping; for example a species may occur in a spatially-defined group, such as a riparian forest, while also relying on the availability of a temporally brief habitat, such as tree-fall gaps, for seedling establishment (USDA Forest Service 2003b). The following groupings have been selected to represent the rare species being addressed in this analysis:

- **Fens (F) -** includes species found in wetland sites sub-irrigated by cold water, with substantial accumulations of peat.
- **Meadows and seeps (MS) -** includes species growing in openings with more or less dense grasses, sedges and herbs that grow under moist or saturated conditions.
- **Riparian areas (R) -** includes species found along the margins of perennial, intermittent or ephemeral streams, natural lakes, reservoirs or ponds.
- **Serpentine (S) -** includes those species restricted to serpentine rocks and soils that contain high levels of heavy metals and low availability of plant nutrients.
- **Barren (B) -** includes those species found in very open, sparsely vegetated and in some cases barren communities, e.g. rock fields, ridge tops, talus slopes and cliffs.
- **Interior Forest (IF) -** includes species inhabiting shaded, protected microclimates and undisturbed substrates.
- **Open Habitats (O)** includes species inhabiting open forest types, edge-habitats or light gaps.

3.8.6.1 Habitat Group Descriptions

The following describes the seven habitat groupings and lists the rare plant species assigned to each group.

3.8.6.1.1 Fens (F)

Fens are groundwater-fed wetland ecosystems that develop where perennially saturated soils and cool temperatures slow the decomposition of plant material, allowing it to accumulate and form organic soils, called peat (Cooper, Chimner and Wolf 2005). Fens are considered significant resources due to their unique hydrologic characteristics (USDA Forest Service 2004a); ability to support high levels of biodiversity, including rare species (USDA Forest Service 2004a); relative rarity across the Sierra Nevada (Bartolome, Erman and Schwarz 1990); and ability to remain relatively stable for long periods of time, storing plant and climatic data over millennia (Chimner and Cooper 2002).

Fens are thought to be one of the most sensitive wet habitats in the Sierra Nevada (Rundel, Parsons and Gordon 1977). They are inherently tied to hydrological processes and it has been demonstrated that small-scale disturbances caused by water diversions, channels, trails and other management actions can have substantial impacts on their hydrologic and biotic integrity (Woods 2001, Cooper et al. 1998, Weixelman 2007).

Over seventy fens have been documented on the PNF, ranging in size from 0.04 acre to over 15 acres. Twenty nine of these (39 percent) are located in the Bucks Lake Wilderness, where motor vehicle travel is prohibited. The inventory of fens across the forest is not complete.

Rare species in this guild are: *Botrychium ascendens, Botrychium crenulatum, Botrychium minganense, Botrychium montanum, Eleocharis torticulmis, Helodium blandowii, Meesia longiseta, Meesia triquetra, Meesia uliginosa and Oreostemma elatum.*

3.8.6.1.2 Meadows and Seeps (MS)

Meadows and seeps are characterized by the presence of grasses, rushes, sedges and herbaceous plants that thrive, at least seasonally, under moist or saturated conditions. They occur at all elevations, are found on many different substrates and may be surrounded by grasslands, forests or shrub lands. Meadows and seeps provide valuable habitat for a diversity of plants and wildlife and perform essential ecological and hydrological functions. Due to their high levels of biological diversity, these habitats are often destination spots for Forest users.

Meadows and seeps are limited in number and distribution and have not been well documented or mapped on the PNF; therefore, quantification of the amount (acreage) of this habitat affected by the proposed trails is limited. The PNF vegetation maps estimate that there are approximately 2,520 acres of meadow habitat across the forest.

Rare species occurring in the meadow and seep guild are: *Astragalus lemmonii, Balsamorhiza macrolepis* var. *macrolepis, Botrychium ascendens, Botrychium crenulatum, Botrychium lineare, Botrychium lunaria, Botrychium minganese, Botrychium montanum, Botrychium pinnatum, Bruchia bolanderi, Eleocharis torticulmis, Helodium blandowii, Ivesia aperta* var. *aperta, Ivesia sericolueca, Ivesia webberi, Meesia longiseta, Meesia triquetra, Meesia uliginosa, Oreostemma elatum and Pyrrocoma lucida.*

3.8.6.1.3 Riparian Areas (R)

These are areas immediately bordering the edges of streams, rivers, lakes or other water sources. Riparian vegetation is often characterized by species that are intolerant of high moisture stress and tolerant of seasonal flooding, such as willow and aspen. It can be found under dense canopies of mixed conifer forest, in aspen groves and along the borders of streams in montane meadows. Most riparian forest stands are even-aged, reflecting their flood-mediated, episodic reproduction.

Riparian areas are often hotspots for plant and wildlife diversity. Riparian vegetation plays a vital role in the ecological functioning of the riparian system, which includes: stabilization of the stream bank; moderation of stream light intensity and water temperatures; delivery of large woody debris to stream habitats; filtration of sediment; and maintenance of water quality. The PNF has over 16,000 miles of ephemeral, intermittent and perennial streams.

Species found in riparian habitats include: *Botrychium ascendens, Botrychium crenulatum, Botrychium lineare, Botrychium lunaria, Botrychium minganense, Botrychium montanum, Botrychium pinnatum, Bruchia bolanderi, Buxbaumia viridis, Cypripedium montanum, Fissidens aphelotaxifolius, Fissidens pauperculus, Hydrothyria venosa and Oreostemma elatum.*

3.8.6.1.4 Serpentine Plant Communities (S)

This guild includes plants that grow on serpentine (ultramafic) rocks and soils. Serpentine soils are characterized by low levels of key plant nutrients such as calcium, nitrogen and phosphorous and exceptionally high levels of iron, magnesium and toxic trace elements. Serpentine soils are generally shallow and rocky, with low water-holding capacity and rooting depths. The vegetation in these plant communities tends to be sparse, slow-growing and stunted.

The harsh conditions in serpentine communities give rise to a unique and diverse assemblage of plant species, a high number of which are serpentine-endemics or rare. California's serpentine flora is considered the richest in the temperate zone; it consists of hundreds of species that are largely or entirely confined to serpentine substrates (Safford, Viers and Harrison 2005). Motor vehicles negatively affect this plant community and the rare species it supports by reducing vegetative cover, creating disturbed soils that are vulnerable to increased erosion and by introducing weeds.

On the PNF, serpentine soils occur primarily in bands along the western slopes of the Forest. An accurate inventory of the serpentine soils on the PNF has not yet been completed; however, bedrock geologic maps for the forest (Elder and Reichert 2005) estimate that the PNF contains approximately 56,554 acres of serpentine soils.

Rare species restricted to serpentine rocks or soils are: *Allium jepsonii, Arabis constancei, Balsamorhiza macrolepis* var. *macrolepis, Calycadenia oppositifolia*, *Eriogonum umbellatum* var. *ahartii*, *Mielichhoferia elongata*, *Monardella follettii, Monardella stebbinsii, Packera eurycephalus* var. *lewisrosei*, *Packera layneae and Sedum albomarginatum.*

3.8.6.1.5 Barren (B)

This guild is characterized by open, sparsely vegetated habitats that include rock outcrops, ridge tops, cliffs and talus slopes. The plant species that grow in these harsh environments are adapted to little soil, limited nutrients and low water availability. Species in this guild are also generally poor competitors. In many of these areas, particularly where the terrain is steep, the habitat is highly susceptible to erosion.

Rare species restricted to barren communities are: *Lewisia cantelovii*, *Lewisia kelloggii ssp. hutchisonii*, *Lomatium roseanum* and *Mielichhoferia elongata*.

3.8.6.1.6 Interior Forest (IF)

Plant and fungi species that are dependent on interior or late-seral forest communities rely on shade, protected microclimates and infrequently disturbed substrates. Because of mycorrhizal associations, species that are dependent on interior forest are generally intolerant of edge effects that change the temperature, moisture and other microclimate conditions. Threats to the species in this guild include activities that disrupt litter and duff; alter soil characteristics; reduce shade and moisture; and create openings and bare soil that increase the risk of weed introduction and spread.

Sensitive species dependent on these habitats include: *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa and Phaecollybia olivacea.*

3.8.6.1.7 Open Habitats (O)

The species in this guild are found in a wide variety of open habitat types that include: open forests (i.e. those with less than 40 percent canopy cover); forest margins, such as stabilized roadsides and old skid trails; small openings or gaps; and large openings resulting from natural events or management activities (i.e. mechanical tree removal or road construction). Species in this guild vary in their degree of tolerance to disturbance activities. A number of the species in these habitats tend to be disturbance followers that increase with infrequent, small-scale disturbances.

Species associated with open habitats include: *Astragalus lentiformis*, *Astragalus pulsiferae* var. *coronensis, Astragalus pulsiferae* var. *pulsiferae, Astragalus webberi, Balsamorhiza macrolepis* var. *macrolepis, Calycadenia oppositifolia, Calystegia atriplicifolia* ssp. *buttensis, Clarkia biloba* ssp. *brandegeae, Clarkia gracilis* ssp. *albicaulis, Clarkia mildrediae* ssp. *mildrediae, Clarkia mosquinii, Fritillaria eastwoodiae*, *Lewisia kelloggii* ssp. *hutchisonii*, *Lewisia kelloggii* ssp. *kelloggii, Lupinus dalesiae, Penstemon personatus and Penstemon sudans.*

3.8.6.2 Other Botanical Resources

3.8.6.2.1 Research Natural Areas

Research natural areas are part of a national network of ecological areas designated in perpetuity for research, education and to maintain biological diversity on NFS lands (USDA Forest Service 2005c). Research natural areas (RNA) provide essential baseline or reference condition information that land managers use to evaluate long-term ecological change, ecosystem sustainability and the success of land management activities in equivalent systems (Andrews 1994). The guiding principle in management of a RNA is the perpetuation of unmodified conditions and the prevention of activities that directly or indirectly modify ecological processes (USDA Forest Service 2005c).

FSM 4063.3 outlines protection and management standards within a RNA. These standards do not permit roads, trails, fences or signs on an established RNA unless they contribute to the objectives or to the protection of the area.

There are two RNAs on the PNF, Mud Lake RNA and Mt. Pleasant RNA. The Mud Lake RNA was established to preserve two isolated stands of the special interest species Baker cypress (*Cupressus bakeri*). The Mt. Pleasant RNA was established to preserve red fir (*Abies magnifica*) forest and fen ecosystems and is within the Bucks Lake Wilderness where motorized vehicle use is prohibited.

3.8.6.2.1.1 Existing Conditions Related to Direct and Indirect Impacts to Research Natural Areas

There are 0.3 miles of unauthorized routes within the Wheeler Peak unit of the Mud Lake RNA (Table 128), which contains the world's largest specimen of Baker Cypress (diameter at breast height of 56 inches).

3.8.6.2.2 Special Interest Areas

Special Interest Areas (SIA) have been designated (or proposed for designation) to protect and where appropriate foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, palentological or other special characteristics (Meyer 1991). FSM 2372.4 outlines protection and management standards within a SIA. These standards specify that (a) roads and trails be located without disturbing the special features of the established area and that (b) roads and trails are kept to the minimum necessary for public enjoyment. There are six designated and 12 proposed SIAs on the PNF.

3.8.6.2.2.1 Existing Conditions Related to Direct and Indirect Impacts to Special Interest Areas

There are approximately 41.6 miles of unauthorized routes and existing system trail within designated and proposed SIAs (Table 128).

Table 128. Miles of unauthorized routes and existing system trails within Plumas National Forest Research Natural Areas and Special Interest Areas.

Special Interest Area	PNF Status[1]	Number of Occurrences within 100'	
		Unauthorized Routes	Existing System Trail
Brady's Camp	P	4.9	
Butterfly Valley	E	3.5	0.04
Eastern Escarpment	P	6.0	
Fales Basin	P	0.3	
Fowler Lake	P	0.1	
Little Last Chance Canyon	E	0.02	
Little Volcano	P	0.2	
McRae Meadow	P	10.3	5.6
Mount Fillmore	P	1.3	4.0
Red Hill	P	4.9	
Mud Lake RNA	E	0.3	
Soda Rock	E	0.2	
Grand total		**32**	**9.6**

[1] P = Proposed SIA, E = Existing SIA

3.8.7 Environmental Consequences—General Types of Impacts

3.8.7.1 Direct Effects

Direct effects occur when plants are physically impacted. Vehicles traveling on or parking off of the trail surface can result in death, altered growth or reduced seed set through physically breaking, crushing or uprooting plants (Wilshire, Shipley and Nakata 1978, Cole and Bayfield 1993). Off-highway vehicle use on trails can reduce perennial and annual plant cover, plant density and above-ground biomass (Hall 1989).

Direct effects are dependent upon the intensity and timing of disturbance. For example, direct impacts to an annual plant that has already gone to seed would not be as adverse as direct impacts to an annual plant that has not set seed (Ouren et al. 2007). Effects are also dependent upon the number of plants at a specific location and the proportion of the occurrence impacted. Repeated damage to sensitive species and other native plants can lead to the degradation of habitat and eventually to the replacement of native plant species, including sensitive plants, with species more adapted to frequent disturbance, such as invasive weeds.

3.8.7.2 Indirect Effects

Indirect effects on rare species are effects that are separated from an action in either time or space. Indirect effects from off-highway vehicle use may include changes in vegetation composition by creating edge habitats (Lovich and Bainbridge 1999 *in* Ouren et al. 2007). Adverse indirect effects are more likely to occur to those species that are intolerant of disturbance, such as those in the Interior Forest habitat group. In contrast, for those species that tolerate or are dependent upon some level of disturbance, such as those species in the Open Habitat group that inhabit gaps and forest openings, routes and trails may have less detrimental indirect effects.

Off-highway vehicles have been shown to accelerate plant invasions (von der Lippe and Kowarik 2007) by reducing native plant vigor and cover (Brooks 1995 in Ouren et al. 2007), creating a competition-free habitat open to invasion (Frenkel 1970) and acting as a vector for seed dispersal. Once established, noxious weeds have the potential to impact rare species indirectly through allelopathy (the production and release of plant compounds that inhibit the growth of other plants) (Bais et al. 2003), as well as through direct competition for nutrients, light and water (Bossard, Randall and Hoshovsky 2000).

Indirect effects to rare plants and native vegetation from off-highway vehicle use are often tied to soil impacts. Soil compaction, erosion and modification of soil properties can affect the distribution, abundance, growth rate, reproduction and size of plants (Ouren et al. 2007). For example, studies conducted in the Mohave Desert found significantly less plant cover (Davidson and Fox 1974) and density (Vollmer and others 1976) in areas frequented by off-highway vehicles.

Soil compaction, caused by repeated off-highway vehicle use, can result in reduced seed germination (Williams 1967 *in* Davidson and Fox 1974), seedling survival, soil water infiltration (Wilshire, Shipley and Nakata 1978), plant and root growth (Phillips and Kirkham *in* Davidson and Fox 1974). The effects of soil erosion on plants can include undercutting of root systems as trails are enlarged by erosion; creation of new erosion channels in areas not used by vehicles; wind erosion of adjacent destabilized areas; burial of plants by debris eroded from areas of use; and reduction of the biological capability of the soil by physical modification and stripping of fertile layers (Wilshire, Shipley and Nakata 1978).

Dust from motorized vehicle use has also been shown to decrease native plant cover and vigor by reducing rates of photosynthesis, respiration, transpiration (Spellerberg and Morrison 1998 *in* Ouren et al. 2007) and water-use efficiency. On heavily traveled roads, dust impacts have been documented up to 10 meters (32 feet) from the roadside and dust layers of up to 10 cm thick found on mosses and other vegetation of low stature (Walker and Everett 1987 *in* Ouren et al. 2007).

3.8.7.3 Cumulative Effects

A cumulative effect can result from the incremental effect of the current action when added to the effects of past, present and reasonably foreseeable future actions. These effects are considered regardless of what agency or person undertakes the other actions and regardless of land ownership on which the other actions occur. An individual action when considered alone may not have a significant effect, but when its effects are considered in sum with the effects of other past, present and reasonably foreseeable future actions, the effects may be significant (40 CFR 1508.7 and 1508.8 and FSH 1909.15 section 15.1).

One crucial step in assessing cumulative impacts on a particular resource is to compare the current condition of the resource (rare plants) and the projected changes as a result of management activities (such as off-highway vehicle use along a trail) to the natural variability in the resources and processes of concern (MacDonald 2000). This assessment is particularly difficult for rare plant species because long-term data are often lacking. In addition, the habitats in which many rare plant species are presently found have a long history of disturbance, making an undisturbed reference difficult to find. For some rare plants, particularly those that do not tolerate disturbance or are found under dense canopy conditions, minimizing on-site change is an effective way of reducing the potential for larger-scale cumulative impact (MacDonald 2000). If the greatest impact on a rare species is both local and immediate, then this is the scale at which the effect is easiest to detect (MacDonald 2000).

The additive effects of past actions (such as off-highway vehicle use, wildfires, wildfire suppression, timber harvest, mining, nonnative plant introductions and ranching) have shaped the present landscape and corresponding populations of rare plants. However, data describing the past distribution and abundance of rare plant species is extremely limited, making it impossible to quantify the effects of historic activities on the resources and conditions that are present today. Rare plant surveys did not begin until the early 1980s on the PNF. In many cases, even when project-level surveys were conducted, there is very little documentation that describes whether past projects avoided or protected rare plant species during project implementation. In addition to these unknowns, changes have been made to the PNF Sensitive species list. Therefore, in order to incorporate the contribution of past activities into the cumulative effects of the proposed trail project, this analysis uses the current abundance and distribution of rare plant species as a proxy for the impacts of past actions.

Undeniably, past, present and future activities have and will continue to alter rare plant populations and their habitats to various degrees. These activities include off-highway vehicle use, grazing, timber harvest, fire suppression, prescribed fire, mining, recreational use, road construction and noxious weed infestation. However, the approach taken in this analysis is that, if direct and indirect adverse effects on rare plant species from motor vehicle routes or trails are minimal or would not occur, then they would not contribute substantially to cumulative effects on the species.

Present and future activities that are associated with the proposed trail system could impact rare species growing along or in the vicinity of a trail. These activities may include routine maintenance, such as brushing, signing, cleaning or clearing of debris or increased levels of dispersed camping or recreation along and near trails. Monitoring of road and trail conditions, which is required (see Chapter 2), will detect if resource damage is occurring to sensitive species and will instigate the development of species-specific protection measure or trail closure. The effects of other types of future projects (i.e. vegetation management) would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

Flagging and avoiding rare plants is one of the most frequently used management strategies for reducing the cumulative impacts to known occurrences. While flag-and-avoid management can be effective in reducing cumulative impacts in most projects, it is not practical for proposed trails; therefore, alternatives that minimize adverse effects are preferable to alternatives that do not.

3.8.8 Environmental Consequence—Effects of Alternatives on Rare Plant Species and Botanical Resources

The following sections provide a discussion of the direct, indirect and cumulative effects of each alternative on rare species, rare plant habitats and sensitive botanical resources. It is important to note that the analysis below represents what is known about motor vehicle impacts along unauthorized routes at this point in time. Adding a trail to the NFTS is expected to increase and concentrate motor vehicle use; this has the potential to increase negative impacts to those rare species and habitats found along established trails. Trails and rare plant occurrences will need to be re-evaluated on a continual basis to assess and address detrimental resource affects.

Only those rare species with the potential to be affected directly or indirectly by the proposed project (that is, those within 100 feet of a proposed trail) are discussed in detail in this document. The number of rare species locations within 100 feet of an existing system trail or unauthorized route is displayed in Table 127; the number of locations within 100 feet of a proposed trail is displayed by action alternative in Table 131. The remainder of the effects discussion or more specifically the analysis presented for Alternative 1, is focused on the more general effects to rare species and habitat groupings from motorized vehicle use. The following table summarizes the number of miles within each of the rare plant habitat types.

Table 129. Approximate number of miles of open unauthorized routes, existing system trails and proposed trails that occur within rare plant habitat types.

Habitat Type	Measure (miles)	Alternative				
		1 (No-action)	2	3	4	5
Riparian Areas[1]	Proposed trails		81		27	50
	Existing System Trails	34	34	34	34	34
	Unauthorized Routes	344				
	Total Miles	**378**	**115**	**34**	**61**	**84**
Wet Meadows[2]	Proposed trails		0.5			0.4
	Existing System Trails	1	1	1	1	1
	Unauthorized Routes	1.5				
	Total Miles	**2.5**	**1.5**	**1**	**1**	**1.4**
Serpentine Areas	Proposed trails		10		4	6.5
	Existing System Trails	3	3	3	3	3
	Unauthorized Routes	37				
	Total miles	**40**	**13**	**3**	**7**	**9.5**
Barren Habitats[2]	Proposed trails		2		0.75	1
	Existing System Trails	8.4	8.4	8.4	8.4	8.4
	Unauthorized Routes	11				
	Total miles	**19.4**	**10.4**	**8.4**	**9.15**	**9.4**
Interior Forest[3]	Proposed trail		207		75	139
	Existing System Trail	72	72	72	72	72
	Unauthorized Routes	625				
	Total miles	**697**	**279**	**72**	**147**	**211**
Open Habitat[4]	Proposed trail		112		59	85
	Existing System Trail	38	38	38	38	38
	Unauthorized Routes	346				
	Total miles	**384**	**150**	**38**	**97**	**123**

[1] Riparian Areas are defined here as ephemeral, intermittent or perennial streams.

[2] It is important to note that these numbers are an estimate; this habitat type is not well mapped on the Forest.

[3] Interior Forest is defined here as CWHR 4M, 4D, 5M, 5D and 6M.

[4] Open Forest ecosystems are defined here as CWHR 1-3: M, D, S, P, X and 4P, 4S, 5P, 5S.

In addition to rare plant species and habitats, the affects to two additional botanical resources are also discussed in the analysis below; these resources are Research Natural Areas and Special Interest Areas. The number of existing and unauthorized route miles within PNF SIAs and RNAs is displayed in Table 128; the number of proposed trail miles is displayed by action alternative in Table 132.

3.8.8.1 Alternative 1—No-action

Alternative 1 has the greatest negative effect on rare species and habitats. The largest impact of this alternative is from cross-country travel, which has the potential to affect all but the most inaccessible rare species and habitats.

Under this alternative, it is impossible to quantify when and where rare plant species and habitats will be impacted by motorized vehicles; therefore, the analysis below uses the approximately 1,109 miles of unauthorized routes as a representation of current motorized vehicle use on the Forest (Table 130). Due to the potential scope of these effects, the analysis of this alternative also focuses on a discussion of effects to plant groups, rather than to individual species.

3.8.8.1.1 Direct/Indirect Effects

Table 130. Summary of rare species indicator measures for Alternative 1 (No-action).

Indicator Measure	Value
Miles of unauthorized routes within or adjacent to rare plant sites	30 miles
Acres of rare plant sites within 100 feet of an existing unauthorized route	509 acres
Total number of rare plant sites within 100 feet of an existing unauthorized route	304 sites

3.8.8.1.1.1 Fens

Implementation of Alternative 1 has the highest risk of direct and indirect effects to rare species dependent upon fen ecosystems, primarily due to the allowance for cross-country travel. At present, there are no known rare fen species occurrences within 100 feet of an unauthorized route; however, at least one unauthorized route comes within 100 feet of one fen and vehicle tracks have been documented in close proximity to another. Motor vehicle use has been listed as a potential threat to almost all of the fens outside of the Bucks Lake Wilderness (PNF Fen Inventory files 2008).

Motor vehicle use within or in close proximity to fen habitats, has the potential to disrupt key hydrologic processes essential to maintaining the integrity of the fen system. In situations where the hydrologic function of a fen has been disrupted and the water table lowered, the peat quickly oxidizes and decomposes. This reduces the peat depth, alters hydrologic patterns, increases the risk of pocket gopher invasion and can result in shifts in species diversity and composition (Cooper 1990 *in* Weixelman 2007). All of these factors can have detrimental effects to rare fen species.

3.8.8.1.1.2 Meadows and seeps

Implementation of Alternative 1 and the allowance for cross-country travel, provides the greatest access to meadows (Table 129) and seeps; it also carries the highest risk of direct and indirect effects to rare species dependent upon meadow and seep ecosystems. Meadows and seeps often have high scenic value, which makes them a destination spot for motorized recreation and tends to concentrate use in these areas. There are currently four rare Meadow and Seep species, with a total of 34 locations, within 100 feet of an unauthorized route or existing system trail (Table 127). Unauthorized routes often lack water bars or other design features that slow water flow, decrease erosion and prevent sedimentation into the meadows and seeps situated adjacent to routes. Motorized vehicle use results in soil disturbance, soil compaction and removal of vegetation in and around routes; all of these can have a substantial impact on the hydrologic and biotic integrity of the meadow and seep ecosystems. Meadows and seeps are also highly susceptible to invasion from noxious weed species that thrive under wet conditions, such as Canada thistle (*Cirsium arvense)* and perennial pepperweed (*Lepidium latifolium*).

3.8.8.1.1.3 Riparian Areas

Alternative 1 has highest number of existing unauthorized routes and system trails (378 miles) within riparian ecosystems (Table 129). There are also three rare Riparian species, with a total of seven locations, within 100 feet of existing unauthorized routes or system trail (Table 127). These factors, in combination with the allowance for cross-country travel, result in Alternative 1 carrying the highest risk of effects to rare species within riparian systems. Unauthorized routes have not been designed to reduce impacts to riparian ecosystems. Motor vehicles traveling on and off of these routes negatively impact riparian species and habitats by reducing the vegetative cover in and around trails, compacting soils, increasing erosion, altering patterns of water flow and reducing water quality by depositing petroleum products and/or sediment into streams. Removal of vegetation can alter the microclimate and lead to warmer and drier conditions that are not favored by the rare species in this guild. Riparian areas, like meadows and seeps, are highly susceptible to invasion from noxious weed species that thrive under wet conditions, such as Canada thistle (*Cirsium arvense)* and perennial pepperweed (*Lepidium latifolium*).

3.8.8.1.1.4 Serpentine areas

Alternative 1 has an estimated 40 miles of unauthorized routes and existing system trail within serpentine areas (Table 129). There are also six rare Serpentine species, with a total of 67 locations, within 100 feet of an unauthorized or existing system trail (Table 127). Serpentine areas often lack natural barriers to motor vehicles (i.e. dense vegetation), which makes this habitat type particularly inviting to cross-country travel. All of these factors result in Alternative 1 carrying the highest risk of effects to rare species within Serpentine areas.

Serpentine soils are generally shallow and rocky, with low water-holding capacity and rooting depths. These conditions inhibit plants from developing deep root systems and also increase the vulnerability of serpentine soils to erosion (Whittaker 1954). Motor vehicles negatively affect this unique plant community and the rare species that it supports by creating disturbed soils that are highly vulnerable to increased erosion. In areas where motor vehicle use has occurred, vegetation and soil recovery rates are generally very slow (Harrison et. al 2006). While these nutrient-poor ecosystems tend to be less invaded by non-native species than other habitat types (Harrison 1999), motor vehicles still increase the risk of noxious weed introduction and spread in these communities.

3.8.8.1.1.5 Barren Habitats

Alternative 1 has the highest estimated number of unauthorized routes (11 miles) on rock outcrops, ridge tops, cliffs and talus slope ecosystems (Table 129). Two rare species, with a total of four locations, also occur within 100 feet of unauthorized or existing system trail (Table 127). These factors, in combination with the allowance for cross-country travel, result in Alternative 1 carrying the highest risk of effects to rare species within these "barren" ecosystems.

Some of the species in this group (i.e. *Lewisia cantelovii*) grow in sites that are inaccessible to motor vehicles, such as steep cliffs or rocky habitats. In these areas, where natural barriers to motor vehicle use exist, the likelihood of direct impacts from this alternative is much lower than it is for rare species that grow in more accessible habitat types (i.e. forest openings or serpentine areas). In contrast, other species in this group, such as *Lewisia kelloggii* ssp. *hutchisonii*, grow in flatter, more open terrain, where the risk of direct effects from motor vehicle travel is much higher.

In many of these ecosystems, particularly where the terrain is steep, disturbance from motor vehicles can increase the rates of erosion, causing significant indirect impacts to rare species. In addition, plants dependent on Barren habitat types generally do not compete well with other vegetation; therefore, weed introduction or spread can be a significant risk in those areas with more developed soils.

3.8.8.1.1.6 Interior Forest Habitats

Implementation of Alternative 1 has the highest risk of direct and indirect effects to rare species dependent upon interior forest ecosystems. Alternative 1 has 697 miles of unauthorized routes and existing system trail within interior forest habitats (Table 129). There are also two rare Interior forest orchid species, with a total of 19 locations, within 100 feet of unauthorized or existing system trail (Table 127).

Rare species that are dependent upon interior forest communities often require shade, protected microclimates and infrequently disturbed substrates. Many of these species, particularly the *Cypripedium* species, have complex mycorrhizal associations that require sufficient organic matter in the duff layer. Motor vehicle use within interior forest habitats can alter the temperature, moisture and other microclimate conditions; disrupt underground mycorrhizal networks; disturb litter and duff layers; change soil characteristics; and create open areas of bare soil that increase the risk of weed introduction and spread. Increased route and road density in interior forest habitat also has the potential to fragment rare plant populations that are dependent upon closed canopy systems.

The species in the Interior Forest habitat group may not be as impacted by cross-country travel as those in the previously discussed species groups (i.e. meadows or serpentine species) due to the higher density and size of trees or other natural barriers to motor vehicle travel that exist in this habitat type; however, the Interior Forest species are also highly intolerant of disturbances, such as those from motor vehicles. This latter factor greatly increases the risk to these species from Alternative 1.

3.8.8.1.1.7 Open Habitats

The species in this guild are found in a wide variety of open habitat types that include open forests, forest margins, stabilized roadsides, old skid trails and forest openings or gaps. Because many of these habitats are ephemeral in nature or occur along habitat edges, a quantification of some of these habitat types cannot be completed. An estimate of the number of miles within open forest habitat is presented in Table 129. In general, these habitats are highly accessible to and utilized by motor vehicles. In addition, many of these types (i.e. stabilized roadsides, forest margins) are often created as a result of motor vehicle travel. This grouping contains the largest number of species (12) and locations (168) within 100 feet of an unauthorized or existing system trail (Table 127).

In general, the rare species in this plant association colonize open areas, multiply rapidly and persist for a short while. They are often poor competitors and may persist only until stronger competitors move in and shade them out. Many are well adapted to take advantage of the high-light intensities found along routes. Species in this guild vary in their degree of tolerance to disturbance activities; many tend to be disturbance-followers that increase with infrequent, small-scale disturbances.

The edge of routes may provide open habitat for some rare species; however, any beneficial effect to these species (i.e. increased light or low levels of competition) could easily be overcome by negative direct effects such as repeated trampling or death of individuals; continual soil disturbance, which could lead to soil erosion and degradation of the seedbed; and noxious weed introduction and spread. Open habitats are highly susceptible to noxious weed invasions, particularly from species such as yellow starthistle (*Centaurea solstitialis*), knapweed (*Centaurea* species) or annual grasses such as medusahead (*Taeniatherum caput-medusae*).

3.8.8.1.2 Cumulative Effects

Implementation of Alternative 1 would not improve conditions for rare species or their habitats. Unmanaged motorized vehicle use on the PNF has the potential for negative direct and indirect effects to all of the rare species known to occur on the Forest (Table 126); therefore, the potential for cumulative effects to these species is high.

Under this alternative, motor vehicles traveling on and off of unauthorized routes would continue to trample, kill and uproot rare species. Indirect effects to rare species and their associated habitats could include reduction of native plant cover, creation of edge-habitats, increased rutting, erosion and soil compaction. One of the largest potential impacts from cross-country motor vehicle travel is the increased risk of noxious weed introduction and spread. Noxious weeds reduce the quality of native (including rare plant) habitat by displacing native species, altering nutrient and fire cycles, degrading soil structure and decreasing the quality and availability of forage for wildlife (Bossard, Randall and Hoshovsky 2000). Noxious weeds are spread by roads, motorized trails, recreational activities (such as camping, hiking, horseback riding and hunting) and ongoing land management activities. Under this alternative, all but the most inaccessible habitats are at risk of noxious weed invasion and spread from cross-country motor vehicle travel.

Many of the PNF plant communities (discussed above) have been degraded or altered by historic human activities. Riparian areas, fens, meadows, seeps and springs on the PNF have been altered by water diversions, habitat type conversion (i.e. meadow to annual grassland), intense grazing by domestic livestock and construction of roads and trails. Serpentine areas and barren, rocky habitats have been impacted by gold and gravel mining, timber harvest, road construction and recreation. Interior or late-successional forests across the Sierra Nevada have been altered by past timber management practices, wildfire suppression and road construction. Open or early to mid-successional forests, have also been heavily impacted by past timber management practices, which tended to favor removal of larger, more dominant trees (i.e. overstory removal). This management practice, as well as the suppression of wildfire, has resulted in a greater number of dense forests that are dominated by small trees and a reduction in open forest habitat across the landscape. Forest openings or edges, which are not a specific habitat type, are continually being created as trees or other vegetation die. While the specific amount of habitat reduction or alteration is unknown, it can be presumed that these activities and others have impacted rare species directly, indirectly and cumulatively by reducing the amount of suitable habitat across the PNF.

Past management activities, such as timber harvest, have also created skid trails and temporary roads that often contribute to cross-country travel and the creation of unauthorized routes. The number of Forest users and subsequently the number of unauthorized routes, continues to grow each year with many having negative impacts to rare species and their habitats. Under this alternative, these negative impacts would not be addressed or mitigated and would continue to occur at an increased rate. These routes and use areas lack the planning and design features that are important for limiting disturbance and damage to sensitive botanical resources.

The effects of present and future projects on rare species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

3.8.8.1.2.1 Cumulative Effects to Other Botanical Resources Under Alternative 1

Under this alternative, motorized vehicle use would continue to occur within the Mud Lake Research Natural Area and the 18 PNF Special Interest Areas (Table 129). These areas were designated (or proposed for designation) to protect significant geological, botanical and/or historical features. Unmanaged motorized vehicle use within these areas has the potential to significantly degrade or disturb these special features.

3.8.9 Action Alternatives (2 thru 5)—Summary of Environmental Consequences for Individual Species

The following sections provide a discussion of the direct, indirect and cumulative effects of each alternative on those rare species with the potential to be affected directly or indirectly by the proposed project (that is, those within 100 feet of a proposed trail). These sections also provide information on the abundance, distribution (both on a global and local scale) and habitat specificity for each of the rare species (organized by habitat grouping) found within 100 feet of a proposed trail. Sections of the PNF rare species management prescriptions (USDA Forest Service 2007) that are relevant to trails are also provided. The PNF species management prescriptions are based on field visits, monitoring and professional observations; individual species conservation assessments and guides; and known species ecology.

In general, the types of impacts to rare species would be similar to those described under Alternative 1 (No-action); however, due to the prohibition of cross-country travel, the action alternatives would negatively affect far fewer rare species (Table 131), rare plant habitats (Table 129) and Special Interest Areas (Table 132). In general, the greater the number of motorized vehicle trails (and miles) proposed, the higher the risk and severity of negative impacts to rare species and their associated habitats.

Table 131. The number of rare plant locations within 100' of a proposed trail displayed by action alternative.

Species	Habitat Grouping[1]	Action Alternatives		
		2	4	5
Allium jepsonii	S	2		2
Arabis constancei	S	2	1	1
Astragalus lentiformis	O	9	1	4
Astragalus pulsiferae var. *pulsiferae*	O	3		
Botrychium sp.	MS, R	1		
Calycadenia oppositifolia	S, O	2		2
Clarkia mildrediae ssp. *mildrediae*	O	10	1	2
Clarkia mosquinii	O	1		
Cypripedium fasciculatum	IF	6	4	4
Eriogonum umbellatum var. *ahartii*	S	7		
Hydrothyria venosa	R	2		1
Ivesia aperta var. *aperta*	MS	2		2
Ivesia sericolueca	MS	2		
Lewisia kelloggii ssp. *hutchisonii*	O, B	1		
Lupinus dalesiae	O	22	12	18
Monardella follettii	S	3	1	1
Penstemon personatus	O	2	1	1
Pyrrocoma lucida	MS	2		2
TOTAL		**78**	**21**	**40**

[1]Fens (F), Meadows and Seeps (MS), Riparian areas (R), Serpentine (S), Barren (B), Interior Forest (IF), Open habitat (O)

Table 132. Miles of proposed trails within Plumas National Forest Special Interest Areas displayed by action alternative.

Special Interest Area	PNF Status[1]	Action Alternative		
		2	4	5
Brady's Camp	P	3.1		2.1
Butterfly Valley	E	0.2		0.2
Fowler Lake	P	0.1		
McRae Meadow	P	1.2	1.2	1.2
Grand total		**4.4**	**1.2**	**3**

[1] P = Proposed SIA, E = Existing SIA

3.8.9.1 Meadows and Seeps

The following four meadow and seep species occur within 100 feet of a proposed trail: *Botrychium sp., Ivesia aperta* var. *aperta, Ivesia sericolueca* and *Pyrrocoma lucida*.

Botrychium (moonworts) *Botrychium* are small, inconspicuous, perennial ferns that are commonly referred to as moonworts. Some of these species are widely distributed across North America. In California, *Botrychium* have been reported from the Oregon border as far south as the San Bernardino mountain range (Laeger 2002). Despite this wide range, *Botrychium* occurrences are often scattered and consist of only a few individuals.

In California, *Botrychium* are most often found in high latitudes and high elevation montane or forest habitats. Within these habitat types, *Botrychium* occur in meadows, springs and fens; along stream banks and alpine lakeshores; and in wet crevices in outcrops (Laeger 2002). Important habitat requirements include sufficient canopy cover, soil moisture organic matter and because *Botrychium* are closely associated with mycorrhizal fungi at all life stages, the avoidance of root and mycorrhizal disturbance.

Population trends are difficult to define for *Botrychium* because individuals do not appear above ground every year. Threats from management activities include grazing and trampling by livestock; road construction and maintenance; recreation, including off-road vehicles use; changes in the hydrologic regime; and harvesting of plants as special forest products. The dispersal strategies and population dynamics (i.e. metapopulation dynamics) of these species make it particularly important to protect unoccupied suitable habitat. Although many of these species may be found in areas of old disturbance (greater than 10 years old), continuous, heavy soil disturbance can be very detrimental (Laeger 2002).

The *Botrychium's* small size, inconspicuous growth form and potential for dormancy make survey and identification particularly challenging. On the PNF, fifteen sites have been identified as supporting unidentified *Botrychium* species (i.e. where the taxonomy has yet to be confirmed). *B. ascendens*, *B. crenulatum*, *B. lineare, B. lunaria* and *B. pinnatum* have not been documented on the PNF but are considered to have the potential to occur. *B. minganese* and *B. montanum* have been found on the PNF.

PNF management prescription: Protect all plant occurrences from ground disturbance. Maintain hydrologic conditions in riparian areas where these plants occur. Do not allow machinery in occupied habitat. Develop a monitoring strategy for habitat enhancement activities as needed.

Evaluate other activities on a site-by-site basis considering species abundance, population size and known species ecology.

3.8.9.1.1.1 Direct and Indirect Effects

One *Botrychium* location was documented within 100 feet of a trail proposed under Alternative 2 (Table 133). Due to the difficulty of identification, a species determination for this *Botrychium* has not been made; therefore, for the purposes of this analysis this species will be treated as one of the eight PNF Sensitive *Botrychium* species (Table 126) and protected according to the management prescription described below.

Table 133. *Botrychium* occurrences within 100' of the proposed trails under Alternative 2.

Occurrence	Route ID	Number of acres with potential for impact			Action Alternatives		
		Within 0-30' route	Within 30-100'	Size of Occurrence (acres)	2	4	5
6	17M05	0.1	0.01	0.11	X		

Due to its close proximity to the route proposed under Alternative 2, the individuals within Occurrence 6 are at a high risk of direct impacts (i.e. trampling or death) from motor vehicle use. This small occurrence contains only eight individuals; all of which are located along the banks of a small spring that crosses the proposed trail. Soil disturbance from motor vehicle use, particularly when it occurs on a regular basis, could have an adverse effect on the *Botrychium* at this site.

The habitat where this species is found is particularly sensitive to the impacts of motor vehicle use. Motor vehicles can disrupt key hydrologic processes, alter the timing and direction of water flow and infiltration and increase rates of erosion. This habitat is also highly susceptible to invasion from aggressive noxious weed species that thrive under wet conditions, such as Canada thistle (*Cirsium arvense)* and perennial pepperweed (*Lepidium latifolium*).

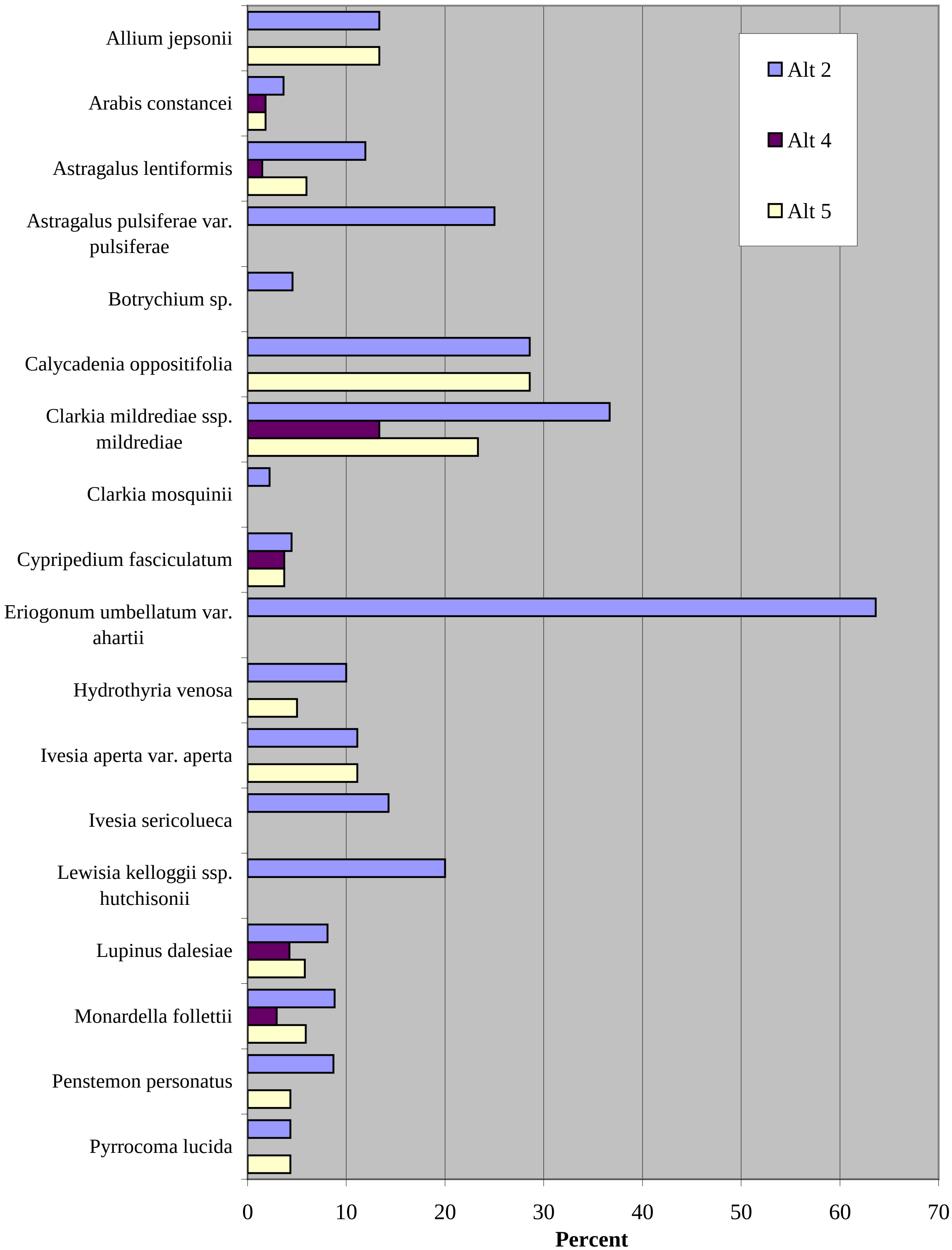
There would be no direct or indirect effects to the *Botrychium* from implementation of Alternatives 3, 4 or 5.

3.8.9.1.1.2 Cumulative Effects

Past activities, such as grazing by domestic livestock and construction of roads and trails, have resulted in water diversions and habitat type conversions of seeps, springs and meadows across this species' range. These past management activities have likely had a negative impact on *Botrychium* individuals and areas of suitable habitat.

Implementation of the action alternatives would reduce impacts to this species by banning cross-country travel; however, Alternative 2 would not eliminate the impacts to all occurrences or areas of suitable habitat. The occurrence that may be impacted by use of the proposed trails represents approximately five percent of all known *Botrychium* occurrences on the PNF (Figure 8).

Figure 8. Percentage of Plumas National Forest occurrences impacted by the proposed trails.



The proposed trail appears to be relatively well-established; therefore, the largest impact to this occurrence most likely occurred at the time the route was created or constructed. Continued use of this route would likely threaten the individuals within this occurrence, by directly impacting individuals and indirectly increasing rates of erosion. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There are no direct or indirect effects to *Botrychium* from implementation of Alternatives 3, 4 or 5; therefore, the cumulative effects from these alternatives would be negligible.

3.8.9.1.2 *Ivesia aperta* var. *aperta* (Sierra Valley Ivesia)

This species has a limited range that consists of scattered occurrences in Washoe County, Nevada and Plumas, Lassen and Sierra counties in California. On the PNF, *Ivesia aperta* var. *aperta* has been documented at 18 locations. Thirty three occurrences have been recorded from Bureau of Land Management (BLM), Forest Service, State and private lands adjacent to the PNF (CNDDB 2008).

Ivesia aperta var. *aperta* is found in sagebrush plant communities at the eastern base of the Sierra Nevada. Within these communities, it is associated with meadow flats, meadow borders, rocky ephemeral stream channels, gentle rocky slopes with sparse vegetative cover and vernal pools (USDA Forest Service 1992). This species appears to be in decline across its range. Threats include livestock grazing and trampling, road construction and maintenance, mining, fire suppression activities (fire camps) and off-highway vehicle use. Off-highway vehicles impact this species and habitat by compaction of soils and physical damage to the plants. Observations have shown that motorized vehicle trails on the PNF have removed “strips” from *Ivesia* populations (USDA Forest Service 1992).

PNF management prescription: At least 30 percent of the known occurrences within a project area should be protected from all ground-disturbing actions. Avoid impacting more than 50 percent of the known individuals within a project area over any 10 year period. To the degree possible, incorporate known aspects of the species’ ecology into design elements of proposed actions to protect or enhance species viability. Evaluate activities and use mitigations consistent with Riparian Management Objectives (HFQLG FEIS) or Riparian Conservation Objectives (Sierra Nevada Forest Plan Amendment ROD, p. 32-35) depending on which standards apply, species abundance, population size, geographic distribution and known species ecology. In general, strive to avoid direct impacts.

3.8.9.1.2.1 Direct and Indirect Effects

Two locations of *Ivesia aperta* var. *aperta* are situated within 100 feet of a trail proposed under Alternatives 2 and 5.

Table 134. Locations of *Ivesia aperta* var. *aperta* within 100 feet of the trails proposed under the Action Alternatives

Occurrence ID	Route ID	Number of acres with potential for impact			Action Alternatives		
		Within 0-30' route	Within 30-100'	Size of Occurrence (acres)	2	4	5
2	16M04A	0.4	1	125	X		X
10	15M04	0.5	1.1	9	X		X

Ivesia aperta var. *aperta* individuals within 30 feet of a proposed trail will have a high probability of direct effects (i.e. trampling or death) from motor vehicle use; however, because this species is dependent upon wet meadow habitats and is less likely to inhabit the drier conditions associated with the trail bed or shoulder, indirect effects to adjacent habitats are most likely to have an adverse impact.

The habitat where this species is found is particularly sensitive to the impacts of motor vehicle use. Motor vehicle use within or in close proximity to this habitat has the potential to disrupt key hydrologic processes, which could have adverse indirect effects on the species. Ruts caused by motor vehicles in wet meadows can alter the timing and direction of water flow and infiltration. Increased rates of erosion and creation of head-cuts can also become so severe that a large portion of wet meadow habitat is degraded. These habitats are also highly susceptible to invasion from aggressive noxious weed species that thrive under wet conditions, such as Canada thistle (*Cirsium arvense)* and perennial pepperweed (*Lepidium latifolium*).

There would be no direct or indirect effects to *Ivesia aperta* var. *aperta* from implementation of Alternatives 3 or 4.

3.8.9.1.2.2 Cumulative Effects

Past activities, such as grazing by domestic livestock and construction of roads and trails, have resulted in water diversions and habitat type conversions of meadows across this species' range. These past management activities have likely had a negative impact on *Ivesia aperta* var. *aperta* individuals and areas of suitable habitat.

At present, the two *Ivesia aperta* var. *aperta* occurrences that are potentially impacted by the proposed trails are also impacted by ongoing livestock grazing. Preliminary monitoring of this species has shown lower recruitment numbers and higher mortality levels in areas that are grazed by domestic livestock (M. Friend, personal communication). Occurrence 10 also has a channel headcut, which may accelerate the hydrologic degradation of the habitat. These conditions, in combination with motor vehicle use on the proposed trails, have the potential to negatively impact *Ivesia aperta* var. *aperta* habitat and threaten individuals.

Implementation of the action alternatives would reduce impacts to this species by banning cross-country travel; however, Alternatives 2 and 5 would not eliminate the impacts to all occurrences or areas of suitable habitat. The two occurrences that may be impacted by use of the proposed trails represent approximately eleven percent of all known occurrences on the PNF (Figure 8) and four percent of the known occurrences in California (CNDDB 2008).

Both of the proposed trails appear to be relatively well established; therefore, the largest impact to these two *Ivesia aperta* var. *aperta* occurrences most likely occurred at the time the route was created or constructed. Adding these trails to the NFTS under the action alternatives would have some negative impact on this species; however, it would likely not reduce the overall viability of *Ivesia aperta* var. *aperta* due to the small proportion of the two occurrences affected (less than eighteen percent) and the relatively small amount of suitable habitat potentially impacted. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There are no direct or indirect effects to *Ivesia aperta* var. *aperta* from implementation of Alternatives 3 or 4; therefore, the cumulative effects from these alternatives would be negligible.

3.8.9.1.3 *Ivesia sericolueca* (Plumas Ivesia)

This species has a limited range that consists of scattered occurrences in Washoe County, Nevada and Plumas, Lassen, Nevada and Sierra counties in California. *Ivesia sericolueca* has been recorded at 14 locations on the PNF and 52 occurrences outside of the PNF on County, Forest Service, State and private lands (CNDDB 2008).

This plant is found in vernally wet portions of meadows and alkali flats and in vernal pools. These habitats are not widespread and are sensitive to changes in hydrology and impacts from erosion. *Ivesia sericolueca* has a downward trend across its range due to low levels of reproduction and high levels of disturbance at known sites. Threats to this species include recreation activities, off-highway vehicle use, firewood gathering, target shooting, livestock grazing, mining, fire suppression, military practice camps, timber harvest activities, changes in hydrology and erosion.

PNF management prescription: At least 30 percent of the known occurrences within a project area should be protected from all ground-disturbing actions. Avoid impacting more than 50 percent of the known individuals within a project area over any 10 year period. To the degree possible, incorporate known aspects of the species' ecology into design elements of proposed actions to protect or enhance species viability. Evaluate activities and use mitigations consistent with Riparian Management Objectives (HFQLG FEIS) or Riparian Conservation Objectives (Sierra Nevada Forest Plan Amendment ROD, p. 32-35) depending on which standards apply, species abundance, population size, geographic distribution and known species ecology. In general, strive to avoid direct impacts.

3.8.9.1.3.1 Direct and Indirect Effects

Two locations of *Ivesia sericolueca* occur within 100 feet of a trail proposed under Alternative 2 (Table 135). No occurrences of this species are impacted under any of the other action alternatives.

Table 135. Locations of *Ivesia sericolueca* within 100’ of a trail proposed under Alternative 2.

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30’	Within 30-100’		2	4	5
5	13M10	0.6	1.1	52	X		
6	13M10	0.04	0.4	17	X		

Ivesia sericolueca individuals within 30 feet of a proposed trail will have a high probability of direct effects (i.e. trampling or death) from motor vehicle use; however, because this species is dependent upon wet meadow habitats and is less likely to inhabit the drier conditions associated with the trail bed or shoulder, indirect effects to adjacent habitats are most likely to have an adverse impact.

Ivesia sericolueca occupies habitats that are particularly sensitive to the impacts of motor vehicle use. Motor vehicle use within or in close proximity to this habitat has the potential to disrupt key hydrologic processes, which could have adverse indirect effects on the species. Ruts caused by motor vehicles in wet meadows can alter the timing and direction of water flow and infiltration. Increased rates of erosion and creation of head-cuts can also become so severe that a large portion of wet meadow habitat is degraded. These habitats are also highly susceptible to invasion from aggressive noxious weed species that thrive under wet conditions, such as (*Cirsium arvense)* and perennial pepperweed (*Lepidium latifolium*).

There would be no direct or indirect effects to *Ivesia sericolueca* from implementation of Alternatives 3, 4 or 5.

3.8.9.1.3.2 Cumulative Effects

Past activities, such as grazing by domestic livestock and construction of roads and trails, have resulted in water diversions and habitat type conversions of meadows across this species’ range. These past management activities have likely had a negative impact on *Ivesia sericolueca* individuals and areas of suitable habitat.

Current livestock grazing on the PNF impacts occurrences of *Ivesia sericolueca* by reducing recruitment levels and increasing mortality rates (M. Friend, personal communication). This management activity, in combination with motor vehicle use along some of the proposed trails, may accelerate the hydrologic degradation of suitable habitat for this species across the Forest.

Implementation of the action alternatives would reduce impacts to this species by banning cross-country travel; however, Alternative 2 would not eliminate the impacts to all occurrences or areas of suitable habitat. The two occurrences that may be impacted by use of the proposed trail represent approximately 14 percent of all known occurrences on the PNF (Figure 8) and three percent of the known occurrences in California (CNDDB 2008).

The proposed trail (13M10) is relatively well established; therefore, the largest impact to these two occurrences most likely occurred at the time the route was created or constructed. Adding this trail to the NFTS under Alternative 2 would have some negative impact on this species; however, it would likely not reduce the overall viability of *Ivesia sericolueca* due to the small proportion of the two individual occurrences affected (less than three percent) and the relatively small amount of suitable habitat potentially impacted. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There are no direct or indirect effects to *Ivesia sericolueca* from implementation of Alternatives 3, 4 or 5; therefore, the cumulative effects from these alternatives would be negligible.

3.8.9.1.4 *Pyrrocoma lucida* (sticky Pyrrocoma)

This perennial tap rooted species is known from 76 occurrences in Sierra, Plumas, Yuba and Lassen counties (CNDDB 2008). It is endemic to the eastern portion of the Beckwourth Ranger District of the PNF, the Sierra Valley area on the Sierraville Ranger District of the Tahoe NF and adjacent private lands. The PNF currently has 46 occurrences.

Pyrrocoma lucida is found in vernally saturated soils of alkaline clay meadows within sagebrush scrub habitats below 6,000 feet. Within these habitats it occurs in the drier sagebrush-meadow ecotones rather than in the perennially wet meadows. It is also found in ephemeral drainages and swales, roadside ditches and historic railroad ditches.

The trend for this species is not known. Documented occurrences are numerous and individuals are estimated to exceed 383,000 plants with over half occurring on state or federal lands. In spite of this substantial number of occurrences and abundance of individuals, nearly every occurrence is disturbed by one or more factors. Threats include reservoir development, meadow restoration, off-highway vehicle use, recreation activities, fire suppression camps, military camps, prescribed burning and other fuel treatments, activities associated with timber harvest (i.e. landings), fuel wood gathering, grazing and land exchanges.

PNF management prescription: At least 30 percent of the known occurrences within a project area should be protected from all ground disturbing actions. Avoid impacting more than 50 percent of the known individuals within a project area over any 10 year period. To the degree possible, incorporate known aspects of the species' ecology into design elements of proposed actions to protect or enhance species viability. Evaluate activities and use mitigations consistent with Riparian Management Objectives (HFQLG FEIS) or Riparian Conservation Objectives (Sierra Nevada Forest Plan Amendment ROD, pp. 32-35) depending on which standards apply, species abundance, population size, geographic distribution and known species ecology. In general, strive to avoid direct impacts.

3.8.9.1.4.1 Direct and Indirect Effects

Two locations of *Pyrrocoma lucida* occur within 100 feet of a trail proposed under Alternatives 2 and 5 (Table 136).

Table 136. Locations of *Pyrrocoma lucida* within 100’ of the trails proposed under the Action Alternatives

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30’	Within 30-100’		2	4	5
4	16M04A		0.2	63	X		X
5	16M04	0.05	0.4	100	X		X

Pyrrocoma lucida is found along the edges of vernally moist meadows and alkali flats. Because of their sparse vegetation and open terrain, these habitats are particularly inviting to motor vehicle use. The trails within the vicinity of these two occurrences are both well-established roads/trails; therefore, the likelihood of individuals occurring within the trail is relatively low. Motor vehicles pulling off of the trail to park may directly affect individuals within Occurrence 5 if plants occupy the area between 0-30 feet of the trail.

Indirect effects to this species include increased risk of noxious weed invasion, particularly from aggressive noxious weed species that thrive under wet conditions, such as Canada thistle (*Cirsium arvense)* and perennial pepperweed (*Lepidium latifolium*). Motor vehicle use within or in close proximity to this habitat can also disrupt key hydrologic processes, alter the timing and direction of water flow and infiltration and increase rates of erosion.

There would be no direct or indirect effects to *Pyrrocoma lucida* from implementation of Alternatives 3 or 4.

3.8.9.1.5 Cumulative Effects

Past activities, such as grazing by domestic livestock and construction of roads and trails, have resulted in water diversions and habitat type conversions of meadows across this species’ range. These past management activities have likely had a negative impact on *Pyrrocoma lucida* individuals and areas of suitable habitat. Current livestock grazing within occurrences, in combination with motor vehicle use along some of the proposed trails, may accelerate the degradation of habitat for this species across the Forest.

Implementation of the action alternatives would reduce impacts to this species by banning cross-country travel; however, Alternatives 2 and 5 would not eliminate the impacts to all occurrences or areas of suitable habitat. The two occurrences that may be impacted by use of the proposed trail represent approximately four percent of all known occurrences on the PNF (Figure 8) and three percent of the known occurrences in California (CNDDB 2008).

The proposed trails are relatively well-established; therefore, the largest impact to these two occurrences most likely occurred at the time the route was created or constructed. Adding these trails to the NFTS under the action alternatives would have some negative impact on this species; however, it will likely not reduce the overall viability of *Pyrrocoma lucida* due to the small proportion of the two individual occurrences affected (less than 0.5 percent) and the relatively small amount of suitable habitat potentially impacted. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There are no direct or indirect effects to *Pyrrocoma lucida* from implementation of Alternatives 3 or 4; therefore, the cumulative effects from these alternatives would be negligible.

3.8.9.2 Riparian Areas

One riparian species, *Hydrothyria venosa,* occurs within 100 feet of a proposed trail.

3.8.9.2.1 *Hydrothyria venosa* (Veined Water Lichen)

This aquatic lichen has a broad distribution that includes five eastern states, Oregon, Washington, British Columbia and California. In California, it is found in streams along the western slope of the Sierra Nevada and northern Coast ranges. Twenty occurrences of *Hydrothyria venosa* have been documented on the PNF. Outside of the PNF, 25 occurrences are known from the Forest Service and State Park lands. Where populations do occur, individuals are generally few in number.

Hydrothyria venosa is found in cold, unpolluted streams in mixed conifer forests. It is in decline throughout its historic range. Threats to this species include activities that change the water chemistry, alter the stream channel or significantly alter the riparian vegetation. These changes increase the water temperature and/or increase flows that scour the gravel and rocks where this lichen is attached. Management activities of concern include grazing, off-highway vehicles, sedimentation from roads, herbicides, dispersed camping and recreational water use.

PNF management prescription: Protect all locations from disturbance. Maintain hydrologic conditions in streams where occurrences are found. Coordinate stream activities up and downstream of known occurrences. Consider a protection buffer to maintain canopy cover. If the establishment of a no-disturbance buffer is appropriate, consider the following when determining the size and shape of the buffer: site conditions, topographic position, slope, aspect, stand structure (including canopy height), intensity of the proposed management activity and proximity to water.

3.8.9.2.1.1 Direct and Indirect Effects

Two locations of *Hydrothyria venosa* occur within 100 feet of the trails proposed under Alternative 2 (Table 137).

Table 137. Locations of *Hydrothyria venosa* within 100’ of the trails proposed under the Action Alternatives

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30’	Within 30-100’		2	4	5
6	5M20		0.04	42	X		
11	5M28E	0.5	0.2	1.6	X		

This aquatic lichen requires perennial streams, with relatively stable water flows and clear, cool water (Dillingham 2005). This lichen also cannot tolerate too much physical disruption; therefore, those individuals in Occurrence 11 that occupy portions of the stream that intersect the proposed trail will likely be negatively impacted (i.e. killed) by motor vehicle use if Alternative 2 is implemented.

Adding the proposed trails to the NFTS could also indirectly impact the two occurrences listed above if use of the trails result in alteration of the stream channel, removal of riparian vegetation or modification of the water chemistry. These changes can increase the water temperature and/or increase flows that scour the gravel and rocks where this lichen is attached.

There would be no direct or indirect effects to *Hydrothyria venosa* from implementation of Alternatives 3, 4, or 5.

3.8.9.2.1.2 Cumulative Effects

This species has likely lost individuals and suitable habitat in the past as a result of management activities that include water diversions, habitat type conversion and construction of roads and trails. Implementation of the action alternatives would reduce impacts to *Hydrothyria venosa* by banning cross-country travel; however, Alternatives 2 and 5 would not eliminate the impacts to occurrences or areas of suitable habitat.

The two occurrences that may be impacted by use of the proposed trails represent approximately 10 percent of all known occurrences on the PNF (Figure 8) and four percent of the known occurrences in California (CNDDB 2008). Adding these trails to the NFTS under Alternatives 2 and 5 would have some negative impact on this species and its habitat. These impacts would likely not reduce the overall viability of *Hydrothyria venosa* due to the small number of occurrences affected and the relatively low amount of suitable habitat potentially impacted. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There are no direct or indirect effects to *Hydrothyria venosa* from implementation of Alternatives 3 or 4; therefore, the cumulative effects from these alternatives would also be negligible.

3.8.9.3 Serpentine Plant Communities

The following five serpentine species are within 100 feet of a proposed trail: *Allium jepsonii*, *Arabis constancei, Calycadenia oppositifolia, Eriogonum umbellatum* var. *ahartii and Monardella follettii.*

3.8.9.3.1 *Allium jepsonii* (Jepson's onion)

This plant is known from 23 occurrences in eastern Butte and Tuolumne Counties in the northern Sierra Nevada (CNDDB 2008). In Butte County, it grows on serpentine soils in foothill woodland or mixed conifer forest. On the PNF, this plant is known from fifteen occurrences that are found on steep, relatively undisturbed, serpentine outcrops between 1,400 and 3,800 feet in elevation in the western portion of the Forest. Most occurrences are small, containing only hundreds of individuals.

The trend for this plant on the PNF appears to be stable for those plants located on rock outcrops; however, population numbers may fluctuate in serpentine soils located off of outcrops depending on climatic fluctuation. In Butte County threats to this species include road construction and for the few occurrences not on rock outcrops, timber harvest, prescribed burning and off-highway vehicle use.

PNF management prescription: Protect all plant occurrences from ground disturbance. Evaluate activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.3.1.1 Direct and Indirect Effects

There are two occurrences of *Allium jepsonii* within 30-100 feet of the trails proposed under Alternatives 2 and 5 (Table 138).

Table 138. Locations of *Allium jepsonii* within 100' of the trails proposed under the Action Alternatives

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30'	Within 30-100'		2	4	5
2	5M02		0.2	11.1	X		X
5	5M05		0.02	0.2	X		X

The two *Allium jepsonii* occurrences are situated more than 30 feet from the system trails proposed under Alternatives 2 and 5; therefore, the potential for direct effects to individuals is low. There is some potential for indirect effects, such as increased erosion and noxious weed invasion; however, only a small portion (less than 10 percent) of each occurrence is located within 100 feet of the proposed trails, making the potential for significant effects to the entire occurrence low.

There would be no direct or indirect effects to *Allium jepsonii* from implementation of Alternatives 3 or 4.

3.8.9.3.1.2 Cumulative Effects

This rare onion is found on rocky, low productivity, serpentine soils and has not been observed in areas of recent or high disturbance. This species has likely lost individuals and suitable habitat over the past 150 years as a result of ground disturbing activities such as gold and gravel mining, timber harvest, road construction and recreation. Implementation of the action alternatives would reduce impacts to *Allium jepsonii* by banning cross-country travel; however, Alternatives 2 and 5 would not eliminate the impacts to all occurrences or areas of suitable habitat.

The two *Allium jepsonii* occurrences that may be indirectly impacted by use of the proposed trails represent approximately 13 percent of all known occurrences on the PNF (Figure 8) and nine percent of the known occurrences in California (CNDDB 2008). Based on the low likelihood of direct effects to the known occurrences and the relatively small amount of suitable habitat impacted, it is predicted that implementation of the action alternatives would not reduce the overall viability of *Allium jepsonii*. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There would be no direct or indirect effects to *Allium jepsonii* from implementation of Alternatives 3 or 4; therefore, cumulative effects from these alternatives would also be negligible.

3.8.9.3.2 *Arabis constancei* (Constance's Rock Cress)

This species occurs on undisturbed serpentine-derived soils in scattered locations on the PNF and southernmost part of the Lassen National Forest, in Plumas and Sierra counties. There are 55 occurrences on the PNF that occur in several parallel bands of serpentine. Only one occurrence is known from outside of the PNF; it is found on the Lassen National Forest (CNDDB 2008). Occurrences are found between 3,200 and 6,600 feet in elevation and range in size from a few individuals on small serpentine outcrops to over a hundred individuals within larger areas of productive serpentine soil.

The known occurrences of this plant seem to be stable if they have not been impacted; however, many of the known occurrences have been impacted by various activities including mining, road building, timber harvest, off-highway vehicle use and recreation activities.

PNF management prescription: Protect all plant occurrences from ground disturbance. Evaluate activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.3.2.1 Direct and Indirect Effects

There are two occurrences of *Arabis constancei* within 30-100 feet of the trails proposed under Alternatives 2, 4 and 5 (Table 139).

A review of the PNF files indicates that this species has a very low tolerance to soil disturbance. It may be found occupying very old areas of disturbance, but it is not found in new areas of disturbance.

The potential for direct effects to individuals is low in the two *Arabis constancei* occurrences because individuals are situated more than 30 feet from the proposed trails. There is some potential for indirect effects, such as increased erosion and noxious weed invasion; however, only a small portion (less than three percent) of each occurrence is located within 100 feet of the proposed trails, making the potential for significant effects to the entire occurrence low.

Table 139. Locations of *Arabis constancei* within 100' of the trails proposed under the Action Alternatives.

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30'	Within 30-100'		2	4	5
12C2	8M11		0.03	1.3	X	X	X
43	8M13		0.3	12	X		

There would be no direct or indirect effects to *Arabis constancei* from implementation of Alternative 3.

3.8.9.3.2.2 Cumulative Effects

This species has likely lost individuals and suitable habitat over the past 150 years as a result of ground disturbing activities such as gold and gravel mining, timber harvest, road construction and recreation. Implementation of the action alternatives will reduce impacts to *Arabis constancei* by banning cross-country travel; however, Alternatives 2, 4 and 5 would not eliminate the impacts to all occurrences or areas of suitable habitat.

The two *Arabis constancei* occurrences that may be impacted by use of the proposed trails represent approximately four percent of all known occurrences on the PNF (Figure 8) and in California (CNDDB 2008). It is predicted that implementation of action Alternatives 2, 4 and 5 would not reduce the viability of *Arabis constancei* due to this relatively small scale of potential impact; the low likelihood of direct effects to the two occurrences that are within 30-100 feet of the proposed trails; and the relatively small proportion of the occurrence affected (less than three percent). The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There are no direct or indirect effects to *Arabis constancei* from implementation of Alternative 3; therefore, the cumulative effects from this alternative would also be negligible.

3.8.9.3.3 *Calycadenia oppositifolia* (Butte County calycadenia)

Calycadenia oppositifolia is an annual herb that is restricted to a narrow band of habitat in the foothills of the Sierra Nevada and Cascade Mountain Range in Butte County, California. There are seven occurrences on the PNF.

Calycadenia oppositifolia is found in grassy openings in woodland, chaparral and forested habitats below 3,100 feet in elevation. It often occurs on shallow, serpentine soils, but can also be found on volcanic or granitic parent materials. Threats to this species include livestock grazing, road construction and maintenance, off-highway vehicle use and urban development. *Calycadenia oppositifolia* has been observed in disturbed areas; however, the greatest concentrations of the species have been found in undisturbed openings (State of California, Department of Water Resources 2004).

PNF management prescription: Protect occurrences from ground disturbance before seed set. Evaluate any disturbance outside the growing season to determine if effect would be detrimental to the species. For any other activities, evaluate on a site-by-site basis considering the species abundance, population size, geographic distribution and known species ecology.

3.8.9.3.3.1 Direct and Indirect Effects

Two occurrences of *Calycadenia oppositifolia* occur within 30-100 feet of the trails proposed under Alternatives 2 and 5 (Table 140).

Table 140. Locations of *Calycadenia oppositifolia* within 100’ of the trails proposed under the Action Alternatives.

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30’	Within 30-100’		2	4	5
6	5M02		1.4	18.2	X		X
12	5M01		0.3	0.3	X		X

Field surveys of the proposed trails did not find *Calycadenia oppositifolia* individuals growing directly in or along the trail (L. Janeway, personal communication 2008); therefore, the potential for direct effects to individuals is low. There is some potential for negative indirect effects, particularly in Occurrence 12, which has 100 percent of its individuals located within 100 feet of the trail and occurs in open and highly accessible habitat. Negative impacts to individuals within this location could result in the elimination of the entire occurrence.

There would be no direct or indirect effects to *Calycadenia oppositifolia* from implementation of Alternatives 3 or 4.

3.8.9.3.3.2 Cumulative Effects

Past ground disturbing activities, such as off-highway vehicle use, mining, logging and road building, have most likely affected *Calycadenia oppositifolia* individuals and areas of suitable habitat. It is unclear to what extent these past activities have affected this species due to the fact that it has been observed growing in both disturbed and undisturbed habitats (State of California, Department of Water Resources 2004).

Implementation of the action alternatives will reduce impacts to *Calycadenia oppositifolia* by banning cross-country travel; however, Alternatives 2 and 5 would not eliminate the impacts to all occurrences or areas of suitable habitat. The two *Calycadenia oppositifolia* occurrences that may be impacted by use of the proposed trails represent approximately 29 percent of all known occurrences on the PNF (Figure 8). This relatively substantial percentage of occurrences affected increases the risk of negative cumulative impacts to *Calycadenia oppositifolia*; however, this species' tolerance for disturbance, in combination with the low likelihood of direct impacts, makes the overall risk to the species' viability much lower. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There are no direct or indirect effects to *Calycadenia oppositifolia* from implementation of Alternatives 3 or 4; therefore, the cumulative effects from these alternatives would also be negligible.

3.8.9.3.4 *Eriogonum umbellatum* var. *ahartii* (Ahart's sulphur flower)

This newly described sub-shrub species is restricted to Butte, Yuba and Plumas Counties in California. Eleven occurrences have been recorded on the PNF and an additional three occurrences are on Lassen NF lands that are administered by the PNF.

This species occurs on serpentine slopes in open chaparral and mixed conifer forests. The current trend for this species is unknown. Threats include timber harvest, off-highway vehicle use, prescribed burning and road construction on public lands.

PNF management prescription: Protect all plant occurrences from ground disturbance. Evaluate other activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.3.4.1 Direct and Indirect Effects

Seven locations of *Eriogonum umbellatum* var. *ahartii* occur within 100 feet of the trails proposed under Alternative 2 (Table 141). No occurrences of this species are impacted under any of the other action alternatives.

Table 141. *Eriogonum umbellatum* var. *ahartii* occurrences within 100’ of Alternative 2 proposed trails.

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30’	Within 30-100’		2	4	5
10	7M09	0.07	0.007	0.07	X		
11 (1)	7M10		0.04	0.04	X		
11 (2)	7M10	0.3	0.3	0.7	X		
11 (3)	7M10		0.04	0.04	X		
11 (4)	7M10		0.2	0.8	X		
11 (5)	7M10	0.002	0.04	0.04	X		
11 (6)	7M10	0.02	0.02	0.04	X		

The response of this serpentine sub-shrub to disturbance is presently unknown. While it is found in open, rocky habitats, it has not been observed in recently disturbed areas. Surveys of trails 7M09 and 7M10 did not observe individuals in the trails and motor vehicle disturbance was not observed to extend beyond the trails (L. Janeway, personal communication 2008). These two factors lower the probability of direct disturbance to *Eriogonum umbellatum* var. *ahartii* individuals.

As seen in Table 141, all seven locations are at risk of indirect effects from motorized vehicle use under this alternative. Five of these locations are small, with 100 percent of their occurrence at risk of being indirectly impacted. Indirect effects, such as erosion or noxious weed invasion, within these small sites could result in the elimination or degradation of the entire sub-occurrence.

There are no direct or indirect effects to *Eriogonum umbellatum* var. *ahartii* from implementation of Alternatives 3, 4 or 5.

3.8.9.3.4.2 Cumulative Effects

Little is known about the past distribution and abundance of this newly described species, making it difficult to determine the effects of past management activities on this species. As is the case with many of the serpentine species, *Eriogonum umbellatum* var. *ahartii* has most likely been affected by historic ground disturbing activities, such as off-highway vehicle use, mining, logging and road building. Implementation of the action alternatives will reduce impacts to *Eriogonum umbellatum* var. *ahartii* by banning cross-country travel; however, Alternative 2 will not eliminate the impacts to all occurrences or areas of suitable habitat.

The seven occurrences that may be impacted by use of the proposed trails under Alternative 2 represent approximately 64 percent of all known occurrences on the PNF (Figure 8) and 50 percent of the known occurrences in California (CNDDB 2008). This large percentage of occurrences with the potential to be impacted greatly increases the risk of negative cumulative impacts to *Eriogonum umbellatum* var. *ahartii* under Alternative 2. There are no direct or indirect effects to *Eriogonum umbellatum* var. *ahartii* from implementation of Alternatives 3, 4 or 5; therefore, the cumulative effects from these alternatives would be negligible.

The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

3.8.9.3.5 *Monardella follettii* (Follett's monardella)

This species is known from Plumas County in the northern Sierra Nevada and from one historic occurrence in Nevada County that has not been relocated since 1916. There are currently 35 known occurrences in California (CNDDB 2008), 34 of which occur on the PNF.

The PNF occurrences occur within a band of serpentine that extends from Meadow Valley to Red Hill. Plants are often found in open, rocky areas and openings in mixed conifer forest. Occurrences range in size from a few individuals to thousands of individuals scattered over a large area. Threats to this species include off-highway vehicle use, rock collection and mining, timber harvest, road construction and maintenance and canopy closure resulting from fire suppression.

PNF management prescription: Protect 50 percent of known occurrences within a project area from ground disturbance. Favor protection of locations that have open tree and shrub canopies (less than 50 percent cover) over those with closed tree and shrub canopies. Favor allowing ground disturbance and prescribed fire in areas of dense shrub or tree cover. Evaluate other activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.3.5.1 Direct and Indirect Effects

Three occurrences of *Monardella follettii* occur within 100 feet of the trails proposed under Alternatives 2, 4 and 5 (Table 142).

This perennial herb is found in undisturbed and disturbed sites, such as abandoned roads, skid trails and on old landings (Griggs 2001). Occurrences of this species often cover large areas that range from 1-100 acres and individuals within occurrences are often abundant and patchily distributed.

Table 142. Locations of *Monardella follettii* within 100’ of trails proposed under the Action Alternatives.

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30’	Within 30-100’		2	4	5
1S	8M23	0.003	0.2	27	X		
4	8M13		0.3	8	X		
9	8M11	3.0	6.6	183	X	X	X

Although this species is found in areas of disturbance, any beneficial affect of these open sites (i.e. increased light or low levels of competition) could easily be overcome by the negative direct effect of repeated trampling or death of individuals. Two of the occurrences are in close proximity to the proposed trails. Within these occurrences, those individuals that are within 30 feet of the trail would likely be negatively impacted by motor vehicle use. Indirect effects, such as increased erosion and noxious weed invasion, may also negatively impact all of the three occurrences.

3.8.9.3.5.2 Cumulative Effects

Monardella follettii individuals and areas of suitable habitat have likely been affected by past ground disturbing activities, such as off-highway vehicle use, mining, logging and road building; however, the ability of this species to colonize both previously disturbed and undisturbed sites suggests that at least some of these past management activities may not have been detrimental to the species.

Implementation of the action alternatives would reduce impacts to *Monardella follettii* by banning cross-country travel; however, Alternatives 2, 4 and 5 would not eliminate the impacts to all occurrences or areas of suitable habitat. One large *Monardella follettii* occurrence (11B) occurs along an existing system trail; use of this trail and any associated impacts to this occurrence would continue under all of the action alternatives.

As noted above, the close proximity of this species to the proposed trails would increase the probability of negative direct effects, which may outweigh the positive indirect effects to the species (i.e. increased light availability or low levels of competition). The three *Monardella follettii* occurrences that may be impacted by use of the proposed trails represent approximately nine percent of all known occurrences on the PNF (Figure 8) and in California (CNDDB 2008). These factors, in combination with the large size (between 8 and 183 acres) of the *Monardella follettii* occurrences and consequently the relatively low number of individuals with potential to be directly and indirectly affected, reduce the overall negative impact to this species from adding the trail to the NFTS. The effects of present and future projects on *Monardella follettii* would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

3.8.9.4 Barren Habitats

One barren habitat species, *Lewisia kelloggii* ssp. *huchinsonii*, occurs within 100 feet of a proposed trail.

3.8.9.4.1 *Lewisia kelloggii* ssp. *huchinsonii* (Hutchinson's lewisia)

In California, *Lewisia kelloggii* ssp. *huchinsonii* occurs at 18 sites ranging from the southern Cascade Range to the central Sierra Nevada (USDA Forest Service 2008). On the PNF, it is limited to five occurrences, all of which occur in the southwestern portion of the forest in an area of approximately 20 square miles.

This species is found in granitic gravel on ridge tops and flats, sparsely vegetated by Jeffrey pine and lodgepole pine woodlands, with patches of upland sedge (*Carex* sp.) and rock garden wildflowers. One of the largest threats to this species is off-highway vehicles, which travel easily across the flat open terrain where *Lewisia kelloggii* ssp. *huchinsonii* is found. Other threats include horticultural collection, camping, hiking and activities that compact soil and trample plants.

PNF management prescription: Protect all plant occurrences from ground disturbance that result in soil displacement. Evaluate other activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.4.1.1 Direct and Indirect Effects

One occurrence of *Lewisia kelloggii* ssp. *huchinsonii* occurs within 30-100 feet of a proposed system trail (Table 143).

Table 143. Locations of *Lewisia kelloggii* ssp. *huchinsonii* within 100' of the trails proposed under the Action Alternatives.

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30'	Within 30-100'		2	4	5
5	9M24		0.06	0.4	X		

This species is found in gravelly, exposed sites with sparse vegetation and little to no natural barriers to motor vehicle use. The response of this species to disturbance is presently unknown; however, motor vehicles have been identified as a significant threat to this species (USDA Forest Service 2005a).

The distance to the trail makes the likelihood of direct effects to individuals low; however, the small size of the occurrence, its isolation from other occurrences and the fragility of the habitat increase the potential for indirect effects to this occurrence. The substrate where *Lewisia kelloggii* ssp. *huchinsonii* occurs is highly susceptible to erosion; therefore, effects from soil erosion may be a concern at this site.

There are no direct or indirect effects to *Lewisia kelloggii* ssp. *huchinsonii* from implementation of Alternatives 3, 4 or 5.

3.8.9.4.1.2 Cumulative Effects

Scientific research recently identified this species as being genetically distinct from other subspecies of *Lewisia kelloggii* (USDA Forest Service 2008); this recent distinction means that little is actually known about this species' past distribution or about how management activities have affected individuals or areas of suitable habitat. The presence of this species in areas that are susceptible to erosion and off-highway vehicle use suggests that past ground disturbing management activities have likely had a negative effect on *Lewisia kelloggii* ssp. *huchinsonii*.

Implementation of the action alternatives would reduce impacts to *Lewisia kelloggii* ssp. *huchinsonii* by banning cross-country travel; however, Alternative 2 would not eliminate the impacts to all occurrences or areas of suitable habitat. One occurrence of *Lewisia kelloggii* ssp. *huchinsonii* (#2) occurs along an existing system trail; use of this trail and any associated impacts to this occurrence would continue under all of the action alternatives.

The *Lewisia kelloggii* ssp. *huchinsonii* occurrence that may be impacted by use of trail proposed under Alternative 2 represents approximately 20 percent of all known occurrences on the PNF (Figure 8) and 6 percent of the occurrences documented in California (CNDDB 2008). Inclusion of this route under Alternative 2 is likely to have a negative impact on this occurrence. This relatively large percentage of occurrences with the potential to be impacted greatly increases the risk of negative cumulative impacts to *Lewisia kelloggii* ssp. *huchinsonii* under Alternative 2. There are no direct or indirect effects to *Lewisia kelloggii* ssp. *huchinsonii* from implementation of Alternatives 3, 4 or 5; therefore, the cumulative effects from these alternatives would be negligible.

The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

3.8.9.5 Interior Forest Habitat

One Interior Forest species, *Cypripedium fasciculatum*, occurs within 100 feet of a proposed trail.

3.8.9.5.1 *Cypripedium fasciculatum* (Clustered Lady's Slipper)

This orchid has a wide distribution that extends from British Columbia, south to the Sierra Nevada and Coast Ranges of California and east to the Rocky Mountains. While the distribution of this species is broad, occurrences are often small and widely scattered. In California, the highest distribution of *Cypripedium fasciculatum* is on the Klamath and Plumas National Forests. There are 135 occurrences on the PNF; these range in size from two to over 3,000 stems. A total of 200 occurrences have also been recorded on the Six Rivers, Shasta-Trinity, Klamath, Mendocino and Tahoe National Forests (Kaye and Cramer 2005).

In California, *Cypripedium fasciculatum* is most commonly associated with mixed conifer forests in the mid-to-late stages of successional development. The best conditions for this species are thought to exist when crown canopy cover is between 50 and 75 percent, with 60 percent being optimal (Kaye and Cramer 2005). It appears that the optimum habitat conditions for *Cypripedium fasciculatum* are not found in early successional communities (Kagan 1990). This species has an apparent intolerance to intense disturbance that directly reduces the duff layer. It is usually found in areas that have not been disturbed or in areas where the disturbance was light or in the distant past. Mycorrhizal fungi play a pivotal role in the biology of orchids. Several stages in the orchid's life cycle, particularly the early stages of seedling development, depend on mycorrhizal fungal symbioses.

Threats include any direct ground disturbance from activities such as timber harvest, intense fire, recreational activities, livestock grazing, road and trail maintenance and illegal collection. Given this species' complicated life history, narrow range of environmental factors necessary for establishment, apparent intolerance to intense disturbance and occurrence on private lands, the trend for this species is thought to be declining.

PNF management prescription: Buffer all plant occurrences by approximately 100 feet from ground disturbance to maintain canopy closure, hydrologic conditions and mycorrhizal relationships. Do not advertise locations, to minimize poaching. Evaluate other activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.5.1.1 Direct and Indirect Effects

Six occurrences of *Cypripedium fasciculatum* occur within 100 feet of the trails proposed under Alternatives 2, 4 and 5 (Table 144).

Table 144. Locations of *Cypripedium fasciculatum* within 100' of the trails proposed under the Action Alternatives.

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30'	Within 30-100'		2	4	5
31	7M16	0.0001	0.3	8	X	X	X
51	8M35		0.02	0.02	X	X	X
126	5M28E	0.001	0.00005	0.02	X		
132	8M26		0.0001	0.001	X	X	X
135A	9M55		0.0001	0.0001	X	X	X
137	9M20	0.02		0.02	X		

Formal studies of the response of *Cypripedium fasciculatum* to disturbance are limited; however, this orchid is most commonly found in areas that have not been disturbed or in areas where the disturbance was light or in the distant past. Several stages in the orchid's life cycle, particularly the early stages of seedling development, depend on mycorrhizal fungal symbioses; therefore, occurrences are usually found in those areas where suitable conditions for the fungi exist (i.e. sites that are moist, shady and have adequate organic matter). *Cypripedium fasciculatum* is most frequently found in late successional, closed-canopy stands and is much less common in early to mid-successional forests. The habitat that this species is dependent upon makes it highly unlikely that individuals would inhabit or colonize the open sites associated with trail beds or shoulders.

At this time, no individuals are known to occur within any of the proposed trails. There are however, three occurrences documented within 0-30 feet of a proposed trail. Individuals within these occurrences may be at risk of direct effects (i.e. trampling or death) from motor vehicle use.

The close proximity (within 100 feet) of these six occurrences to the trails greatly increases the potential for negative edge effects, such as reduced shade, moisture and duff levels, which could alter the orchid's microhabitat conditions. Adding these trails to the NFTS would also provide access to these orchid occurrences, which could increase the potential for illegal collection.

3.8.9.5.1.2 Cumulative Effects

Cypripedium fasciculatum has likely lost individuals and a considerable amount of suitable habitat over the last 150 years due to human activities related to mining, logging, road building, fire suppression and homesteading. All of these activities have, to one extent or another, resulted in a reduction in canopy cover, modification of stand dynamics, alteration in fire frequency and intensity and change in microclimate conditions.

Implementation of the action alternatives would reduce impacts to *Cypripedium fasciculatum* by banning cross-country travel; however, Alternatives 2, 4 and 5 would not eliminate the impacts to all occurrences or areas of suitable habitat. One occurrence of *Cypripedium fasciculatum* (#31B) occurs along an existing system trail and many of the trails proposed under the action alternatives are old skid trails or temporary roads; this suggests that the largest impact to these six *Cypripedium* *fasciculatum* occurrences most likely occurred at the time the route, skid trail or temporary road was created or constructed.

The six occurrences impacted by use of the proposed trails represent approximately four percent of all known occurrences on the PNF (Figure 8) and two percent of the occurrences documented on National Forests in California (Kaye and Cramer 2005). It is predicted that implementation of action Alternatives 2, 4 and 5, would not reduce the overall viability of *Cypripedium fasciculatum* due to this relatively small scale of potential impact.

The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

3.8.9.6 Open Habitats

The following eight Open Habitat species are within 100 feet of a proposed trail: *Astragalus lentiformis, Astragalus pulsiferae* var. *pulsiferae, Calycadenia oppositifolia, Clarkia mildrediae* ssp. *mildrediae, Clarkia mosquinii, Lewisia kelloggii* ssp. *hutchisonii, Lupinus dalesiae and Penstemon personatus.* The individual species discussion for *Calycadenia oppositifolia* is included above under the “Serpentine plant communities” section. *Lewisia kelloggii* ssp. *hutchisonii* is discussed under the “Barren habitat” section.

3.8.9.6.1 *Astragalus lentiformis* (lens-pod milk-vetch)

This perennial herb is limited to Plumas County. There are presently 67 documented occurrences of this species on the PNF, all of which are located within the eastern portion of the Forest. Two occurrences occur outside of the PNF on private land (CNDDB 2008). This plant is found on bare, xeric volcanic soils in flat to gently sloping sagebrush/pine woodlands between 4,900 and 6,400 feet in elevation. It is considered an edaphic specialist.

The tolerance of this milk-vetch to disturbance is presently unknown. This species has been observed growing in areas that have been disturbed; however, the intensity, extent and frequency of the disturbance have not been quantified. Certain levels of soil displacement and disturbance may be beneficial. Threats to this species include fire suppression, livestock grazing, timber harvest, road construction, mining, reservoir construction and utility line construction. Although this species recruits after disturbance, it is unknown to what extent these activities cause local extinction and seed burial.

PNF management prescription: Protect at least 30 percent of all known occurrences within a project analysis area from all disturbances associated with management activities. In small populations (containing less than 50 individuals or less than one-quarter acre) avoid ground disturbance. Evaluate other activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.6.1.1 Direct and Indirect Effects

There are nine locations of *Astragalus lentiformis* within 100 feet of the trails proposed under Alternatives 2, 4 and 5 (Table 145)

Table 145. Locations of *Astragalus lentiformis* within 100' of trails proposed under the Action Alternatives.

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30'	Within 30-100'		2	4	5
13	13M08	8.5	18	341.9	X		
13B	13M10	0.1	0.004	0.07	X		
14/	13M09	0.25	0.63	26.8	X	X	X
	14M05	1.6	3.7		X		X
31	14M06	3	6.4	95.3	X		X
41	13M32	0.003	0.2	24.2			X
43	13M10		0.01	0.02	X		
68	13M08	0.06	0.01	0.07	X		
69	13M10	0.08	0.01	0.09	X		
70	13M10	0.5	0.9	1.7	X		

Astragalus lentiformis is a perennial herb that is found in both undisturbed and disturbed sites. In general, this species appears to respond favorably to light-to-moderate disturbance and PNF botanists have observed this species growing directly in roadbeds. Surveys conducted during the summer of 2007 also noted individual plants growing in the center of and along the edge of the proposed trails (Vollmar 2007). While past management has demonstrated that certain levels of soil displacement and disturbance may be beneficial, the intensity and frequency of disturbance that is tolerable to this species has not been fully quantified.

The *Astragalus lentiformis* occurrences that are within 30 feet of the trail may be directly affected by the proposed trails. Some individuals are likely to have their vigor and productivity reduced or to be killed by motor vehicles parking or driving over them. None of the locations have 100 percent of their individuals within 0-30 feet of the trail; however, those occurrences that contain less than 50 individuals or are less than one-quarter acre are at a high risk of being negatively impacted.

A number of the occurrences listed in Table 145 are large and/or have additional sub-occurrences in the vicinity that are not at risk of being impacted under these alternatives. All of the occurrences also have a portion of their occurrence between 30-100 feet from the edge of the trail, where direct effects are less likely to occur. Individuals that are greater than 30 feet from the trail may benefit from the indirect effects (i.e. increased light or low levels of competition) of the trail. Some negative indirect effects, such as increased erosion and noxious weed invasion, could negatively impact these occurrences.

There would be no direct or indirect effects to *Astragalus lentiformis* from implementation of Alternative 3.

3.8.9.6.1.2 Cumulative Effects

The ability of *Astragalus lentiformis* to colonize both previously disturbed and undisturbed sites suggests that this species may have benefited from past management activities that created open conditions and increased light reception to the understory. Suitable habitat for this locally abundant species has likely been impacted by past timber management practices, which generally favored removal of larger, more dominant trees (i.e. overstory removal). This management practice, as well as the suppression of wildfire, has resulted in a greater number of dense forests that are dominated by small trees and a reduction in open forest habitat across the landscape.

Implementation of the action alternatives would reduce direct impacts to this species by banning cross-country travel; however, Alternatives 2, 4 and 5 would not eliminate the potential for direct impacts to all occurrences. The close proximity of this species to the proposed trails would increase the probability of negative direct effects, which may outweigh the positive indirect effects to the species (i.e. increased light availability or low levels of competition).

The nine locations of *Astragalus lentiformis* that may be impacted by use of the proposed trails represent approximately 13 percent of all known occurrences on the PNF (Figure 8) and 13 percent of the known occurrences in California (CNDDB 2008).

Adding these trails to the NFTS under the action alternatives may have some negative direct impacts to this species; however, these will likely not reduce the overall viability of *Astragalus lentiformis* due to its ability to tolerate and even thrive, in disturbed sites; the large occurrence size and close proximity to adjacent sub-occurrences; and the low amount of suitable habitat potentially impacted. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There are no direct or indirect effects to *Astragalus lentiformis* from implementation of Alternative 3; therefore, the cumulative effects from this alternative would also be negligible.

3.8.9.6.2 *Astragalus pulsiferae* var. *pulsiferae* (Pulsifer's milk-vetch)

Pulsifer’s milk-vetch is known to occur in Lassen, Modoc, Plumas and Sierra Counties in California, as well as in two counties in the state of Nevada. This species is presently known from a total of 16 occurrences, 12 of which are located on the PNF (CNDDB 2008).

Pulsifer’s milk-vetch typically occupies steep, sandy or gravelly slopes in Great Basin scrub, pinyon and juniper woodlands and lower montane coniferous forests between 4,200 and 6,000 feet in elevation. It is considered to be an “unusual edaphic” species, which means that it is often more influenced by soil conditions than by light regimes (USDA Forest Service 2003b). In many cases, the substrate where this species occurs inhibits the growth of other species, resulting in a lower accumulation of biomass. Although this species recruits after disturbance, it is unknown to what extent these activities cause local extinction and seed burial.

PNF management prescription: Protect at least 30 percent of all known occurrences within a project analysis area from all disturbances associated with management activities. Protect all plant occurrences from soil displacement activities. Allow for at least 5 years rest between disturbance prescriptions to the same occurrence. Evaluate other activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.6.2.1 Direct and Indirect Effects

Three occurrences of *Astragalus pulsiferae* var. *pulsiferae* occur within 100 feet of the trails proposed under Alternative 2 (Table 146). No occurrences of this species are impacted under any of the other action alternatives.

Table 146. Locations of *Astragalus pulsiferae* var. *pulsiferae* within 100' of the trails proposed under the Action Alternatives.

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30'	Within 30-100'		2	4	5
3	15M01	0.02		0.02	X		
3A	15M01	0.8	1.6	17	X		
	15M01A	0.4	1.26		X		
7C	12M16	0.02		0.02	X		

Astragalus pulsiferae var. *pulsiferae* is found in sandy or gravelly sites with sparse vegetation and little to no natural barriers to motorized vehicle use. Although plants have been located in old road beds, they are more often found scattered across lightly vegetated side slopes. This species has been shown to recruit after disturbance; however, it is unknown at what extent soil disturbing activities cause extirpation and seed burial.

All three of these occurrences are at high risk of direct effects from motor vehicle use along these trails. Individuals may be killed or damaged by vehicles parking on or driving over them. Soil displacement can easily dislodge individuals, bury seeds and damage or destroy seedlings (USDA Forest Service 2005d). Due to their small size and close proximity, the death of individuals in Occurrences 3 and 7C could result in the elimination of the entire sub-occurrence. Occurrence 3A is large enough (only 25 percent has the potential to be directly or indirectly affected) that impacts would likely not result in a significant negative effect over the entire occurrence. Indirect effects to these three occurrences include increased risk of noxious weed introduction and spread, soil erosion and soil compaction.

There would be no direct or indirect effects to *Astragalus pulsiferae* var. *pulsiferae* from implementation of Alternatives 3, 4 or 5.

3.8.9.6.2.2 Cumulative Effects

Suitable habitat for this species has likely been impacted by past management practices, such as overstory removal and wildfire suppression, which has resulted in a greater number of dense forests that are dominated by small trees and a reduction in open forest habitat across the landscape. The ability of *Astragalus pulsiferae* var. *pulsiferae* to colonize previously disturbed sites suggests that this species may benefit from some management activities that create open habitat conditions; however, it is also not known to what extent or intensity this species is able to survive soil-disturbing activities.

Implementation of the action alternatives would reduce direct impacts to this species by banning cross-country travel; however, Alternative 2 would not eliminate the potential for direct impacts to all occurrences. The close proximity of this species to the proposed trails would increase the probability of negative direct effects, which may outweigh any positive indirect effects to the species such as increased light availability or lower levels of competition.

Livestock grazing has historically occurred in the area where occurrence 3 and 3A are found. Monitoring of these sites in 1994 documented some disturbance from cattle; however, the steepness of the site was thought to prevent heavy grazing and access to *Astragalus pulsiferae* var. *pulsiferae* individuals. This present management activity, in combination with motor vehicle use on the proposed trails, may have the potential to negatively impact habitat and threaten individuals.

The three *Astragalus pulsiferae* var. *pulsiferae* that may be impacted by use of the proposed trails represent approximately 25 percent of all known occurrences on the PNF and 19 percent of the known occurrences in California (CNDDB 2008). Implementation of action Alternative 2 would likely have some negative direct impacts to this species; however, it is predicted that it would not reduce the overall viability of *Astragalus pulsiferae* var. *pulsiferae* due to the species' ability to recruit after disturbance, its presence in areas of disturbance (i.e. road cuts), the large occurrence size or close proximity to adjacent sub-occurrences and the relatively small scale of potential impact.

There are no direct or indirect effects to *Astragalus pulsiferae* var. *pulsiferae* from implementation of Alternatives 3, 4 or 5; therefore, the cumulative effects from these alternatives would be negligible.

3.8.9.6.3 *Clarkia mildrediae* ssp. *mildrediae* (Mildred's clarkia)

This annual plant is limited to eastern Butte County and western Plumas County in the northern Sierra Nevada and southern Cascades of California. There are 30 *Clarkia mildrediae* ssp. *mildrediae* occurrences on the PNF, the majority of which are located in the Feather River Canyon. Ten occurrences are found outside of the Forest boundary.

This species occurs in cismontane woodland and in lower montane coniferous forest, usually on sandy granitic substrate. The current trend for this species is unknown; however, most occurrences appear to be stable (USDA Forest Service 2005b). Wildfire suppression has likely restricted the amount of suitable habitat for this species. As a result, most occurrences are found on road cut banks, where there is minimal plant competition and open light conditions. This increases the potential for impact from road widening and maintenance activities. Activities that create soil disturbance may negatively impact plants and the soil seed bank.

PNF management prescription: Protect occurrences from ground disturbance before seed set. Evaluate ground disturbance outside the growing season; however, in general, disturbance (without major habitat alteration) after plants had set seed could occur. Canopy removal in and adjacent to occurrences is encouraged to open the habitat. Evaluate other activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.6.3.1 Direct and Indirect Effects

There are 10 locations of *Clarkia mildrediae* ssp. *mildrediae* within 100 feet of the trails proposed under Alternatives 2, 4 and 5 (Table 147).

Table 147. Locations of *Clarkia mildrediae* ssp. *mildrediae* within 100' of the trails proposed under the Action Alternatives

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30'	Within 30-100'		2	4	5
8	5M23	0.01		70.6	X		
8A (1)	5M23	8.2	1.5	17.5	X		
	5M26	0.3	0.01		X	X	X
8A (2)	5M27	0.4	0.6	1.8	X		
8A (3)	5M28E	0.1	0.3	0.5	X		
8A (4)	5M28E		0.08	1.2	X		
8C	5M21		0.2	14.8	X		
	5M24	1.3	2.0		X		X
8D (1)	5M20	0.02		0.02	X		
8D (2)	5M20		0.01	0.02	X		
8D (3)	5M21		0.02	0.02	X		
8D (4)	5M21	0.01	0.01	0.02	X		

This early seral species is found in very exposed, sunny openings and road cuts on erodible, granitic soils. It has primarily been observed in areas of past disturbance, but is not found in areas of recent disturbance.

All of the *Clarkia mildrediae* ssp. *mildrediae* occurrences that are within 30 feet of the trail may be directly affected by the proposed trails. Some individuals are likely to have their vigor and productivity reduced or to be killed by motor vehicles. Location 8D that has almost 100 percent of its individuals within 0-30 feet of the trail has the highest risk of negative effects. The death of individuals within this location could result in the elimination of the entire occurrence.

The remaining sites have a portion of their occurrence between 30-100 feet from the edge of the trail, where direct effects are less likely to occur. Individuals that are greater than 30 feet from the trail may benefit from the indirect effects (i.e. increased light or low levels of competition) of the trail. Due to their proximity to the trail, negative indirect effects, such as increased erosion and noxious weed invasion, may also negatively impact these occurrences.

3.8.9.6.3.2 Cumulative Effects

The ability of *Clarkia mildrediae* ssp. *mildrediae* to colonize both previously disturbed and undisturbed sites suggests that this species has benefited from past management activities that created open conditions and increased light reception to the understory. Past wildfire suppression activities have likely restricted the amount of suitable habitat for this species.

Implementation of the action alternatives would reduce direct impacts to this species by banning cross-country travel; however, Alternatives 2, 4 and 5 would not eliminate the potential for direct impacts to all occurrences. Six locations of *Clarkia mildrediae* ssp. *mildrediae* have been documented along one of the existing system trails; use of this trail and any associated impacts to these locations would continue under all of the action alternatives. The close proximity of this species to the proposed trails would increase the probability of negative direct effects, which may outweigh the positive indirect effects to the species (i.e. increased light availability or low levels of competition).

The nine locations of *Clarkia mildrediae* ssp. *mildrediae* that may be impacted by use of the proposed trails represent approximately 30 percent of all known occurrences on the PNF (Figure 8) and 23 percent of the known occurrences in California (CNDDB 2008). Adding these trails to the NFTS under the action alternatives may have some negative direct impacts to this species; however, these would likely not reduce the overall viability of *Clarkia mildrediae* ssp. *mildrediae* due to its ability to tolerate and even thrive, in disturbed sites. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

3.8.9.6.4 *Clarkia mosquinii* (Mosquin's clarkia)

This annual species occurs in the foothill woodland and lower elevation mixed conifer forest of Butte and Plumas Counties. This species was thought to be extinct when the only known location was eliminated with the formation of Lake Oroville. *Clarkia mosquinii* was rediscovered in 1992, initiating surveys for this species on the PNF. To date, 45 occurrences have been documented within the lower elevations of the PNF, while 14 occurrences have been reported from outside of the Forest boundary.

Clarkia mosquinii is probably a fire-follower and wildfire suppression has likely restricted the amount of suitable habitat for this species. This species often occurs in road cuts and on decomposing granite. Threats from management activities include road construction and maintenance and timber harvest. This species is considered highly vulnerable because of the high risk to occurrences outside of NFS lands.

PNF management prescription: Protect occurrences from ground disturbance before seed set. Evaluate ground disturbance outside of the growing season; however, in general, disturbance (without major habitat alteration) after plants have set seed can occur. Canopy removal in and adjacent to occurrences is encouraged to open the habitat. Evaluate other activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.6.4.1 Direct and Indirect Effects

One occurrence of *Clarkia mosquinii* occurs within 100 feet of a trail proposed under Alternative 2 (Table 148). No occurrences of this species are impacted under any of the other action alternatives.

Like many of the species in this guild, *Clarkia mosquinii* is often found in exposed, disturbed habitats such as roadsides. Motor vehicle trails may create some suitable edge habitat for this species (i.e. increased light availability and low levels of competition); however, these effects could easily be overcome by the negative direct effect of repeated trampling or death of individuals. Indirect effects, such as increased erosion and noxious weed invasion, may negatively impact occurrence 13B.

Table 148. ***Clarkia mosquinii*** **location within 100' of the trails proposed under the Action Alternatives.**

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30'	Within 30-100'		2	4	5
13B	5M06		0.04	0.5	X		

3.8.9.6.4.2 Cumulative Effects

It is difficult to determine how *Clarkia mosquinii* has responded to past management activities because this species was thought to be extinct until its re-discovery in 1992. The presence of *Clarkia mosquinii* on exposed, disturbed habitats such as roadsides suggests that this species may benefit from management activities that create open conditions and increase light reception to the understory. Past wildfire suppression activities have likely restricted the amount of suitable habitat for this species.

Implementation of the action alternatives would reduce direct impacts to this species by banning cross-country travel; however, Alternative 2 would not eliminate the potential for direct impacts to all occurrences. One occurrence of *Clarkia mosquinii* (12C) occurs along an existing system trail; use of this trail and any associated impacts to this occurrence would continue under all of the action alternatives. The one location of *Clarkia mosquinii* that may be impacted by use of the trail proposed under Alternative 2 represents approximately two percent of all known occurrences on the PNF (Figure 8) and the known occurrences in California (CNDDB 2008).

Adding this trail to the NFTS under Alternative 2 may have some negative indirect impacts to this species; however, these would likely not reduce the overall viability of *Clarkia mosquinii* due to its presence in areas of disturbance (i.e. road cuts) and the relatively small scale of potential impact. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

3.8.9.6.5 *Lupinus dalesiae* (Quincy lupine)

This perennial lupine species is known to occur in Plumas County and in isolated occurrences in Sierra and Yuba counties in California. Within this limited range, *Lupinus dalesiae* is locally abundant. There are currently 260 occurrences documented on the PNF. Outside of the PNF, there are 22 occurrences, all of which occur on lands adjacent to the National Forest.

Lupinus dalesiae is found in a variety of habitats that include undisturbed and disturbed sites (such as old skid trails and road cut banks), openings in chaparral, cismontane woodlands and mixed conifer forests. Recent visits to old project areas have shown that this species tolerates and even thrives on disturbance; however, the intensity, extent or frequency of the disturbance associated with these occurrences has not been quantified in a manner that facilitates the development of prescriptions that consistently mimic historical disturbance regimes.

The trend for this plant is stable. Threats include road construction and maintenance; timber harvest, release and site preparation activities; mining; off-highway vehicle use; and development on private lands. The California Native Plant Society recently lowered the listing status of *Lupinus* *dalesiae* (from List 1B to List 4) based on the number of mapped occurrences in the California Fish and Game's California Native Diversity Data Base (CNDDB).

PNF management prescription: Protect 30 percent of known occurrences within a project area from ground disturbance. Favor protection of locations that have open tree and shrub canopies (less than 50 percent cover) over those with closed tree and shrub canopies. Favor allowing ground disturbance and prescribed fire in areas of dense shrub or tree cover. Evaluate other activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.6.5.1 Direct and Indirect Effects

There are 22 locations of *Lupinus dalesiae* within 100 feet of the proposed trails (Table 149).

Lupinus dalesiae is a perennial herb that is found in disturbed sites, such as old skid trails and road cut banks and undisturbed sites. Past management has demonstrated that this species tolerates and even thrives on disturbance. For example, a survey of Occurrence 35 found *Lupinus dalesiae* occupying all of the areas that had been previously disturbed by mechanical timber harvest and disturbance and road building were thought to have been one cause for this population's increase (Rotta 1983). Surveys conducted during the summer of 2007 also noted individual plants growing in the center of and along the edge of the proposed trails (Vollmar 2007).

All of the *Lupinus dalesiae* occurrences that are within 30 feet of the trail may be directly affected by the proposed trails. Some individuals are likely to have their vigor and productivity reduced or to be killed by motor vehicles. The five locations (23J, 160, 165, 166A and 166B) that have 100 percent of their individuals within 0-30 feet of the trail have the highest risk of negative effects. The death of individuals within these locations could result in the elimination of the entire occurrence.

Table 149. Locations of *Lupinus dalesiae* within 100' of the trails proposed under the Action Alternatives

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30'	Within 30-100'		2	4	5
0	9M54	0.01	0.001	0.01	X	X	X
2E	8M19	0.005	0.23	0.35	X	X	X
10A	8M13		0.006	0.02	X		
10B	8M13		0.02	0.02	X		
23F	8M18	0.8	1.5	2.79	X		
23J	8M17	0.1		0.1	X		
35	7M16	2.9	5.6	29.6	X	X	X
41D	8M42	0.71	1.72	19	X		X
	8M43	0.27	0.88		X	X	X
44A	9M37	0.2	0.50	111	X		X
66	9M37	0.02	0.003	0.02	X		X
	9M37A		0.003		X		
79	8M28	2.49	5.64	23	X	X	X
	8M28A	0.79	2.10		X		
88	9M35	0.8	1.2	5.10	X		X
89A	9M35		0.02	0.02	X		X
89B	9M33	0.03	0.1	0.1	X		
140A1	10M12		0.01	0.01	X	X	X
140A2	10M12		0.006	0.02	X	X	X
141A	10M12		0.03	5.14	X	X	X
160	11M09	0.07		0.07	X		X
161	9M39A		0.01	0.01	X	X	X
165	7M15	0.01		0.01	X	X	X
166A	7M15	0.01		0.01	X	X	X
166B	7M15	0.002		0.002	X	X	X

The remaining sites have a portion of their occurrence between 30-100 feet from the edge of the trail, where direct effects are less likely to occur. Individuals that are greater than 30 feet from the trail may benefit from the indirect effects (i.e. increased light or low levels of competition) of the trail.

There would be no direct or indirect effects to *Lupinus dalesiae* from implementation of Alternative 3.

3.8.9.6.5.2 Cumulative Effects

The ability of *Lupinus dalesiae* to colonize both previously disturbed and undisturbed sites and tolerate and even thrive on disturbance, suggests that this species may have benefited from past management activities that created open conditions and increased light reception to the understory.

Implementation of the action alternatives would reduce direct impacts to this species by banning cross-country travel; however, Alternatives 2, 4 and 5 would not eliminate the potential for direct impacts to all occurrences. The close proximity of this species to the proposed trails would increase the probability of direct effects; however, these effects will likely not be severe enough to negatively impact this species due to its high tolerance to disturbance.

The 22 locations of *Lupinus dalesiae* that may be impacted by use of the proposed trails represent approximately eight percent of all known occurrences on the PNF (Figure 8) and seven percent of the known occurrences in California (CNDDB 2008). Adding these trails to the NFTS under the action alternatives may have some negative direct impacts to individuals; however, these would likely not reduce the overall viability of *Lupinus dalesiae* due to its ability to tolerate and even thrive, in disturbed sites and the low percentage of sites impacted. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There are no direct or indirect effects to *Lupinus dalesiae* from implementation of Alternative 3; therefore, the cumulative effects from this alternative would be negligible.

3.8.9.6.6 *Penstemon personatus* (closed-throated beardtongue)

This rhizomatous species is limited to 31 occurrences in Butte, Nevada, Plumas and Sierra counties. On the PNF, this species occurs in 23 large but localized populations and population size varies from thousands of stems to less than 10.

Penstemon personatus occurs in west side mixed conifer and red fir forests. It appears to tolerate limited disturbance, as long as it does not change the microhabitat or result in soil compaction. Observations have shown that plants that grow in complete canopy cover typically have a shorter stature and do not flower, whereas plants in partial sun are reproductive. A report on the biology of *Penstemon personatus* in 2001 found that the species is typically less abundant and less tolerant of disturbance on south-facing slopes.

Although there may be local fluctuations in population size, the overall trend for this species appears stable. General threats to this species include road construction and maintenance, timber site preparation and release, landing construction, high intensity pile burns, grazing, mining activity and off-highway vehicle use. A species management guide was written for this species in 1987.

PNF management prescription: Use guidance in the Preferred Alternative of the approved *Penstemon personatus* Species Management Guide of 1987 to develop a set of key *Penstemon personatus* Areas (occurrences or portions of occurrences) within each metapopulation, which will be protected from management disturbances. These key areas would be established within occupied habitat to maintain the species' geographic distribution. Priority for the delineation of key areas would be given to those occurrences that currently exhibit a diversity of habitat types. Avoid building landings or temporary roads through known occurrences. Avoid sub-soiling through known occurrences. Evaluate other activities on a site-by-site basis considering species abundance, population size, geographic distribution and known species ecology.

3.8.9.6.6.1 Direct and Indirect Effects

Two locations of *Penstemon personatus* intersect the trails proposed under Alternatives 2, 4, and 5 (Table 150)

Table 150. Locations of *Penstemon personatus* within 100' of the trails proposed under the Action Alternatives

Occurrence ID	Route ID	Number of acres with potential for impact		Size of Occurrence (acres)	Action Alternatives		
		Within 0-30'	Within 30-100'		2	4	5
7I	8M04	3.2	6.3	148	X		
12	7M11	1.3	2.8	83	X	X	X

Penstemon personatus is a perennial herb that is found in disturbed and undisturbed sites. For example, surveys of the above occurrences found *Penstemon personatus* along the edges of old skid trails and in other disturbed sites where the soil had not been compacted (Carter 1992). Past management indicates that this species is able to tolerate and even increase in abundance or vigor following ground disturbance. Although this species does tolerate a number of different types of disturbance, it is not required for regeneration or survival.

Within the two occurrences, the distribution and abundance of *Penstemon personatus* in relation to the trail is unknown; therefore, those individuals that are within the trail would likely be negatively impacted by motor vehicle use. Indirect effects, such as increased erosion and noxious weed invasion, may also negatively impact the two occurrences. The large size (over 80 acres) of these occurrences and consequently the relatively low number of individuals with potential to be directly and indirectly affected, would reduce the overall negative impact to this species from adding the trail to the NFTS.

There would be no direct or indirect effects to *Penstemon personatus* from implementation of Alternative 3.

3.8.9.6.6.2 Cumulative Effects

Suitable habitat for *Penstemon personatus* has been impacted by past timber management practices, which generally favored removal of larger, more dominant trees (i.e. overstory removal). This management practice, as well as the suppression of wildfire, has resulted in a greater number of dense forests that are dominated by small trees and a reduction in open forest habitat across the landscape. The ability of *Penstemon personatus* to colonize both previously disturbed and undisturbed sites suggests that this species may have benefited from past management activities that created open conditions and increased light reception to the understory.

Implementation of the action alternatives would reduce direct impacts to this species by banning cross-country travel; however, Alternatives 2, 4, and 5 would not eliminate the potential for direct impacts to all occurrences. The close proximity of this species to the proposed trails would increase the probability of direct effects; however, these effects would likely not be severe enough to negatively impact this species due to its high tolerance to disturbance.

The two locations of *Penstemon personatus* that may be impacted by use of the proposed trails represent approximately nine percent of all known occurrences on the PNF and two percent of the known occurrences in California (CNDDB 2008). Adding these trails to the NFTS under the action alternatives may have some negative direct impacts to individuals; however, these would likely not reduce the overall viability of *Penstemon personatus* due to its ability to tolerate and even thrive, in disturbed sites and the low percentage of sites impacted. The effects of present and future projects on this species would likely be minimal or similar to those described in this analysis if existing Management Guidelines (such as field surveys, protection of known rare species locations and noxious weed prevention measures) remain in place.

There are no direct or indirect effects *Penstemon personatus* from implementation of Alternative 3; therefore, the cumulative effects from this alternative would be negligible.

3.8.10 Action Alternatives (2 thru 5)—Summary of Environmental Consequences

The following section presents an overview of the effects analysis for each action alternative (Table 151). In general, the greater the number of motor vehicle trails (and miles) proposed, the higher the risk and severity of negative impacts to rare species and their associated habitats. Alternative 2 impacts the largest number of rare species and botanically sensitive resources. Alternative 3, which does not add trails to the NFTS, has the least impact on rare species. In comparison to these alternatives, the impacts from Alternative 5 fall near the middle of the spectrum of potential effects.

3.8.10.1 Alternative 2—Proposed Action.

3.8.10.1.1 Direct/Indirect Effects

Table 151. Summary of rare species indicator measures for Alternative 2.

Indicator Measure	Value
Miles of proposed system trail open for public motorized vehicle use within or adjacent to Sensitive rare species sites	5.2 miles
Number of trails open for public motorized vehicle use within or adjacent to Sensitive rare species sites	52 trails
Acres of rare plant sites within 100 feet of a proposed system trail	124 acres
Total number of rare plant sites within 100 feet of a proposed system trail	78 locations

Alternative 2 prohibits cross-country travel, adds approximately 361 miles of proposed trails to the trail system and makes no changes to the existing system trails. In comparison to the other action alternatives, Alternative 2 has the highest impact on rare species and their habitats. It has the highest number of proposed trails (52 trails) and trail miles (5.2 miles) that intersect rare species occurrences or associated habitat. This alternative also has the potential to impact 18 rare species (78 locations) both directly and indirectly.

The following species have been documented within 100 feet of a trail proposed under Alternative 2: *Botrychium* sp., *Ivesia aperta* var. *aperta, Ivesia sericolueca* and *Pyrrocoma lucida* (Meadow and Seep species); *Hydrothyria venosa* (Riparian Area species); *Allium jepsonii, Arabis constancei, Calycadenia oppositifolia, Eriogonum umbellatum* var. *ahartii and Monardella follettii* (Serpentine species); *Lewisia kelloggii* ssp. *huchinsonii* (Barren and Open Habitat species); *Cypripedium fasciculatum* (Interior Forest species); and *Astragalus lentiformis, Astragalus pulsiferae* var. *pulsiferae, Clarkia mildrediae* ssp. *mildrediae, Clarkia mosquinii, Lupinus dalesiae and Penstemon personatus* (Open Habitat species). Six of these species are only impacted by this alternative and none of the other action alternatives; these are: *Astragalus pulsiferae* var. *pulsiferae, Botrychium sp., Clarkia mosquinii, Eriogonum umbellatum* var. *ahartii, Ivesia sericolueca and Lewisia kelloggii* ssp. *hutchisonii*. Refer to the analysis in the section above ("Action Alternatives (2 thru 5): Summary of Environmental Consequences for Individual Species") for a detailed discussion of effects to individual species. Overall, Alternative 2 has the potential to negatively affect all of these species.

In general, occurrences with individuals that are in or within 30 feet of the trail are at a high risk of direct effects from motorized vehicle use. These effects could include death, altered growth or reduced seed set from physically breaking, crushing or uprooting plants (Wilshire, Shipley and Nakata 1978, Cole and Bayfield 1993).

Indirect effects to species are dependent upon a number of species-specific factors that include habitat type, tolerance to disturbance, distance from trail, amount of occurrence impacted and intensity and timing of disturbance. All of the rare species listed above (i.e. those within 100 feet of a proposed trail) have a high risk of indirect effects from noxious weed introduction and spread. Species that are intolerant of disturbance, such as *Cypripedium fasciculatum*, may be indirectly impacted by increased light levels and duff or litter disturbance along the edges of motorized trails. In contrast, for those species that tolerate some degree of disturbance, such as *Astragalus lentiformis* or *Lupinus dalesiae*, adding motorized trails to the NFTS may have fewer detrimental indirect effects.

The largest improvement over Alternative 1 is the prohibition of cross-country travel. This reduces vehicle access and impacts to rare plants and their habitats, lowers the risk of noxious weed introduction and spread throughout the forest and concentrates use on maintained trails that would be managed and improved to reduce resource damage.

3.8.10.1.1.1 Special Interest Areas

Alternative 2 has highest number of proposed trails (4.4 miles) within PNF Special Interest Areas (Table 132). Implementation of this alternative proposes adding trails to NFTS in Brady's Camp (2.8 miles), Butterfly Valley (0.2 miles) and Fowler Lake (0.1 miles) SIAs. An additional 1.2 miles of unauthorized routes would also be added to the existing 5.6 miles of NFS trail in the proposed McRae Meadow SIA. Some of the unique botanical features for which these Special Interest areas were designated (or proposed for designation) include large meadow and stream complexes, aquatic plant communities, red fir and lodgepole forests and sub-alpine plant communities (Meyer 1991). While some of these proposed trails are relatively well-established, motor vehicle use within these areas still has the potential to significantly degrade or disturb these special features if trail design features are not in place. Trails that would be designated under Alternative 2 will meet the requirements of the best management practices (USDA Forest Service. 2000). Maintenance improvements to trails would be consistent with standard practices for trail construction and maintenance. Those practices can be found in the Forest Service Trails Handbook (FS 2309.18). Alternative 2 includes route 9M24 which enters the Fowler Lake SIA. Designation of this route is likely to have a significant impact on the sensitive plant species *Lewisia kelloggii* spp. *hutchinsonii*.

3.8.10.1.2 Cumulative Effects

All of the rare species locations (78 sites) located within 100 feet of a proposed trail have the potential to be directly or indirectly affected by adding the trail to the NFTS; therefore, these species are also at risk of being cumulatively impacted.

In comparison to the other action alternatives, Alternative 2 has the greatest number of miles in riparian areas, wet meadows, serpentine areas, barren habitats, interior forest and open forest (Table 129); therefore, implementation of this alternative also has the potential to affect suitable habitat for a number of rare species on the PNF.

Of the eighteen species with the potential to be directly and indirectly impacted by Alternative 2, fourteen have 25 percent or less of their known PNF locations impacted by the proposed trails (Figure 8). Four species have greater than 25 percent of their known locations affected; these are: *Eriogonum umbellatum* var. *ahartii* (64 percent), *Clarkia mildrediae* ssp. *mildrediae* (57 percent), *Calycadenia oppositifolia* (29 percent) and *Astragalus pulsiferae* var. *pulsiferae* (25 percent). Because of this large percentage of occurrences impacted, direct and indirect effects to locations along the proposed trails could have a significant cumulative effect to these species.

Overall, cumulative effects to rare species under this alternative are far less than those under Alternative 1. This is primarily due to the ban on cross-country travel. Of the action alternatives, this alternative has the largest cumulative impact on Sensitive rare species due to the large number of miles proposed, the amount of suitable habitat impacted and the number of species directly and indirectly affected by the proposed trails.

3.8.10.2 Alternative 3

3.8.10.2.1 Direct/Indirect Effects

Table 152. Summary of rare species indicator measures for Alternative 3.

Indicator Measure	Value
Miles of proposed system trail open for public motorized vehicle use within or adjacent to Sensitive rare species sites	0 miles
Number of trails open for public motorized vehicle use within or adjacent to Sensitive rare species sites	0 trails
Acres of rare plant sites within 100 feet of a proposed system trail	0 acres
Total number of rare plant sites within 100 feet of a proposed system trail	0 locations

Alternative 3 prohibits cross-country travel, adds no proposed trails to the trail system and makes no changes to the existing trail system. In comparison to the other action alternatives, Alternative 3 has the lowest impact on rare species and their associated habitats. It proposes no trails that intersect rare species occurrences or associated habitat.

Of those species that have been documented along a trail proposed under Alternatives 2, 4 or 5, the following five are known to occur along existing system trails: *Monardella follettii* in Serpentine Areas; *Lewisia kelloggii* ssp. *huchinsonii* in Barren and Open Habitats; *Cypripedium fasciculatum* in Interior Forest habitats; and *Clarkia mildrediae* ssp. *mildrediae* and *Clarkia mosquinii* in Open Habitats. Use of the existing system trails may have some negative effects to these five species, but they would not contribute to a trend toward federal listing. This is due to the low number of sites that are potentially impacted, as well as the fact that many of the existing system trails are already well-established and frequently utilized roads and trails where species have either adapted to the existing condition or been extirpated by past motorized vehicle use. Impacts to species along the existing system trails would continue under all of the action alternatives; no additional impacts would occur to PNF Sensitive species under Alternative 3 because no trails are proposed.

3.8.10.2.1.1 Special Interest Areas

Alternative 3 proposes no new trails within PNF Special Interest Areas or Research Natural Areas; therefore, it places no additional adverse impact on these unique botanical resources. There are approximately 9.6 miles of existing system trail in the Butterfly Valley SIA and the proposed McRae Meadow and Mount Fillmore SIAs (Table 128). Use of these existing trails would continue under all of the action alternatives.

3.8.10.2.2 Cumulative Effects

Overall, cumulative effects to rare species under this alternative are far less than those under Alternative 1 or the action alternatives. This is primarily due to the ban on cross-country travel and eliminating the use of all unauthorized routes. No proposed trails are added to the NFTS under this alternative; therefore, none of the PNF rare species are at risk of being cumulatively impacted by Alternative 3.

3.8.10.3 Alternative 4

3.8.10.3.1 Direct/Indirect Effects

Table 153. Summary of rare species indicator measures for Alternative 4

Indicator Measure	Value
Miles of proposed system trail open for public motorized vehicle use within or adjacent to Sensitive rare species sites	1.3 miles
Number of trails open for public motorized vehicle use within or adjacent to Sensitive rare species sites	15 trails
Acres of rare plant sites within 100 feet of a proposed system trail	33 acres
Total number of rare plant sites within 100 feet of a proposed system trail	21 locations

Alternative 4 prohibits cross-country travel, adds approximately 141 miles of trails to the NFTS and makes no changes to the existing trail system. In comparison to the other action alternatives, Alternative 4 has second lowest impact on rare species and their associated habitats. It has the second lowest number of trails (15 trails) and trail miles (1.3 miles) that intersect rare species occurrences or associated habitat. This alternative has the potential to impact 6 rare species (21 locations) both directly and indirectly.

The following species have been documented within 100 feet of a trail proposed under Alternative 4: *Arabis constancei* and *Monardella follettii* (Serpentine Area species); *Cypripedium fasciculatum* (Interior Forest species); and *Astragalus lentiformis, Clarkia mildrediae* ssp. *mildrediae and Lupinus dalesiae* (Open Habitat species). A detailed discussion of direct, indirect and cumulative effects to these species from motorized vehicle use is provided under “Action Alternatives (2 thru 5):

Summary of Environmental Consequences for Individual Species". While Alternative 4 may negatively affect some of these species, it would not contribute to a trend toward federal listing.

In comparison to Alternative 2, this alternative provides a greater level of protection for the following seven rare species: *Astragalus pulsiferae* var. *pulsiferae*, *Astragalus lentiformis*, *Botrychium sp.*, *Clarkia mosquinii*, *Eriogonum umbellatum* var. *ahartii*, *Ivesia sericolueca and Lewisia kelloggii* ssp. *hutchisonii*. This is because a number of the routes that were in violation of the PNF management prescriptions for individual species (i.e. those that had the potential to directly impact individuals or small occurrences) were excluded from the proposed trail system. In addition, this alternative avoids impacts to *Ivesia aperta* var. *aperta* and *Pyrrocoma lucida* (Meadow and Seep species); *Hydrothyria venosa* (Riparian Area species); *Allium jepsonii* and *Calycadenia oppositifolia* (Serpentine Area species); and *Penstemon personatus* (Open Habitat species).

In general, occurrences with individuals that are in or within 30 feet of the trail are at a high risk of direct effects from motor vehicle use. These effects could include death, altered growth or reduced seed set from physically breaking, crushing or uprooting plants (Wilshire, Shipley and Nakata 1978, Cole and Bayfield 1993).

Indirect effects to species are dependent upon a number of species-specific factors that include habitat type, tolerance to disturbance, distance from trail, amount of occurrence impacted and intensity and timing of disturbance. All of the rare species listed above (i.e. those within 100 feet of a proposed trail) have a high risk of indirect effects from noxious weed introduction and spread. Species that are intolerant of disturbance, such as *Cypripedium fasciculatum*, may be indirectly impacted by increased light levels and duff or litter disturbance along the edges of motorized trails. In contrast, for those species that tolerate some degree of disturbance, such as *Astragalus lentiformis* or *Lupinus dalesiae*, adding motorized trails to the NFTS may have fewer detrimental indirect effects.

The largest improvement over Alternative 1 is the prohibition of cross-country travel. This reduces vehicle access and impacts to rare plants and their habitats, lowers the risk of noxious weed introduction and spread throughout the forest and concentrates use on maintained trails that would be managed and improved to reduce resource damage.

3.8.10.3.1.1 Special Interest Areas

Alternative 4 has the lowest number of motorized trails (1.2 miles) within PNF Special Interest Areas (Table 129). Under this alternative, 1.2 miles are proposed in the McRae Meadow SIA, which currently contains 5.6 miles of existing system trail. Some of the unique botanical features for which this SIA has been proposed for designation include large meadow complexes, a state-designated Wild Trout stream, unique old-growth forests and unusual geologic features (Meyer 1991). While some of these proposed trails are relatively well-established, motor vehicle use within these areas still has the potential to significantly degrade or disturb these special features if trail design features are not in place. Trails that would be designated under Alternative 4 will meet the requirements of the best management practices (USDA Forest Service. 2000). Maintenance improvements to trails would be consistent with standard practices for trail construction and maintenance. Those practices can be found in the Forest Service Trails Handbook (FS 2309.18). Alternative 4 meets the PNF management direction for Special Interest Areas.

None of the remaining Plumas SIAs or RNAs are impacted by the routes proposed under Alternative 4 (Table 129).

3.8.10.3.2 Cumulative Effects

All of the rare species locations (21 sites) located within 100 feet of a proposed trail have the potential to be directly or indirectly affected by adding the trail to the NFTS; therefore, these species are also at risk of being cumulatively impacted.

In comparison to the other action alternatives, Alternative 4 has the second lowest number of proposed trail miles in riparian areas, wet meadows, serpentine areas, barren habitats, interior forest and open forest (Table 129). Because this alternative does propose routes within these sensitive habitat types, implementation of this alternative has the potential to affect suitable habitat for a number of rare species on the PNF. Of the six species with the potential to be directly and indirectly impacted by Alternative 4, all have 13 percent or less of their known PNF locations impacted by the proposed trails (Figure 8).

Overall, cumulative effects to rare species under this alternative are far less than those under Alternative 1. This is primarily due to the ban on cross-country travel. Of the action alternatives, this alternative has the second lowest cumulative impact on Sensitive rare species due to the low number of miles proposed, amount of suitable habitat impacted and the lower number of species directly and indirectly affected.

3.8.10.4 Alternative 5

3.8.10.4.1 Direct/Indirect Effects

Table 154. Summary of rare species indicator measures for Alternative 5

Indicator Measure	Value
Miles of proposed system trail open for public motorized vehicle use within or adjacent to Sensitive rare species sites	2.6 miles
Number of trails open for public motorized vehicle use within or adjacent to Sensitive rare species sites	30 trails
Acres of rare plant sites within 100 feet of a proposed system trail	62.2 acres
Total number of rare plant sites within 100 feet of a proposed system trail	36 locations

Alternative 5 prohibits cross-country travel, adds approximately 234 miles of proposed trails to the trail system and makes no changes to the existing trail system. Of the action alternatives, implementation of Alternative 5 has the second greatest impact to rare species and their associated habitats. It has the second highest number of trails (30 trails) and trail miles (2.6 miles) that intersect rare species occurrences or associated habitat. This alternative also has the potential to impact 12 rare species (36 locations) both directly and indirectly.

The following species have been documented within 100 feet of a trail proposed under Alternative 5: *Ivesia aperta* var. *aperta* and *Pyrrocoma lucida* (Meadow and Seep species); *Hydrothyria venosa* (Riparian Area species); *Allium jepsonii, Arabis constancei, Calycadenia* *oppositifolia and Monardella follettii* (Serpentine species); *Cypripedium fasciculatum* (Interior Forest species); and *Astragalus lentiformis, Clarkia mildrediae* ssp. *mildrediae, Lupinus dalesiae and Penstemon personatus* (Open Habitat species). A detailed discussion of direct, indirect and cumulative effects to these species from motorized vehicle use is provided under "Action Alternatives (2 thru 5): Summary of Environmental Consequences for Individual Species". While Alternative 5 may negatively affect some of these species, it would not contribute to a trend toward federal listing.

In comparison to Alternative 2, this alternative provides a greater level of protection for the following seven rare species: *Astragalus pulsiferae* var. *pulsiferae*, *Astragalus lentiformis*, *Botrychium sp.*, *Clarkia mosquinii*, *Eriogonum umbellatum* var. *ahartii*, *Ivesia sericolueca and Lewisia kelloggii* ssp. *hutchisonii*. This is because a number of the routes that were in violation of the PNF management prescriptions for individual species (i.e. those that had the potential to directly impact individuals or small occurrences) were excluded from the proposed trail system.

In general, occurrences with individuals that are in or within 30 feet of the trail are at a high risk of direct effects from motorized vehicle use. These effects could include death, altered growth or reduced seed set from physically breaking, crushing or uprooting plants (Wilshire, Shipley and Nakata 1978, Cole and Bayfield 1993).

Indirect effects to species are dependent upon a number of species-specific factors that include habitat type, tolerance to disturbance, distance from trail, amount of occurrence impacted and intensity and timing of disturbance. All of the rare species listed above (i.e. those within 100 feet of a proposed trail) have a high risk of indirect effects from noxious weed introduction and spread. Species that are intolerant of disturbance, such as *Cypripedium fasciculatum*, may be indirectly impacted by increased light levels and duff or litter disturbance along the edges of motorized trails. In contrast, for those species that tolerate some degree of disturbance, such as *Astragalus lentiformis* or *Lupinus dalesiae*, adding motorized trails to the NFTS may have fewer detrimental indirect effects.

The largest improvement over Alternative 1 is the prohibition of cross-country travel. This reduces vehicle access and impacts to rare plants and their habitats, lowers the risk of noxious weed introduction and spread throughout the forest and concentrates use on maintained trails that would be managed and improved to reduce resource damage.

3.8.10.4.1.1 Special Interest Areas

Of the action alternatives, Alternative 5 has second highest number of motorized trails (3 miles) within PNF Special Interest Areas (Table 129). Implementation of this alternative proposes trails in Brady's Camp (2.1 miles), Butterfly Valley (0.2 miles) and McRae Meadow (1.2 miles) SIA. Two of these SIAs, Butterfly Valley and McRae Meadow, already have existing NFS trails within their boundary (Table 128). Some of the unique botanical features for which these Special Interest areas were designated (or proposed for designation) include large meadow and stream complexes, aquatic plant communities, red fir and lodgepole forests and sub-alpine plant communities (Meyer 1991). While some of these proposed trails are, relatively well-established, motorized vehicle use within these areas still has the potential to significantly degrade or disturb these special features if trail design features are not in place. Trails that would be designated under Alternative 5 will meet the requirements of the best management practices (USDA Forest Service. 2000). Maintenance improvements to trails would be consistent with standard practices for trail construction and maintenance. Those practices can be found in the Forest Service Trails Handbook (FS 2309.18). Alternative 5 meets the PNF management direction for Special Interest Areas.

None of the remaining Plumas SIAs or RNAs are impacted by the routes proposed under Alternative 5 (Table 129).

3.8.10.4.2 Cumulative Effects

All of the rare species locations (36 sites) located within 100 feet of a proposed trail have the potential to be directly or indirectly affected by adding the trail to the NFTS; therefore, these species are also at risk of being cumulatively impacted.

In comparison to the other action alternatives, Alternative 5 has the second greatest number of miles in riparian areas, wet meadows, serpentine areas, barren habitats, interior forest and open forest (Table 129); therefore, implementation of this alternative also has the potential to affect suitable habitat for a number of rare species on the PNF.

Of the 12 species with the potential to be directly and indirectly impacted by Alternative 5, eleven have 25 percent or less of their known PNF locations impacted by the proposed trails (Figure 8). One species, *Calycadenia oppositifolia*, has 23 percent known locations affected. Because of this large percentage of occurrences impacted, direct and indirect effects to locations along the proposed trails could have a significant cumulative effect to this species.

Overall, cumulative effects to rare species under this alternative are far less than those under Alternative 1. This is primarily due to the ban on cross-country travel. Of the action alternatives, this alternative has the second largest cumulative impact on Sensitive rare species due to large number of miles proposed, the amount suitable habitat impacted and the number of species directly and indirectly affected.

3.8.10.5 Summary of Determinations

Table 155 presents the determinations for all of the PNF rare species. These determinations are based on professional experience and judgment; the existing condition of botanical resources within the analysis area and the potential impacts of the alternatives. An effects determination is also the culmination of potential direct, indirect and cumulative effects. Even if the potential direct effects are low, there is often the potential for the indirect or cumulative effects to affect the viability of the species.

Table 155. Summary of species determinations. Shaded cells indicate a "may affect" determination.

Species	Alternative				
	1	2	3	4	5
Allium jepsonii	MA (T)	MA (NT)	WN	WN	MA (NT)
Arabis constancei	MA (NT)	MA (NT)	WN	MA (NT)	MA (NT)
Astragalus lemmonii	WN	WN	WN	WN	WN
Astragalus lentiformis	MA (NT)	MA (NT)	WN	MA (NT)	MA (NT)
Astragalus pulsiferae var. *coronensis*	MA (NT)	WN	WN	WN	WN
Astragalus pulsiferae var. *pulsiferae*	MA (NT)	MA (NT)	WN	WN	WN
Astragalus webberi	MA (T)	WN	WN	WN	WN
Balsamorhiza macrolepis var. *macrolepis*	WN	WN	WN	WN	WN
Botrychium ascendens	MA (NT)	MA (NT)	WN	WN	WN
Botrychium crenulatum	MA (NT)	MA (NT)	WN	WN	WN
Botrychium lineare	MA (T)	MA (NT)	WN	WN	WN
Botrychium lunaria	MA (NT)	MA (NT)	WN	WN	WN
Botrychium minganese	MA (NT)	MA (NT)	WN	WN	WN
Botrychium montanum	MA (NT)	MA (NT)	WN	WN	WN
Botrychium pinnatum	MA (NT)	MA (NT)	WN	WN	WN
Bruchia bolanderi	MA (NT)	WN	WN	WN	WN
Buxbaumia viridis	MA (NT)	WN	WN	WN	WN
Calycadenia oppositifolia	MA (NT)	MA (NT)	WN	WN	MA (NT)
Calystegia atriplicifolia ssp. *buttensis*	MA (NT)	WN	WN	WN	WN
Clarkia biloba ssp. *brandegeae*	MA (NT)	WN	WN	WN	WN
Clarkia gracilis ssp. *albicaulis*	MA (NT)	WN	WN	WN	WN
Clarkia mildrediae ssp. *mildrediae*	MA (NT)	MA (NT)	WN	MA (NT)	MA (NT)
Clarkia mosquinii	MA (T)	MA (NT)	WN	WN	WN
Cudonia monticola	WN	WN	WN	WN	WN
Cypripedium fasciculatum	MA (NT)	MA (NT)	WN	MA (NT)	MA (NT)
Cypripedium montanum	MA (NT)	WN	WN	WN	WN
Dendrocollybia racemosa	WN	WN	WN	WN	WN
Eleocharis torticulmis	MA (T)	WN	WN	WN	WN
Eriogonum umbellatum var. *ahartii*	MA (NT)	MA (NT)	WN	WN	WN)
Fissidens aphelotaxifolius	WN	WN	WN	WN	WN
Fissidens pauperculus	MA (NT)	WN	WN	WN	WN
Fritillaria eastwoodiae	MA (NT)	WN	WN	WN	WN
Helodium blandowii	WN	WN	WN	WN	WN
Hydrothyria venosa	MA (NT)	MA (NT)	WN	WN	MA (NT)
Ivesia aperta var. *aperta*	MA (NT)	MA (NT)	WN	WN	MA (NT)

Species	Alternative				
	1	2	3	4	5
Ivesia sericolueca	MA (NT)	MA (NT)	WN	WN	WN
Ivesia webberi	WN	WN	WN	WN	WN
Lewisia cantelovii	MA (NT)	WN	WN	WN	WN
Lewisia kelloggii ssp. *hutchisonii*	MA (NT)	MA (NT)	WN	WN	WN
Lewisia kelloggii ssp. *kelloggii*	WN	WN	WN	WN	WN
Lomatium roseanum	MA (NT)	WN	WN	WN	WN
Lupinus dalesiae	MA (NT)	MA (NT)	WN	MA (NT)	MA (NT)
Meesia longiseta	WN	WN	WN	WN	WN
Meesia triquetra	MA (NT)	WN	WN	WN	WN
Meesia uliginosa	MA (NT)	WN	WN	WN	WN
Mielichhoferia elongata	WN	WN	WN	WN	WN
Monardella follettii	MA (T)	MA (NT)	WN	MA (NT)	MA (NT)
Monardella stebbinsii	MA (T)	WN	WN	WN	WN
Oreostemma elatum	MA (NT)	WN	WN	WN	WN
Packera eurycephala var. *lewisrosei*	MA (NT)	WN	WN	WN	WN
Packera layneae	MA (FT)	WN (FT)	WN (FT)	WN (FT)	WN (FT)
Penstemon personatus	MA (NT)	MA (NT)	WN	WN	MA (NT)
Penstemon sudans	MA (NT)	WN	WN	WN	WN
Phaecollybia olivacea	WN	WN	WN	WN	WN
Pyrrocoma lucida	MA (NT)	MA (NT)	WN	WN	MA (NT)
Sedum albomarginatum	MA (NT)	WN	WN	WN	WN

For Sensitive Species:

•WN: The routes proposed under this Alternative will not affect this species.

•MA (NT): The routes proposed under this Alternative may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the species.

•MA (T): The routes proposed under this Alternative may affect individuals and is likely to result in a trend toward federal listing or loss of viability for the species.

For Federally Listed Species:

•WN (FT):The routes proposed under this Alternative will not affect this species or its designated critical habitat.

•MA (FT): The routes proposed under this Alternative may affect and is likely to jeopardize the continued existence of the species

3.8.10.5.1 Summary of Effects Analysis across All Alternatives

The following presents an overview of the effects analysis for each alternative (Table 156). In general, the greater the number of motorized vehicle trails (and miles) proposed, the higher the risk and severity of negative impacts to rare species and their associated habitats. Alternative 1 has the greatest negative effect on rare species and habitats, primarily due to the allowance for cross-country travel, which has the potential to affect all but the most inaccessible rare species and habitats. Out of the action alternatives, Alternative 2 impacts the largest number of rare species and botanically sensitive resources. Alternative 3, which designates no unauthorized routes, has the least impact on rare species. In comparison to these alternatives, the impacts from Alternative 5 fall closer to the middle of the spectrum of potential effects.

3.8.10.6 Compliance with the Forest Plan and Other Direction

Alternative 1 does not comply with the Forest Plan or other management direction for botanical resources. It does not prohibit cross-country travel and has the highest impact on rare species and botanical resources. Alternative 1 does not protect sensitive species as needed to maintain viability (FSM/H 2670). It also does not protect the resource values within the established Mud Lake RNA from motorized vehicle travel (SNFPA 2004).

The action alternatives are consistent with the Forest Plan and other direction. Under these alternatives, sensitive plant species are protected (albeit to differing degrees) as needed to maintain viability. Motor vehicle travel in the Mud Lake RNA is also prohibited under all action alternatives (SNFPA 2004).

Table 156. Summary of Effects for Botanical Resources

Indicators – Botanical Resources	Rankings of Alternatives for Each Indicator[1]				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of unauthorized or proposed system trails open for public motorized vehicle use within or adjacent to Sensitive rare species sites.	1	2	5	4	3
Number of unauthorized or proposed trails open for public motorized vehicle use within or adjacent to Sensitive rare species sites.	1	2	5	4	3
Acres of rare plant sites or suitable habitat within 100 feet of unauthorized or proposed system trails.	1	2	5	4	3
Total number of rare plant sites within 100 feet of unauthorized or proposed trails.	1	2	5	4	3
Average for Botanical Resources	**1**	**2**	**5**	**4**	**3**

[1] A score of 5 indicates the alternative is the best for botanical resources related to the indicator; A score of 1 indicates the alternative is the worst for botanical resources related to the indicator.

3.9 Noxious Weeds

3.9.1 Introduction

In 2003, the United States Forest Service identified invasive species as one of four critical threats to the nation's ecosystems (Bosworth 2003). Noxious weed species pose a significant threat to biological diversity due to their ability to displace native species, alter nutrient and fire cycles, decrease the availability of forage for wildlife and degrade soil structure (Bossard, Randall and Hoshovsky 2000).

Motorized vehicles contribute to the introduction and spread of noxious weed species by creating suitable environmental conditions for establishment and by acting as a major vector for spread (Trombulak and Frissell 2000). The following section provides a discussion of the risk associated with noxious weed introduction and spread as a result of the proposed trail designation. A complete assessment of noxious weed risk is provided in the "Plumas National Forest Travel Management: Noxious Weed Risk Assessment", which is located in the project record.

3.9.2 Analysis Framework: Statute, Regulation, Forest Plan and Other Direction

Direction relevant to the alternatives that are relevant to the management and prevention of noxious weeds includes:

FSM 2081.03 requires that a weed risk assessment be conducted when any ground disturbing activity is proposed. Determine the risk of introducing or spreading noxious weeds associated with the proposed action. Projects having moderate to high risk of introducing or spreading noxious weeds must identify noxious weed control measures that must be undertaken during project implementation.

Executive Order 13112 of Feb. 3, 1999, directs federal agencies to: prevent the introduction of invasive species; detect and respond rapidly to and control such species, not authorize, fund or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and take all feasible and prudent measures to minimize risk of harm in conjunction with the actions.

Sierra Nevada Forest Plan Amendment (SNFPA). The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified Standards and Guidelines applicable to motorized travel management and noxious weeds, which will be considered during the analysis process (USDA Forest Service 2004). Appendix A of the SNFPA 2004 Record of Decision (page 36) establishes goals for noxious weed management using an integrated weed management approach according to the priority set forth in Forest Service Manual 2081.2. The three goals/priorities include:

1. Prevent the introduction of new invaders.
2. Conduct early treatment of new infestations.
3. Contain and control established infestations.

3.9.3 Effects Analysis Methodology

3.9.3.1 Geographic Area Evaluated for Impacts on Noxious Weeds

Two geographic areas were chosen to analyze the effects of the proposed trails on noxious weeds:

- Direct and indirect effects from noxious weeds under the four action alternatives were assessed using the area within 100 feet of proposed trails. In general, weed infestations located in close proximity to the proposed trails (i.e. within 100 feet) will have a high risk of spread to areas along the trail and to other parts of the Forest.
- The No-action Alternative (Alt. 1), which allows for cross-country travel, was assessed using the entire PNF.

Those noxious weed species located within these two geographic areas were considered to have the highest potential to be impacted or influenced by the proposed trail designation. Conversely, species outside of the analysis area were not considered to have a high likelihood of being impacted by the proposed project either directly, indirectly or cumulatively.

3.9.3.2 Field Surveys

To date, field surveys have been conducted on approximately 287 miles of proposed trails (Vollmar 2007, USDA Forest Service 2007, USDA Forest Service 2008 a, b and c). An additional 66 miles of proposed trail and 10 miles of existing system trails (USDA Forest Service 2003a) have also been surveyed under past management projects. For those 25 miles of trail that had not been surveyed at the time of this analysis, information from the PNF noxious weed records were used to analyze the potential risk from known noxious weed infestations.

3.9.3.3 Assumptions Specific to Noxious Weed Assessment

In addition to those listed at the beginning of Chapter 3, the following assumptions were used in the analysis of noxious weeds:

1. This project is assumed to be a ground-disturbing activity, which requires a weed risk assessment.
2. Existing weed infestations will continue to spread and the rate of spread will be increased by motorized vehicle activity. Infestations located along trails will spread further along the trails. Motorized vehicles will bring in weed seeds and propagative parts from home areas and other areas where they have traveled.
3. When completing the risk assessments, the following categories were assigned to determine the risk of noxious weed spread or introduction: high, medium or low. These categories were assigned based on the following factors:
    - **High Risk**: A high risk of spread or introduction was assigned based on the presence of weed infestations along portions of an unauthorized route that was heavily used, a high level of invasiveness (i.e. the species was considered an A-rated species by the California Department of Agriculture or invasive by the California Invasive Plant Council.) or unauthorized route inventories were lacking or incomplete. A high risk of spread was assumed when there was no information on weed populations.

- **Medium Risk**: The risk of spread was considered medium if noxious weed infestations did not occur directly along a travel route or occurred on a portion of the unauthorized route where travel was prohibited; treatments were available and feasible; or the species was listed as a B or C-rated species by the California Department of Agriculture or was considered to be less invasive and already fairly well-distributed.
- **Low Risk**: The risk of introduction or spread was considered low if existing inventories demonstrated that noxious weed populations were not present along the unauthorized route.

3.9.3.4 Noxious Weeds Methodology by Action

1. Direct/indirect effects of the prohibition of cross-country motor vehicle travel.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Plumas National Forest.

Indicator(s):

- Miles of unauthorized routes within or adjacent to noxious weed sites.
- Total number of weed sites within 100 feet of an existing unauthorized route.

2. Direct/Indirect Effects of adding facilities (presently unauthorized roads, trails and /or areas) to the NFTS.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Plumas National Forest.

Indicator(s):

- Number and miles of proposed trail open for public motorized vehicle use within or adjacent to noxious weed sites.
- Acres of noxious weed sites within 100 feet of a proposed trail.
- Total number of noxious weed sites within 100 feet of a proposed trail.

3. Direct/Indirect effects of identifying vehicle class and season of use on the NFTS.

The timeframe, spatial boundary, indicators and methodology would be the same as those listed under number 2 above.

4. Cumulative Effects

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years.

Spatial boundary: Plumas National Forest.

Indicator(s):

- Number and miles of proposed trails assigned a “high” risk of noxious weed spread.

3.9.4 Affected Environment

Twenty five invasive plant species are considered to be a high management concern for the Plumas National Forest. Of these, fifteen have been documented on the PNF. These weed species, which are known from about 1,280 locations, occupy a total area of almost 700 acres. Of these known occurrences, 551 (or 43 percent) are within 100 feet of an existing National Forest System road. The weed sites on the PNF range in size from 1 square foot to over 150 acres, with the majority of infestations (over 80 percent) occupying an area less than 0.25 acre.

Table 157 lists all noxious weed species that are managed by and known to occur on the Plumas National Forest. Also included in the table are the ratings from the California Department of Food and Agriculture's noxious weed list (CDFA 2007) and the California Invasive Plant Council's invasive plant inventory (Cal-IPC 2006). The CDFA list divides noxious weeds into three categories: A, B and C. A-listed weeds are those for which eradication or containment is required at the State or County level. Eradication or containment of B-listed weeds is at the discretion of the County Agricultural Commissioner and C-listed weeds require eradication or containment only when found in a nursery or at the discretion of the County Agricultural Commissioner. Cal-IPC categorizes invasive plants as high, moderate or limited, based on the species' negative ecological, rather than economic or management, impact in California.

Table 157. Plumas National Forest noxious weed species.

Species	Common Name	CDFA rating	Cal-IPC rating	Number of PNF locations	Total acres on the PNF
Aegilops triuncialis	barb goatgrass	B	High	5	0.8
Cardaria draba	hoary cress	B	Moderate	2	0.1
Carduus nutans	musk thistle	A	Moderate	1	< 0.001
Centaurea maculosa	spotted knapweed	A	High	18	1.8
Centaurea solstitialis	yellow starthistle	C	High	207	269
Chondrilla juncea	rush skeletonweed	A	Moderate	8	1.8
Cirsium arvense	Canada thistle	B	Moderate	597	139
Cytisus scoparius	Scotch broom	C	High	97	131
Genista monspessulana	French broom	C	High	64	20.5
Isatis tinctoria	dyer's woad	B	Moderate	3	0.1
Lepidium latifolium	perennial pepperweed	B	High	128	8.7
Linaria genistifolia* ssp. *dalmatica	Dalmation toadflax	A	Moderate	4	0.1
Rubus armeniacus	Himalaya blackberry	None	High	2	0.05
Spartium junceum	Spanish broom	None	High	5	0.6
Taeniatherum caput-medusae	medusahead	C	High	123	98

3.9.4.1 Habitat Vulnerability

A large portion of the PNF is considered relatively free of noxious weeds, with most infestations concentrated along roads (43 percent) or in areas of past and present disturbance, such as timber harvest units, skid trails, temporary roads, unauthorized routes, mining claims and grazing allotments. The lower elevations on the Forest and the mid-elevation valleys contain many of the high noxious weed concentrations. These areas often provide entry points or "seed sources" for weeds moving into the less-invaded parts of the Forest.

Motorized vehicle travel both on and off roads and trails has been a part of Forest recreation for many years. This activity has created disturbed conditions that greatly increase the vulnerability of the landscape to noxious weed invasion and spread. The PNF has been heavily influenced over the last 150 years by activities that include mining, livestock grazing, timber harvest, fire exclusion, large high-severity wildfires and non-motorized recreational activities such as camping, hiking, biking and horseback riding. Undeniably, the additive effects of recent and past actions have shaped the present landscape and corresponding noxious weed infestations.

Over the past few years, a number of large wildland fires have occurred on the Forest. These recent events increase the vulnerability of the landscape to weed establishment and spread by increasing the availability of resources, such as light and nitrogen; and decreasing competition from native plant species. In their comparison of low-severity and high-severity burns, Turner et al. (1997) found that the density of the invasive Canada thistle after severe surface and crown fires was two to four times greater than the density of Canada thistle after a light surface fire.

Beyond these recent events, the effect of specific past management actions on noxious weed species is largely unknown. Targeted noxious weed surveys at the project-level first began relatively recently on the Forest. While it is often difficult to draw definitive conclusions regarding the effects of past project activities on noxious weeds, the high level of past activity, combined with the current level of weed infestation, suggest that past activities have had a significant effect on noxious weed introduction and spread across the PNF.

Of the 1,280 noxious weed locations (covering approximately 700 acres) that have been documented to date on the PNF, about 160 locations are treated annually using mechanical, cultural and in some limited cases, chemical methods. In addition, one future project is designed to treat noxious weeds found within 50 feet of existing roads. While these ongoing and future actions would decrease the potential for these occurrences to spread along roads, the actions would not greatly reduce the extent of noxious weed infestations over the Forest landscape.

3.9.4.2 General Types of Impacts

Noxious weed species pose a serious threat to biological diversity because of their ability to displace native species, alter nutrient and fire cycles, decrease the availability of forage for wildlife and degrade soil structure (Bossard, Randall and Hoshovsky 2000). Noxious weed species have the potential to affect native plant species indirectly through allelopathy (the production and release of plant compounds that inhibit the growth of other plants) (Bais et al. 2003), as well as through direct competition for nutrients, light and water (Bossard, Randall and Hoshovsky 2000). Noxious weed infestations can also reduce the recreational or aesthetic value of native habitats.

Noxious weed species are oftentimes classified as “pioneer” species or invaders. Therefore, disturbance, such as that associated with motorized vehicle use, often creates ideal conditions for weed introduction and establishment. Natural areas that have experienced minimal levels of human disturbance are generally less invaded by noxious weeds than those areas that have been directly disturbed (Rejmánek 1989 *in* Daehler 2003). Noxious weed colonization into disturbed sites is often due to the removal of natural barriers that frequently keep invasive species in check, such as unsuitable light, soil or moisture conditions (Parendes and Jones 2000).

Motorized vehicles greatly increase the amount of disturbance along and in the vicinity of the proposed trails. Indirect effects from motorized vehicle use, such as soil compaction, increased erosion and modification of soil properties, can impact the distribution, abundance and vigor of native vegetation (Brooks 1995 *in* Ouren et al. 2007). The removal of native vegetation increases light levels and reduces the amount of competition for water and nutrients, making these edge-habitats highly susceptible to noxious weed invasion.

3.9.4.3 Increased Vectors as a Result of Proposed Trail Designation

Motorized vehicle routes contribute to dispersal of noxious weed species because they (1) create suitable habitat by altering environmental conditions, (2) make invasion more likely by stressing or removing native species and (3) allow for easier movement by wild or human vectors (Trombulak and Frissell 2000).

High concentrations of noxious weeds have been observed in close proximity to roads and areas of motorized vehicle use in many different ecosystems (Gelbard and Harrison 2003, Parendes and Jones 2000 and others). One study in the Mohave Desert determined that non-native, early successional species were more common at sites disturbed by off-highway motorcycles (Davidson and Fox 1974). Another study in the Mohave Desert, found that the biomass of a non-native grass increased in plots disturbed by off-highway vehicle use and grazing when compared to areas excluded from these activities (Brooks 1995).

Roads, whether they are major highways, general Forest roads or motorized vehicle trails, are often the primary conduit for weed introduction and establishment. For example, in their study of invasive species along roads and streams in Oregon, Parendes and Jones (2000) found weed species along nearly all of the high and low-use roads that they sampled.

Seeds and propagative plant parts often get lodged in the tires or undercarriages of motor vehicles and can be transported along and between routes into un-invaded portions of the forest. In one National Park in Australia, weed seed was found to be most often transported into and around the park by visitor’s vehicles that had been driven off-road (Lonsdale and Lane 1994). Maintenance (i.e. brush clearing) of routes can also facilitate the spread of noxious weeds by disturbing the soil, removing native vegetation and transporting soil and weed seed to new locations.

At the site-specific level, the risk of noxious weed establishment and the potential for spread is largely dependent upon the type and frequency of disturbance associated with each route. For example, plant communities adjacent to routes that receive high vehicle traffic would be expected to be more invaded than those adjacent to infrequently used areas (Parendes and Jones 2000). Also, the risk of weed introduction would be highly dependent upon if a vehicle had been in an area infested with noxious weeds in the recent past.

3.9.5 Environmental Consequences: Effects of Alternatives on Noxious Weed Species

The following sections provide a discussion of the direct, indirect and cumulative effects of each alternative on noxious weeds. It is important to note that the analysis below represents what is known about motorized vehicle impacts along unauthorized routes at this point in time. Designation of a trail is expected to increase and concentrate motorized vehicle use; this has the potential to increase the risk of noxious weed introduction and spread. Proposed trails, infestations and control measures will need to be re-evaluated on a continual basis to assess and address the risk from noxious weeds.

3.9.5.1 Alternative 1 (No-action)

3.9.5.1.1 Direct/Indirect Effects

Alternative 1 carries the highest risk of noxious weed introduction and spread. The largest impact of this alternative is from cross-country travel, which has the potential to introduce new noxious weeds to areas that are not currently infested and to aid in the expansion of existing infestations.

Under this alternative, it is impossible to quantify when and where noxious weeds will be encountered, spread or introduced by motorized vehicles; therefore the 1,073 miles of unauthorized routes were used as a representation of current motorized vehicle use on the Forest. There are presently 159 noxious weed locations (68 acres) documented within 100 feet of unauthorized routes and existing system trails (Table 158). This represents 13 percent of the noxious weed locations documented on the PNF.

Table 158. High priority noxious weed species documented within 100 feet of an unauthorized route or existing system trail and their percentage relative to the total percent and acreage on the Plumas National Forest.

Species	Number (and acres) of noxious weed infestations within 100’		% of known PNF infestations	% of total PNF acres
	Unauthorized Routes	Existing System Trail		
Centaurea maculosa **(spotted knapweed)**	5 infestations (0.2 acres)		28	11
Centaurea solstitialis **(yellow starthistle)**	41 infestations (26.2 acres)	8 infestations (8 acres)	24	13
Cirsium arvense **(Canada thistle)**	38 infestations (6.7 acres)	3 infestations (0.9 acres)	7	5
Cytisus scoparius **(Scotch broom)**	11 infestations (4.8 acres)		11	4
Genista monspessulana **(French broom)**	2 infestations (11.6 acres)		3	57
Isatis tinctoria **(Dyer's woad)**	2 infestations (0.04 acre)		67	40
Lepidium latifolium **(perennial pepperweed)**	1 infestation (0.02 acre)		1	0.2
Linaria dalmatica ssp. dalmatica **(Dalmatian toadflax)**	3 infestations (0.1 acres)		75	100
Rubus armeniacus **(Himalaya blackberry)**	1 infestation (0.002 acres)	1 infestation (0.05 acre)	100	100
Taeniatherum caput-medusae **(medusahead)**	34 infestations (9.4 acres)	9 infestations (0.25 acre)	35	10
TOTAL	**138 infestations (59 acres)**	**21 infestations (9.25 acres)**	**13**	**10**

Under this alternative, motorized vehicles traveling on and off unauthorized routes would continue to create areas of disturbance that are highly vulnerable to weed invasion. Noxious weeds would continue to reduce the quality of native plant communities by displacing native species, altering nutrient and fire cycles, degrading soil structure and decreasing the quality and availability of forage for wildlife (Bossard, Randall and Hoshovsky 2000). Under this alternative, all but the most inaccessible habitats would be at risk of noxious weed invasion and spread from cross-country motorized vehicle travel.

3.9.5.1.2 Cumulative Effects

As the number of Forest visitors and subsequently the number of unauthorized routes, continues to grow each year, the risk of new invasive species introductions also increases. The high number of past, on-going and planned activities on the Forest also increases the vulnerability of the landscape to noxious weed spread. Existing vectors for spread, which are unrelated to the motorized vehicle travel, include mining, livestock grazing, timber harvest, fire exclusion, large high-severity wildfires and non-motorized recreational activities such as camping, hiking, biking and horseback riding. These would continue to aide in the dispersal and spread of noxious weed species across the forest.

Standard management practices, such as cleaning off-road vehicles and flagging and avoiding weed infestations, are often used to reduce the risk of noxious weed introduction and spread. While these practices can be effective in reducing cumulative impacts in most projects, they are not practical for trail designation. Some of the PNF standard management guidelines and noxious weed prevention measures (i.e. the requirement to use weed-free materials for erosion control, maintenance and revegetation) would reduce the risk of weed invasion from trail reconstruction and maintenance; however, in general, those alternatives that avoid or treat existing weed infestations have a lower risk of weed spread than those alternatives that do not.

3.9.5.2 Action Alternatives (2 through 5): Summary of Environmental Consequences for Individual Species

The following sections provide a discussion of the effects of each action alternative (2 through 5) on those noxious weed species with the highest potential to be directly or indirectly impacted by the proposed project (Table 159). The general effects, described under the "General Types of Impacts" section, also apply to these weed species. The following summarizes information about the noxious weed species that are known to occur within 100 feet of a proposed trail.

Table 159. The number of noxious weed infestations within 100' of a proposed trail displayed by action alternative.

Species	Action Alternatives		
	2	4	5
Centaurea solstitialis	8	0	4
Cirsium arvense	8	2	5
Cytisus scoparius	2	2	2
Rubus armeniacus	1	1	1
Taeniatherum caput-medusae	12	1	2
TOTAL	31	6	14

3.9.5.2.1 *Centaurea solstitialis* (yellow starthistle)

Yellow starthistle is considered a high priority for control and eradication in Plumas County as well as on the PNF (Karl Bishop, Plumas-Sierra Counties Agricultural Commissioner, personal communication). In California alone, this invasive species is estimated to cover approximately 12 million acres of rangeland and wildland.

Yellow starthistle reproduces exclusively from seed, with most long-distance dispersal (greater than 16 feet) attributed to wildlife or human-related factors. The control or eradication of this species requires elimination of seed production as well as depletion of the soil seedbank (seeds residing in the soil that have not germinated). The size of the seedbank is dependant upon the age of the infestation; on average it takes 5 to 10 years to deplete the seedbank. This species is actively treated on the PNF where control methods have ranged from hand pulling to limited herbicide control.

3.9.5.2.1.1 Effects from the Proposed trails

There are eight yellow starthistle infestations within 100 feet of the proposed trails under Alternatives 2, 4 and 5 (Table 160).

Table 160. Yellow starthistle occurrences within 100' of the proposed trails.

Site ID	Trail ID	Number of acres with potential for impact		Size of infestation (acres)	Proposed treatment[1]	Action Alternatives		
		Within 0-30'	Within 30-100'			2	4	5
CESO3_198	10M39	0.02	0.2	1.5		X		
CESO3_201	10M40	0.4	0.3	0.8	FP	X		X
CESO3_292	11M25		0.002	0.002	HP	X		X
CESO3_309	5M06		0.1	0.9	HP	X		
CESO3_332	10M36	0.04		0.04	HP	X		X
CESO3_333	10M36		0.002	0.002	HP	X		X
CESO3_339	10M42	0.1	0.3			X		
CESO3_344	6M08	0.1	0.1	0.4	HP (O)	X		

[1]HP: Hand-pull individuals within infestation prior to trail designation; HP (O): Hand-pull individuals within infestation / trail open for designation; FP: Infestation proposed for treatment under future project

The five infestations situated less than 30 feet from the proposed trails will have the highest risk of spread from motorized vehicles. Although seed dispersal in yellow starthistle is generally poor, with most seeds falling within two feet of the mother plant, dispersal distances of over 16 feet have been documented (Roché 1991). Long-distance dispersal events are often attributed to wildlife or human factors, such as dispersed camping, vehicle use or hiking along trails. Experimental results suggest that seeds remain viable in the soil for three to ten years (DiTomaso 2004). These factors, in combination with the close proximity (less than 100 feet) from the trails, place all of the seven trails listed above at high risk due to yellow starthistle.

None of the infestations in Table 160 are currently treated on an annual basis. One infestation, CESO3_201, is proposed for treatment under the Keddie Hazardous Fuels Project. Four additional infestations (CESO3_292, CESO3_309, CESO3_332 and CESO3_333) require mechanical treatment (i.e. hand-pulling) prior to the trail being open for motorized use. One of these infestations, CESO3_292, occurs on an old, disturbed landing, which also appears to be used as a dispersed campsite (Coppoletta, personal observation 2007). This site is the starting point for unauthorized route 11M25 and would likely be utilized for staging off-road vehicles, making the risk of yellow starthistle spread from this infestation along trail 11M25 and the adjacent 11M24 trail high.

Yellow starthistle infestations are also found along some of the National Forest system roads and existing system trails that are adjacent to the proposed trails (e.g. 5M09, 5M32 and 6M08). Restricting motorized vehicle access on these trails through the trail designation process would not remove the risk of spread from other licensed vehicles utilizing these existing roads and trails; however, in a few of the higher risk situations, trails have been proposed for designation (i.e. they will be open to the public) with the intent of mechanically treating the noxious weeds along the access routes.

3.9.5.2.2 *Cirsium arvense* (Canada thistle)

This perennial thistle spreads rapidly by producing long horizontal underground roots that give rise to aerial shoots (Bossard, Randall and Hoshovsky 2000). Canada thistle has an extensive root system; the species has been shown to produce over 66 feet of new roots over a two-year period, some of which have been shown to grow 15–20 feet deep. This species is considered particularly difficult to eradicate. Several insect species have been identified as possible biocontrol agents, but none of them have been shown to be effective controls (Bayer 2000, Nuzzo 1997, Tu et al. 2001). Mechanical methods, such as hand pulling or mowing, are generally not recommended because they may exacerbate the problem by spreading root fragments to new locations (Bossard, Randall and Hoshovsky 2000). The most effective method is herbicide control, which is oftentimes used in conjunction with revegetation activities (Bossard, Randall and Hoshovsky 2000).

3.9.5.2.2.1 Effects from the Proposed trails

There are ten Canada thistle infestations within 100 feet of the proposed trails under Alternatives 2, 4 and 5 (Table 161).

Seven of the Canada thistle infestations are situated less than 30 feet from a proposed trail, making the risk of spread from motorized vehicles very high. Canada thistle poses a large threat to native plant communities on the PNF due to its abundance and distribution, particularly in the northern portion of the Forest. The rates of Canada thistle spread that are documented in scientific literature range from less than 2 feet per year to over 40 feet per year (Donald 1990; USGS 2005; Nuzzo 1997; Bond and Turner 2004).

Table 161. Canada thistle occurrences within 100’ of the proposed trails.

Site ID	Trail ID	Number of acres with potential for impact		Size of infestation (acres)	Proposed Treatment[1]	Action Alternatives		
		Within 0-30’	Within 30-100’			2	4	5
CIAR4_040	13M03	0.1	0.2	2.2		X		
	13M04A		0.002			X		
CIAR4_081	10M40	0.002		0.002	FP	X		X
CIAR4_089	10M43	0.01		0.005		X		
CIAR4_270	11M42	0.02	0.01	0.04		X		
CIAR4_355	12M22	0.005	0.2	0.2	FP	X		X
CIAR4_358	12M21		0.05	0.05	FP	X		X
	12M21A		0.04		FP	X		X
CIAR4_372	12M34		0.003	0.003	FP		X	X
CIAR4_390	12M34		0.01	0.01	FP		X	X
CIAR4_495	11M42	0.3	0.05	0.5		X		
CIAR4_546	12M24	0.1	1.4	14.8		X		

[1] FP: Infestation proposed for treatment under future project

Canada thistle is a shade-intolerant species and its growth is shown to be discouraged in areas where there are low levels of disturbance and sufficient competition from native species. For example, in Rocky Mountain National Park, it was found that dry upslope conditions, thick canopies from woody species and well-established grass meadows inhibited Canada thistle invasion and population size over time (Beck 1994). However, it was also noted that only a minor amount of disturbance (such as from elk grazing) was necessary to promote Canada thistle invasion and establishment.

This species is considered particularly difficult to eradicate and none of the infestations listed above are treated on an annual basis. Mechanical methods, such as hand pulling or mowing, are generally not effective (Bossard, Randall and Hoshovsky 2000). At present, the most successful control method for Canada thistle is herbicide treatment (Bossard, Randall and Hoshovsky 2000). Canada thistle sites that are not actively treated will continue to expand along roadsides, trails and into riparian and other native plant communities.

One infestation, CIAR4_081, is proposed for treatment under the Keddie Hazardous Fuels Project. Four additional infestations (CIAR4_355, CIAR4_358, CIAR4_372 and CIAR4_390) are being considered for treatment under a future weed treatment project. To reduce the high risk of spread along these proposed trails, some of these trails would remain closed until future treatments are complete.

3.9.5.2.3 Cytisus scoparius (Scotch broom)

Scotch broom is an invasive shrub that currently occupies more than 700,000 acres in the central to northwest coastal and Sierra Nevada foothill regions of California (Bossard 2000). In disturbed areas, this species has been shown to form dense thickets that decrease native plant diversity and have the potential to modify fire frequency and intensity. Scotch broom spreads by producing large quantities of seed; one medium-sized plant can produce over 12,000 seeds (Bossard 2000). Scotch broom is also capable of stump sprouting after cutting, freezing or fire.

3.9.5.2.3.1 Effects from the Proposed trails

There are two scotch broom infestations within 100 feet of the proposed trails under Alternatives 2, 4 and 5 (Table 162).

Table 162. Scotch broom occurrences within 100’ of the proposed trails.

Site ID	Trail ID	Number of acres with potential for impact		Size of infestation (acres)	Proposed Treatment	Action Alternatives		
		Within 0-30’	Within 30-100’			2	4	5
CYSC4_147	9M50		0.01	0.3		X	X	X
CYSC4_154	9M50	0.03	0.07	0.1		X	X	X

CYSC4_147 and CYSC4_154 are situated opposite the proposed trails on a paved NFS road. These two sites have been treated annually since 2005. To date, the mechanical methods used to treat Scotch broom on the Forest have been effective. This on-going treatment, as well as the location of these infestations in relation to the proposed trails, lowers the risk of spread along the proposed trails.

3.9.5.2.4 *Rubus armeniacus* (Himalayan blackberry)

This robust shrub effectively and rapidly displaces native species by forming impenetrable thickets along disturbed roadsides, right-of-way corridors and riparian areas. It can grow in a wide variety of conditions and on a number of different soil types, including barren and infertile soils (Hoshovsky 2000). Himalayan blackberry has rapid growth rates; canes have been shown to grow up to twenty-three feet in a single growing season (Hoshovsky 2000). It spreads both vegetatively and through the production of large quantities of seed, which are readily dispersed by mammals, birds and via rivers and streams. The most effective treatment methods for Himalayan blackberry are mechanical removal, burning and in some cases herbicide application (Hoshovsky 2000).

3.9.5.2.4.1 Effects from the Proposed Trails

There is one Himalayan blackberry infestation within 100 feet of a proposed trail under Alternatives 2, 4 and 5 (Table 163).

Table 163. Himalayan blackberry occurrences within 100' of the proposed trails.

Site ID	Trail ID	Number of acres with potential for impact		Size of infestation (acres)	Proposed Treatment	Action Alternatives		
		Within 0-30'	Within 30-100'			2	4	5
RUAR_002	8M36	0.002		0.002		X	X	X

This small infestation is situated less than 30 feet from the proposed trail and poses a high risk of spread from motorized vehicles. Himalayan blackberry has rapid growth rates and spreads both vegetatively and by seed. At present, this species is not actively treated on the Plumas National Forest and efforts to document infestations are in the early stages.

3.9.5.2.5 *Taeniatherum caput-medusae* (medusahead)

Over the past 10 years, managers of public lands in the western United States have witnessed an explosive spread of this invasive grass species (Bisson 1999). This species spreads primarily by seed, which is dispersed by wind and water, although it can be dispersed to more distant sites by grazing animals, machinery, vehicles and clothing (Bossard, Randall and Hoshovsky 2000). Medusahead is able to grow in a wide range of climatic conditions and has been documented in plant communities up to 7,000 feet in elevation.

Traditional methods of control (such as mowing and hand pulling) are not considered practical for medusahead because they are nonselective, oftentimes fail to remove the active portion of the plant where new growth originates and are not recommended along roadsides after seed set because of increased potential for seed dispersal (CDFA 2004). Other management options, such as biological, cultural and chemical control methods, have also shown variable effectiveness (CDFA 2004).

3.9.5.2.5.1 Effects from the Proposed trails

There are twelve medusahead infestations within 100 feet of the proposed trails under Alternatives 2, 4 and 5 (Table 164).

Table 164. Medusahead occurrences within 100' of the proposed trails.

Site ID	Trail ID	Number of acres with potential for impact		Size of infestation (acres)	Proposed Treatment	Action Alternatives		
		Within 0-30'	Within 30-100'			2	4	5
TACA8_031	10M22		0.05	0.2		X		
TACA8_051	10M20		0.01	0.02		X	X	X
	10M21		0.02			X		X
TACA8_085	10M39	0.02	0.2	1.5		X		
TACA8_087	10M39		0.001	0.005		X		
TACA8_088	10M39		0.02	0.03		X		
TACA8_094	10M38		0.01	0.02		X		

Site ID	Trail ID	Number of acres with potential for impact		Size of infestation (acres)	Proposed Treatment	Action Alternatives		
		Within 0-30’	Within 30-100’			2	4	5
TACA8_097	10M38	0.03		0.03		X		
TACA8_098	10M38	0.01		0.009		X		
TACA8_172	10M14	0.03	0.2	1.5		X		X
TACA8_186	10M42	0.002		0.002		X		
TACA8_187	10M42	0.07		0.07		X		
TACA8_188	10M42	0.01		0.01		X		

Under these alternatives, the seven medusahead infestations that are situated less than 30 feet from the proposed trails have a very high risk of spread from motorized vehicles. This invasive grass is primarily dispersed by wind and water, although it can be dispersed to more distant sites by machinery, vehicles and clothing (Bossard, Randall and Hoshovsky 2000). Medusahead is of significant concern on the PNF because it occurs in areas of high visitor use where there is increased potential for spread and traditional treatment methods (mechanical, chemical, biological, etc) are not practical or effective for large-scale control. These factors, in combination with the close proximity (less than 100 feet) from the trails, place all of the seven trails listed above at high risk due to medusahead.

TACA8_051 and TACA8_172 are situated directly off County Roads; therefore restricting motorized vehicle access on trails through the trail designation process may not remove the entire risk of spread from other licensed vehicles utilizing the road. Many of these trails (10M20, 10M21 and 10M22) occur in an area that is heavily infested with medusahead. There are currently no feasible or effective treatment measures to control the spread of this invasive species; therefore the risk of spread is high in these areas.

3.9.5.3 Action Alternatives (2 through 5): Summary of Environmental Consequences

The following section presents an overview of the effects analysis for each action alternative. In general, the greater the number of motorized vehicle trails (and miles) and the less treatment proposed, the higher the risk of noxious weed spread. Of the action alternatives, Alternative 2 carries the highest risk from noxious weeds, whereas Alternative 3, which designates no unauthorized routes, has the lowest risk of weed introduction and spread. In comparison to these alternatives, the risk of noxious weed spread and introduction from the proposed trails under Alternative 5 is closer to the middle.

3.9.5.3.1 Alternative 2 (Proposed Action)

3.9.5.3.1.1 Direct/Indirect Effects

Table 165. Summary of noxious weed indicator measures for Alternative 2.

Indicator Measure	Value
Miles of proposed trail open for public motorized vehicle use within or adjacent to noxious weed sites	1.2 miles
Number of trails open for public motorized vehicle use within or adjacent to noxious weed sites	20 trails
Acres of noxious weed sites within 100 feet of a proposed trail	5 acres
Total number of noxious weed sites within 100 feet of a proposed trail	31 locations

Alternative 2 prohibits cross-country travel, adds approximately 361 miles of unauthorized routes to the trail system and makes no changes to the existing system trails. In comparison to the other action alternatives, Alternative 2 poses the greatest risk of noxious weed introduction and spread due the high number of trails within or adjacent to noxious weed infestations (20 trails), the total number (31 sites) and acreage (5 acres) of weed infestations within 100 feet of a proposed trail and the lack of feasible treatment and control options for some of these infestations (Table 165).

The following noxious weeds have been documented within 100 feet of a proposed trail under Alternative 2: yellow star-thistle (8 locations), Canada thistle (8 locations), Scotch broom (2 locations), Himalayan blackberry (1 location) and medusahead (12 locations). A detailed discussion of the risk associated with these individual species is provided in the section above (“Action Alternatives (2 through 5): Summary of Environmental Consequences for Individual Species”).

Of the 31 noxious weed sites that are located within 100 feet of a trail proposed under Alternative 2, twelve are proposed for treatment either prior to or concurrent with the trail being open to the public. Of those 19 infestations that are not proposed for treatment, three (CYSC4_147, TACA8_051 and TACA8_172) are situated on a paved NFS road on the side opposite of the proposed trail; the risk of spread from these infestations onto the proposed trails is considered moderate. Five of the remaining untreated sites are Canada thistle and nine are medusahead; these two weed species do not have practical treatment options available that fall within the scope of this project. Under this alternative, those locations that are left untreated will greatly increase the risk of spread along the proposed trails and into adjacent unoccupied habitat.

3.9.5.3.1.2 Cumulative Effects

In comparison to Alternative 1, the risk of noxious weed spread under this alternative is far less, primarily due to the ban on cross-country travel; however, in comparison to the other action alternatives, Alternative 2 carries one of the highest cumulative risks from noxious weed introduction and spread. This is largely due to the number (20 proposed trails) and mileage (12.8 miles) of “high risk” proposed trails. Under this alternative, the 31 noxious weed sites that are located within 100 feet of a proposed trail and are not actively treated will have a high risk of spread from motorized vehicle use. These noxious weed infestations would continue to expand along trails and into uninvaded native plant communities and would act as sources of seed for new weed introductions to nearby trails.

As the number of forest users continues to grow each year, the risk of new invasive species introductions also increases. The high number of past, on-going and planned activities on the Forest also increases the vulnerability of the landscape to noxious weed spread. Existing vectors for spread, unrelated to motorized vehicle use, would continue to aide in the dispersal and spread of noxious weed species across the Forest.

3.9.5.3.2 Alternative 3

3.9.5.3.2.1 Direct/Indirect Effects

Table 166. Summary of noxious weed indicator measures for Alternative 3.

Indicator Measure	Value
Miles of proposed trail open for public motorized vehicle use within or adjacent to noxious weed sites	0 miles
Number of trails open for public motorized vehicle use within or adjacent to noxious weed sites	0 trails
Acres of noxious weed sites within 100 feet of a proposed trail	0 acres
Total number of noxious weed sites within 100 feet of a proposed trail	0 locations

Alternative 3 prohibits cross-country travel, adds no proposed trails to the trail system and makes no changes to the existing trail system. In comparison to the other action alternatives, Alternative 3 has the lowest risk of noxious weed introduction and spread due to the fact that it proposes no new system trails that intersect noxious weed occurrences (Table 166).

Of those species that have been documented along a proposed trail under Alternatives 2, 4 or 5, the following four are known to occur along existing system trails: yellow star-thistle (8 locations), Canada thistle (3 locations), Himalayan blackberry (1 location) and medusahead (9 locations). Use of the existing system trails will increase the risk of noxious weed introduction and spread onto PNF lands; however, motorized use of existing system trails would continue under all of the action alternatives. No additional risk of noxious weed spread and introduction would occur under Alternative 3 because there are no proposed trails to the trail system.

Cumulative Effects

Overall, cumulative effects to noxious weeds under this alternative are far less than those under Alternative 1 or the action alternatives. This is primarily due to the ban on cross-country travel and elimination of all proposed trails. No trails are proposed under this alternative; therefore none of the noxious weed infestations that have been documented along unauthorized trails pose a risk under Alternative 3.

3.9.5.3.3 Alternative 4

3.9.5.3.3.1 Direct and Indirect Effects

Alternative 4 prohibits cross-country travel, adds approximately 141 miles of unauthorized routes to the trail system and makes no changes to the existing trail system. In comparison to the other action alternatives, Alternative 4 has the second lowest risk of noxious weed introduction and spread due to the lower number of trails within or adjacent to noxious weed infestations (3 trails) and the reduced number (6 sites) and acreage (0.2 acres) of weed infestations within 100 feet of a proposed trail (Table 167).

Table 167. Summary of noxious weed indicator measures for Alternative 4.

Indicator Measure	Value
Miles of proposed trail open for public motorized vehicle use within or adjacent to noxious weed sites	0.14 miles
Number of trails open for public motorized vehicle use within or adjacent to noxious weed sites	3 trails
Acres of noxious weed sites within 100 feet of a proposed trail	0.2 acres
Total number of noxious weed sites within 100 feet of a proposed trail	6 locations

The following noxious weeds have been documented within 100 feet of a trail proposed under Alternative 4: Canada thistle (2 locations), Scotch broom (2 locations), Himalayan blackberry (1 location) and medusahead (1 location). Refer to the analysis in the section above (“Action Alternatives (2 through 5): Summary of Environmental Consequences for Individual Species”) for a detailed discussion of effects to these individual species.

Of the seven noxious weed sites that are located within 100 feet of a trail proposed under Alternative 2, three are proposed for treatment either prior to or concurrent with the trail being open to the public. Of those four infestations that are not proposed for treatment, three (CYSC4_147, TACA8_051 and TACA8_172) are situated on a paved NFS road on the side opposite of the proposed trail; the risk of spread from these infestations onto the proposed trail is considered moderate. The remaining infestation is Himalayan blackberry, which is not currently treated on the PNF.

In comparison to Alternatives 2 and 5, the exclusion of a number of “high risk” unauthorized routes and the proposed weed treatments greatly reduce the risk of noxious weed spread along and among the Alternative 4 proposed trails.

3.9.5.3.3.2 Cumulative Effects:

In comparison to Alternative 1, the risk of noxious weed spread is far less under this alternative, primarily due to the ban on cross-country travel. In comparison to the other action alternatives, Alternative 4 carries the second lowest cumulative risk of noxious weed introduction. This is largely due to the lower number (2 trails) and mileage (0.7 miles) of “high risk” trails.

Under this alternative, the seven noxious weed sites that are located within 100 feet of a proposed trail and are not actively treated have a high to moderate risk of spread from motorized vehicle use. These noxious weed infestations could continue to expand along trails and into uninvaded native plant communities and may act as sources of seed for new weed introductions to nearby trails.

As the number of Forest visitors continues to grow each year, the risk of new invasive species introductions also increases. The high number of past, on-going and planned activities on the Forest also increases the vulnerability of the landscape to noxious weed spread. Existing vectors for spread, unrelated to motorized vehicle use, would continue to aide in the dispersal and spread of noxious weed species across the Forest.

3.9.5.3.4 Alternative 5

3.9.5.3.4.1 Direct/Indirect Effects:

Table 168. Summary of noxious weed indicator measures for Alternative 5.

Indicator Measure	Value
Miles of proposed trail open for public motorized vehicle use within or adjacent to noxious weed sites	0.6 miles
Number of trails open for public motorized vehicle use within or adjacent to noxious weed sites	13 trails
Acres of noxious weed sites within 100 feet of a proposed trail	1.6 acres
Total number of noxious weed sites within 100 feet of a proposed trail	14 locations

Alternative 5 prohibits cross-country travel, adds approximately 234 miles of proposed trails to the trail system and makes no changes to the existing trail system. In comparison to the other action alternatives, Alternative 5 has the second highest risk of noxious weed introduction and spread due the high number of proposed trails within or adjacent to noxious weed infestations (14 proposed trails) and the high number (14 sites) and acreage (1.6 acres) of weed infestations within 100 feet of a proposed trail (Table 168).

The following noxious weeds have been documented within 100 feet of a trail proposed under Alternative 5: yellow star-thistle (4 locations), Canada thistle (5 locations), Scotch broom (2 locations), Himalayan blackberry (1 location) and medusahead (2 locations). Refer to the analysis in the section above ("Action Alternatives (2 through 5): Summary of Environmental Consequences for Individual Species") for a detailed discussion of effects to individual species.

Of the 14 noxious weed sites that are located within 100 feet of a trail proposed under Alternative 5, ten are proposed for treatment either prior to or concurrent with the trail being open to the public. Of those four infestations that are not proposed for treatment, three (CYSC4_147, TACA8_051 and TACA8_172) are situated on a paved NFS road on the side opposite of the proposed trail; the risk of spread from these infestations onto the proposed trail is considered moderate. The remaining infestation is Himalayan blackberry, which is not currently treated on the PNF.

In comparison to Alternative 2, the exclusion of a number of "high risk" unauthorized routes and the proposed weed treatments greatly reduce the risk of noxious weed spread along and among the Alternative 5 proposed trails.

3.9.5.3.4.2 Cumulative Effects

In comparison to Alternative 1, the risk of noxious weed spread under this alternative is far less, primarily due to the ban on cross-country travel; however, in comparison to the other action alternatives, Alternative 5 carries the second highest cumulative risk from noxious weed introduction and spread. This is largely due to the number (10 proposed trails) and mileage (5.2 miles) of "high risk" proposed trails.

Under this alternative, the 14 noxious weed sites that are located within 100 feet of a proposed trail and are not actively treated will have a high to moderate risk of spread from motorized vehicle use. These noxious weed infestations could continue to expand along proposed trails and into uninvaded native plant communities and may act as sources of seed for new weed introductions to nearby trails.

As the number of Forest users continues to grow each year, the risk of new invasive species introductions also increases. The high number of past, on-going and planned activities on the Forest also increases the vulnerability of the landscape to noxious weed spread. Existing vectors for spread, unrelated to motorized vehicle use, would continue to aide in the dispersal and spread of noxious weed species across the Forest.

3.9.6 Summary of Effects Analysis Across All Alternatives

The proposed trails would greatly increase the risk of noxious weed introduction and spread by creating disturbed conditions that favor noxious weed establishment and spread. Implementation of standard management prevention practices is not practical for this project and the limited number of noxious weed control measures that are available do not completely eliminate the risk of noxious weed spread along and among proposed trails.

The risk of noxious weed introduction and spread varies among the proposed alternatives due to the number and mileage of unauthorized routes within or adjacent to noxious weed infestations and the total number and acreage of weed infestations within 100 feet of a proposed trail. Alternative 1 has the highest risk of noxious weed introduction and spread, primarily due to the allowance for cross-country travel, which provides potential access to all but the most inaccessible weed infestations and native plant habitats (Table 169). Out of the action alternatives, Alternative 2 poses the highest risk from noxious weeds, while Alternative 3, which designates proposed trails, has the lowest risk of weed introduction and spread. In comparison to these alternatives, the impacts from Alternative 5 fall closer to the middle of the spectrum of potential effects.

Table 169. Summary of Noxious Weed risk under each Alternative

Indicators–Noxious Weeds	Rankings of Alternatives for Each Indicator1				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of unauthorized routes or proposed trails open for public motorized vehicle use within or adjacent to noxious weed sites.	1	2	5	4	3
Acres of noxious weed infestations within 100 feet of unauthorized or proposed trails.	1	2	5	4	3
Total number of noxious weed sites within 100 feet of unauthorized or proposed trails.	1	2	5	4	3
Overall Risk of Noxious Weed Spread	1	2	5	4	3

[1] A score of 5 indicates the alternative has the lowest risk of noxious weed spread (in relation to the indicator measure); A score of 1 indicates the alternative is the worst for noxious weeds (highest risk).

3.9.7 Compliance with the Forest Plan and Other Direction

Alternative 1 does not prohibit cross-country travel and carries a high risk of noxious weed spread and introduction. This alternative is not consistent with Forest Service Manual direction (FSM 2081.03), which requires the identification of noxious weed control measures in areas of high risk.

The action alternatives are consistent with the Forest Plan and other direction. A noxious weed risk assessment has been completed for each alternative (FSM 2081.03 and USDA Forest Service 2004); the public has been informed of the risk and effects from motorized vehicle travel and noxious weeds (USDA Forest Service 2004); and under some of the alternatives, noxious weed control measures (i.e. route closure or restricted access) have been identified in areas of high risk (FSM 2081.03).

3.9.8 Control Measures

Standard weed prevention practices, such as cleaning off-road vehicles and flagging and avoiding weed infestations, are not practical for trails designation. Weed prevention practices that are practical include: education, outreach and continued cooperation with federal, state and private entities; requirements for use of weed-free materials for erosion control, trails maintenance and revegetation; cleaning of equipment used in trails maintenance; and monitoring. Educational materials that emphasize weed prevention measures should be incorporated into the final MVUM maps or associated materials. In addition, the weed treatments (i.e. hand-pulling) listed in Appendix A and in Table 160 and Table 161 have been designed to reduce the risk of noxious weed spread along the proposed trails.

3.10 Cultural Resources

3.10.1 Introduction

The Plumas National Forest is responsible for stewardship of a large share of the region's cultural resources including a wide variety of archaeological sites, buildings, structures, objects and cultural landscapes. The Forest also manages natural resources, which are critical to the continuation of the lifeways of indigenous peoples (referred to as traditional cultural properties). Preserving the important cultural, educational and scientific values of these nonrenewable resources for future generations is a Forest Service priority. The proposed project was designed to ensure compliance with federal historic preservation laws, and management strategies were developed to balance resource protection, cultural values and recreation opportunities. The following provides a summary of the effects of the proposed project to cultural resources, as well as proposed mitigation measures, where needed. Although the analysis is presented from the perspective of each alternative as a whole, all individual routes have been analyzed. Site-specific analysis is provided in the following reports, which are part of the project record and incorporated by reference: Archaeological Reconnaissance Report, OHV Route Designation Survey, Feather River Ranger District, Plumas National Forest, Butte and Plumas, California (Moore 2008); Archaeological Reconnaissance Report, OHV Route Designation Survey, Mt Hough Ranger District, Plumas National Forest, Plumas County California (Weinberg 2008); Archaeological Reconnaissance Report, OHV Route Designation Survey, Beckwourth Ranger District, Plumas National Forest, Plumas and Sierra Counties, California. (Kliejunas 2008); Heritage Resource Survey for the Plumas National Forest Off-Highway Vehicle Route Designation Project (McCombs 2008).

The Congress in 1966 declared it to be our National policy that the Federal government "administer federally owned, administered, or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations" (National Historic Preservation Act (NHPA) (16 U.S.C. 470-1(3)). This need was made more explicit when the National Historic Preservation Act was amended in 1980 and Section 110 was added to expand and underscore Federal agency responsibility for identifying and protecting historic properties and avoiding unnecessary damage to them. Many historic properties are fragile and once damaged or destroyed they cannot be repaired or replaced.

Section 106 of the NHPA compels federal agencies to take into account the effect of its undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (36 CFR 60) (Historic Properties). The Travel Management Rule requires that the effects on cultural resources be considered, with the objective of minimizing damage, when designating roads, trails, and areas for motor vehicle use on National Forest System lands (36 CFR 212.55(a), 212.55(b)(1)).

3.10.2 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant and specific to the alternatives as they affect cultural resources includes:

The Forest Service is directed to identify, evaluate, treat, protect, and manage historic properties by several laws. However, the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.) (NHPA), provides comprehensive direction to federal agencies about their historic preservation responsibilities. Executive Order 11593, entitled *Protection and Enhancement of the Cultural Environment*, also includes direction about the identification and consideration of historic properties in Federal land management decisions.

The **National Historic Preservation Act of 1966** extends the policy in the Historic Sites Act of 1935 (49 Stat. 666; 16 U.S.C. 461-467) to include resources that are of State and local significance, expands the National Register of Historic Places (NRHP), and establishes the Advisory Council on Historic Preservation and State Historic Preservation Officers (SHPO). NHPA Section 106 directs all Federal agencies to take into account effects of their undertakings (actions, financial support, and authorizations) on properties included in or eligible for the National Register. The Advisory Council on Historic Preservation's (ACHP) regulations (36 CFR 800) implements NHPA Section 106. NHPA Section 110 sets inventory, nomination, protection, and preservation responsibilities for Federally-owned historic properties.

The Forest Service's policy for compliance with Section 106 of the NHPA in travel management with respect to route designation for motor vehicle use was issued in 2005: *USDA Forest Service Policy for Section 106 of the NHPA Compliance in Travel Management: Designated Routes for Motor Vehicle Use* (2005). This policy was developed in consultation with the Advisory Council on Historic Preservation. It outlines minimal requirements for considering possible effects to historic properties that may be associated with designating routes and areas as part of a National Forest's Transportation System (NFTS). This policy statement recognizes that Forests with programmatic agreements for compliance with Section 106 of the NHPA will follow the terms of those agreements.

Section 106 of the NHPA and the ACHPs implementing regulations, *Protection of Historic Properties* (36 CFR Part 800), require that federal agencies take into account the effect of their undertakings on historic properties, and that agencies provide the ACHP with an opportunity to comment on those undertakings. Programmatic agreements (36 CFR 800.14(b)) provide alternative procedures for complying with 36 CFR 800. Region 5 has such an agreement: *Programmatic Agreement among the U.S.D.A. Forest Service, Pacific Southwest Region, U.S.D.A. Forest Service, Intermountain Region's Humboldt-Toiyabe National Forest, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Designating Motor Vehicle Routes and Managing Motorized Recreation on the National Forests in California* (2006) (**Motorized Recreation PA**). This agreement defines the Area of Potential Effects (APE) (36 CFR 800.4(a)(1)) and includes a strategy outlining the requirements for cultural resource inventory, evaluation of historic properties, and effect determinations; it also includes protection and resource management measures that may be used where effects may occur.

Executive Order 11593: *Protection and Enhancement of the Cultural Environment*, issued May 13, 1971, directs Federal agencies to inventory cultural resources under their jurisdiction, to nominate to the National Register of Historic Places all Federally owned properties that meet the criteria, to use due caution until the inventory and nomination processes are completed, and to assure that Federal plans and programs contribute to preservation and enhancement of non-Federally owned properties.

3.10.3 Effects Analysis Methodology

3.10.3.1 Geographic Scope of Analysis

The geographic analysis area for cultural resources includes all trails identified under Alternatives 2 (Proposed Action), 4, and 5. These alternatives include all unauthorized or user-created routes proposed for adding to the NFTS as trails under the action alternatives. The location of historic properties is the unit of spatial analysis used to consider effects with one exception: a possible Native American Traditional Cultural Property (TCP) in the vicinity of a route on the Feather River Ranger District required consideration of the setting beyond the historic property's location in order to address potential auditory and visual effects from OHV use in the area.

3.10.3.2 Assumptions Specific to Cultural Resources Analysis

1. Unauthorized, user-created routes and areas have already affected historic properties within route/area prisms.
2. Under the action alternatives, use will continue at current levels or increase over time on the designated system with the prohibition of cross-country motorized travel.

3.10.3.3 Data Sources

Three types of data were gathered to provide the basis for understanding the nature and extent of cultural resources within project area, and the effects of the proposed additional trails to the NFTS on these resources:

1. Archival and literature sources were reviewed and data from Forest Service cultural resource records, maps and GIS layers compiled to provide a prehistoric and historic overview of the geographic region, identify major historical themes and events, and to provide information on previous archaeological inventories, known site locations, and the likelihood of unidentified resources within the project area. Tribal consultation occurred concurrently with other public involvement activities. The project was discussed at multiple meetings with the Concow Maidu Tribe of Mooretown Rancheria, the Estom Yumeka Tribe of Enterprise Rancheria, Greenville Rancheria, the Mechoopda Indian Tribe of Chico Rancheria, Susanville Indian Rancheria, the Tyme Maidu Tribe of Berry Creek Rancheria, and the Washoe Tribe of California and Nevada.
2. All routes proposed under the action alternatives for which there was no previous survey coverage have been inventoried. Survey coverage includes a 30-meter corridor centered on each route, and complete survey of proposed use areas, including a 30-meter buffer around these use areas.
3. Archaeological site monitoring was completed for all known sites within the project area unless current data on the effects of motor vehicle use was available. Data collection focused on characterizing the type, nature and severity of effects.

3.10.3.4 Basis for Analysis/Cultural Resources Indicators

All cultural resources identified within the APE are considered historic properties, as defined by the NHPA (36 CFR 60), for purposes of this undertaking (Motorized Recreation PA) unless they have already been determined not eligible in consultation with the SHPO or through other agreed upon procedures (36 CFR 60.4; 36 CFR 800).

Site characteristics identified in the NHPA and the following NRHP eligibility criteria form the basis for effects analysis. Of the four National Register Criteria, the following are applicable to most resources within the project area: criterion (c) which includes resources that embody distinctive characteristics of a type, period, or method of construction, that represent the work of a master, and that possess high artistic values, that represent a significant and distinguishable entity whose components may lack individual distinction (e.g. historic structures); and criterion (d) which includes resources that have yielded, or may be likely to yield, information important in prehistory or history (e.g. prehistoric and historic archaeological sites) (36 CFR60.4(a-d)). Criterion (a), which includes events that have made a significant contribution to the broad patterns of our history, and criterion (b), resources that are associated with people important to our history, apply to the Beckwourth National Historic Trail. Integrity measures are based on effects to important site characteristics, including location, design, setting, materials, workmanship, feeling and/or association (36 CFR 800.5(a) (1)).

The following cultural resources indicators will be used to assess effects:

- Degree to which the integrity of historic property values discussed above are diminished.
- Number of historic properties within unauthorized routes at risk from ongoing use.
- Average number of historic properties per acre at risk if additional proposed trails or areas are created.

For purposes of this analysis, cultural resources effects are defined as follows:

1. Direct effect is or will be caused by motor vehicle use or the consequences of such use, including physical damage resulting from erosion, down-cutting or displacement of resources (Table 170).
2. Indirect effects are associated with motor vehicle uses outside unauthorized routes and areas, for example, adjacent camping areas or areas where motorized travel off of unauthorized routes or areas may occur. The proximity of sensitive cultural resources to unauthorized routes is an important factor when determining where resources are at greater risk. Indirect effects could include those listed for direct effects, but may also include other destructive actions like vandalism and looting.
3. Types of effects: None, Direct, Indirect, Cumulative
4. Nature of effects: Erosion, down-cutting, rutting, displacement, disturbance, damage, deterioration, vandalism, removal/alteration of historic structures, visual/auditory/atmospheric effects to historic setting or cultural landscape.
5. Severity of effects: Low, Moderate, High, Extreme
    - Low—only minor disturbances confined to unauthorized routes; no obvious displacement of artifacts, features or archaeological deposits other than original unauthorized route placement (i.e. slight disturbance but no apparent effect to integrity of NRHP values).

- Moderate—Less than 2 cubic meters of disturbance within the unauthorized route zone (i.e. slight affect to artifacts/features, but overall site integrity and NRHP values are retained.
- High—Estimated 3-5 cubic meters of disturbance within the unauthorized route zone; displaced artifacts (i.e. localized or multiple areas of effects). Overall site integrity and NRHP values are damaged or altered.
- Extreme—Estimated 5+ cubic meters of disturbance within the unauthorized route zone; displaced artifacts in several locations and or vandalism noted (i.e. severe effects to NRHP values, artifacts and features associated with NRHP values have been diminished or altered.

Table 170. Cultural resources effects category crosswalk between the National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA) and severity determination for this Environmental Impact Statement (EIS).

NEPA	NHPA	Severity
None	No Effect	None-Negligible
Direct Effect	No Adverse Effect	Low
	Adverse Effect	Moderate-High-Extreme
Indirect Effect	No Adverse Effect	Low
	Adverse Effect	Moderate-High-Extreme
Cumulative Effect	No Adverse Effect	Low
	Adverse Affect	Low-Moderate-High-Extreme

3.10.3.5 Cultural Resources Methodology by Action

3.10.3.5.1 Direct/indirect effects of the prohibition of cross-country motorized vehicle travel.

The prohibition of motor vehicle use off of existing NFTS and areas would have a beneficial effect on cultural resources throughout the Forest in both the short and long term. It would curtail ongoing effects and reduce the threat to cultural resources and historic properties that would occur should past unauthorized use patterns continue. Prohibiting cross-country travel would eliminate the effects resulting from the creation of additional unauthorized routes. Under this prohibition, most if not all, future permitted or other unauthorized motorized vehicle travel off of the NFTS would be subject to NHPA Section 106 compliance and potential effects to cultural resources and historic properties could be identified at that time.

Short-term timeframe: 1 year

Long-term timeframe: 20 years

Spatial boundary: Forest scale where motor vehicle use is not already prohibited by law (e.g., wilderness).

Indicator(s): (1) Number of historic properties within unauthorized routes at risk from ongoing use; and (2) Average number of historic properties per acre at risk if proposed trails or areas are created.

Methodology: GIS analysis to identify: (1) the number of historic properties at risk within existing unauthorized routes (estimate of on-going direct/indirect effects curtailed); and (2) the average

number of historic properties per acre that would be protected from any unauthorized routes created in the future without a prohibition (estimate of indirect effects).
Rationale: Motorized Recreation PA.

3.10.3.5.2 Direct/Indirect Effects of adding facilities (presently unauthorized routes and/or areas) to the NFTS, including identifying seasons of use and vehicle class.

Short-term timeframe: 1 year
Long-term timeframe: 20 years
Spatial boundary: Location of historic property.
Indicator(s): Degree to which the integrity of historic property values are diminished, related to: location, design, setting, materials, workmanship, feeling, or association.
Methodology: Use existing data from cultural resource site atlas, historic archives, maps, site record files, and GIS spatial layers, and information obtained from archaeological inventories of unauthorized routes, to identify cultural resources in the APE that may have direct, indirect, or cumulative effects.
Rationale: Motorized Recreation PA.

3.10.3.5.3 Changes to the existing NFTS (this can include deletions of facilities and changing the vehicle class and season of use).

None of these actions are considered an undertaking subject to NHPA Section 106 compliance (USDA Forest Service Policy for Section 106 of the NHPA Compliance in Travel Management: Designated Routes for Motor Vehicle Use (2005)). Motor vehicles can already use NFTS roads. Allowing or prohibiting non-highway vehicle use will have no direct, indirect, or cumulative effect on cultural resources.

3.10.3.5.4 Cumulative Effects

Short-term timeframe: Not applicable; cumulative effects analysis will be done only for the long-term timeframe.
Long-term timeframe: 20 years
Spatial boundary: Forest administrative boundary (outside of designated wilderness).
Indicator(s): Degree to which the integrity of historic property values are diminished, related to: location, design, setting, materials, workmanship, feeling, or association.
Methodology: Use existing data from cultural resource site atlas, historic archives, maps, site record files, and GIS spatial layers, and information obtained from archaeological inventories of unauthorized routes, to identify cultural resources in the APE that may have direct, indirect, or cumulative effects.
Rationale: Motorized Recreation PA.

3.10.4 Affected Environment

Archaeology can provide valuable contextual information for assessing existing conditions on the Forest. Cultural resources provide a record of the dynamic relationship between humans and the natural landscape—a relationship in the project area which has spanned thousands of years. Cultural remains in the analysis area include a wide-array of objects, sites, buildings, and cultural landscapes from both the prehistoric and historic period, and natural/traditional cultural resources, which are used by modern indigenous peoples.

3.10.4.1 Ethnographic Period

The study area encompasses a region described as a ‘contact zone’ between two geomorphic provinces and ethnographic areas—the Sierra Nevadas and the Western Great Basin (PAR 1996, Kroeber 1925). Most of the study area is within the traditional homelands of the Maidu, though the eastern margins of the PNF were occupied and used by the Northern Paiute and Washoe. Because of similar cultural traits, the sharing of ideas, and use of similar natural environments, the identification of historic cultural boundaries between Native American groups in the area is difficult to identify archaeologically (D’Azevdo 1986, Fowler & Liljeblad 1986, Riddell 1978).

The Maidu had three distinctive linguistic and cultural groups, which also coincided with geographical locations (Dixon 1905). These groups included: the Mountain or Northeastern Maidu, the Konkow or Northwestern Maidu, and the Nisenan or Southern Maidu (Riddell 1978). Maidu territory included the drainages of the Feather and Susan Rivers, and was bounded by Lassen Peak to the north, Sierra Buttes to the south, present-day Quincy to the west, and the Great Basin to the east between Honey and Eagle Lakes. One or more permanent villages were established in Big Meadows (now under Lake Almanor), Butt, Genesee, Indian, Mountain Meadows, and Red Clover Valleys (Riddell 1978:370-372).

Ethnographic literature suggests that political organization within Maidu communities was based on a settlement pattern of villages (Kroeber 1925:397-398; Riddel 1978:373). A central village included a circular, semi-subterranean assembly structure, now commonly referred to as a Roundhouse. A community was composed of 3 to 5 villages, and villages were relatively self-sufficient. Kroeber (1925:397) estimated village populations to be less than 200 prior to contact.

The fundamental basis of the Maidu economy was subsistence hunting, fishing, and collection of plant foods. Acorns were a dietary staple, and were typically collected from oak groves at lower elevations (Riddell 1978). Heavily utilized oak varieties included black oak (*Quercus kelloggii*), canyon or golden oak (*Q. chrysolepis*), and interior live oak (*Q. wislizenii*). The Maidu also gathered nuts from the sugar pine and yellow pine. In the northeastern part of their territory, near present day Susanville, nuts from the huckleberry oak (*Q. vaccinifolia*) and chinquapin (*Chrysolepis sempervirens*) were also collected. Other vegetal resources included hazelnuts, buckeye, wild nutmeg, grass seeds, berries, and various underground roots and bulbs. Salmon, eel, birds/waterfowl, grasshoppers and other insects, as well as large and small mammals, were also consumed. Large animals included deer, elk, and bear.

A wide variety of tools and implements were employed to gather and process food resources. Among these the bow and arrow, traps, nets, slings, snares, clubs, and blinds for hunting land mammals and birds; and salmon gigs, traps, and nets for fishing. Woven tools, including seed beaters, burden baskets, and carrying nets, as well as sharpened digging sticks, were used to collect plant resources. Baskets were either coiled or twined. Snowshoes were used for winter travel, and dugout canoes or log rafts were used for navigating or crossing the mountain waterways (Riddell 1978:373-379).

Prior to the discovery of gold in 1848 at Sutter's Mill near Coloma on the American River, Maidu lifeways were little affected by European exploration. Konkow territory was entered occasionally by Spanish explorers and American trappers. With the discovery of gold, tens of thousands of gold seekers came into the region and with them, the mass introduction of diseases into California native populations. A great epidemic swept the Sacramento Valley in 1833 and all but decimated the Konkow Maidu. Even the remote territories of the Mountain Maidu were overrun in the early 1850s with explorers and miners. The spread of disease and direct acts of violence inflicted on Native peoples were devastating, as was the loss of land and territory, including traditional hunting and gathering locales.

Today, the PNF works closely with descendents of the original inhabitants of this region to ensure that tribal cultural resource values are properly considered in land management activities. The Forest consults regularly with seven federally-recognized tribes including Greenville Rancheria, Susanville Rancheria, the Estom Yemeka Tribe of Enterprise Rancheria, the Tyme Maidu Tribe of Berry Creek Rancheria, the Concow Maidu Tribe of Mooretown Rancheria, the Washoe Tribe of California and Nevada, and the Mechoopda Indian Tribe of Chico Rancheria. In addition to managing many important ancestral sites, the Forest Service also manages natural resources critical to the continuation of traditional lifeways.

3.10.4.2 Prehistoric Period

Prehistoric sites represent activity by Native Americans prior to European contact. Intensive archaeological research has generally not occurred with the exception of documentation of resources associated with Forest Service undertakings. For the most part, available data is not sufficient to adequately define prehistoric complexes or to establish reliable cultural chronologies. Cultural themes and interpretations for the area are heavily reliant on extrapolations from studies in surrounding regions, though it is known that there is significant time-depth of human occupation on the Forest, and high potential for archaeological work to reveal critical information about the history of the natural environment and human adaptation in the northern Sierra Nevada.

Based on evidence from the eastern Sierra Nevada, Elston (1986) proposed that human occupation of the region spans from the Early Holocene (approximately 10,000 years before present (BP)) to the present time. Prehistoric cultural complexes which have been documented in the northern Sierra Nevada mountains include: the Tahoe Reach (10,000-8,000 BP), Spooner (7,000-4,000 BP), Martis (4,000 BP to 1,500 BP), Kings Beach (1,500 BP to 1850), and Historic (after 1850) (Kowta 1988, Moratto 1984).

The Tahoe Reach Complex dates to the early Holocene during which the environment was in a warming trend after the last ice age (Wallace 1978). The most notable artifacts from this time period are large Parman-style projectile points (Moratto 1984). Other diagnostic artifacts of this cultural complex include basalt bifaces, crescents, and scrapers. Cultural material from this time period remains sparse, which may demonstrate a small human population (PAR 1996).

The Spooner Complex is thought to mark the initial occupation of the high Sierras (PAR 1996, Moratto 1984). There is thought to have been a general warming and drying of the environment during periods when Lake Tahoe did not overflow. Characteristic artifacts include large basalt projectile points, milling stones, manos, and unshaped pestles. There are not many significant differences between the Spooner and Martis Complexes.

The Martis Complex is further broken down into the Early (4,000-3,500 BP), Middle (3,500-2,500 BP), and Late (2,500-1500 BP) Complexes. It is believed that the Martis Complex is "represented on both sides of the Sierran crest from south of Lake Tahoe northward to the south end of Honey Lake" (Kowta 1988). Projectile points, scraping, and cutting tools, most commonly made of basalt, demonstrate the importance of hunting large and small game. Diagnostic projectile points include contracting stemmed, corner-notched, eared, and large side-notched points. Seed grinding tools, the milling stone and mano, are also present. Mortars and pestles, associated with acorn and larger seed grinding, show up later in the Martis complex. Areas revisited or occupied over a long period of time have a wide variety and quantity of artifacts, which included bedrock milling features and midden (dark colored culturally-affected soil). Population size increases are evident in the size of permanent base camps and winter settlements (PAR 1996). Evidence of circular houses with sunken floors also appears in the archaeological record during this time.

The Kings Beach Complex is also further broken down into Early (1,500-800 BP) and Late (800 BP to historic) complexes (Kowta 1988). Smaller and lighter projectile points are more commonly made of chert, jasper, and obsidian and demonstrate the introduction of the bow and arrow (Moratto 1984). Diagnostic projectile point types include small desert side notched, cottonwood triangular, and rosegate series. Local faunal food sources include deer, mountain sheep, rabbits, and ground squirrels. Hopper and bedrock mortars as well as the continued use of milling stones and manos demonstrate that seeds and other plant resources like piñon nuts and grass seeds are still utilized (PAR 1986). Other artifacts include pine nut beads, olivella shell beads, steatite pipes, bone tubes, cordage, and basketry.

Prehistoric resources documented on the PNF to date include flaked-stone artifacts scatters reflecting resource procurement activities and seasonal campsites, and habitation sites with diverse cultural deposits, and in some instances, house pits.

3.10.4.3 Historic Period

The California Gold Rush was the initial catalyst for early Euro-American settlement in what would become Plumas County. Many early gold seekers undoubtedly passed westward through the area in 1849 but, so far as is recorded, none settled that year (Farriss and Smith 1882). However, strikes along the Middle and North Forks of the Feather River in early 1850 resulted in the first settlements both along the river terraces and within the attractive and temperate locations of American and Indian Valleys. Many land claims and permanent settlement were well established the following year.

Jim Beckwourth, of African-American heritage, first surveyed an overland trail through the northern Sierra Nevada in the summer of 1850 (Young 2004). From modern day Sparks, NV, his trail first extended northwest then east across Beckwourth Pass skirting the northern edge of Sierra Valley then followed Grizzly Creek northwest into Grizzly Valley. The trail continued northwest diagonally through the valley to Emigrant Creek where it made one of the most difficult crossings along its length over Grizzly Ridge. From here the trail continued down into American Valley and then westward to end at Bidwell's Bar. The route saw extensive one-way traffic though Grizzly Valley throughout the 1850s including the movement of great numbers of cattle to the markets of California's northern gold camps (Lawson 2005).

For the first few years of mining (1849–1852), activity focused on working the natural watercourses by pan, rocker, and sluice box. By 1853 areas away from these streambank diggings, as they were initially called, had become important, and a rush for water claims ensued. The hydraulic mining technique began at this time and small-scale drifting ("drifts" or "tunnels" as they were often called) into the gravel banks of the ancient river channels was also underway (Sinnott 1977:11, 314). An important first step towards the successful mining of the gravel deposits was the transport of water to mining sites. The years 1853 and 1854 saw a rush for water claims since water was needed to wash the drift dirt and undertake hydraulic operations (Baker and Shoup 1985: 25). The rush for water in 1853 to 1854 resulted in the creation of a number of major ditch and flume systems throughout the project area (Baker and Shoup 1985: 26). Hydraulic mining was carried out by applying a stream of water under high pressure onto a gravel bank. The water blasted the bank down, and the gravels containing the gold were then directed into a sluice box, which caught the heavier gold. The water and mud went into a stream or river. Using this system, a few men could process hundreds of tons of earth a day, making it economical to mine gravel worth only a small amount per square yard (Baker and Shoup 1985: 26).

Drift mining was used when lava or other hard rock made hydraulic mining impractical, or when the gold in the gravel was mostly on bedrock. Thus, adits or "tunnels," as they were usually called, were more frequently used to penetrate the bank, using rails and ore cars to bring the pay gravel out of the mine. The first real boom in drift mining came in the late 1850s (Baker and Shoup 1985: 26). The founding and early development of drift mines marked another stage in a transition, which was underway during the mid and late 1850s. This transition had a number of aspects, which collectively marked the demise of the Gold Rush and the rise of a much different type of political economy and society. The most important of these aspects included more capital-intensive mining, the rise of reasonably stable small towns, occupational diversification in these towns, improved transportation and communication in these towns, an alteration of the dominant cultural forms, the arrival of women and children, better mining technology, and the development of sawmills and logging (Baker and Shoup 1985: 27).

Agricultural products were soon in high demand due to the rise of the Comstock in Nevada beginning in the late 1860s. During the following decade many small dairies were established in the valleys of the northern Sierra Nevada to tap this lucrative market. Despite significant transportation challenges, many of these small operations found considerable profit until the mining boom ended in the mid-1880s. Facing a shrinking market and a downturn in the national economy beginning in the early 1890s, most of these small dairies did not survive into the new century.

When the Western Pacific Railroad was completed through Plumas County in 1909 many sawmills were developed. Among these was the Feather River Lumber Company (FRLC), formed in 1905 (Vaughan 1989). By 1910 the main sawmill and box factory had been established at Delleker, west of Portola. The FRLC engaged in extensive logging operations in the forested hills in the late 1910s and early 1920s on both private and PNF land. After about 1915 the company began using a narrow gauge railroad to bring logs to its mill.

3.10.5 Environmental Consequences

3.10.5.1 Existing Conditions

The existing condition of cultural resources identified in the APE provides baseline information with which to assess potential effects. The first indicator of existing conditions is the total number of historic properties located within the APE, regardless of effects. There are 227 known sites within the project area. This total includes all properties where any segment of a user-defined route bisects the boundary of the historic property, regardless of scale or impact.

A second, more important indicator of existing conditions is the number of at-risk historic properties currently identified with the APE. This group is a subset of the total properties. An “at-risk historic property” is defined in the Motorized Recreation PA as:

> *...a property that the Forest Heritage Resource Manager (HRM) identifies as susceptible to being adversely affected as a result of designation a motor vehicle OHV route or specifically defined area, or using or maintaining the designated motorized recreation OHV system. An at-risk historic property is identified based on property characteristics and proximity to designated OHV routes or specifically defined areas (e.g. trail corridor, trailhead, vista point (2006).*

As a result of archaeological investigations, a number of effects and potential effects to cultural resources were identified. These are discussed for purposes of comparison by alternative below, and are also summarized in the following tables.

Table 171. Quantity and assessment of historic properties identified within APE

Properties	Number
Total “Not At-Risk Properties Identified Within APE	192
Total “At-Risk Properties Identified within APE	35
Total Properties Identified within the APE	**227**

Table 172. Cultural resource effect severity summary

Low	Moderate	High	Extreme	Total
192	29	3	3	227

3.10.5.2 Alternative 1

3.10.5.2.1 Direct/Indirect Effects

As described in Chapter 2, under the No-action alternative, current management plans would continue to guide management of the project area. No changes would be made to the current NFTS and no cross-country travel prohibition would be put into place. This No-action alternative has the greatest potential to directly affect historic properties due to the large number of sites located within route corridors (227 known sites), as well as the probability that these and additional sites would be impacted by unrestricted, random impacts from cross-country travel. However, it is difficult to quantify when and where cultural resources would be impacted by motor vehicles over time. In the short term, disturbances on unauthorized routes would not change.

3.10.5.2.2 Cumulative Effects

The geographic scope of the cumulative effects analysis was limited to the Forest's administrative boundary because impacts to cultural resources accumulate at their specific locations, irrespective of actions in surrounding areas. A minimum of 35 historic properties would be adversely affected if no mitigation action was taken. Another 192 sites identified within the area where cross-country travel was allowable is more likely to continue under Alternative 1 than the action alternatives. Cumulative effects would likely occur under Alternative 1.

3.10.5.3 Alternative 2

3.10.5.3.1 Direct/Indirect Effects

For the action alternatives, the prohibition of motor vehicle use off designated transportation systems and areas would have a beneficial effect on cultural resources throughout the forest in the short and long terms. It would curtail ongoing potential for adverse effects and reduce the threat to cultural and historic properties that would occur if use were to continue on all unauthorized roads and trails. It would also help eliminate potential effects resulting from the creation of any new routes and trails if cross-country motorized vehicle use was not prohibited. Under this prohibition, most if not all future permitted or other authorized motorized vehicle travel off designated NFTS roads will be subject to NHPA Section 106 compliance and potential effects to cultural and historic properties can be identified at that time.

New inventory was completed for 2,371 acres within the project area (acreage is based on linear distance of routes and the 30 meter corridor that was surveyed). New and previous inventories have resulted in identification of 227 sites within the project area, all of which were monitored or newly documented (including documentation of indirect and direct effects of off-highway vehicle use) to assess potential impacts from motor vehicle use. Detailed results of the inventory and monitoring efforts are provided in multiple archaeological reconnaissance reports (McCombs 2007; Moore 2008; Weinberg 2008; Kliejunas 2008). For all routes within the action alternatives that would be added to the NFTS, Appendix A provides a summary of resource impacts by route. All routes which have moderate, high or extreme effects to cultural resource values are listed below in Table 176.

Of the 227 sites identified within the project area, the vast majority have not been affected by motor vehicle use: 85% of the sites that were monitored had negligible effects, if any. Thirty-five (35) sites were identified with indirect and direct effects ranging from low to extreme.

Under Alternative 2, five (5) proposed trails were identified as having extreme adverse effects on historic properties. Three (3) of these proposed trails affect segments of the Beckwourth National Historic Trail (FS Site #051151500001). National Historic Trails are designated by Congress because of their far-reaching effects on broad patterns of American culture and history. The National Historic Trail System is managed for its educational and interpretive values, as well as recreation values (generally, non-motorized depending on the historical use of the trail in question). Designating portions of the Beckwourth Trail for motorized use would adversely affect characteristics of the property which form the basis for its significance as a pioneer trail. Another proposed trail was deemed to have extreme effects to four historic properties, including the Beckwourth Trail and a geologic feature which is associated with Maidu creation stories, and is culturally important to modern Native Americans. One other proposed trail dissects the Letterbox Townsite. There is an extensive web of unauthorized routes throughout the site area, and evidence of intensive site vandalism.

Table 173. Number of sites by ranking for Alternative 2 effects to cultural resources

Moderate	High	Extreme
29	3	3

3.10.5.3.2 Cumulative Effects

Cumulative effects are not anticipated under Alternative 2 because the NFTS would be well defined and all identified and potential effects (both direct and indirect) will be mitigated. This assertion presupposes the assumptions listed under the Management Actions and Effects Analysis Methodology sections above.

3.10.5.4 Alternative 3

3.10.5.4.1 Direct/Indirect Effects

As previously discussed, the prohibition of motor vehicle use off of NFTS and areas under Alternative 3 would have a beneficial effect on cultural resources throughout the Forest in both the short and long term. It would curtail ongoing effects and reduce the threat to cultural resources and historic properties that would occur, should past unauthorized use patterns continue. It would also help eliminate effects resulting from the creation of any additional unauthorized routes if cross-country use was allowed. Under this prohibition, most if not all, future permitted or other unauthorized motor vehicle travel off of the NFTS would be subject to NHPA Section 106 compliance and potential effects to cultural resources and historic properties could be identified at that time.

3.10.5.4.2 Cumulative Effects

Cumulative effects are not anticipated under Alternative 3 because the NFTS would be well defined and all identified and potential adverse effects (both direct and indirect) will be mitigated. This assertion presupposes the assumptions listed under the Effects Analysis Methodology sections above.

3.10.5.5 Alternative 4

3.10.5.5.1 Direct/Indirect Effects

This action alternative favors resource protection by minimizing impacts to natural and cultural resources. Most of the sites within this alternative exhibit little or no evidence of effects from motorized uses. Conversely, direct and/or indirect effects requiring mitigation have only been identified at six (6) sites within the APE.

3.10.5.5.2 Cumulative Effects

Cumulative effects are not anticipated under Alternative 4 because the NFTS would be well defined and all identified and potential effects will be mitigated. This assertion presupposes the assumptions listed under the Effects Analysis Methodology sections above.

Table 174. Number of sites by ranking for Alternative 4 effects to cultural resources

Moderate	High	Extreme
6	0	0

3.10.5.6 Alternative 5

3.10.5.6.1 Direct/Indirect Effects

This alternative would add 234.1 miles of routes to the NFTS. As with the other action alternatives, the prohibition of motor vehicle use off designated transportation systems and areas would have a beneficial effect on cultural resources throughout the forest in the short and long terms. Effects to site integrity as a result of motorized-vehicle use have been identified at 18 sites within this alternative.

3.10.5.6.2 Cumulative Effects

Cumulative effects are not anticipated under Alternative 5 because the NFTS would be well defined and all identified and potential adverse effects (both direct and indirect) will be mitigated. This assertion presupposes the assumptions listed under the Effects Analysis Methodology section above.

Table 175. Number of sites by ranking for Alternative 5 effects to cultural resources

Moderate	High	Extreme
18	0	0

3.10.5.7 Effects of Specific Routes to Cultural Resource Sites

Table 176. Effects to sites by route.

Route ID	Alt 2	Alt 4	Alt 5	Site Number	Site Type	Type of Effect	Nature of Effect	Severity of Effect	Specialized Protection Measures/Mitigation
5M06	✓			5115400840	HIS	Indirect and Direct	Looting (indirect) and site displacement (direct)	High	Restriction Category H* for cultural resources/L if specialized protection measures implemented (II.A.3.(a-b) and Adaptive Management (II.A. 4.(d) (MRPA). *Route dropped for watershed concerns.*
5M28E	✓			5115400388	HIS	Direct	Site displacement	Moderate to High	Restriction Category H for cultural resources/L if specialized protection measures implemented (Adaptive Management (II.A.4.(d) (MRPA). *Route dropped for watershed concerns.*
6M05	✓			5115400212	PRE	Direct	Rutting, site displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (Adaptive Management (II.4.(d) (MRPA).
6M08	✓			5115400227	HIS	Direct	Rutting, site displacement	Moderate	Restriction Category H for cultural resources/L after specialized protection measures implemented (Adaptive Management (II.4.(d) (MRPA).
6M14	✓			5115400574	MUL	Direct	Rutting, site displacement, artifact disturbances	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (Adaptive Management (II.4.(d) (MRPA).

Route ID	Alt 2	Alt 4	Alt 5	Site Number	Site Type	Type of Effect	Nature of Effect	Severity of Effect	Specialized Protection Measures/Mitigation
6M26	✓			5115400062 5115400063 5115400103	MUL	Direct and Indirect	Site displacement, artifact/feature disturbances, vandalism (graffiti), possible audio/visual effects to Tribal cultural resource.	Moderate to Extreme	Restriction Category E for cultural resources. Route dropped due to cultural resource concerns.
6M27	✓			5115400062 5115400063 5115400103	MUL	Direct and Indirect	Site displacement, artifact/feature disturbances, vandalism (graffiti), possible audio/visual effects to Tribal cultural resource.	Moderate to Extreme	Restriction Category E for cultural resources. Route dropped due to cultural resource concerns.
6M29	✓		✓	5115400190 5115400192	HIS	Direct	Site displacement, damage to artifacts	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
6M30 W	✓		✓	5115400595	PRE	Direct	Erosion	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).

Route ID	Alt 2	Alt 4	Alt 5	Site Number	Site Type	Type of Effect	Nature of Effect	Severity of Effect	Specialized Protection Measures/Mitigation
6M35	✓			5115400162	HIS	Direct and Indirect	Maze of OHV activity through historic townsite, looting, artifact disturbances	Moderate to Extreme for all	Category E for cultural resources. Route dropped due to cultural resource concerns.
6M47	✓			5115400275 5115400480 5115400765	MUL PRE PRE	Direct	Site displacement, artifact/feature disturbances	Moderate for all	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
8M17	✓			511500001	HIS	The Beckwourth Trail is part of the National Historic Trail System designated by Congress. NHTs are Nationally-significant because of their far-reaching effects on broad patterns of American culture and history. The trail is managed for its educational and interpretive value, and non-motorized recreation values.			Category E for cultural resources. Route dropped due to cultural resource concerns.
8M18	✓			511500001	HIS	The Beckwourth Trail is part of the National Historic Trail System designated by Congress. NHTs are Nationally-significant because of their far-reaching effects on broad patterns of American culture and history. The trail is managed for its educational and interpretive value, and non-motorized recreation values.			Restriction Category E for cultural resources. Route dropped due to cultural resource concerns.
8M25	✓	✓	✓	511560077	HIS	Direct	Site displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).

Route ID	Alt 2	Alt 4	Alt 5	Site Number	Site Type	Type of Effect	Nature of Effect	Severity of Effect	Specialized Protection Measures/Mitigation
9M03	✓			5115300296	HIS	Direct	Erosion	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
9M05 W	✓	✓	✓	5115300935 5115300956	HIS	Direct	Site displacement, artifact damage	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
9M07	✓			511530014	HIS	Direct	Site displacement, artifact damage	Moderate	Restriction Category H for cultural resources. Route dropped due to private property issues.
9M12	✓		✓	5115300466	HIS	Direct	Soil displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
9M14s	✓			5115300466	HIS	Direct	Site displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
9M14a	✓			5115300466	HIS	Direct	Site displacement	Moderate	Restriction Category M for cultural resources. Mitigation not proposed, already system road.
9M15	✓		✓	5115300730 5115300735	HIS	Direct	Site displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
9M16	✓		✓	5115300849 5115300364	HIS	Direct	Site displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).

Route ID	Alt 2	Alt 4	Alt 5	Site Number	Site Type	Type of Effect	Nature of Effect	Severity of Effect	Specialized Protection Measures/Mitigation
9M16a	✓			5115300822 5115300634	HIS	Direct	Site displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
9M17	✓			5115300025 5115300404	HIS	Indirect and Direct	Site displacement (direct), looting (indirect)	Moderate	Restriction Category M for cultural resources/L if specialized protection measures implemented (II.A.3.(a) and Adaptive Management (II.A. 4.(d) (MRPA). *Route dropped for watershed concerns.*
9M18	✓			5115300025	HIS	Direct	Site displacement	Moderate	Restriction Category M for cultural resources/L if specialized protection measures implemented (II.A.3.(a-b) and Adaptive Management (II.A. 4.(d) (MRPA). *Route dropped for watershed concerns.*
9M20	✓			5115300466	HIS	Direct	Site displacement	Moderate	Restriction Category M for cultural resources. Mitigation not proposed, route dropped for watershed concerns.
9M45	✓		✓	5115600258	HIS	Direct	Site displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
9M46	✓		✓	5115600375	HIS	Direct	Site displacement	Moderate	Restriction Category H for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
9M46A	✓		✓	5115600375	HIS	Direct	Site displacement	Moderate	Restriction Category H for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).

Route ID	Alt 2	Alt 4	Alt 5	Site Number	Site Type	Type of Effect	Nature of Effect	Severity of Effect	Specialized Protection Measures/Mitigation
9M51	✓	✓	✓	5115600267	HIS	Indirect	Route is situated adjacent to Stiver Cemetery	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
10M13	✓		✓	515600105	HIS	Direct	Site displacement, artifact/feature disturbances	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
13M10 all 13M10 Routes	✓			51155000048	PRE	Direct	Site displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
13M32			✓	5115500614	MUL	Direct and Indirect	Site displacement, artifact/feature disturbances	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
13M36		✓	✓	5115100387	PRE	Direct	Site displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).
13M38		✓	✓	5115500349	PRE	Direct	Site displacement	Moderate	Restriction Category M for cultural resources/L after specialized protection measures implemented (II.A.2.(a-d) and/or Adaptive Management (II.A.4.(d) (MRPA).

TABLE DEFINITIONS:

PRE Prehistoric

HIS Historic

MUL Multi-compnent (prehistoric and historic)

L (Low) only minor disturbances confined to unauthorized routes; no obvious displacement of artifacts, features or archaeological deposits other than original unauthorized route placement (i.e. slight disturbance but no apparent effect to integrity of NRHP values).

M (Moderate) less than 2 cubic meters of disturbance within the unauthorized route zone (i.e. slight affect to artifacts/features, but overall site integrity and NRHP values are retained. *Route will not be published on the initial Motorized Vehicle Use Maps (MVUM.

H (High) estimated 3-5 cubic meters of disturbance within the unauthorized route zone; displaced artifacts (i.e. localized or multiple areas of effects). Overall site integrity and NRHP values are damaged or altered. **Route will not be published on initial MVUM.

E (Extreme) estimated 5+ cubic meters of disturbance within the unauthorized route zone; displaced artifacts in several locations and or vandalism noted (i.e. severe effects to NRHP values, artifacts and features associated with NRHP values have been diminished or altered.

Applicable Specialized Protection Measures (SPMs)

From Section II, Appendix B (Motorized Recreation PA (MRPA)):

2. Placement of foreign, non-archaeological material over archaeological deposits to prevent surface and subsurface impacts:
   a) engineering will design the foregin material depth to acceptable profressional standards;
   b) engineering will design the foreign material use to assure that there will be no surface or subsurface impacts to archaeological deposits;
   c) the foreign material must be easily distinguished from and cannot mix with the underlying archaeological deposits;
   d) the foreign material must be removable should research or other heritage needs require access to the archaeological deposits at a later date.

3. Installation of physical barriers and protection devices within the boundaries of historic properties:
   a) Nonintrusive barriers:
      (i) wooden and other barriers anchored with rebar;
      (ii) rocks/boulders or other items placed on the surface;
      (iii) certified weed-free straw bales/straw bales anchored with rebar.

4. Adoption or implementation of use controls:
   (d) Adaptive Management (protocol that proceeds through stages managed to reduce or eliminate any effect) that includes monitoring, education, signage, and closure in a sequential process.

3.10.5.8 Summary of Effects

Table 177. Summary Rankings of Alternatives by Indicator and Overall Average

Indicators – Cultural Resources	Rankings of Alternatives for Each Indicator[1]				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Degree to which the integrity of historic property values are diminished	1	3	5	3	3
Number of historic properties within unauthorized routes at risk from ongoing use	1	2	5	4	3
Average number of historic properties per acre protected from creation of new routes	1	2	5	4	2
Average for Cultural Resources	**1**	**2**	**5**	**4**	**3**

[1] A score of 5 indicates the alternative is the best for cultural resources related to the indicator; a score of 1 indicates the alternative is the worst for cultural resources related to the indicator

3.11 Other Disclosures

3.11.1 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). All action alternatives have the potential to improve the long-term productivity of the landscape by reducing the number of existing routes on the landscape. Routes not designated for public motor vehicle use would have the potential to revert to vegetated conditions, gradually reducing adverse effects on forest resources related to motor vehicle use of these routes. Based on average route widths (10 feet for all-vehicle trails, 10 feet for less than 50-inch vehicle trails and 3 feet for motorcycle trails), this represents an improvement in productivity on up to 1,152 acres in Alternative 3; 990 acres in Alternative 4, 901 acres in Alternative 5, 784 acres in Alternative 2, and 0 acres in Alternative 1.

Alternatives 2, 4, and 5 propose to add existing unauthorized routes to the Forest transportation system and designate those routes for public motor vehicle use. Although these designations may be revised in the future in response to changing conditions, the designation of routes is considered to be a long-term use of the environment, with long-term impacts on productivity within the route tread. However, as described in the section below on unavoidable impacts, mitigations are proposed as needed in the action alternatives to ensure adverse effects the productivity of the environment are avoided, eliminated, or minimized.

3.11.2 Unavoidable Adverse Effects

Unavoidable adverse effects are expected with implementation of Alternative 1, as described in the resource analyses contained in this Chapter. Alternative 1 (no action) would allow continued use of all unauthorized routes, including those known to be adversely affecting forest resources, and would not propose mitigations to reduce, avoid, or eliminate those effects.

Implementation of Alternatives 2, 4, and 5 would result in some unavoidable adverse environmental effects; however, mitigations are proposed as needed to ensure effects are avoided or minimized to acceptable levels in all alternatives (e.g., species viability is maintained, Best Management Practices standards are met, etc.). Overall, these effects are not expected to be significant, because the alternatives were designed using site-specific information regarding the nature and location of sensitive natural and cultural resources. Routes with resource concerns that could not be mitigated to acceptable levels were not proposed for addition to the NFTS. Alternative 3 would have no unavoidable adverse effects as no unauthorized routes are added to the NFTS. The environmental consequences section for each resource area discusses these effects in more detail.

3.11.3 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 powerline right-of-way or road.

None of the alternatives are expected to result in irreversible impacts. The action of adding unauthorized routes to the NFTS as motorized trails or changing vehicle class on existing NFTS roads would not result in any impacts that cannot be regained. However, roads and motorized trails represent a commitment of the soil resource, in that the route tread is dedicated to use as a transportation facility. As a result, the designation of existing unauthorized routes for public motor vehicle use is expected to result in an irretrievable commitment of the soil and plant and animal habitat occupied by the routes. The routes under consideration are low standard, native surface routes maintained primarily by continued passage of motor vehicles. Based on an average width of 10 feet for all-vehicle trails, 10 feet for less than 50-inch vehicle trails and 3 feet for motorcycle trails, trails would encumber 368 acres in Alternative 2; 251 acres in Alternative 5; and 162 acres in Alternative 4, and 0 acres in Alternative 3. While Alternative 1 would not add trails to the NFTS, existing unauthorized routes would continue to encumber 1,152 acres. These effects are considered irretrievable for as long as the trail is designated for public motorized use, in that continued passage by motor vehicles would keep the route tread free of vegetation. If trails are closed to motor vehicle use in future travel management decisions, the area occupied by the trail would gradually revegetate and assume the characteristics of surrounding habitat as described in the resource effects analyses in this Chapter.

Chapter 4 Consultation and Coordination

4.1 Distribution of the Environmental Impact Statement

This EIS is being distributed primarily online at the Plumas National Forest website on the internet: http://fs.usda.gov/plumas

Letters announcing the web site posting are being sent to numerous individuals, Federal agencies, State and local governments, and organizations representing a wide range of views.

Hard copies are being distributed to individuals who specifically requested a copy of the document. In addition, this EIS is being sent to:

- USDA National Agricultural Library, Acquisitions and Serials Branch
- US Environmental Protection Agency, Office of Federal Activities
- Environmental Protection Agency, Region 9
- US Department of Interior, Office of Environmental Policy and Compliance
- Concow Maidu Tribe of Mooretown Rancheria
- Estom Yumeka Tribe of Enterprise Rancheria
- Greenville Rancheria
- Mechoopda Indian Tribe of Chico Rancheria
- Susanville Indian Rancheria
- Tyme Maidu Tribe of Berry Creek Rancheria
- Washoe Tribe of California and Nevada

4.2 List of Preparers

The following is a list of primary contributors to this EIS. Numerous other people have also contributed in many ways to this document. Their help is greatly appreciated.

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Appendices

Appendix A: List of Routes and Resource Impacts

A summary of the route assessments is presented in the table below. It contains a comprehensive list of every route proposed to be added to the NFTS as trails under one or more of the action alternatives. For these proposed trails, the route assessment in the table below identifies the number of miles, effects determinations by resource and any mitigation measures (including the season when the trail would be open and any mitigation measures that would be implemented on the trail prior to publication on a MVUM and allowing public use). An explanation of each effects determination is presented below. The effect after mitigation is provided for those trails with determinations that can be mitigated. Trails with an asterisk (*) after the trail number would need mitigation completed prior to being added to the MVUM and used by the public. Trails without an asterisk would have listed mitigation occur during the first scheduled trail maintenance. Trails with single asterisks will need mitigation performed on them prior to being added to the MVUM. Trails with double asterisks indicate trails that were deleted from Alternative 4 due to public concerns.

Ratings for Resources, and Recommended Mitigations:

L: Low resource effects with routine maintenance of the trail.

M: Moderate resource effects that require site-specific maintenance to reduce current or potential future effects..

H: High resource effects that require site-specific mitigation to reduce effects.

E: Extreme resource effects that cannot be mitigated without additional environmental analysis.

Table 178. Plumas National Forest Public Motorized Travel Management list of proposed trails.

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
4M01*	M	FRRD	5/1-12/31	1.55		1.55	Rolling dips, out-sloping and hardened crossings. SOU for watershed.	L	L	L	H/L
4M02*	M	FRRD		0.76			Rolling dips, out-sloping and hardened crossings.	L	L	L	E
5M01	M	FRRD	5/1-12/31	2.16		2.16	Rolling dips, out-sloping and hardened crossings. SOU for deer and watershed. Note: deleted from Alternative 4 due to public input.	M-Deer	L	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
5M02	M	FRRD	5/1-12/31	2.74		2.54	Rolling dips, out-sloping. SOU for deer. Monitor for CRLF. Note: deleted from Alternative 4 due to public input.	M-Deer, M-CRLF	L	L	M/L
5M04	M	FRRD	5/1-12/31	1.92		1.92	Rolling dips, out-sloping. SOU for watershed. Note: deleted from Alternative 4 due to public input.	M-Deer	L	L	M/L
5M05	M	FRRD	5/1-12/31	0.88		0.88	Rolling dips, out-sloping. SOU for watershed. Note: deleted from Alternative 4 due to public input.	M-Deer	L	L	M/L
5M06*	<50"	FRRD	5/1-10/14	0.47			Rolling dips, out-sloping and hardened crossings. Treat weeds, monitor. SOU for watershed.	E-CRLF-Jack's CAR	H/M-Weeds	H/M	E
5M07*	M	FRRD	5/1-10/14	0.29			Rolling dips, out-sloping, harden crossings and stabilize approaches for CRLF, watershed. Monitor for CRLF. SOU for CRLF.	E-CRLF-Jack's CAR	L	L	H/L
5M08*	M	FRRD	5/1-10/14	0.45			Rolling dips, out-sloping. Install stream crossing structure and or harden and stabilize approaches to the crossing for CRLF. Monitor for CRLF. SOU for CRLF.	E-CRLF-Jack's CAR	L	L	H/L
5M08A	<50"	FRRD		0.12			Note: Non-existent.	Jack’s Car			
5M09*	<50"	FRRD	5/1-10/14	0.65			Rolling dips, out-sloping. Treat weeds, monitor. Monitor for CRLF. SOU for CRLF.	E-CRLF-Jack's CAR	M/M-Weeds	L	M/L
5M10*	M	FRRD	5/1-10/14	0.28			Rolling dips, out-sloping and hardened crossings. Monitor for CRLF. This trail has 3 ephemeral crossings. SOU for CRLF.	E-CRLF-Jack's CAR	L	L	M/L
5M11*	M	FRRD	5/1-10/14	0.65			Rolling dips, out-sloping and hardened crossings. Monitor for CRLF. SOU for CRLF.	E-CRLF-Jack's CAR	L	L	H/L
5M12	M	FRRD	8/16-12/31	1.69	1.69	1.69	Rolling dips, out-sloping and hardened crossings. SOU for CSO.	M-CRLF, H/M-CSO	L	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
5M13*	M	FRRD	8/16-12/31	1.11		1.11	Rolling dips, out-sloping and hardened crossings. SOU for CSO.	M-CRLF, H/M-CSO	L	L	H/L
5M14	<50"	FRRD		0.55			Non-existent, opened during and obliterated after the 2008 Canyon Complex fire.				
5M15*	M	FRRD	5/1-10/14	1.05			Rolling dips, out-sloping and hardened crossings. SOU for FYLF.	H-FYLF	L	L	E
5M16	<50"	FRRD	5/1-12/31	0.84	0.84	0.84	Rolling dips, out-sloping. SOU for watershed.	L	L	L	M/L
5M17*	M	FRRD	5/1-12/31	0.90		0.90	Rolling dips, out-sloping and hardened crossings. SOU for watershed.	L	L	L	M/L
5M18*	M	FRRD	5/1-10/14	1.00			Rolling dips, out-sloping and hardened crossings. SOU for FYLF.	H-FYLF	L	L	E
5M19*	M	FRRD	5/1-12/31	0.60		0.60	Rolling dips, out-sloping. SOU for watershed.	L	L	L	H/L
5M20*	M	FRRD	5/1-10/14	0.85			Rolling dips, out-sloping and hardened crossings. Monitor for CRLF/FYLF. SOU for CRLF/FYLF.	E-CRLF H/M-FYLF, M/M-CSO	L	L	H/L
5M21*	M	FRRD	5/1-10/14	1.32			Rolling dips, out-sloping and hardened crossings. SOU for FYLF.	H-FYLF	L	L	E
5M22*	M	FRRD	5/1-10/14	1.60			Rolling dips, out-sloping and hardened crossings. SOU for FYLF.	H-FYLF	L	L	E
5M23*	M	FRRD	5/1-10/14	1.69			Rolling dips, out-sloping and hardened crossings. SOU for FYLF.	H-FYLF	L	L	E
5M24*	M	FRRD	8/16-10/14	1.17		1.17	Rolling dips, out-sloping and hardened crossings. Monitor for CRLF/FYLF. SOU for CSO/CRLF/FYLF.	H/M-CRLF H/M-FYLF H/M-CSO	L	L	H/L
5M25*	M	FRRD	8/16-12/31	0.76		0.76	Rolling dips, out-sloping and hardened crossings. SOU for CSO.	M-FYLF H/M-CSO	L	L	H/L
5M25A	M	FRRD		0.34			Note: No access thru private.				

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
5M26	All	FRRD	8/16-12/31	0.49	0.49	0.49	Rolling dips, out-sloping. SOU for CSO.	H/M-CSO	L	L	M/L
5M27*	M	FRRD	5/1-10/14	1.22			Rolling dips, out-sloping and hardened crossings. SOU for FYLF.	H-NOGO, FYLF	L	L	E
5M28 W	M	FRRD	8/16-12/31	0.43	0.43	0.43	Rolling dips, out-sloping and hardened crossings. SOU for CSO.	M-NOGO H/M-CSO	L	L	M/L
5M28 E*	M	FRRD	5/1-10/14	0.76			Rolling dips, out-sloping and hardened crossings. SOU for FYLF.	H-NOGO, FYLF	E-TES	H/M	E
5M30*	M	FRRD	5/1-10/14	1.42			Rolling dips, out-sloping and hardened crossings. SOU for FYLF.	H-FYLF	L	L	E
6M02*	M	FRRD	5/1-10/14	0.87			Rolling dips, out-sloping and hardened crossings. Install a crossing for CRLF. Monitor for CRLF. SOU for CRLF.	E-CRLF-Jack's CAR	L	L	H/L
6M03*	M	FRRD	5/1-10/14	1.23			Rolling dips, out-sloping and hardened crossings. Install a > 48" culvert for CRLF. Monitor for CRLF. SOU for CRLF.	E-CRLF-Jack's CAR	L	L	H/L
6M04*	M	FRRD	5/1-10/14	1.39			Rolling dips, out-sloping and hardened crossings. SOU for CRLF.	E-CRLF, FYLF-Jack's CAR	L	L	E
6M05*	M	FRRD	5/1-10/14	0.41			Rolling dips, out-sloping. Cultural SPMs needed. SOU for CRLF.	E-CRLF-Jack's CAR	L	M	M/L
6M08*	M	FRRD	5/1-10/14	1.52			Rolling dips, out-sloping. Cultural SPMs needed. Treat weeds, monitor. SOU for CRLF.	E-CRLF-Jack's CAR	M/M-Weeds	M	H/L
6M09*	M	FRRD	5/1-10/14	0.37			Rolling dips, out-sloping. SOU for CRLF.	E-CRLF-Jack's CAR	L	L	M/L
6M10*	M	FRRD	5/1-10/14	5.48			Rolling dips, out-sloping and hardened crossings. Monitor for CRLF. SOU for CRLF.	E-CRLF-Jack's CAR	L	L	M/L
6M11*	M	FRRD	5/1-10/14	1.09			Rolling dips, out-sloping. SOU for CRLF.	E-CRLF-Jack's CAR	L	L	H/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
6M12*	M	FRRD	5/1-10/14	0.43			Rolling dips, out-sloping. SOU for CRLF.	E-CRLF- Jack's CAR	L	L	M/L
6M13 N*	M	FRRD	5/1-10/14	0.79			Rolling dips, out-sloping and hardened crossings and stabilized approaches for CRLF and water. Monitor for CRLF, SOU for CRLF.	E-CRLF- Jack's CAR	L	L	M/L
6M13 S*	M	FRRD	5/1-10/14	0.62			Rolling dips, out-sloping and hardened crossings. SOU for CRLF.	H-CRLF- Jack's CAR	L	L	E
6M14*	M	FRRD	5/1-10/14	2.62			Rolling dips, out-sloping, hardened and stabilized approaches to crossings for CRLF, watershed. Survey for TES botany. Cultural SPMs needed. Monitor for CRLF. SOU for CRLF.	E-CRLF- Jack's CAR	H/M- TES	M	H/L
6M14A	M	FRRD		0.17			Note: Non-existent.	Jack's CAR			
6M15*	M	FRRD	5/1-10/14	0.40			Rolling dips, out-sloping. SOU for CRLF.	E-CRLF- Jack's CAR	L	L	M/L
6M16*	M	FRRD	5/1-10/14	2.26			Rolling dips, out-sloping and hardened and stabilized approaches to crossings for CRLF and watershed. Survey for TES botany. Relocate trail 25' uphill to avoid wet area. SOU for CRLF.	E-CRLF- Jack's CAR	H/M- TES	L	H/L
6M16A*	M	FRRD	5/1-10/14	0.29			Rolling dips, out-sloping and hardened crossings. Survey for TES botany. SOU for CRLF.	E-CRLF- Jack's CAR	L	L	H/L
6M16B	M	FRRD		0.11			Note: Non-existent.				
6M17	M	FRRD		1.00	1.00	1.00		L	L	L	L
6M17A	M	FRRD		0.12	0.12	0.12		L	L	L	L
6M19	M	FRRD	9/16-12/31	3.02		3.02	Rolling dips, out-sloping and hardened crossing. SOU for NOGO.	M-MYLF, H/M-NOGO M-CSO	L	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
6M20 W	M	FRRD	9/16-12/31	0.95		0.95	Rolling dips, out-sloping. SOU for NOGO.	H/M-NOGO M-CSO	L	L	M/L
6M20 E*	M	FRRD	5/1-10/14	0.82			Rolling dips, out-sloping and hardened crossings. SOU for MYLF.	E-MYLF	L	L	E
6M21	M	FRRD		0.86			Note: System road 23N18S.				
6M22 N*	M	FRRD		1.90		1.90	Rolling dips, out-sloping and hardened crossing.	L	L	L	H/L
6M22 S	M	FRRD		0.93	0.93	0.93	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
6M22A*	M	FRRD	5/1-10/14	0.65		0.65	Rolling dips, out-sloping and hardened crossing, install a crossing for MYLF. SOU for MYLF.	H/M-MYLF	L	L	H/L
6M23*	M	FRRD		0.99		0.99	Rolling dips, out-sloping and hardened crossings.	M-MYLF	L	L	H/L
6M24	M	FRRD		0.23	0.23	0.23	Rolling dips, out-sloping.	L	L	L	M/L
6M25	All	FRRD		0.20			Note: System road 23N63.				
6M26*	M	FRRD		1.36			Cultural resource concerns. Rolling dips, out-sloping and hardened crossing.	L	L	E	M/L
6M27*	M	FRRD		0.83			Cultural resource concerns. Rolling dips, out-sloping and hardened crossing.	L	L	E	M/L
6M28	M	FRRD		0.09	0.09	0.09		L	L	L	L
6M29*	<50"	FRRD	8/16-10/14	3.25		3.25	Rolling dips, out-sloping and hardened crossing. Install a crossing for MYLF. Cultural SPMs needed. SOU for CSO.	H/M-MYLF H/M-CSO	L	M	H/L
6M29A*	M	FRRD	5/1-10/14	0.20		0.20	Rolling dips, out-sloping. SOU for FYLF/MYLF.	H/M-FYLF/MYLF	L	L	H/L
6M29B*	M	FRRD		0.47		0.47	Note: Spur off 6M29. Trail drainage.	L	L	L	H/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
6M29C*	M	FRRD	8/16-10/14	0.76		0.76	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF. SOU for CSO/MYLF.	H/M-MYLF H/M-CSO	L	L	H/L
6M29D*	M	FRRD	9/16-10/14			0.52	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF. SOU for CSO/NOGO.	H/M-MYLF H/M-CSO, NOGO	L	L	H/L
6M29E*	M	FRRD	5/1-10/14	.65		0.65	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF.	H/M-MYLF	L	L	H/L
6M30 E	M	FRRD		0.33	0.33	0.33	Rolling dips, out-sloping.	M-MYLF	L	L	M/L
6M30 W*	M	FRRD	5/1-10/14	0.17		0.17	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF. Cultural SPMs needed. SOU for MYLF.	H/M-MYLF	L	M	H/L
6M30A	M	FRRD		0.30	0.30	0.30	Rolling dips, out-sloping.	M-MYLF	L	L	M/L
6M31 W	M	FRRD		0.20	0.20	0.20	Rolling dips, out-sloping and hardened crossing.	M-MYLF	L	L	M/L
6M31 E*	M	FRRD	5/1-10/14	0.15		0.15	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF. SOU for MYLF.	H/M-MYLF	L	L	H/L
6M32	M	FRRD	9/16-12/31	0.36	0.36	0.36	SOU for CSO/NOGO.	H/M-CSO, NOGO	L	L	L
6M33	<50"	FRRD	9/16-12/31	0.65	0.65	0.65	SOU for NOGO.	H/M-NOGO	L	L	L
6M34	All	FRRD		0.52	0.52	0.52		L	L	L	L
6M34A*	M	FRRD		0.37		0.37	Rolling dips, out-sloping and hardened crossings	M-MYLF	L	L	H/L
6M35*	M	FRRD		0.47			Cultural resource concerns. Rolling dips, out-sloping	L	L	E	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
6M36*	M	FRRD	9/16-10/14	0.86		0.86	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF. SOU for CSO/NOGO.	H/M-MYLF H/M-CSO, NOGO	L	L	H/L
6M37	All	MHRD		1.42	1.42	1.42	Clean corrugated metal pipe, water bar.	M-MYLF	L	L	M/L
6M38*	All	MHRD	5/1-10/14	0.38			Parallels stream, parallel access exists. SOU for MYLF.	E-MYLF	L	L	E
6M39*	All	MHRD	5/1-10/14	0.66		0.66	Stream in buffer, install a crossing for MYLF and Hydro. SOU for MYLF.	H/M-MYLF	L	L	H/L
6M47*	M	FRRD	5/1-10/14	1.56			Rolling dips, out-sloping and hardened crossing. Cultural SPMs needed. SOU for CRLF.	E-CRLF- Jack's CAR	L	M	M/L
6M51	M	FRRD	8/16-12/31		0.77	0.77	Rolling dips, out-sloping. SOU for CSO.	H/M-CSO	L	L	M/L
7M01*	All	FRRD	5/1-10/14	0.59			Rolling dips, out-sloping and hardened crossings. Monitor weeds. SOU for CRLF.	E-CRLF	M/M-Weeds	L	E
7M02	M	FRRD		1.12			Majority of the trail is a system road. The non-system section, decommissioned during 2008 Canyon Complex Fire, not accessible.				
7M03	All	FRRD		0.36	0.36	0.36	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
7M04*	M	FRRD	5/1-10/14	0.66		0.66	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF. SOU for MYLF.	H/M-MYLF	L	L	H/L
7M07*	M	FRRD		0.39		0.39	Rolling dips, out-sloping and hardened crossing.	L	L	L	H/L
7M08	M	FRRD		0.86			Note: Not surveyed.				
7M09	All	FRRD		0.26			Note: Not surveyed TES in area.		E-TES		

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
7M10*	M	FRRD		0.54			TES. Rolling dips, out-sloping.	L	E-TES	L	M/L
7M11	<50"	FRRD		0.48	0.48	0.48	Rolling dips, out-sloping.	M-MYLF	L	L	M/L
7M12	<50"	FRRD		0.94			Note: System road.				
7M13*	All	MHRD	5/1-10/14	0.70			Dry crosses stream, needs relocation outside of the analysis area. SOU for MYLF.	H-MYLF	L	L	E
7M14	All	MHRD		0.25	0.25	0.25	Rolling dips, out-sloping.	M-MYLF	L	L	M/L
7M15	All	MHRD		1.20	1.20	1.20		L	L	L	L
7M16	All	MHRD		0.94	0.94	0.94		L	L	L	L
7M17	All	MHRD	8/16-12/31	1.73	1.73	1.73	Very steep, needs out-slope, install dips. SOU for CSO.	H/M-CSO	L	L	M/L
7M18	All	MHRD		0.66	0.66	0.66		L	L	L	L
7M22	<50"	MHRD		0.72	0.72	0.72	Note: Needs to be defined with the Lassen.	L	L	L	M/L
7M28	All	FRRD			0.39	0.39	Rolling dips, out-sloping.	L	L	L	M/L
8M01	M	FRRD		0.50			Note: Accesses private land. Rolling dips, out-sloping and hardened crossings.				
8M02	All	MHRD		0.78	0.78	0.78	Trail in perennial stream riparian management area. Rolling dips, out-sloping and hardened crossings. No overnight camping. Install sign to keep OHVs away from stream.	M-CSO, M-MYLF	L	L	M/L
8M03	All	MHRD		1.57	1.57	1.57	Crosses ephemeral streams, needs hardened crossing improvement.	M-CSO, L	L	L	M/L
8M04*	<50"	MHRD		0.69			Note: Redundant access, nonexistent.				
8M10	<50"	MHRD	9/16-12/31	0.67	0.67	0.67	SOU for NOGO.	M-Mdw H/M-NOGO	L	L	L
8M11*	All	MHRD		1.01		1.01	Rolling dips, out-sloping and hardened crossing.	L	L	L	H/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
8M11A*	M	MHRD		0.84	0.84	0.84	Trail in perennial stream riparian management area. Rolling dips, out-sloping and hardened crossing.	M-MYLF	L	L	H/L
8M13*	<50"	MHRD		0.96			Rolling dips, out-sloping and hardened crossings. Private.	L	L	L	E
8M14*	<50"	MHRD		0.27			Rolling dips, out-sloping and hardened crossings.	L	L	L	E
8M15	<50"	MHRD		0.32	0.32	0.32	Rolling dips, out-sloping and hardened crossing.	M-MYLF	L	L	M/L
8M16	<50"	MHRD		0.77	0.77	0.77	Rolling dips, out-sloping and hardened crossing.	M-MYLF	L	L	M/L
8M17*	<50"	MHRD	5/1-10/14	1.28			Hardened crossing. SOU for FYLF. Note: Beckwourth Trail.	H/M-FYLF	L	E	M/L
8M18*	<50"	MHRD		0.41			Rolling dips, out-sloping. Note: Beckwourth Trail.	L	L	E	M/L
8M19	<50"	MHRD		1.27	1.27	1.27	Rolling dips, out-sloping.	L	L	L	M/L
8M20*	All	MHRD	5/1-10/14	0.19			Redundant road, Rolling dips, out-sloping, hardened crossings, and within meadow. SOU for MYLF.	H-MYLF	L	L	E
8M21	All	MHRD		0.72			Note: System road 25N56B.				
8M22	All	MHRD		0.48			Note: Non-existent.				
8M23*	All	MHRD	5/1-10/14	0.49			Entrenched for 1,000'. Rolling dips, out-sloping. Avoid impacts to TES during maintenance. Asbestos survey needed. SOU for MYLF.	H/M-MYLF	M/M-TES	L	E-Asbestos
8M24	<50"	MHRD	8/16-12/31	2.71		2.71	Rolling dips, out-sloping and hardened crossings. SOU for CSO.	H/M-CSO	L	L	M/L
8M25*	All	MHRD		1.03	1.03	1.03	Cultural SPMs needed.	L	L	M	L
8M26	All	MHRD		1.01	1.01	1.01	Rolling dips, out-sloping.	M-Macros	M/M-TES	L	M/L
8M27	All	MHRD		2.26	2.26	2.26	Rolling dips, out-sloping. Powerline access.	L	L	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
8M27(ex)*	All	MHRD	8/16-12/31	0.81			Rolling dips, out-sloping and hardened crossings. SOU for CSO.	E-CSO, Macros	L	L	E
8M27A	All	MHRD		0.33	0.33	0.33	Rolling dips, out-sloping.	M-Macros	L	L	M/L
8M28	<50"	MHRD		1.08	1.08	1.08		L	L	L	L
8M28A	<50"	MHRD		0.10			Note: Redundant access.				
8M29	<50"	MHRD		0.66	0.66	0.66		L	L	L	L
8M30	<50"	MHRD		0.49	0.49	0.49		L	L	L	L
8M31	<50"	MHRD		1.11	1.11	1.11		L	L	L	L
8M32	All	MHRD		0.64	0.64	0.64		L	L	L	L
8M33	All	MHRD		0.96	0.96	0.96		L	L	L	L
8M34	All	MHRD		0.06			Note: Redundant access.				
8M35	All	MHRD		1.57	1.57	1.57		L	L	L	L
8M36	All	MHRD		0.96	0.96	0.96	Rolling dips, out-sloping.	M	L	L	M/L
8M37	All	MHRD		0.82	0.82	0.82	Rolling dips, out-sloping.	M	L	L	M/L
8M37A	All	MHRD		0.08			Note: Redundant access.				
8M37B	All	MHRD		0.15	0.15	0.15	Rolling dips, out-sloping.	L	L	L	M/L
8M38*	All	MHRD		0.54		0.54	Rolling dips, out-sloping and hardened crossings.	M	L	L	H/L
8M39	All	MHRD		0.71	0.71	0.71	Rolling dips, out-sloping.	L	L	L	M/L
8M39A	All	MHRD		0.32	0.32	0.32		L	L	L	L
8M40	All	MHRD		0.34	0.34	0.34	Rolling dips, out-sloping.	L	L	L	M/L
8M41*	All	MHRD		0.33		0.33	Rolling dips, out-sloping. Powerline access.	L	L	L	H/L
8M42*	<50"	MHRD		0.98		0.98	Rolling dips, out-sloping and hardened crossings	M-MYLF	L	L	H/L
8M43	All	MHRD		0.36	0.36	0.36	Rolling dips, out-sloping.	L	L	L	M/L
8M44	All	MHRD		0.30	0.30	0.30	Rolling dips, out-sloping.	L	L	L	M/L
8M45	All	MHRD		0.46	0.46	0.46	Rolling dips, out-sloping.	L	L	L	M/L
8M46	All	MHRD		0.61	0.61	0.61	Rolling dips, out-sloping.	L	L	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
8M47	All	MHRD	8/16-12/31	1.46	1.46	1.46	Rolling dips, out-sloping and hardened crossings. SOU for CSO.	H/M-CSO	L	L	M/L
8M47A	All	MHRD		0.35			Note: Redundant access.				
8M48*	All	MHRD		0.49		0.49	Rolling dips, out-sloping.	M-CSO	L	L	H/L
8M49	All	MHRD		0.32	0.32	0.32	Rolling dips, out-sloping and hardened crossings.	M	L	L	M/L
8M50	All	MHRD		0.83	0.83	0.83	Rolling dips, out-sloping.	L	L	L	M/L
8M51	All	MHRD		0.84	0.84	0.84	Rolling dips, out-sloping and hardened crossings.	L	L	L	M/L
8M52	All	MHRD	8/16-12/31	1.39	1.39	1.39	Rolling dips, out-sloping and hardened crossings. SOU for Bald Eagles.	M-BE	L	L	M/L
8M53	All	MHRD		0.66	0.66	0.66	Rolling dips, out-sloping.	L	L	L	M/L
8M54	All	MHRD		0.82	0.82	0.82	Rolling dips, out-sloping and hardened crossings.	L	L	L	M/L
9M01	<50"	FRRD		0.91	0.91	0.91	Rolling dips, out-sloping.	L	L	L	M/L
9M02	M	FRRD		0.39	0.39	0.39	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
9M03*	<50"	FRRD	5/1-10/14	0.56			Rolling dips, out-sloping and hardened crossings. Cultural SPMs needed. SOU for MYLF.	E-MYLF	L	M	E
9M04*	M	FRRD	5/1-10/14	0.18		0.18	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF. SOU for MYLF.	H/M-MYLF	L	L	H/L
9M05 W*	<50"	FRRD		1.57	1.57	1.57	Rolling dips, out-sloping and hardened crossing. Cultural SPMs needed.	M-MYLF	L	M	M/L
9M05 E*	<50"	FRRD		0.09			Rolling dips, out-sloping and hardened crossings. Cultural SPMs needed.	M-MYLF	L	L	E
9M06	<50"	FRRD		0.14			Note: Private access issues.				
9M07	M	FRRD		0.08			Note: Private access issues.				

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
9M08	<50"	FRRD		2.11	2.11	2.11	Rolling dips, out-sloping.	L	L	L	M/L
9M08A	<50"	FRRD		0.13	0.13	0.13		L	L	L	L
9M09	<50"	FRRD		0.84	0.84	0.84	Rolling dips, out-sloping and hardened crossing.	M-MYLF	L	L	M/L
9M10	<50"	FRRD		1.65	1.65	1.65	Rolling dips, out-sloping.	L	L	L	M/L
9M11	M	FRRD		0.65	0.65	0.65		L	L	L	L
9M12*	M	FRRD	5/1-10/14	0.38		0.38	Rolling dips, out-sloping and hardened crossing. Cultural SPMs needed. Evaluate after MYLF study complete. Install crossing for MYLF. SOU for MYLF.	H/M-MYLF	L	M	M/L
9M13*	All	FRRD	8/16-10/14	0.48		0.48	Rolling dips, out-sloping. Evaluate after MYLF study complete. SOU for CSO.	H/M-MYLF H/M-CSO	L	L	H/L
9M14 N*	All	FRRD	8/16-10/14	0.94		0.94	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF. Cultural SPMs needed. SOU for CSO.	H/M-MYLF H/M-CSO	L	L	M/L
9M14 S	All	FRRD		0.56			Note: System road 22N55Y.				
9M14A	All	FRRD		0.58			Note: System road 22N55Y.				
9M15*	M	FRRD		0.81		0.81	Rolling dips, out-sloping and hardened crossing. Evaluate after MYLF study complete. Install crossing for MYLF. Cultural SPMs needed.	M-MYLF	L	M	M/L
9M16*	<50"	FRRD	5/1-10/14	1.22		1.22	Rolling dips, out-sloping and hardened crossing. Evaluate after MYLF study complete. Install crossing for MYLF. Cultural SPMs needed. SOU for MYLF.	H/M-MYLF	L	M	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
9M16A*	<50"	FRRD	5/1-10/14	0.57			Rolling dips, out-sloping and hardened crossings. Evaluate after MYLF study complete. Install crossing for MYLF. Cultural SPMs needed. SOU for MYLF.	H-MYLF	L	M	E
9M17*	All	FRRD	5/1-10/14	1.38			Rolling dips, out-sloping and hardened crossings. Evaluate after MYLF study complete . Install crossing for MYLF. Cultural SPMs needed. SOU for MYLF.	H-MYLF	L	M	E
9M18*	All	FRRD		0.05			Rolling dips, out-sloping and hardened crossings. Cultural SPMs needed.	L	L	M	E
9M19*	All	FRRD		0.67			Rolling dips, out-sloping and hardened crossings.	L	L	L	E
9M20*	All	FRRD	5/1-10/14	1.39			Rolling dips, out-sloping and hardened crossings. Eval after MYLF study complete. Install crossing for MYLF. Cultural SPMs needed. SOU for MYLF.	H-MYLF	L	M	E
9M21	All	FRRD	8/16-12/31	1.63	1.63	1.63	Rolling dips, out-sloping and hardened crossing. SOU for CSO.	M-MYLF H/M- CSO M-NOGO	L	L	M/L
9M22*	All	FRRD	8/16-12/31	0.38			Note: Trail ends where 9M23 intersects. SOU for CSO.	E-CSO, NOGO	L	L	M/L
9M23	All	FRRD	8/16-12/31	1.06	1.06	1.06	Rolling dips, out-sloping and hardened crossing. SOU for CSO.	H/M-CSO, M -NOGO	L	L	L
9M24*	All	FRRD		0.85			Sensitive Plants. Rolling dips, out-sloping.	L	E-TES, SIA	L	M/L
9M25	<50"	FRRD		1.72			Note: Non-existent.				
9M25A	<50"	FRRD		0.14			Note: Non-existent.				
9M26	<50"	FRRD		0.90			Note: Non-existent.				
9M27*	<50"	FRRD		0.24			Rolling dips, out-sloping and hardened crossings.	L	L	L	E

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
9M32 W*	All	MHRD		0.53			Rolling dips, out-sloping and hardened crossings. , asbestos survey needed.	M-MYLF	L	L	E-Asbestos
9M32 E*	All	MHRD	5/1-10/14	0.43			Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF. Asbestos survey needed. SOU for MYLF.	H-MYLF	L	L	E
9M33*	M	MHRD	8/16-12/31	2.66			Rolling dips, out-sloping and hardened crossings. SOU for CSO.	H/M-CSO	L	L	E
9M34	M	MHRD		0.55	0.55	0.55	Rolling dips, out-sloping.	M-MYLF	L	L	M/L
9M35	M	MHRD	8/16-12/31	0.69		0.69	Rolling dips, out-sloping. SOU for CSO.	M-CSO	L	L	M/L
9M36	All	MHRD		1.33			Note: Non-existent.				
9M37*	All	MHRD	8/16-12/31	1.68		1.68	Rolling dips, out-sloping and hardened crossings. SOU for CSO.	H/M-CSO, M-Macros, tree frogs	L	L	H/L
9M37A	All	MHRD		0.43			Note: Redundant Access.				
9M37B	All	MHRD		0.25			Note: Redundant Access.				
9M38	<50"	MHRD		1.61	1.61	1.61	Rolling dips, out-sloping.	M-MYLF	L	L	M/L
9M39	All	MHRD		1.13	1.13	1.13	Rolling dips, out-sloping.	L	L	L	M/L
9M39A	All	MHRD		0.69	0.69	0.69	Rolling dips, out-sloping.	L	L	L	M/L
9M40	<50"	MHRD		1.01	1.01	1.01	Rolling dips, out-sloping.	L	L	L	M/L
9M41	M	MHRD		0.67	0.67	0.67		L	L	L	M/L
9M41A	M	MHRD		0.19	0.19	0.19		L	L	L	L
9M42 N	All	MHRD		0.49	0.49	0.49	Rolling dips, out-sloping.	L	L	L	M/L
9M42 S*	All	MHRD		0.32			Rolling dips, out-sloping.	E-NWPT	L	L	M/L
9M42A	All	MHRD		0.17	0.17	0.17	Rolling dips, out-sloping.	M-NWPT	L	L	M/L
9M42B	All	MHRD		0.52		0.52	Rolling dips, out-sloping.	M-NWPT	L	L	M/L
9M43	All	MHRD		0.26	0.26	0.26	Rolling dips, out-sloping.	L	L	L	M/L
9M44	All	MHRD		0.49	0.49	0.49	Rolling dips, out-sloping.	L	L	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
9M45*	M	MHRD	8/16-12/31	0.61		0.61	Rolling dips, out-sloping. Cultural SPMs needed. SOU for CSO.	H/M-CSO	L	M	M/L
9M46*	All	MHRD		0.95		0.95	Rolling dips, out-sloping. Cultural SPMs needed.	L	L	M	L
9M46A*	All	MHRD		0.49		0.49	Rolling dips, out-sloping. Cultural SPMs needed.	L	L	M	M/L
9M47A	All	MHRD		0.47	0.47	0.47	Rolling dips, out-sloping.	L	L	L	M/L
9M48	All	MHRD		0.96	0.96	0.96	Powerline access.	L	L	L	M/L
9M49	All	MHRD		1.76	1.76	1.76	Rolling dips, out-sloping.	L	L	L	M/L
9M50	All	MHRD	9/16-12/31	0.33	0.33	0.33	Rolling dips, out-sloping and hardened crossings. SOU for NOGO.	H/M-NOGO	L	L	M/L
9M51*	All	MHRD		1.27	1.27	1.27	Rolling dips, out-sloping and hardened crossings. Cultural SPMs needed.	L	L	M	M/L
9M52	All	MHRD		0.63	0.63	0.63	Rolling dips, out-sloping.	L	L	L	M/L
9M53*	All	MHRD	8/16-12/31	0.59			Spotted Owl PAC. SOU for CSO.	E-CSO	L	L	M/L
9M53A*	All	MHRD	8/16-12/31	0.46			Note: Dead ends onto private. Rolling dips, out-sloping. SOU for CSO.	E-CSO	L	L	H/L
9M54	All	MHRD		1.00	1.00	1.00	Rolling dips, out-sloping.	L	L	L	M/L
9M55	All	MHRD		0.53	0.53	0.53	Rolling dips, out-sloping and hardened crossings.	L	L	L	M/L
9M56*	All	MHRD		0.73		0.73	Rolling dips, out-sloping and hardened crossings.	L	L	L	H/L
9M56A*	All	MHRD		0.38		0.38	Rolling dips, out-sloping and hardened crossings.	L	L	L	H/L
9M57	All	MHRD		0.82	0.82	0.82	Rolling dips, out-sloping and hardened crossings.	L	L	L	M/L
9M57A	All	MHRD		0.17	0.17	0.17	Rolling dips, out-sloping and hardened crossings.	L	L	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
9M58	All	MHRD		1.11	1.11	1.11	Rolling dips, out-sloping and hardened crossings.	L	L	L	M/L
9M58A	All	MHRD		0.63	0.63	0.63	Rolling dips, out-sloping and hardened crossings.	L	L	L	M/L
9M58B	All	MHRD		0.55	0.55	0.55	Rolling dips, out-sloping and hardened crossings.	L	L	L	M/L
9M59A*	All	MHRD	5/1-12/31	0.47			Rolling dips, out-sloping and hardened crossings. SOU for Deer.	E-deer, M-macros	L	L	H/L
9M59C*	All	MHRD	5/1-12/31	0.18			Rolling dips, out-sloping and hardened crossings. SOU for Deer.	E-deer, M-macros	L	L	M/L
9M59D*	All	MHRD	5/1-12/31	0.18			Rolling dips, out-sloping and hardened crossings. SOU for Deer.	E-deer, M-macros	L	L	E
9M59E*	All	MHRD	5/1-12/31	0.43			Rolling dips, out-sloping and hardened crossings. SOU for Deer.	E-deer, M-macros	L	L	M/L
9M60	All	MHRD		0.42	0.42	0.42	Rolling dips, out-sloping and hardened crossings.	L	L	L	M/L
9M62	All	FRRD		0.48	0.48	0.48	Rolling dips, out-sloping.	L	L	L	M/L
9M65	All	MHRD		0.63	0.63	0.63	Rolling dips, out-sloping.	L	L	L	M/L
10M01	M	FRRD					Note: Non-existent.				
10M02*	<50"	FRRD	8/16-10/14	1.25		1.25	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF and FYLF. SOU for CSO.	H/M-MYLF, FYLF H/M-CSO	L	L	H/L
10M07	<50"	FRRD		2.64			Note: Overgrown.				
10M09	All	FRRD		0.84			Note: Non-existent.				
10M11	All	FRRD		0.67		0.67	Rolling dips, out-sloping and hardened crossing. CIRA.	L	L	L	M/L
10M12	All	BKRD		0.95	0.95	0.95	Rolling dips, out-sloping.	L	L	L	M/L
10M13*	All	BKRD		0.20		0.20	Cultural SPMs needed. Rolling dips, out-sloping.	L	L	M	M/L
10M14	All	MHRD		0.12		0.12	CIRA. Monitor for CRLF.	M CRLF	L	L	L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
10M15	All	BKRD		0.54		0.54	Rolling dips, out-sloping. Dropped from Alt. 4 because it's near the Middle Fork.	L	L	L	M/L
10M16*	All	MHRD		1.09		1.09	Rolling dips, out-sloping. Monitor for CRLF.	M-CRLF	L	L	H/L
10M19	All	MHRD	8/16-12/31	1.26	1.26	1.26	Culverts need cleaning. SOU for CSO.	H/M-CSO	L	L	M/L
10M20	All	MHRD		1.31	1.31	1.31	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
10M20A	All	MHRD		0.48	0.48	0.48	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
10M20B*	All	MHRD	5/1-12/31	0.13			Note: Redundant access. SOU for Deer.	E-Deer	L	L	L
10M21*	All	MHRD		1.24		1.24	Rolling dips, out-sloping.	L	L	L	H/L
10M21AW*	All	MHRD		0.16			Steep hill climb, Rolling dips, out-sloping and hardened crossings.	L	L	L	E
10M21AE	All	MHRD		0.11		0.11	Note: 10M21 is dropped from Alt. 4	L	L	L	L
10M21B	All	MHRD		0.91		0.91		L	L	L	L
10M21C*	All	MHRD	5/1-12/31	0.13			SOU for Deer.	E-Deer	L	L	L
10M22*	All	MHRD		0.50			Unmitigatable weed issue.	L	E-Weeds	L	L
10M23 N	All	MHRD			0.52	0.52	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
10M23 S	All	MHRD		2.07	2.07	2.07	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
10M24*	All	MHRD		1.28		1.28	Rolling dips, out-sloping.	L	L	L	H/L
10M25	All	MHRD		1.14	1.14	1.14	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
10M27*	All	MHRD		0.96		0.96	Rolling dips, out-sloping.	H/M-Macros	L	L	H/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
10M28	All	MHRD		1.38			Non-motorized, single track, therefore not being analyzed as part of this Project. Rolling dips, out-sloping.				
10M28A	All	MHRD		1.01			Non-motorized, single track, therefore not being analyzed as part of this Project. Rolling dips, out-sloping.				
10M29*	All	MHRD		1.56		1.56	Rolling dips, out-sloping.	L	L	L	H/L
10M30	All	MHRD		0.83	0.83	0.83		L	L	L	L
10M30A	All	MHRD		0.24	0.24	0.24		L	L	L	L
10M30B	All	MHRD		0.27			Note: Redundant access.				
10M30C	All	MHRD		0.09			Note: Redundant access.				
10M30D	All	MHRD		0.18			Note: Redundant access.				
10M31	All	MHRD		0.24	0.24	0.24		L	L	L	M/L
10M32*	<50"	MHRD		1.26		1.26	Rolling dips, out-sloping. CIRA.	L	L	L	H/L
10M33*	All	MHRD	5/1-12/31	0.70			Rolling dips, out-sloping. SOU for Deer.	E-Deer	L	L	M/L
10M34	All	MHRD		1.83	1.83	1.83	Rolling dips, out-sloping.	L	L	L	M/L
10M35*	All	MHRD	5/1-12/31	0.51			Rolling dips, out-sloping and hardened crossing. SOU for Deer.	E-Deer	L	L	M/L
10M36*	All	MHRD		1.01		1.01	Remove weeds, monitor. Rolling dips, out-sloping and hardened crossing.	L	H/M-Weeds	L	H/L
10M36A*	All	MHRD	5/1-12/31	0.17			Rolling dips, out-sloping and hardened crossings. SOU for Deer.	E-Deer	L	L	E
10M38*	<50"	MHRD		2.47			Unmitigatable weed issue.	L	E-Weeds	L	M/L
10M39*	All	MHRD		0.17			Unmitigatable weed issue.	L	E-Weeds	L	M/L
10M40*	<50"	MHRD		1.35		1.35	Remove weeds, monitor. Rolling dips, out-sloping.	L	H/M - Weeds	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
10M42*	All	MHRD		1.44			Unmitigatable weed issue.	L	E-Weeds	L	M/L
10M43*	All	MHRD		1.15			Unmitigatable weed issue and wet meadow.	E-WTM	E-Weeds	L	M/L
10M44	All	MHRD		0.45	0.45	0.45		L	L	L	L
10M45	All	MHRD		0.67	0.67	0.67		L	L	L	L
10M46	All	MHRD		0.71	0.71	0.71	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
10M47	All	MHRD		1.50	1.50	1.50	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
10M54	All	MHRD		0.83	0.83	0.83	Rolling dips, out-sloping.	L	L	L	M/L
10M55*	All	MHRD	5/1-10/14			0.25	Rolling dips, out-sloping and hardened crossings, install a crossing for MYLF. SOU for MYLF.	H/M-MYLF	L	L	M/L
11M02	All	BKRD		1.72	1.72	1.72	Rolling dips, out-sloping and hardened crossing.	M-MYLF	L	L	L
11M03	All	BKRD		0.52	0.52	0.52	Rolling dips, out-sloping.	L	L	L	M/L
11M04	All	BKRD		0.76	0.76	0.76	Rolling dips, out-sloping.	L	L	L	M/L
11M05	All	BKRD		0.96	0.96	0.96		L	L	L	L
11M06	All	BKRD		0.42	0.42	0.42	Rolling dips, out-sloping, protect spring.	M	L	L	M/L
11M07	All	BKRD		0.16	0.16	0.16	Rolling dips, out-sloping.	L	L	L	M/L
11M08*	All	MHRD	8/16-10/14	1.16			Rolling dips, out-sloping and hardened crossing In and out of wild and scenic. SOU for CSO/FYLF.	E-CSO, H-FYLF, Macros	L	L	H/L
11M08A*	All	MHRD	8/16-10/14	0.27			In and out of scenic river segment. Rolling dips, out-sloping and hardened crossing. SOU for CSO/FYLF.	E-CSO, H-FYLF, Macros	L	L	H/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
11M08B*	All	MHRD	8/16-10/14	0.09			Note: In and out of scenic river segment. SOU for CSO/FYLF.	E-CSO, H-FYLF, Macros	L	L	L
11M09*	All	BKRD	8/16-12/31	1.07		1.07	Railroad access. Rolling dips, out-sloping and hardened crossing. SOU for CSO/FYLF.	H/M-CSO, M-FYLF, Macros	L	L	H/L
11M10	<50"	BKRD		1.97	1.97	1.97	Trail drainage.	L	L	L	M/L
11M11	<50"	BKRD		1.03	1.03	1.03	Trail drainage.	L	L	L	M/L
11M13 N	<50"	MHRD		0.80		0.80	Rolling dips, out-sloping. Users recommended dropping due to access issues, proponents proposed better access route. CIRA.	L	M-SIA	L	M/L
11M13 SW	<50"	MHRD		0.23			Rolling dips, out-sloping. CIRA.	L	M-SIA	L	M/L
11M13A	All	MHRD		0.35		0.35	Rolling dips, out-sloping. CIRA.	L	M-SIA	L	M/L
11M13B	<50"	MHRD		0.53		0.53	Rolling dips, out-sloping. CIRA.	L	M-SIA	L	M/L
11M13C	<50"	MHRD		0.06		0.06	CIRA.	L	M-SIA	L	L
11M13D*	<50"	MHRD		0.08			Proposed SIA and redundant. CIRA.	L	E-SIA	L	L
11M14*	<50"	MHRD		0.42			Proposed SIA. CIRA.	L	E-SIA	L	L
11M15	All	MHRD		0.38		0.38	CIRA.	L	M-SIA	L	L
11M15A*	All	MHRD		0.25			Proposed SIA and redundant. CIRA.	L	E-SIA	L	L
11M16	<50"	MHRD		0.65	0.65	0.65	Non-existent upper section, close to meadow. CIRA.	M-WTM, TRFR	L	L	M/L
11M17	All	MHRD		0.96		0.96	Rolling dips, out-sloping. CIRA.	L	L	L	M/L
11M18	All	MHRD		0.14		0.14	Rolling dips, out-sloping. CIRA.	L	L	L	M/L
11M19	All	MHRD		0.66			System road, update INFRA.	L	L	L	L
11M20	All	MHRD		3.33	3.33	3.33	Rolling dips, out-sloping.	L	L	L	M/L
11M22	<50"	MHRD		0.40	0.40	0.40		L	L	L	L
11M23*	<50"	MHRD		0.67		0.67	Rolling dips, out-sloping.	L	L	L	H/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
11M24*	All	MHRD		0.47		0.47	Treat weeds, monitor.	L	H/M - Weeds	L	L
11M25*	All	MHRD		0.43		0.43	Treat weeds, monitor.	L	H/M - Weeds	L	L
11M30	All	MHRD		0.58	0.58	0.58	Improve crossing.	L	L	L	M/L
11M34	All	MHRD		0.73	0.73	0.73		L	L	L	L
11M35*	All	MHRD		0.71		0.71	Rolling dips, out-sloping.	L	L	L	H/L
11M36	All	MHRD		1.36	1.36	1.36	Rolling dips, out-sloping and hardened crossing.	M-MYLF	L	L	M/L
11M37	All	MHRD		2.15	2.15	2.15	Rolling dips, out-sloping.	L	L	L	M/L
11M38	All	MHRD		0.53	0.53	0.53	Rolling dips, out-sloping.	L	L	L	M/L
11M39	All	MHRD		0.55	0.55	0.55		L	L	L	L
11M40*	All	MHRD	8/16-12/31	0.64			Rolling dips, out-sloping and hardened crossing. SOU for CSO.	E-CSO, M-MYLF	L		M/L
11M41	All	MHRD		1.29	1.29	1.29		L	L	L	L
11M41A	All	MHRD		0.35	0.35	0.35	Rolling dips, out-sloping.	L	L	L	M/L
11M42*	All	MHRD		0.16			Meadow and noxious weeds.	L	E-Weeds	L	E-WTM
12M03	All	BKRD		0.76	0.76	0.76	Rolling dips, out-sloping.	L	L	L	M/L
12M04	All	BKRD		0.41	0.41	0.41	Rolling dips, out-sloping, install corrugated metal pipe.	M-FYLF, Macros	L	L	M/L
12M06	All	BKRD		0.85			Redundant.				
12M07	All	BKRD		0.44	0.44	0.44	Rolling dips, out-sloping.	L	L	L	M/L
12M08	All	BKRD		0.72		0.72		L	L	L	L
12M09*	All	MHRD		3.08		3.08	Rolling dips, out-sloping and hardened crossing. CIRA.	M-Macros	L	L	H/L
12M09A	All	MHRD		0.84	0.84	0.84	Rolling dips, out-sloping and hardened crossing. CIRA.	M-Macros	L	L	M/L
12M10*	All	BKRD		2.96		2.96	Rolling dips, out-sloping and hardened crossing. CIRA.	M-Macros	L	L	H/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
12M10A*	All	BKRD		0.35		0.35	Rolling dips, out-sloping and hardened crossing. CIRA.	H/M-Macros	L	L	H/L
12M12*	All	BKRD		0.67		0.67	Ford needed over Last Chance. CIRA.	L	L	L	H/L
12M13	All	BKRD		0.40	0.40	0.40	Rolling dips, out-sloping. CIRA.	L	L	L	M/L
12M14*	All	BKRD		0.58			Redundant access. Meadow. CIRA.	L	L	L	E-WTM
12M15*	All	MHRD		0.23		0.23	Rolling dips, out-sloping. Prevent trail from crossing Indian Creek for MYLF. CIRA. Install signs to inform public not to cross Indian Creek.	H/M-MYLF	L	L	M/L
12M16*	All	MHRD	8/16-12/31	1.21			Rolling dips, out-sloping and hardened crossing. CIRA. SOU for CSO.	E-CSO, M-FYLF	E-TES	L	M/L
12M17	All	MHRD		0.16	0.16	0.16		L	L	L	L
12M18	All	MHRD		0.14			Note: Non-existent.				
12M19	All	MHRD		0.68	0.68	0.68		L	L	L	L
12M20	All	MHRD		0.11	0.11	0.11		L	L	L	L
12M21*	All	MHRD		0.23		0.23	Treat weeds, monitor, out-slope, install dips.	M-MYLF	H/M - Weeds	L	M/L
12M21A*	All	MHRD		0.05		0.05	Treat weeds, monitor.	M-MYLF	H/M - Weeds	L	L
12M22*	All	MHRD		0.15		0.15	Treat weeds, monitor.	L	H/M-Weeds	L	L
12M23	All	MHRD		0.91	0.91	0.91	Rolling dips, out-sloping.	M-MYLF	L	L	M/L
12M24*	All	MHRD		0.28			Parallels, high quantity of noxious weeds. Rolling dips, out-sloping and hardened crossings.	H-Macros	E-Weeds	L	E
12M25*	<50"	MHRD	9/16-12/31	1.44			Crossing at the system road. Wildlife concerns. SOU for NOGO.	E-NOGO	L	L	M/L
12M26*	<50"	MHRD		1.55			Rolling dips, out-sloping and hardened crossings.	L	L	L	E
12M27	<50"	MHRD		0.91	0.91	0.91	Rolling dips, out-sloping.	M-MYLF	L	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
12M30	All	MHRD		0.04			Redundant.				
12M31*	All	MHRD				0.99	Rolling dips, out-sloping.	M-Macros	L	L	H/L
12M32	All	MHRD			0.16	0.16		L	L	L	L
12M34	All	MHRD			0.25	0.25	Monitor weeds.	M-MYLF	M/M-Weeds	L	L
12M35	All	BKRD			0.11	0.11		L	L	L	L
12M37	All	BKRD			0.17	0.17		L	L	L	L
12M38	All	MHRD			0.26	0.26		L	L	L	L
13M01	All	BKRD		1.07	1.07	1.07	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
13M03*	All	BKRD		0.45			Rolling dips, out-sloping and hardened crossings.	L	E - Weeds	L	E
13M04	All	BKRD		0.49	0.49	0.49	Dispersed camping, out-slope, install dips.	L	L	L	M/L
13M04A*	All	BKRD		0.16				L	E-Weeds	L	M/L
13M04B	All	BKRD		0.11	0.11	0.11	Rolling dips, out-sloping.	L	L	L	M/L
13M05	All	BKRD		0.58			Note: Non-existent.				
13M06*	All	BKRD		1.63		1.63	Rolling dips, out-sloping and hardened crossing.	M-Macros	L	L	H/L
13M07	All	BKRD		1.24			Note: Non-existent.				
13M08*	All	BKRD		1.39			Note: Meadow.	H-MIS, TRFR	L	L	E- WTM
13M09	All	BKRD		0.46	0.46	0.46	Rolling dips, out-sloping. Avoid TES locations during maintenance.	L	M/L-TES	L	L
13M09A	All	BKRD		0.06			Note: Redundant access.				
13M10*	All	BKRD		12.04			Redundant Access. Cultural SPMs needed. CIRA.	E-MIS, Macros	E-TES	M	E-Seasonal WTM

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
13M10A*	All	BKRD		0.04			Redundant Access. Cultural SPMs needed. CIRA.	E-MIS, Macros	E-TES	M	E
13M10B*	All	BKRD		0.13			Redundant Access. Cultural SPMs needed. CIRA.	E-MIS, Macros	E-TES	M	M/L
13M10C*	All	BKRD		0.04			Redundant Access. Cultural SPMs needed. CIRA.	E-MIS, Macros	E-TES	M	M/L
13M11	<50"	BKRD		1.97			Note: Non-existent in places.				
13M12	All	BKRD		1.50	1.50	1.50	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
13M12A	All	BKRD		0.25	0.25	0.25	Rolling dips, out-sloping.	L	L	L	M/L
13M13*	All	BKRD	9/16-12/31	1.07		1.07	Rolling dips, out-sloping and hardened crossing. SOU for NOGO.	H/M-NOGO	L	L	H/L
13M14	All	BKRD	9/16-12/31	1.33	1.33	1.33	Rolling dips, out-sloping. SOU for NOGO.	H/M-NOGO	L	L	M/L
13M15	All	BKRD		0.81	0.81	0.81	Rolling dips, out-sloping.	L	L	L	M/L
13M16	All	BKRD		0.54	0.54	0.54	Rolling dips, out-sloping.	L	L	L	M/L
13M17	All	BKRD		1.02	1.02	1.02	Rolling dips, out-sloping.	L	L	L	M/L
13M18 N	All	BKRD		0.65	0.65	0.65		L	L	L	L
13M18 S	All	BKRD			0.85	0.85		L	L	L	L
13M19*	All	BKRD		1.19			Rolling dips, out-sloping and hardened crossings.	L	L	L	E
13M20*	All	BKRD		0.22			Rolling dips, out-sloping and hardened crossings.	L	L	L	E
13M21 S	All	BKRD		0.60	0.60	0.60	Rolling dips, out-sloping.	M-TRFR	L	L	M/L
13M21 N*	All	BKRD		0.71			Rolling dips, out-sloping and hardened crossings.	M-TRFR	L	L	E
13M21A	All	BKRD		0.22			Note: Redundant access.				
13M22*	All	BKRD		1.12			Note: Wet meadow.	H-TRFR	L	L	E
13M23*	All	BKRD		0.60			Rolling dips, out-sloping and hardened crossings.	H-TRFR	L	L	E

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
13M24*	All	BKRD		0.64			Rolling dips, out-sloping and hardened crossings.	L	L	L	E
13M25*	All	BKRD	5/1-10/14	0.70		0.70	Willow habitat. Swale needs rocking. SOU for MYLF.	H/M-MYLF, CAR	L	L	M/L
13M26	All	BKRD		0.59	0.59	0.59	Rolling dips, out-sloping.	L	L	L	M/L
13M27	All	BKRD		0.93			Note: Non-existent.				
13M28	All	BKRD		0.45	0.45	0.45	Rolling dips, out-sloping.	M-TRFR	L	L	M/L
13M29	All	BKRD		2.24	2.24	2.24	Rolling dips, out-sloping.	L	L	L	M/L
13M30*	M	BKRD		0.43		0.43	Rolling dips, out-sloping. CIRA.	L	L	L	H/L
13M31	All	BKRD		2.33		2.33	Rolling dips, out-sloping.	L	L	L	M/L
13M31A	<50"	BKRD		1.56		1.56	Rolling dips, out-sloping. CIRA.	L	L	L	M/L
13M32*	All	BKRD				0.21	Cultural SPMs needed.	L	L	M	M/L
13M34	All	BKRD			0.54	0.54	Rolling dips, out-sloping.	L	L	L	M/L
13M36*	All	BKRD			0.13	0.13	Cultural SPMs needed.	L	L	M	L
13M37	All	BKRD			0.57	0.57	Rolling dips, out-sloping.	L	L	L	M/L
13M38*	All	BKRD			0.47	0.47	Rolling dips, out-sloping. Cultural SPMs needed.	L	L	M	M/L
13M40	All	BKRD			1.02	1.02	Rolling dips, out-sloping.	M-FYLF, TRFR	L	L	M/L
13M41*	All	BKRD				0.82	Rolling dips, out-sloping and hardened crossing.	L	L	L	H/L
13M42*	All	BKRD				0.08	Rolling dips, out-sloping and hardened crossing.	H/M-Macros	L	L	H/L
14M01	All	BKRD		1.76	1.76	1.76	Rolling dips, out-sloping and hardened crossing.	L	L	L	M/L
14M01A	All	BKRD		0.22			Note: Redundant.				
14M01B	All	BKRD		0.17			Note: Redundant.				
14M01C	All	BKRD		0.24			Note: Redundant.				
14M02 W	All	BKRD		0.45	0.45	0.45	Rolling dips, out-sloping.	L	L	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
14M02 E	All	BKRD		0.81			Note: Non-existent.				
14M04	All	BKRD		0.70	0.70	0.70	Close off around the spring.	M-TRFR	L	L	M/L
14M05*	All	BKRD		0.72		0.72	Rolling dips, out-sloping and hardened crossing. Avoid TES during maintenance.	L	M/L-TES	L	H/L
14M06*	All	BKRD		0.37		0.37	Rolling dips, out-sloping and hardened crossing. Avoid TES during maintenance. CIRA.	L	M/L-TES	L	H/L
14M07*	All	BKRD		0.49			Note: No access without 13M10, which has been dropped from Alt. 4 and 5.				
14M08*	All	BKRD		0.48			Note: No access without 13M10, which has been dropped from Alt. 4 and 5.				
14M09*	All	BKRD		1.41			Note: No access without 13M10, which has been dropped from Alt. 4 and 5. CIRA.				
14M10	All	BKRD		0.57	0.57	0.57		L	L	L	M/L
14M11 NW	All	BKRD		0.57			Rolling dips, out-sloping and hardened crossing. Private.	M-WIFL, M-TRFR, Macro	L	L	M/L
14M11 NE	All	BKRD		0.57	0.37	0.37	Rolling dips, out-sloping.	M-WIFL, M-TRFR, Macro	L	L	M/L
14M11 S	All	BKRD		1.70	1.70	1.70	Rolling dips, out-sloping.	M-WIFL, M-TRFR, Macro	L	L	M/L
14M12	All	BKRD		1.52	1.52	1.52	Rolling dips, out-sloping.	L	L	L	M/L
14M16	All	BKRD			0.29	0.29		L	L	L	L
15M01*	<50"	BKRD		1.46			Note: Sensitive plant. CIRA.	L	E-TES	L	M/L
15M01A*	<50"	BKRD		0.16			Note: Sensitive plant. CIRA.	L	E-TES	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
15M02*	All	BKRD		1.46			Proximity to stream channel. Relocation needed outside analysis area.	L	L	L	E
15M02A*	All	BKRD		0.09			Proximity to stream channel. Relocation needed outside analysis area.	L	L	L	E
15M02B*	All	BKRD		1.08			Rolling dips, out-sloping.	L	L	L	E
15M03*	All	BKRD		0.29		0.29	Rolling dips, out-sloping reroute away from stream. Channels. Avoid impacts to MIS during maintenance activities. Post for OHVs to stay out of sensitive wet areas. CIRA.	H/M-Macros	L	L	H/L
15M04	All	BKRD		0.32		0.32	Rolling dips, out-sloping reroute away from stream. Channels. Avoid impacts to TES Plants during maintenance activities. CIRA.	M-Macros, CAR	M/L-TES	L	M/L
15M05	All			2.18		2.18	Rolling dips, out-sloping. CIRA.	L	L	L	M/L
15M07*	All	BKRD				0.76	Rolling dips, out-sloping. CIRA.	L	L	L	H/L
15M08	All	BKRD			0.40	0.40	Rolling dips, out-sloping.	L	L	L	M/L
16M01	All	BKRD		1.78			Note: Non-existent.				
16M03	All	BKRD		0.77	0.77	0.77	Rolling dips, out-sloping.	L	L	L	M/L
16M03A	All	BKRD		0.12			Note: Redundant access.				
16M03B	All	BKRD		0.27			Note: Redundant access.				
16M04*	All	BKRD		2.08		2.08	Rolling dips, out-sloping and hardened crossing.	M-Macros	L	L	H/L
16M04A*	All	BKRD		0.54		0.54	Rolling dips, out-sloping.	M-Macros	L	L	H/L
17M01	<50"	BKRD		0.28	0.28	0.28	Rolling dips, out-sloping.	L	L	L	M/L
17M02	All	BKRD		0.66			System road 23N67				
17M03	All	BKRD		0.51	0.51	0.51	Rolling dips, out-sloping.	L	L	L	M/L
17M04	All	BKRD		1.22		1.22	Rolling dips, out-sloping. CIRA.	L	L	L	M/L

Trail	Vehicle Type	District	Season of Use (SOU)	Alt 2 Miles	Alt 4 Miles	Alt 5 Miles	Trail Mitigations/Remarks	Wildlife Effects	Botany Effects	Cultural Effects	Soil/ Water Effects
17M05*	All	BKRD		3.87			Rolling dips, out-sloping. Sensitive plant. CIRA.	L	E-TES	L	H/L
17M06	All	BKRD		0.72			Note: No right of way.				
17M06A	All	BKRD		0.69			Note: No right of way.				
Sly Creek*	<50"	FRRD	5/1-10/14	36 Ac			Rolling dips, out-sloping, access. SOU for CRLF.	E-CRLF	L	L	H/L

Summary of Miles by Type of Motor Use

Mileage Summary	Alt. 2	Alt. 4	Alt.5
All	216.07	108.14	156.35
<50"	62.81	22.42	38.71
Motorcycle	82.46	9.65	39.04
Total Miles	361.34	140.21	234.10

Table Acronyms and Codes

District Codes:

BKRD: Beckwourth Ranger District MHRD: Mt. Hough Ranger District FRRD: Feather River Ranger District

Botanical Resource Codes:

TES: Threatened Endangered and Sensitive SIA: Special Interest Area

Wildlife Resource Codes:

SOU: Season of Use CAR: Critical Aquatic Refuge CRLF: California red-legged frog

MYLF: Mountain yellow-legged frog FYLF: Foothill yellow-legged frog NWPT: Northwestern pond turtle

TRFR: Tree Frog Macros: Stream Invertebrates NOGO: Northern Goshawk BE: Bald Eagle

CSO: California spotted owl WIFL: Willow Flycatcher HRCA: Home Range Core Area WTM: Wet Meadow

Cultural Resource Codes:

SPM: Specialized Protection Measures (refer to Section 3.10 for range of approved protection measures (Motorized Recreation PA).

Land Use Codes:

IRA: Inventoried Roadless Area CIRA: Citizen Inventoried Roadless Area

Relationship of Ratings to Maintenance and Mitigation

L: Low resource effects with routine maintenance of the trail.

Cultural Resources: Only minor disturbances confined to unauthorized routes; no obvious displacement of artifacts, features or archaeological deposits other than original unauthorized route placement (i.e. slight disturbance but no apparent effect to integrity of NRHP values).

M: Moderate resource effects that require site-specific maintenance to reduce effects.

Wildlife: Season of Use Period

Botany: Avoid sensitive plants

Weeds: Pull noxious weeds

Cultural Resources: Less than two cubic meters of disturbance within the unauthorized route zone (i.e. slight affect to artifacts/features, but overall site integrity and NRHP values are retained.

Watershed: Soil and water effects are currently less than adverse. Site-specific maintenance may include addition or modification of route out-slope; installation or modification of drainage features (rolling dips, waterbars, or ditch relief culverts); or addition or modification of stream crossing structures.

H: High resource effects that require site-specific mitigation to reduce effects.

Wildlife: Season of Use Period

Botany: Avoid sensitive plants

Weeds: Pull noxious weeds

Cultural Resources: Estimated 3-5 cubic meters of disturbance within the unauthorized route zone; displaced artifacts (i.e. localized or multiple areas of effects). Overall site integrity and NRHP values are damaged or altered.

Watershed: Soil and water effects are currently adverse. Site-specific mitigations may include addition or modification of route out-slope, installation or modification of drainage features (rolling dips, waterbars, or ditch relief culverts): addition or modification of stream crossing structures; relocation of short segments of the existing route; or designation of acceptable seasons of use and vehicle class.

E: Extreme resource effects that are outside normal mitigation requiring additional environmental analysis.

Cultural Resources: Estimated 5+ cubic meters of disturbance within the unauthorized route zone, displaced artifacts in several locations and or vandalism noted (i.e. severe effects to NRHP values, artifacts and features associated with NRHP values have been diminished or altered.

Table 179. Proposed Trails Not Included in Alternatives

Trail #	MI	Trail Mitigation/Remarks	Effects Determinations Wildlife	Botany	Cultural	Soil/ Water
5M32	1.26	Relocation needed outside of analysis area.	L	L	L	E
6M20A	0.27	No access thru private.	-	-	-	-
6M48*	0.28	Rolling dips, out-sloping and hardened crossings. Install a ≥ 48" culvert and stabilize approaches for CRLF. SOU for CRLF.	E-CRLF-Jack's CAR	L	L	H/L
6M49	0.50	Non-existent.	-	-	-	-
6M52	0.39	Heritage resource concerns.	L	L	E	M
7M27	0.34	Heritage resource concerns.	L	L	E	E
8M27 EX	0.80	Non-existent.	-	-	-	-
8M57	0.20	Meadow, relocation needed outside of the analysis area.	L	L	L	E
9M63	0.36	Excessive sediment delivery to stream channel.	L	L	L	E
9M64	0.14	Excessive sediement delivery to stream channel.	L	L	L	E
10M03		IRA and CIRA.	-	-	-	-
10M04		IRA and CIRA.	-	-	-	-
10M04A		IRA and CIRA.	-	-	-	-
10M52	1.02	Improve surface drainage and stream crossings.				H
11M20A	0.13	Non-existent.	-	-	-	-
12M11	1.71	Non-existent.	-	-	-	-
12M33	0.42	Relocation needed outside of analysis area.	L	L	L	E
12M36	0.54	System road	-	-	-	-
13M33	0.42	Redundant	L	L	L	M
13M35	0.08	Terrestrial Wildlife	E	L	L	M
13M39	0.32	Decommissioned, out-slope, install dips.	-	-	-	-
13M43	0.15	Non-existent.	-	-	-	-
14M13	0.26	No access thru private.	-	-	-	-
14M14	0.94	Spring in trail.	L	L	L	E
14M15	0.37	No access thru private.	-	-	-	-
15M09	0.42	No access thru private.	-	-	-	-
17M07	2.57	Non-existent.	-	-	-	-
17M08	0.58	System road 28N03K	-	-	-	-

Appendix B: Forest Plan Standards and Guidelines

The following table includes the Forest Plan standards and guidelines that apply to this project. The standards and guidelines are from the 1988 Plumas National Forest Plan and the 2004 Sierra Nevada Framework Record of Decision, which amended the Plumas Forest Plan.

Table 180. Forest Plan Standards and Guidelines

No.	Source	Area	Standard/Guideline Text
36	SN04 ROD	Forestwide	Inform forest users, local agencies, special use permittees, groups, and organizations in communities near national forests about noxious weed prevention and management.
38	SN04 ROD	Forestwide	As part of project planning, conduct a noxious weed risk assessment to determine risks for weed spread (high, moderate, or low) associated with different types of proposed management activities. Refer to weed prevention practices in the Regional Noxious Weed Management Strategy to develop mitigation measures for high and moderate risk activities.
40	SN04 ROD	Forestwide	Minimize weed spread by incorporating weed prevention and control measures into ongoing management or maintenance activities that involve ground disturbance or the possibility of spreading weeds. Refer to weed prevention practices in the Regional Noxious Weed Management Strategy.
62	SN04 ROD	Forestwide	As part of the project planning process, survey emphasis habitat within 5 miles of occupied willow flycatcher sites to determine willow flycatcher occupancy. Emphasis habitat is defined as meadows larger than 15 acres that have standing water on June 1 and a deciduous shrub component. Use established protocols to conduct these surveys. If these surveys determine willow flycatcher occupancy, add these to the database of occupied willow flycatcher sites and include them in the 4-year survey cycle of willow flycatcher sites described above.
69	SN04 ROD	Forestwide	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas. Unless otherwise restricted by current forest plans or other specific area standards and guidelines, cross-country travel by over-snow vehicles would continue. (Does not apply to Alt. 1, applies to other alternatives.
71	SN04 ROD	Forestwide	Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites.
85	SN04 ROD	Forestwide	Mitigate impacts where there is documented evidence of disturbance to the fisher den site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites.

No.	Source	Area	Standard/Guideline Text
87	SN04 ROD	Forestwide	Mitigate impacts where there is documented evidence of disturbance to the marten den site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites.
88	SN04 ROD	Forestwide	Designate riparian conservation area (RCA) widths as described in Part B of this appendix. The RCA widths displayed in Part B may be adjusted at the project level if a landscape analysis has been completed and a site-specific RCO analysis demonstrates a need for different widths.
89	SN04 ROD	Forestwide	Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species.
97	SN04 ROD	Forestwide	Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity.
98	SN04 ROD	Forestwide	Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species. Locate water drafting sites to avoid adverse effects to in stream flows and depletion of pool habitat. Where possible, maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows, wetlands, and other special aquatic features.
99	SN04 ROD	Forestwide	Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside the range of natural variability, implement mitigation measures and short-term restoration actions needed to prevent further declines or cause an upward trend in conditions. Evaluate required long-term restoration actions and implement them according to their status among other restoration needs.
110	SN04 ROD	Forestwide	As appropriate, assess and document aquatic conditions following the Regional Stream Condition Inventory protocol prior to implementing ground disturbing activities within suitable habitat for California red-legged frog, Cascades frog, Yosemite toad, foothill and mountain yellow-legged frogs, and northern leopard frog.
112	SN04 ROD	Forestwide	Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions.

No.	Source	Area	Standard/Guideline Text
114	SN04 ROD	Forestwide	Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles. Criteria for defining bogs and fens include, but are not limited to, presence of: (1) sphagnum moss (Spagnum spp.), (2) mosses belonging to the genus Meessia, and (3) sundew (Drosera spp.) Complete initial plant inventories of bogs and fens within active grazing allotments prior to re-issuing permits.
118	SN04 ROD	Forestwide	Recommend restoration practices in: (1) areas with compaction in excess of soil quality standards, (2) areas with lowered water tables, or (3) areas that are either actively down cutting or that have historic gullies. Identify other management practices, for example, road building, recreational use, grazing, and timber harvests, that may be contributing to the observed degradation.
150	PFP 88	Forestwide	Manage all Forest lands according to Recreation Opportunity Spectrum ROS designations as shown on the Recreation Opportunity Spectrum Map. Primitive ROS Class - an essentially unmodified natural environment of 5,000 acres or more that is at least three miles from all motorized use, and that provides significant opportunity for isolation from the sights and sounds of man and a feeling of vastness of scale. Visitors have an opportunity to be part of the natural environment, encounter a high degree of challenge and risk, and use a maximum of outdoor skills. Primitive (P) - Applies only t o the Bucks Lake Wilderness.

No.	Source	Area	Standard/Guideline Text
151	PFP 88	Forestwide	Manage all Forest lands according to Recreation Opportunity Spectrum ROS designations as shown on the Recreation Opportunity Spectrum Map. Roaded Natural ROS Class - a predominately natural environment where resource modifications and utilization practices are evident. Evidence of the sights and sounds of man is moderate and in harmony with the natural environment. Opportunities exist for both social interaction and moderate isolation from sights and sounds of man. RN is defined as those original Roaded Natural areas that are also coded as Foregrund and Sensitivity Level I. These lands lie along the major travel ways and viewsheds. Nearly all developed sites are in this class. Paved roads and hardened sites are common. User interaction is moderate to high at developed sites. Roaded Natural (RN): Meet applicable RN objectives. Design and maintain a all facilities for conventional motorized use. Allow Development Scale (see Appendix I) 2, 3,or 4 facilities (little site modification to site heavily modified) with 2-5 sites per acre. Keep use below capacity. Manage for a visitor capacity of 1.57 PAOT/usable acre outside of developed sites t o maintain the quality of RN experience.
152	PFP 88	Forestwide	Manage all Forest lands according to Recreation Opportunity Spectrum ROS designations as shown on the Recreation Opportunity Spectrum Map. Roaded Natural ROS Class - a predominately natural environment where resource modifications and utilization practices are evident. Evidence of the sights and sounds of man is moderate and in harmony with the natural environment. Opportunities exist for both social interaction and moderate isolation from sights and sounds of man. Roaded Modified (RM) is defined as those Roaded Natural areas that are also coded as Middleground. Background or Unsee, and Sensitivity Level II or III. This is the general resource management area of the Forest, typified by pick-up trucks and many miles of dirt and gravel roads. Other than trails or trailheads, virtually no improvements are present. Users experience low interaction. Roaded Modified (RM): Meet applicable RM objectives. Allow Development Scale 2 or 3 (little to moderate site development) facilities .Manage for a visitor capacity of 0.2 PAOT/usable acre to maintain the quality.

No.	Source	Area	Standard/Guideline Text
153	PFP 88	Forestwide	Manage all Forest lands according to Recreation Opportunity Spectrum ROS designations as shown on the Recreation Opportunity Spectrum Map. Rural ROS Class a substantially modified natural environment. Sights and sounds of man are evident. Modification and utilization practices enhance specific recreation activities or provide the protection of vegetative soil cover. Renewable resource Rural: Meet applicable R objectives. Design facilities according to FSM 2330. Allow Development scale 3 or 4 (moderate to heavily modified facilities) with 3-10 sites per acre to maintain the quality of the RM experience. Manage for a visitor capacity of 4.7 PAOT/usable acre outside of developed sites to maintain the quality of the R experience.
154	PFP 88	Forestwide	Apply Prescriptions Rx-5 (Recreation Area Prescription) and Rx-6 (Developed Recreation Site Prescription) at mapped locations.
157	PFP 88	Forestwide	Construct new trails according to management area direction.
159	PFP 88	Forestwide	Open trails for public, outfitter/guide, and administrative uses. If planned and publicized, allow temporary closures of less than one year.
160	PFP 88	Forestwide	Provide sanitation facilities at trailheads where needed to protect water quality.
167	PFP 88	Forestwide	Pacific Crest Trail: Prohibit ORV use.
168	PFP 88	Forestwide	Allow ORV use except where: 1. use is prohibited by law or regulation 2. use is incompatible with the management of other resources, 3. resource damage is likely, 4. rights-of-way are insufficient, 5. lands are designated administrative or developed recreation sites. (Superceded by #69, applies to Alt. 1 only)
169	PFP 88	Forestwide	Restrictioned acreages are summarized in Table 4-5 and shown on the accompanying Off Road Vehicle Closure map. (Superceded by #69, applies to Alt. 1 only)
170	PFP 88	Forestwide	Cooperate with the State, other agencies, and user groups to identify, and where compatible with Forest Plan management objectives, develop segments of trail that supports the concept of a statewide trail system connecting use areas and providing the opportunity for long distance trail touring

No.	Source	Area	Standard/Guideline Text
171	PFP 88	Forestwide	Manage all Forest land in accordance with the adopted Visual Quality Objectives (VQOs) as mapped in detail in the Planning Records and depicted on the accompanying Visual Quality Objectives map and as defined below. Meet VQOs by applying techniques described in publications listed in Appendix K. Preservation (P) - Allow for ecological changes only. Preclude management activity except use for recreation facilities, with very low visual impact. Appendix K: Preservation (P): Only ecological change is allowed.
172	PFP 88	Forestwide	Manage all Forest land in accordance with the adopted Visual Quality Objectives (VQOs) as mapped in detail in the Planning Records and depicted on the accompanying Visual Quality Objectives map and as defined below. Meet VQOs by applying techniques described in publications listed in Appendix K. Retention (R) - Provide a natural-appearing landscape where management activities are not visually evident. Appendix K: Retention (R): People's activities are not to be evident to the casual forest visitor.
173	PFP 88	Forestwide	Manage all Forest land in accordance with the adopted Visual Quality Objectives (VQOs) as mapped in detail in the Planning Records and depicted on the accompanying Visual Quality Objectives map and as defined below. Meet VQOs by applying techniques described in publications listed in Appendix K. Partial Retention (PR) - Provide a natural-appearing landscape where management activities remain visually subordinate. Appendix K: Partial Retention (PR): People’s activities may be evident but must remain subordinate to the characteristic landscape.

No.	Source	Area	Standard/Guideline Text
174	PFP 88	Forestwide	Manage all Forest land in accordance with the adopted Visual Quality Objectives (VQOs) as mapped in detail in the Planning Records and depicted on the accompanying Visual Quality Objectives map and as defined below. Meet VQOs by applying techniques described in publications listed in Appendix K. Modification (M) - Allow management activities to dominate the landscape: however, keep visual elements comparable to those of natural occurrences. Appendix K: Modification (M): Activities may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. Activities should appear as a natural occurrence when viewed in the foreground or middleground.
175	PFP 88	Forestwide	Manage all Forest land in accordance with the adopted Visual Quality Objectives (VQOs) as mapped in detail in the Planning Records and depicted on the accompanying Visual Quality Objectives map and as defined below. Meet VQOs by applying techniques described in publications listed in Appendix K. Maximum Modification (MM) - Allow management activities to dominate the landscape; however, keep background visual elements comparable to those of natural occurrences. Appendix K: Maximum Modification (MM): Activities may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background.
176	PFP 88	Forestwide	When future resource use activity or wildfire degrades visual quality below the adopted VQOs restore visual quality by planting trees and/or other vegetation where regeneration is feasible.
177	PFP 88	Forestwide	Employ a VQO of “Partial Retention” in those areas viewed as foreground from the Pacific Crest Trail, and allow a VQO of “Modification” in the middle and background.
178	PFP 88	Forestwide	Identify potential locations of non-inventoried cultural resources (cultural, historic, and prehistoric) via documents, literature, and oral interviews, and inventory through archaeological survey or reconnaissance prior to potentially-disturbing project activities on non-inventoried lands. Consult with Native Americans and interested parties regarding cultural resources within these areas.
179	PFP 88	Forestwide	Apply National Register (NR) criteria to determine whether a cultural resource is a Class I, II or III property.
180	PFP 88	Forestwide	Determine probable project effects on Class I and II properties.
181	PFP 88	Forestwide	Apply a test of archaeological interest to Class III cultural resources (according to ARPA criteria). Release properties of non archaeological interest. Determine if each cultural resource is eligible for listing on a local, State, or Federal register of significant properties.

No.	Source	Area	Standard/Guideline Text
182	PFP 88	Forestwide	Consult with Native American and other interested parties regarding eligible cultural properties.
183	PFP 88	Forestwide	Protect and preserve NR and NR eligible cultural resources and those on State or local listings of significant properties, or recover the values that result in their eligibility (in accordance with NRHP or MOU with SHPO) and in consultation with local Native Americans and interested parties.
184	PFP 88	Forestwide	Protect or recover those materials of archaeological interest.
185	PFP 88	Forestwide	Allow scientific study of cultural resources for public education and enjoyment.
186	PFP 88	Forestwide	Develop and implement agreements with the Advisory Council on historic Preservation for the management of identified Class I and II resources.
187	PFP 88	Forestwide	Identify and determine contemporary value of areas and resources used for traditional cultural or religious practices by Native Americans or other ethnic groups. Do not restrict or deter continued use of important areas.
194	PFP 88	Forestwide	Maintain suitability of occupied prairie falcon, osprey, and golden eagle nesting territories.
195	PFP 88	Forestwide	Maintain and enhance the suitability of currently-occupied nesting territories, and provide sufficient potential nesting, foraging, and winter habitat to meet recovery goals of the Pacific States Bald Eagle Recovery Plan. Apply Rx-11 Bald Eagle Habitat Prescription
197	PFP 88	Forestwide	Protect sensitive and special interest plant species as needed to maintain viability. Inventory and monitor sensitive plant populations on a project-by-project basis.
201	PFP 88	Forestwide	Provide for fish passage on any drainage or stream where spawning activity occurs, except with concurrence by DFG.
225	PFP 88	Forestwide	Implement FS Best Management Practices (BMPs) to meet water quality objectives and maintain and improve the quality of surface water on the Forest. Identify methods and techniques for applying the BMPs during project level planning and incorporate them into the associated project plan and implementation documents (see Plan Appendix Q).
227	PFP 88	Forestwide	Through the use of BMPs, keep water quality at a level that will allow a safe and satisfactory supply when given reasonable treatment by the purveyor.
243	PFP 88	Forestwide	Develop specific soil evaluation and mitigation measures for each project site as needed.
246	PFP 88	Forestwide	Develop and apply erosion control plans to road construction, mining, recreation development, and other site disturbance projects. Develop specific mitigation measures for each project site as needed.
248	PFP 88	Forestwide	Document observations of slope failures, significant erosion of and from road surfaces, erosion of mine spoils, and any other sources of sediment that are affecting water quality or channel stability. Use for future erosion control planning.
264	PFP 88	Forestwide	Avoid or provide special treatment of unstable areas to avoid triggering mass movement.

No.	Source	Area	Standard/Guideline Text
265	PFP 88	Forestwide	Use the PNF Land Stability Risk Classification data for preliminary assessment of instability problems on all projects which disturb the land surface. Provide geotechnical evaluation of projects with a moderate or higher potential to initiate or accelerate landslides.
266	PFP 88	Forestwide	Allow no land-disturbing activities on extremely unstable land unless a geotechnical investigation determines certain activities are appropriate.
267	PFP 88	Forestwide	Avoid earthquake fault zones whenever possible when designing roads and other facilities.
325	PFP 88	Forestwide	Prevent violations of the law by making NF restrictions clear and reasonable, informing the public, and pursuing aggressive enforcement.
329	PFP 88	Forestwide	Consider additional areas for RNA status as need and opportunity arise. Protect established, recommended, and candidate RNAs to preserve their research values.
334	PFP 88	Rx-1 Wilderness Prescription	Allow no motor vehicle use. Post boundaries and establish physical controls to prevent motorized entry.
368	PFP 88	Rx 2 - Wild and Scenic River Prescription	Scenic zone: Construct campgrounds and other developments which enhance recreation use. To the extent possible, design and manage recreation developments (including access) to avoid areas of high fire hazard and to prevent ignition and spread of wildfire.
372	PFP 88	Rx 2 - Wild and Scenic River Prescription	Wild zone: Construct or improve trails, or mark travel routes as needed, to properly disperse recreation use and promote safe travel in the zone
373	PFP 88	Rx 2 - Wild and Scenic River Prescription	Wild zone: Permit no additional motorized access routes to the river and no motorized transportation along the river. Permit motorized access on the Cleghorn Bar, Stag Point, Deadman Springs, and Little California Mine roads and close all others at their junctions with system roads.
387	SN04 ROD errata	Rx 2 - Wild and Scenic River Prescription	Conduct field surveys for TEPS plant species early enough in project planning process that the project can be designed to conserve or enhance TEPS plants and their habitat. Conduct surveys according to procedures outlined in the Forest Service Handbook (FSH 2609.25.11). If additional field surveys are to be conducted as part of project implementation, survey results must be documented in the project file.
403	PFP 88	Rx-3 Feather Falls Scenic Area	Close all trails to motorized use.
420	PFP 88	Rx-4 Challenge Experimental Forest	Prohibit ORV use.
444	PFP 88	RX-6 Developed Recreation Site	Confine vehicle use to interior roads and spurs. Allow ORV use of trails which lead to adjacent off-road vehicle routes or acceptable cross-country areas. (Superceded by #69, applies to Alt. 1 only)
463	PFP 88	Rx-8 Semi-Primitive	Allow no motorized travel except over-the-snow and management access.

No.	Source	Area	Standard/Guideline Text
498	PFP 88	Rx-11 Bald Eagle Habitat	Close the areas to ORV use.
540	PFP 88	Rx-17 Research Natural Areas	Manage recreational use according to the ROS class of SPNM. Prohibit recreational uses that would contribute to modification of the area.
541	PFP 88	Rx-17 Research Natural Areas	Maintain existing trails, but do not expand the trail system.
609	PFP 88	MA 4 Galen	Restrict ORV use at Big Bald Rock.
646	PFP 88	MA 8 Kellogg	Allow motorized use in the Wild Zone only on the Little California Mine 4WD trail.
670	PFP 88	MA 10 Feather Falls	Prohibit ORVs below the MFFR canyon rim, on the Feather Falls NRT, and the South Branch Falls Trail.
701	PFP 88	MA 12 Pinchard	Manage the Wild Zone [Middle Fork Feather River] consistent with the Wild and Scenic Rivers Act; employ Rx-2. Allow ORVs on the Stag Point 4WD trail.
727	PFP 88	MA 14 Sawmill	Prohibit ORVs below the MFFR Canyon Rim except on Cleghorn Bar Road.
740	PFP 88	MA 14 Sawmill	Preserve and enhance the Fowler Lake area: employ Rx-7. Close existing road access to Fowler Lake and study the area for ORV closure. Provide directional signing from the PCT. Maintain a forage fish base for wildlife.
757	PFP 88	MA 16 Beartrap	Maintain the Poker Flat and Mt. Fillmore 4WD roads.
788	PFP 88	MA 19 North Fork	Coordinate trail management with the Lassen NF for shared routes with uses conforming to Appendix 0.
789	PFP 88	MA 19 North Fork	Close the existing 4WD road extending northerly along the PCT from Three Lakes.
827	PFP 88	MA 21 Silver	Maintain the Gold Lake and Rock Lake trails.
831	PFP 88	MA 21 Silver	Areas closed to ORV use include Butterfly Valley, Snake Lake, and the Bucks Lake Wilderness.
889	PFP 88	MA 25 Bear	Prohibit motorized use except on the Deadman Springs and Lost Cabin Springs 4WD roads. Provide for 4WD parking at the junction of the Deadman Springs 4WD road and the PCT.
923	PFP 88	MA 27 Indian Valley	Preserve and enhance the scenic values of the Crystal Lake-Mt. Hough area: employ Rx-7. Provide minimal access and facilities. Allow low impact timber harvest activities. Limit road access to the saddle above the lake.
937	PFP 88	MA 29 Antelope	Restrict wheeled vehicles to existing roads and trails in the Antelope Lake Recreation Area and the Diamond Mountain ORV Closure Areas as shown on the Off Road Vehicle Closure Plan for the Preferred Alternative map.
965	PFP 88	MA 30 Ward	Designate the remainder of the as “open” to ORVs. (Superceded by #69, applies to Alt. 1 only)

No.	Source	Area	Standard/Guideline Text
990	PFP 88	MA 33 Nelson Creek	Exclude 4WD's along the East Branch of Nelson Creek in the vicinity of McRae Meadows.
1024	PFP 88	MA 35 Lakes Basin	Confine wheeled ORVs to designated routes. Allow motorized over-the-snow travel, but consider restricting to designated areas if conflicts develop with other users or resources.

Appendix C: Present and Reasonably Foreseeable Future Actions

The following projects were considered as present and reasonably foreseeable future actions for cumulative effects analysis.

Table 181. Present and Reasonably Foreseeable Future Actions on National Forest System lands

District	Project Name	Project Description	Location
Forest-wide	Temporary OHV Forest Order Project CE 31.b(1)	Implement interim OHV forest orders that prohibit wheeled vehicle travel off of existing inventoried roads, areas, and trails for an interim period, until site specific designation can occur utilizing appropriate levels of NEPA.	Forest-wide
Forest-wide	Backcountry Discovery Trail	Designation of Backcountry Discovery Trail (BCDT) on existing roads within the Plumas National Forest to tie together statewide motorized trail.	Forest-wide
Forest-wide	Robert Van Court Ironman Dual Sport Motorcycle Rec Event	Two recreation events are planned using existing Forest Service system roads for a dual sport motorcycle (street legal) tours. One is on the Lassen and Plumas (two day event), and the other is on all three districts of the Plumas (3 day event).	Forest-wide
Beckwourth and Mount Hough	Antelope Reforestation Project	Site prep, planting, and subsequent hand release on approximately 5,000 acres of the 22,000-acre Antelope Complex, which burned in 2007.	Antelope Lake area
Beckwourth	Mabie DFPZ	Approximately 7,181 acres of DFPZ including underburning, hand thinning, and mechanical treatment. May include road relocation/obliteration.	South of Highway 70 and west of highway 89 near the communities of Graeagle, Portola, Clio, and Blairsden.
Beckwourth	Freeman Project	Reduce hazardous fuels, improve forest health, improve bald eagle habitat, support local communities, improve aspen stands, transportation improvements.	West of Lake Davis up to Grizzly Ridge.
Beckwourth	Plumas-Sierra Rural Electric Co-op	Construction of 69kv powerline (3-6 miles) and access road construction (3 miles).	S. Hwy 16, south of Honey Lake.
Beckwourth	Camp 14 Salvage and Reforestation Project	Approximately 249 acre salvage of dead and dying trees that resulted from the Antelope Complex Fire that occurred in July 2007.	The project is located approximately 12 miles northeast of Taylorsville, CA, about 2 miles east of Antelope Lake

District	Project Name	Project Description	Location
Beckwourth	Cold Fire Recovery and Roadside Safety Project	Recover economic value from the loss of fire-killed timber and increase public safety by reducing roadside tree hazards.	The project area is located on the south side of Eureka Ridge, west of Golden Creek drainage and south of the town of Sloat, CA.
Beckwourth	Cold Fire Soil Stabilization and Fireline Rehabilitation	Project consists of post-fire rehabilitation for watershed improvement through soil stabilization utilizing contour felling along approximately 50 acres of adjacent hillsides to Golden Creek and approximately 7 miles of dozer and handline rehab.	Cold Fire burn area along headwaters of Golden Creek
Beckwourth	Horizon Wind Energy Site Testing	Issue a 3 year Special Use Permit to Horizon Wind Energy to install meterological test towers on several locations.	Several locations on the Beckwourth Ranger District.
Beckwourth	Cedar Mining Claim (Placer)	The operators want to process on site less than 1,000 cubic yards of mineral material in search of gold on National Forest System lands.	North of Eureka Ridge, adjacent to Chris Creek.
Beckwourth	Lake Davis Trails	Build an interpretive trail from Catfish Cove to the lake. Build a trail around the lake using the old railroad grade and connecting inbetween these sections with new trail. The first section is between the 24N10 intersection and lightning tree CG.	Lake Davis southeast side
Beckwourth	Lake Davis Trail phase 2 & 3	Continue the non-motorized Lake Davis Trail around Lake Davis from just south of Lightning Tree Campground around the north and west sides of the lake	Lake Davis Recreation Area
Beckwourth	Sulphur - Barry Stream Restoration Project	Restore approximately 0.5 mile of Sulpher Creek (0.28 mile) and Barry-Creek (0.24 mile) using pond-and-plug technique. Project also includes a Timber Sale for the removal of encroaching conifers on cottonwood stands within the project area.	Middle Middle Fork Feather River HUC 5 Watershed
Beckwourth	Clark's Creek Aspen Restoration and Ecosystem Enhancement Project	Thin conifers from three meadows, plant willows and aspen. Desired result: Re-establish naturally occuring riparian vegetation in meadows to improve habitat for deer fawning, willow flycatchers, and other riparian species.	Situated in Clark's Creek, a 10,000 acre tributary watershed to Last Chance Creek, which flows to the North Fork of the Feather River.

District	Project Name	Project Description	Location
Beckwourth	Dotta KV Aspen and Cottonwood Hand Thin Project	This project will hand thin conifer trees less than 11 inches dbh within aspen and cottonwood stands and the adjacent 50 foot buffer. This will help to maintain aspen and cottonwood stands and promote regeneration.	Northwest of Frenchman Lake in the Dixie State Game Refuge and between the Frenchman Work Center and Cottonwood Spring Campground.
Beckwourth	Frenchman WC Aspen Hand Thin Project	Over the next several years Frenchman Work Center will conduct project work within aspen stands. Conifer trees less than 11 inches dbh will be hand thinned within aspen stands and within 50 feet of the stands	Located northwest of Frenchman Lake in the Dixie State Game Refuge and between the Frenchman Work Center and Cottonwood Spring Campground.
Beckwourth	Wildlife Guzzler Replacement and Removal	Guzzlers catch and store water providing water to wildlife througout the year especially during hot summer months. This project will remove 2 wildlife guzzlers and replace 5 in the Eureka Ridge and Frenchman Lake areas.	Along Eureka Ridge, north of Fish Creek and east of Nelson Creek and south of Conklin Park in the Frenchman Lake vicinity.
Beckwourth	Mills Peak Trail	Construct a 7-mile non-motorized trail on Beckwourth Ranger District. Starting at Forest Service (FS) Road 22N98 and ending on FS road 822 at Mills Peak. The trail would be 24 to 36 inches wide.	Lakes Basin Recreation Area Beckwourth Ranger District Plumas National Forest
Beckwourth	Issue five year outfitting and guiding permit to High Sierra ATV Tours	In order to comply with the new outfitting and guiding directives, a five year outfitting and guiding permit would be issued to High Sierra ATV Tours. This company has been operating on one year temporary permits since 2006.	Chilcoot, Crystal Peak, Frenchman Lake, and Dixie Mountain areas
Beckwourth	Smith Lake & Mt Elwell trails reroutes	The Smith Lake Trail reroute will move the trail to the north side of the lake and out of the wet reparian area. The Elwell Trail reroute would install sweeping switchbacks to eliminate the steep grade. A bridge installed at the creek crossings.	Lakes Basin Recreation Area
Beckwourth	Elwell Trail Reroute	Reroute sections of the Elwell Trail on the South side to eliminate over grade sections and provide a sustainable tread.	Lakes Basin

District	Project Name	Project Description	Location
Beckwourth	Nelson Creek Historic Trail	Reopen the historic Nelson Creek Trail from Zumwalt Flat to the La Porte Rd. A few sections of new trail to connect existing trail or correct over grade problems is also being planned.	Nelson Creek area
Beckwourth	Grizz Project	Defensible Fuel Profile Zone (DFPZ), Group Selections (GS) and Individual Tree Selection (ITS). In th past, these types of projects have also involved the treatment of noxious weeds, road decommissioning and upgrades.	Along Grizzly Ridge, approximately 5 miles from Spring Garden and 3.5 miles from Cromberg
Beckwourth	Jackson Project (old name Happy Jack Project)	Defensible Fuel Profile Zone (DFPZ), Group Selection (GS) and Individual Tree Selection (ITS) in addition to, Wildland Urban Interface fuels reduction. Road reconstruction, decommissioning and construction.	Approximately 4-11 miles northwest of Portola and 1-7 miles north of Graeagle.
Beckwourth	Ingalls Project	Defensible Fuel Profile Zone, group selection, riparian hardwood restoration, road reconstruction, decommissioning, temporary road construction and subsequent decommissioning.	Near Lake Davis, 5-10 miles north of Portola.
Beckwourth	Big Hill DFPZ	Defensible Fuel Profile Zone (DFPZ), Group Selection (GS) and Individual Tree Selection (ITS) in addition to, Wildland Urban Interface fuels reduction. Road reconstruction, decommissioning and construction.	Approximately 3 miles north of the town of Old Sloat, California.
Beckwourth	Red Clover DFPZ Underburn	Defensible Fuel Profile Zone (DFPZ) maintenance underburning	Red Clover Valley
Beckwourth	Hopper Thinning	Thinning of approximately 215 acres of forested stands that are currently infested with bark beetles and stands at high risk to future bark beetle mortality in the developed recreation area of Lake Davis.	East shore of Lake Davis from Grizzly Valley Dam to Mallard Cove fishing access.
Beckwourth	Corral Thin Addition	The Corral Thin Addition adds an additional 4 acres to a current forest disease/fuel reduction treatment project. This addition is needed to make an effective contiguous treatment area.	Off Forest Service System Road 24N10, west of Lake Davis.

District	Project Name	Project Description	Location
Beckwourth	Dixie Valley and Little Dixie Sheep Allotments	Change the 12,880-acre Dixie Valley Allotment and the 9,170-acre Little Dixie Allotment from vacant cattle allotments to sheep allotments.	10 to 14 miles north-northeast of the city of Portola, California.
Beckwourth	Grizzly Valley, Grizzly Valley Community, and Humbug Allotments	Range Environmental Assessment.	Near Lake Davis.
Beckwourth	NRCS EQIP Projects	Range improvements, i.e. off site water, riparian pasture reconfiguration on Fitch Canyon and McKessick Peak Allotments.	Fitch Canyon and McKessick Peak areas.
Beckwourth	Plinco Mine Off Site Water Developments	Develop two springs for off site water for livestock.	Plinco Unit McKesick Peak Allotment.
Beckwourth	Last Chance Water Quality Improvement Projects	Stream channel stabilization and road improvements.	Last Chance watershed, Roads 25N66, 25N72, 25N78, 25N08, 25N65, 25N65A, 25N03.
Beckwourth	Red Clover Water Quality Improvement Projects	Stream channel stabilization and road improvements.	Red Clover watershed, Roads 24N03Y, 22N22Y, 25N05.
Beckwourth	Frenchman Water Quality Improvement Projects	Stream channel stabilization and road improvements.	Frenchman watershed.
Beckwourth	Lake Davis Water Quality Improvement Projects	Stream channel stabilization and road improvements.	Lake Davis watershed.
Beckwourth	Nelson-Onion Water Quality Improvement Projects	Stream channel stabilization and road improvements.	Nelson-Onion watershed.
Beckwourth	Last Chance Meadow Restoration	Pond and plug to raise level of creek and reconnect the floodplain.	Last Chance watershed from Doyle crossing to Road 26N20.
Beckwourth	Sulphur Creek and Barry Creek Meadow Restoration	Pond and plug to raise level of creeks and reconnect the floodplain.	Sulphur and Barry Creek at their confluence.
Beckwourth	Red Clover and Poco Creeks Meadow Restoration	Pond and plug to raise level of creeks and reconnect the floodplain.	Red Clover and Poco Creeks.
Beckwourth	Dotta Canyon Meadow Restoration	Pond and plug to raise level of creeks and reconnect the floodplain.	Dotta Canyon.
Beckwourth	Red Clover and Dotta Creek Restoration Project	Project consists of restoring an eastside montane meadow (280 acres) and improving channel stability for 2.9 miles within the Upper Feather River Watershed on Red Clover and Dotta Creeks.	Red Clover and Dotta Creeks.

District	Project Name	Project Description	Location
Beckwourth	Meadowview and Rowland Creek Restoration Project	Project consists of restoring two eastside montane meadows (396 acres) and improving channel stability for 4.4 miles within the Upper Feather River Watershed on Last Chance and Rowland Creeks.	Meadowview and Rowland Creeks.
Beckwourth	Middle Fork Whitetop Project	Eradicate tall whitetop along the Middle Fork Feather River using both mechanical and chemical means to control and eradicate this invasive plant species.	Middle Fork Feather River.
Beckwourth	Goat Grazing Tall Whitetop	Approximately100 goats would graze a total of approximately 40 acres within the project area. The grazing would occur in 2009 for approximately 4 weeks. Temporary electric fences would confine the goats to infested areas only.	South of Hwy 70, east of county road A23 in the town of Beckwith, CA.
Beckwourth	Sticky Pyrrocoma Treatment	Improve the habitat for the sensitive plant species sticky Pyrrocoma (Pyrrocoma lucida). The proposed treatment would be at a known occurrence of this plant. The two acre site would be hand-thinned.	T22N R12E SW 1/4 of the NE 1/4 of Section 5.
Feather River	Basin Group Selection	Timber harvest of approximately 1,215 acres of group selection and 80 acres of individual tree selection harvest under the Herger-Feinstein Quincy Library Group Forest Recovery Act pilot project.	Approximately 10 miles southwest of Quincy, CA.
Feather River	Slapjack Project	Construct Defensible Fuel Profile Zones and harvest trees using group selection and individual tree selection under the Herger-Feinstein Quincy Library Group Forest Recovery Act of 1998.	Southwest of Quincy, CA in the vicinity of Challenge, Clipper Mills, Feather Falls, Forbestwon, and Dobbins, CA.
Feather River	Hughes Conifer Thinning Project	Thin out conifers less than 10 inch dbh to enhance habitat for the California Red-legged Frog, a federally listed species.	French Creek watershed.
Feather River	Burnt Bridge/Cottage Creek Blackoak Enhancement	Thin out small size conifers, less than 10 inch diameter, within a blackoak habitat area.	Dobbins watershed; near Challenge, CA.

District	Project Name	Project Description	Location
Feather River	Yuba Feather K-8 School Expansion DM	Amend an existing special use authorization to allow construction & maintenance of restroom, relocate propane tank, install an emergency power generator, upgrade septic system, renovate play field, and install a track w/in boundaries of play field.	Feather River Ranger District.
Feather River	Watdog	Defensible Fuel Profile Zone and Group Selection Harvest as part of the HFQLG Pilot Project.	Southwest of Quincy, CA in the Fall River and South Branch Middle Fork Feather River watersheds.
Feather River	Concow Hazardous Fuels Reduction Project (Revised Flea Project)	Reduce hazardous fuels and restore ecosystems affected by high-intensity wildfire near Paradise, Pulga, and Concow.	near Paradise, Magalia, Pulga, and Concow, CA.
Feather River	St. Louis Fuels Reduction Project	To protect rural communities and forest natural areas from high-intensity wildfires this project proposes construction of DFPZs for hazardous fuels reduction.	Adjacent to the communities of LaPorte, Strawberry Valley and Clipper Mills.
Feather River	On Top DFPZ and Group Selection	This project will establish DFPZs in various locations for fuels reduction and community protection. Group selection is used to test the effectiveness of uneven aged management to promote multi-storied ecologically fire resilient forests.	Bucks Lake area from Soapstone Hill on the west, to Mt. Ararat on the east.
Feather River	Portwine Cemetery Salvage	Removal of recently burned trees from a historic cemetery.	Portwine historic cemetery near LaPorte.
Feather River	French MP Thin Mastication	This project is proposing to thin and masticate plantation units to reduce the amount of woody material and conifers to improve long-term survival and development of conifers.	Rogers Cow Camp to Four Trees Road.
Feather River	Rock Island Mastication Project	This project is proposing to masticate plantations within the Rock Island sale area boundary to enhance conifer growth and reduce woody vegetation and conifers within the plantation.	North of Rogers Cow Camp.
Feather River	LaPorte Fuels Reduction and Black Oak Enhancement	This project proposes to reduce hazardous fuels that pose a risk to life and property to the communities of Strawberry Valley and LaPorte. Also, this project will enhance and protect black oak stands, an important food source to many species.	LaPorte and Strawberry Valley.

District	Project Name	Project Description	Location
Feather River	LaPorte Pines North Hazardous Fuels Reduction	This project is designed to reduce fuels for protection of the LaPorte communnity by providing connectivity with the LaPorte Hazardous Fuels Reduction and Oak Enhancement Project.	LaPorte area.
Feather River	Canyon Complex Salvage, Site Preparation, and Reforestation Project	This project consists of fire and roadside salvage, site preparation, and reforestation within six of the fire areas of the Canyon Complex of 2008 that had high fire severity. Approximately 1-2 million board feet will be salvage logged.	Near the Middle Fork of the Feather River, within Butte and Plumas counties.
Feather River	Concow Reforestation	This project is to site prep, release, and plant a mixture of ponderosa and sugar pine and Douglas fir on approximately 270 acres in the previously burned Concow community area.	Concow area.
Feather River	Pike County Peak Microwave Relay	South Feather Water & Power Agency propose to construct and maintain a microwave system to include new equipment at Pike County Peak.	Feather River Ranger District.
Feather River	Valley Creek Special Interest Area Interpretive Trail	A hiking trail in the Valley Creek Special Interest Area. This area is 0.5 miles north of American House. The trail would be 1.5 miles in length and would form a loop through the area, crossing Valley Creek at two locations.	Valley Creek Special Interest Area.
Feather River	ARRA Trails Maintenance - Feather River Ranger District	Maintenance on portions of any or all of the following: 34 miles of Pacific Crest Trail (PCT), plus approximately 15 miles of PCT feeder trails and maintenance on approximately 90 miles of other district trails.	District Wide - Feather River Ranger District.
Feather River	Hawkeye Tunnel Mining Plan of Operation	Underground mining operation, gravel washing and incidental occupancy for purpose of minerals extraction.	Howland Flat.
Feather River	Lower Middle Fork Feather River Water Quality Improvement Projects	Meadow improvement, stream stabilization, and road improvments.	Cleghorn Bar Road, Boulder Creek.
Feather River	South Fork Feather River Water Quality Improvement Projects	Meadow improvement, road improvements.	South Fork Feather River.

District	Project Name	Project Description	Location
Feather River	Challenge Work Center Invasive Species Management Project	This project is designed to control non-native invasive plant species at the Challenge Work Center Administrative Site utilizing IPM practices.	Challenge Work Center.
Feather River	Golden Trout Crossing Camp rehabilitation	The project consists of maintenance, rehabilitation, modernization and resource protection within the footprint of an existing developed campground.	Campground located adjacent the north and south banks of the South Fork Feather River on 22N24 Road.
Feather River	Little Grass Valley Campground Restoration	This project involves interplanting conifers for forest health while providing privacy screening within the campgrounds.	Little Grass Valley Campground - Road 57.
Feather River	Little North Fork Campground rehabilitation	The project consists of maintenance, rehabilitation, modernization and resource protections within the footprint of an existing developed campground. Dig a vault and install a new single seat vault toilet.	Little North Fork campground.
Feather River	Milsap Bar Campground Rehabilitation	The project consists of maintenance, rehabilitation, modernization and resource protection within the footprint of an existing developed campground.	Milsap Bar campground.
Feather Rive	Rogers Cow Camp Rehabilitation	The project consists of maintenance, rehabilitation, modernization and resource protection within the footprint of an existing developed campground.	Campground located adjacent Merrimac site off Oro-Quincy Hwy.
Mount Hough	Empire Vegetation Management Project	Construction of a Defensible Fuel Profile Zone, Group Selections, and Individual Tree Selection. May involve temporary road construction, road reconstruction, and road closure/decommissioning.	North of Quincy, California.
Mount Hough	Meadow Valley Defensible Fuel Profile Zone and Group Selection	Construction of a Defensible Fuel Profile Zone and Group Selections. May include temporary road construction and road decommissioning.	Surrounding the community of Meadow Valley, CA.
Mount Hough	Canyon Dam Fuel Treatment Project	Mechanical/Hand Thinning and underburning to treat fuels.	Canyon Dam area.

District	Project Name	Project Description	Location
Mount Hough	American Valley Hazardous Fuels Reduction Project	Hand-thinning, piling and burning, mastication, and underburning to reduce hazardous fuels on approximately 346 acres of public land adjacent to private lands within the WUI around Quincy, CA.	East and South of American Valley and the community of East Quincy.
Mount Hough	Webber's Milkvetch (*Astragalus webberi*) Habitat Enhancement Project Phase II	The project will treat approximately 15.75 acres of US Forest Service land using a combination of hand thinning, piling, pile burning, and underburning to enhance Webber's Milkvetch habitat.	Northwest of Quincy, CA adjacent to State Highway 70 near Virgilia.
Mount Hough	Bucks Fen Vegetation Regeneration Project	This project is proposed to install an exclosure around the Bucks fen and install log structure check dams within the exclosure in order to reduce or eliminate the flow channel out of the fen.	The Bucks Fen is within the Bucks Lake Wilderness adjacent to right hand Salt Rock Creek.
Mount Hough	Snake Lake Meadow Thinning	13 acres of small conifer (less than or equal to 8 inches DBH) removal within grassy openings and shoreline at the east end of Snake Lake with the objective to retain meadow openings and edge.	East side of Snake Lake, Plumas County, California.
Mount Hough	Copper Penny & Two Penny mining Plan of Operation	Mining Plan of Operation for placer mining and mining related activities along Lights Creek, on the Mt. Hough Ranger District.	On or near Lights Creek, on the Mt. Hough Ranger District; the nearest town is Greenville.
Mount Hough	Abandoned Mine Closures	District-wide abandoned mine closures.	Mt. Hough Ranger District.
Mount Hough	Advanced Geologic Placer Exploration	Proposed project is for six (6) separate Plans of Operation for six separate areas of placer mining exploration. Proponent would utilize a backhoe to dig trenches, remove material and process through a trommel using water from the creek.	Wolf Creek (2 sites), Forman's Ravine (2 sites), Cooks Creek, Rush Creek.
Mount Hough	Dutch Hill Placer Exploration	Plan of Operations has been submitted to dig 20 test trenches in the Dutch Hill area. Material will be processed through a trommel using water from the creek. Proposal would involve maintenence of a short piece of existing road.	Dutch Hill Placer claim, north of Seneca.
Mount Hough	Dutch Hill Tunnel	This proposal would allow Dennis Scott (owner) and James Moffat (operator) to conduct underground placer mining on the Boomerang claim.	Along the 26N42Y road, Barker Gulch, Seneca, CA.

District	Project Name	Project Description	Location
Mount Hough	Pioneer Drift and Caribou Amend	Reissue a mining plan of operation. Operation would involve hand labor in exisiting mine tunnels and processing of mining material on site.	Near Belden off of Caribou Road.
Mount Hough	CascadeTrailhead Improvements	Improvement of a trailhead for a trail commonly known as the “Cascade Trail” by local trail users. Trailhead improvements will include installation of a vault toilet restroom building, developing a parking area, and developing accessible parking.	Cascade Trailhead, near Quincy, CA.
Mount Hough	Greenville Campground Trail Reconstruction Project	Trail reconstruction activities in two locations within and directly adjacent to the Greenville Campground to provide permanent sloped pedestrian access to a portion of Greenville Campground and Wolf Creek.	Within and adjacent to Greenville Campground and Wolf Creek in Greenville, CA.
Mount Hough	UC Berkeley Forestry Camp Permit Amendment	Amendment to realign 200 feet of road and widening of the existing road within permit boundary to provide better access. Road project activities will require felling of 25 trees from 4-25 inches in diameter.	UC Berkeley Forestry Camp, Meadow Valley, CA.
Mount Hough	Moonlight Road Relocation Project	The proposal is to relocate Forest Service Road 28N03 to a stable location. A landslide blocked access and indicates that the existing road location is on an unstable slope. To prevent further erosion, the existing road will be decommissioned.	The project is located about 10 miles north of Taylorsville, California on Forest Service Road 28N03.
Mount Hough	Rapala Ridge Road Construction Project	A 500 ft. road segment would be constructed on Forest Service land in order to provide access to Soper-Wheeler Company land.	The road segment would be constructed at the end of 24N26A Road south of Thompson Valley.
Mount Hough	Moonlight Project Amendment	Amendment to current mining Plan of Operation for the Moonlight Project. American Sheffield Inc.has proposed to conduct approximately 6,000 feet of additional exploratory drilling.	Proposed operations are in the area of Moonlight Valley.
Mount Hough	Plan of Operation - Dredger's Delight and High Grade Placer Claims	Approval of a plan of operation for placer mining activities which include suction redging, sluicing, and panning on Thompson Creek. Trail improvement and minor construction are required for access to mining operations.	Near Quincy on La Porte - Quincy Highway, on Thompson Creek.

District	Project Name	Project Description	Location
Mount Hough	Plan of Operation - El Rico Mining Claim	Extension of previously authorized Plan of Operation for one year.	2 miles outside of Greenville off of Wolf Creek Road.
Mount Hough	Guzzler Installation Project	Install 4 guzzlers as a partnership between the USFS, Mule Deer Foundation, and National Wild Turkey Federation.	Johnson Hill, Massack, and Will Fire areas.
Mount Hough	Corridor Wildland Urban Interface (WUI) Fuels Reduction Project	Reduce fuels within Quincy Wildland Urban Interface on approximately 550 acres through mechanical removal of biomass and merchantable material, under burning, mastication of brush, hand thinning, piling, and pile burning.	The project is located adjacent to the community of Quincy within the ¼ mile WUI of Chandler Road and Highway 89.
Mount Hough	Hungarian Timber Stand Improvement Project	Mastication of small trees within these plantations would reduce stand density, thereby improving growth and vigor of residual trees and enhancing the development of existing plantations into mature stands.	2 miles west of Quincy, CA.
Mount Hough	Genesee Wildland Urban Interface (WUI) Fuels Reduction and Black Oak Enhancement Project	Reduce the amount of hazardous fuels and remove conifers which are encroaching and overtopping large diameter residual oak trees on approximately 130 acres of Federal System land.	Approximately 3 miles northeast of the Genesee.
Mount Hough	Genessee Valley Forest Rehabilitation Project	A Resource Advisory Committee (RAC) project on private land including: underburning on 80 acres, revegetation of native species on 80 acres, thinning and removal of live and dead trees up to 12" dbh to provide continuity of fuel reduction projects.	Private land off of Beckwourth Genessee road in Genesee Valley adjacent to NFS land.
Mount Hough	Silver Fire Fuel Reduction Project	This project would reduce small fuels by hand thinning, piling and burning, modify small fuels by hand thinning, lopping and scattering, and provide opportunity for firewood gathering in designated areas within the area burned by the Silver Fire.	The Silver Fire burned approximately 307 acres, west of Meadow Valley, CA and can be accessed by NFS road 24N30A.
Mount Hough	Keddie Hazardous Fuels Reduction Project	Construction of fuelbreaks known as Defensible Fuel Profile Zones, thinning and group selection harvests, road improvements, and noxious weed treatments.	Keddie Project is within the vicinity of Keddie Ridge, Round Valley Reservoir, and Mt. Jura. Communities within include Greenville, Crescent Mills, and Taylorsville, California.

District	Project Name	Project Description	Location
Mount Hough	Moonlight and Wheeler Fires Recovery and Restoration Project	Harvest dead trees utilizing ground-based, skyline, and helicopter logging systems. Construct about 25 miles of temporary roads to access the treatment units. Include reforestation on approximately 17,000 acres.	The project area is located northeast of Greenville and north of Taylorsville in the Lights Creek and surrounding drainages.
Mount Hough	2009 Moonlight Fire Reforestation Project	Re-establish forested conditions within areas that burned with high vegetation burn severity through reforestation and cultural treatments.	2 to 11 miles northwest of Antelope Lake.
Mount Hough	Rich Fire Recovery Project	Allow for economic recovery of fire-killed timber (Rich Fire), reduce hazardous fuels within the Twain Wildland Urban Interface (WUI) over the long term, and plant native seedlings to re-establish forested conditions.	Rich Gulch along Highway 70 and Plumas County Road 317.
Mount Hough	McFarland Ravine Drift Fence Project	This project would build a two mile drift fence to keep cows within the Bear Creek Allotment.	The two mile drift fence would be constructed within the Bear Creek Allotment.
Mount Hough	Upper Indian Creek Water Quality Improvement Projects	Stream channel stabilization and road improvements.	Upper Indian Creek watershed, Roads 27N25Y, 27N19Y, 27N20Y, 27N22Y, 29N43.
Mount Hough	Black Gulch Stream Stabilization Project	Stabilize the crossing of NFS road 25N95 at Black Gulch where the culvert is resulting in excessive erosion and obstructing aquatic organism passage. Actions include culvert removal, placement of large rock, and revegeation with riparian species.	Crossing of NFS road 25N95 at Black Gulch.
Mount Hough	Greenhorn Creek Restoration Project	A RAC project proposed to restore trout populations and bank stability to Greenhorn Creek in American Valley. Fish passage and bank stabilization improvements would be made in six locations along Greenhorn Creek.	The project area encompasses private lands and NFS land along Greenhorn Creek in American Valley.
Mount Hough	Wildcat/Boulder Restoration Project	Stabilize stream bed, improve aquatic species passage, and reduce sediment transport rates.	Boulder Creek and Thompson Creek, north of Antelope Lake.

Table 182. Present and Reasonably Foreseeable Future Timber Harvest Plans (THPs) on Adjacent Private Lands

District	Project Name	Project Description	Location
Beckwourth	Pacific Peninsula-Whitehawk Sub THP	25 acres THP	T21N R13E Sec 5 T22N R13E Sec 32
Beckwourth	Poplar THP	343 acres THP	T22N R11E Sec 10,14,15
Beckwourth	Feather River Inn THP Smith Creek THP	648 acres THP	T22N R12E Sec 9, 17, 20
Beckwourth	Tan Tau Ranch THP Woodbridge THP	468 acres THP	T22N R13E Sec 29,30
Beckwourth	South Lava THP Sloat THP	1,284 acres THP	T23N R11E Sec 5,6,16 T24N R12E Sec 25,29-32,36
Beckwourth	Hungry Creek THP	159 acres THP	T26N R12E Sefc 6,7,8
Beckwourth	Cradle Valley THP	94 acres THP	T27N R13E Sec 3
Beckwourth	Heisey THP	156 acres THP	T28N R13E Sec 27
Beckwourth	THP Conversion Exemption	0.21 acre Conversion	T22N R11E Sec 24
Beckwourth	THP Conversion Exemption	5.05 acres THP Conversion	T22N R12E Sec 15,16,22,25
Beckwourth	THP Conversion Exemption	4.74 acres THP Conversion	T22N R13E Sec 1,32
Beckwourth	THP Conversion Exemption	0.5 acres THP Conversion	T23N R11E Sec 13
Beckwourth	THP Conversion Exemption	1.65 acres THP Conversion	T23N R13E Sec 12,36
Beckwourth	THP Conversion Exemption	9.96 acres THP Conversion	T23N R14E Sec 16,17,21
Beckwourth	THP Conversion Exemption	1 acres THP Conversion	T24N R11E Sec 33
Beckwourth	THP Fire Hazard Trees	0.4 acres Hazard Tree Removal	T21N R13E Sec 33
Beckwourth	THP Fire Hazard Trees	0.5 acres Hazard Tree Removal	T22N R12E Sec 33
Beckwourth	THP Fire Hazard Trees	0.3 acres Hazard Tree Removal	T24N R11E Sec 33
Beckwourth	THP Public Agency, Uitility Exemption	5 acres THP	T21-24N R10-14E Various Sec
Beckwourth	THP Public Agency, Uitility Exemption	80 acres THP	T22N R12E Sec 12-14,23-25
Beckwourth	THP Public Agency, Uitility Exemption	0.5 acres THP	T22N R13E Sec 30
Beckwourth	THP Public Agency, Uitility Exemption	33 acres THP	T23N R12E Sec 32
Beckwourth	THP Public Agency, Uitility Exemption	2 acres THP	T23N R13E Sec 12
Beckwourth	THP Dead, Fuelwood	0.1 acres Salvage THP	T23N R13E Sec 36
Beckwourth	THP Dead, Fuelwood	20 acres Salvage THP	T28?N R12E Sec 36
Beckwourth	THP Dead, Fuelwood	134 acres Salvage THP	T28N R13E Sec 21,22,27
Beckwourth	THP Fire Prevention	230 acres THP	T22N R13E Sec 20,21

District	Project Name	Project Description	Location
Mt Hough	Poplar Valley 2 THP	528 acres THP	T23N R11E Sec 20,21,28,29
Mt Hough	Bucks THP Norton THP	594 acres THP	T23N R7E Sec 1,2,3,10
Mt Hough	Rocky THP	637 acres THP	T23N R9E Sec 16
Mt Hough	Chandler THP	71 acres THP	T24N R9E Sec 2 T25N R9E Sec 35
Mt Hough	Rapala Ridge THP	385 acres THP	T24N R10E Sec 27,28
Mt Hough	Williams THP	382 acres THP	T24N R11E Sec 7,8,17-20
Mt Hough	Middle Ridge THP	1,538 acres THP	T24N R8&9E Various Sec
Mt Hough	Baker Forest 2006 THP Meadow Valley THP	500 acres THP	T24N R8E Sec 10,11,14,15,22,26,27
Mt Hough	Boyle Ravine THP	15 acres THP	T24N R9E Sec 23
Mt Hough	Soda Creek THP	640 acres THP	T25N R9E Sec 6 T26N R9E Sec 31
Mt Hough	12 Meadows THP Lehr THP	71 acres THP	T25N R8E Sec6,7,22,23
Mt Hough	Watertrough THP	3,662 acres THP	T26&27N R8&9E Various Sec
Mt Hough	Greenview THP Greenville Red River THP	1,392 acres THP	T26N R9E Sec 3,5,8,10,11,14,36 T27N R10E Sec 31,32 T27N R9E Sec 33,34,36
Mt Hough	Humbug THP	1,237 acres THP	T26N R7E Sec 4,5,7,8
Mt Hough	Red Rock THP Fant THP	3,195 acres THP	T27&28N R11&12E Various Sec
Mt Hough	Clearview THP	1,524 acres THP	T27N R8E Sec 1,2,3,22,23,26,27 T28N R8E Sec 34,35
Mt Hough	Indicator THP	618 acres THP	T27N R10E Sec 3,10 T28N R10E Sec 15-35
Mt Hough	Wilcox Valley THP	15 acres THP	T27N R11E Sec 23
Mt Hough	Ohio Valley THP	640 acres THP	T27N R7E Sec 36
Mt Hough	Hauns Creek THP	2,568 acres THP	T27N R8&9E Various Sec
Mt Hough	THP Conversion Exemption	0.29 acres THP Conversion	T22N R11E Sec 24
Mt Hough	THP Conversion Exemption	2.21 acres THP Conversion	T24N R10E Sec 19,20
Mt Hough	THP Conversion Exemption	0.5 acres THP Conversion	T24N R11E Sec 33
Mt Hough	THP Conversion Exemption	0.5 acres THP Conversion	T24N R11E Sec 33
Mt Hough	THP Conversion Exemption	0.5 acres THP Conversion	T24N R8E Sec 22
Mt Hough	THP Conversion Exemption	0.85 acres THP Conversion	T24N R9E Sec 2
Mt Hough	THP Conversion Exemption	0.85 acres THP Conversion	T28N R71E Sec 7,36

District	Project Name	Project Description	Location
Mt Hough	THP Fire Hazard Trees	3 acres Hazard Tree Removal	T24N R8E Sec 14,23
Mt Hough	THP Fire Hazard Trees	1.5 acres Hazard Tree Removal	T24N R9E Sec 23
Mt Hough	THP Fire Hazard Trees	5 acres Hazard Tree Removal	T26N R9E Sec 3,4
Mt Hough	THP Fire Hazard Trees	0.5 acres Hazard Tree Removal	T27N R7E Sec 1
Mt Hough	THP Public Agency, Uitility Exemption	20 acres THP	T23N R11E Sec 6 T24N R11E Sec 31
Mt Hough	THP Public Agency, Uitility Exemption	5 acres THP	T23N R7E Sec 3
Mt Hough	THP Public Agency, Uitility Exemption	5 acres THP	T24N R10E Sec 7,18
Mt Hough	THP Public Agency, Uitility Exemption	155 acres THP	T24N R11E Sec 27-34
Mt Hough	THP Public Agency, Uitility Exemption	2.6 acres THP	T24N R9E Sec 10,13,15
Mt Hough	THP Public Agency, Uitility Exemption	1 acres THP	T27N R9E Sec 33
Mt Hough	THP Emergency Operations	280 acres Salvage THP	T27N R11E Sec 1,2,12
Mt Hough	THP Emergency Operations	130 acres Salvage THP	T28N R11E Sec 28,29
Mt Hough	THP Dead, Fuelwood	1,013 acres Salvage THP	T26N R9E Sec 4 T26N R10E Sec 35,36 T27N R9E Sec 25 T27N R10E Sec 30,31 T27N R11E Sec 34,35
Mt Hough	THP Dead, Fuelwood	44,044 acres Salvage THP	Various
Mt Hough	THP Dead, Fuelwood	0.5 acres Salvage THP	T26N R10E Sec 9,13
Mt Hough	THP Dead, Fuelwood	15 acres Salvage THP	T27N R10E Sec 13,24
Mt Hough	THP Dead, Fuelwood	20 acres Salvage THP	T27N R11E Sec 30
Mt Hough	THP Dead, Fuelwood	0.5 acres Salvage THP	T28N R7E Sec 25
Mt Hough	THP Dead, Fuelwood	107,381 acres Salvage THP	Various
Mt Hough	THP Slash Removal	95 acres woody debris and slash removal THP	T24N R10E Sec 20,21,27,28
Mt Hough	THP Fire Prevention	25.5 acres THP	T24N R11E Sec 33
Mt Hough	THP Fire Prevention	6 acres THP	T26N R9E Sec 10
Mt Hough	THP Damaged Timber (Unmerchantable)	693 acres THP	T27N R11E Sec 35,36 T27N R12E Sec 1,31 T28N R11E Sec 6,36 T28N R12E Sec 6
Mt Hough	THP Damaged Timber (Unmerchantable)	190 acres THP	T27N R11E Sec 1,12
Mt Hough	THP Damaged Timber (Unmerchantable)	200 acres THP	T27N R11E Sec1,2
Mt Hough	Hungry Creek TMP	160 acres NTMP	T26N R12E Sec 6,7,8
Mt Hough	Indian Valley Forests THP	535 acres NTMP	T26N R9E Sec 12,13

District	Project Name	Project Description	Location
Feather River	Indian Ranch Road THP Ingersoll THP Thompson THP	767 acres THP	T18N R7E Sec 5,7,28,34
Feather River	Woodleaf THP A & B THP Howard THP Knox THP Prater 2 THP	1,032 acres THP	T19N R7E Sec 2,5,10,18,32 T20N R7E Sec 33
Feather River	Frey THP Midfall THP	598 acres THP	T20&21N R6&7E Various Sec
Feather River	Harrison Ridge THP	1,001 acres THP	T20N R8E Sec 34,35 T21N R8E Sec 1-4,9,10
Feather River	Soper Office THP Camp Paradise THP Jackass Flat THP Big Oak 2 THP Old Office THP	1,918 acres THP	T20N R7E Sec 13,23-26,35,36 T20N R8E Sec 19,20,24-26,29,31
Feather River	Stanwood Junction House THP Freds 7 Acres THP	300 acres THP	T21N R6E Sec 7,27 T22N R6E Sec 16,22
Feather River	Sullivan N Bald Rock THP Hard N Bald Rock THP	101 acres THP	T21N R5E Sec 25,36
Feather River	Rack THP Wyles THP	414 acres THP	T22N R8E Sec 16,17,22,23,26,27,29,30,32
Feather River	Duffy Dome THP	401 acres THP	T23N R6E Sec 16
Feather River	Evers THP	40 acres THP	T24N R4E Sec 8
Feather River	THP Conversion Exemption	1 acres THP Conversion	T20N R5E Sec 2
Feather River	THP Conversion Exemption	1.53 acres THP Conversion	T21N R5E Sec 35
Feather River	THP Conversion Exemption	4.4 acres THP Conversion	T23N R3E Sec 11,27
Feather River	THP Fire Hazard Trees	0.5 acres Hazard Tree Removal	T19N R6E Sec 11
Feather River	THP Fire Hazard Trees	0.25 acres Hazard Tree Removal	T21N R9E Sec 4
Feather River	THP Fire Hazard Trees	0.25 acres Hazard Tree Removal	T22N R3E Sec 15
Feather River	THP Fire Hazard Trees	0.5 acres Hazard Tree Removal	T23E R3E 1
Feather River	THP Public Agency, Uitility Exemption	1 acres THP	T19N R7E Sec 9
Feather River	THP Emergency Operations	370 acres Salvage THP	T21N R7E Sec 30
Feather River	THP Dead, Fuelwood	6,771 acres Salvage THP	T17-20N R6-8E Various Sec
Feather River	THP Dead, Fuelwood	3,666 acres Salvage THP	T18&19N R6&7E Sec 5,6,8,15,22,23,25,27,35,36,29,31

District	Project Name	Project Description	Location
Feather River	THP Dead, Fuelwood	132 acres Salvage THP	T19&20N R6&8E Sec 21,25,26
Feather River	THP Dead, Fuelwood	3,046 acres Salvage THP	T19&20N R7E Sec 1,9-11,14,15,20,28,36
Feather River	THP Dead, Fuelwood	815 acres Salvage THP	T19N R6E Sec 4,9-11,16,20
Feather River	THP Dead, Fuelwood	764 acres Salvage THP	T19N R7E Sec 13,23,24,26
Feather River	THP Dead, Fuelwood	40 acres Salvage THP	T19N R9E Sec 21,22
Feather River	THP Dead, Fuelwood	3,712 acres Salvage THP	T20-22N R4-6E Sec 30,7,6,1,11,13,14,7,22,27,9
Feather River	THP Dead, Fuelwood	26,999 acres Salvage THP	T20&21N R6-8E Sec 1-35
Feather River	THP Dead, Fuelwood	12,632 acres Salvage THP	T20&21N R7&8E Sec 1-4,9-15,21-30,30-33,35
Feather River	THP Dead, Fuelwood	1,590 acres Salvage THP	T20N R9E Sec 4-9,16-20
Feather River	THP Dead, Fuelwood	1,474 acres Salvage THP	T21&22N R4-6E Sec 19,24,34,27
Feather River	THP Dead, Fuelwood	14,314 acres Salvage THP	T21&22N R7&8E Sec 1-20,22-24,26-35
Feather River	THP Dead, Fuelwood	4,457acres Salvage THP	T21&22N R9&10E Sec 1-6,8-10,16,23-27,30,32,34-36
Feather River	THP Dead, Fuelwood	1,474 acres Salvage THP	T21&22N R4-6E VariousSec
Feather River	THP Dead, Fuelwood	17.5 acres Salvage THP	T21N R5E Sec 27
Feather River	THP Dead, Fuelwood	1,612 acres Salvage THP	T21N R8&9E Sec 13,18,20,23-26,30,31
Feather River	THP Dead, Fuelwood	966 acres Salvage THP	T22N R9E Sec 11,14,15,22,23
Feather River	THP Dead, Fuelwood	640 acres Salvage THP	T23N R6E Sec 16
Feather River	THP Dead, Fuelwood	304 acres Salvage THP	T23N R7E Sec 16
Feather River	THP Dead, Fuelwood	960 acres Salvage THP	T23N R9E Sec 25,26,35,36 T23N R10E Sec 30,31
Feather River	THP Dead, Fuelwood	1,600 acres Salvage THP	T24N R5E Sec 3,9-11,13-16,22-28,34-36
Feather River	THP Fire Prevention	88 acres THP	T21N R9E Sec 4
Forest Wide	THP Dead, Fuelwood	557 acres Salvage THP	T21&23N R9&11E Sec 1,3,5,6,16,31
Forest Wide	THP Dead, Fuelwood	12,918.5 acres Salvage THP	T22-25N R8-12E Sec 1-4,6,7,10-15,17-30,32,33,35,36
Forest Wide	THP Dead, Fuelwood	20,708 acres Salvage THP	Various

Forest Wide	THP SUMMARY	THP TYPE	ACRES
		THPs	30,755.7
		Conversions	37.9
		Fire Hazard Removal	12.7
		Public Agency, Utility	310.1
		Emergency Operations	780
		Dead, Fuelwood	274,797.1
		Other Exemptions	1,527.5
		TOTAL	**308,221**

Appendix D: Society, Culture, and Economy

Introduction

The Plumas National Forest is located in portions of five northern California counties: Plumas, Butte, Sierra, Lassen and Yuba. Table 183 reports the total county size in acres and the proportion of land base within these counties managed by the Plumas National Forest. Because of the Forest's geographic proximity to Nevada, Washoe County is also important to local residents in terms of socio-economics. Cities and towns in Washoe County are a critical source of goods and services for residents living in this portion of northeastern California, and conversely, residents of Washoe County frequent National Forest lands managed by the Plumas for recreational and other activities. For purposes of this analysis, Washoe County is therefore considered part of the Plumas National Forest's area of influence.

Table 183. Acres of Plumas National Forest Lands, by County

County	Total Acres [1]	Plumas NF Acres [2]	Percent of County
Plumas	1,672,320	1,000,260	60%
Butte	1,073,280	84,040	8%
Sierra	615,680	40,008	6%
Lassen	3,020,800	29,303	1%
Yuba	412,160	22,394	5%

[1] Total acres calculated as total square miles in the county multiplied by 640 acres per square mile. Total square miles reported in http://en.wikipedia.org.
[2] Source: USDA Forest Service FS-383, January 2008

In comparison to some of the more urban counties of California, the Plumas Study Area is very rural. Thus, interactions between the Forest and local communities are likely to be very important for the social and economic well-being of the area. Three of the California counties (Plumas, Sierra and Lassen) are very different in terms of proximity to the Forest land base, demographics, economic base and tax structure when compared to the other two California counties (Butte, and Yuba) and the Nevada county (Washoe). This study looks at the 5 counties with Plumas National Forest acreage as the main influence on recreation with the knowledge that other counties in California and Nevada impact recreation on the Plumas NF.

Population and Demographics

Historical Background

Archaeological and historical data indicate that people have lived in the geographic region of the Plumas National Forest (PNF) for thousands of years (See Cultural Resources, Chapter 3).

Today, people in the region derive their livelihood in diverse ways. Many American Indian families descended from the original inhabitants of the area still occupy the region. Ranching is still important to local communities, and many of the ranching families have historic ties to the area. National Forest lands are utilized primarily for logging and recreation. The Forest also issues permits for mining, grazing, firewood cutting and other special uses. Hydroelectric, geothermal and wind power utilization and exploration are also occurring on the Forest.

Current Population and Growth Trends

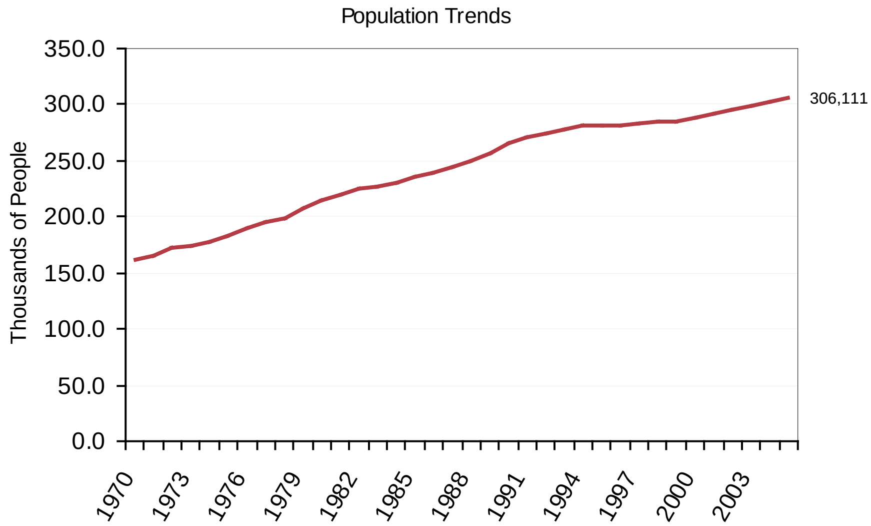
Population, age and racial distributions of county residents are important socioeconomic considerations in land management planning. The following sections highlight demographic trends in the five county study areas. Population forecasts provide a projection of future population levels, which may help to indicate whether there is potential for increased demand on Forest resources. Age distributions provide insight into the socio-economic dynamic of the local area, and allow for an assessment of the proportion of individuals in the working age group versus retirees and minors who typically use local services in different ways. Similarly, the racial composition of residents has potential to affect natural and cultural resource uses of public lands.

Population

The following section highlights trends and considerations of the Plumas NF 5 County Aggregation. Population projections predict what the population levels may be in the future. As mentioned, these numbers help to indicate whether there is the potential for increased pressure on Forest resources. For example, future population increases may change travel management patterns, and interest in recreational opportunities. Population increases may also lead to conflicts over natural resources such as water, timber, and minerals. In short, land managers may have to contend with changing societal interests, demands and economics in order to balance land use and resource management objectives.

The figure below reports the population in the Plumas NF 5 County Aggregation 1970 to 2006. In recent years, populations have remained relatively stable: Plumas, Sierra and Lassen Counties have experienced minimal population growth, while Butte and Yuba Counties have had slow, but steady, growth since 1970. There have been no sharp increases or decreases in population to suggest significant changes in the economic or social structure of the counties.

Figure 9. Population Estimates [1] and Projections [2] for Plumas National Forest Study Area Counties



Some rural areas in California have seen substantial population growth in recent years due to the attraction of nearby natural resources. Many retirees have left more congested areas to be closer to the visual and recreational amenities offered by National Forest System (NFS) lands. In the case of the Plumas National Forest, nearby counties have been experiencing slow growth. This is likely due to the remoteness of the area and immense distance from urban centers. Furthermore, retirees often require medical services not readily available in Plumas County, which could be a contributing factor in slower population growth in that County.

Age Distribution of the Population

The age distribution of the local population can have various influences over the demands for, and participation in, activities on national Forests. Different age groups are likely to gravitate toward different natural resource-based activities. The median age in each county of this region is higher than the median age for California (see table below). This suggests that residents in the Plumas National Forest study area are older than residents in more urban areas of California. This is likely due to inadequate job opportunities to draw a younger demographic.

Table 184. Median Age by State and 5 county Aggregation (Source: US Census 2000)

Area	Median Age
State of California	33.3
5 County Aggregation	35.6

In terms of the distribution of age groups, all counties in the Plumas National Forest study area are predominantly middle aged. The table below reports the age distribution for the 5 county aggregation. Most individuals lie within the under 20-year old age group, suggesting that the majority of residents in the study area are of school age and do not support themselves. Those areas with an older population typically have a higher percentage of retirees, and are thus less dependent on local employment conditions due to the influence of transfer payments from outside the local region. Plumas and Sierra Counties have a substantial proportion of individuals over the age of 65, more so than State of California as a whole.

Table 185. Age and Gender Distribution by 5 county Aggregation

	Total	Under 20 years		40 - 54 (Baby Boom in 2000)		65 years and over		Median Age	Density (Pop. per sq. mi.)
	Number	Number	Share	Number	Share	Number	Share		
Total Population									
2000	287,769	83,513	29%	58,654	20%	42,820	15%	35.6	50
1990	263,405	75,855	29%	40,787	15%	41,522	16%	33.1	46
10 Yr. Change	+24,364	+7,658	0%	+17,867	+5%	+1,298	-1%	+2.5	+4
10 Yr. % Change	+9%	+10%		+44%		+3%		+8%	+9%
2000 Gender									
Male	142,090	43,057	30%	28,759	20%	18,535	13%	33.7	
Female	145,679	40,456	28%	29,895	21%	24,285	17%	37.3	
Male/Female Split	49%/51%	52%/48%		49%/51%		43%/57%			

Ethnicity

The following table reports the racial distribution percentages for the five-county analysis area and the state of California. The vast majority of residents around the Plumas National Forest are Caucasian. This is a very different ethnic composition than the state average for California. At the county level, all counties have a higher percentage of Caucasian residents than the state on a whole. Of the five counties, Yuba is the most ethnically diverse with nearly 35 percent of the population being something other than Caucasian.

Table 186. Racial Percentages of Total Population by County and State, Census 2000

Area	Total Population	White	Black/ African-American	Am. Ind. & Alaska Native	Asian/ Pacific Islander	Other Race	Hispanic Origin (of any race)[1]
California	33,871,648	46.7	6.4	0.5	11.1	2.9	32.4
Plumas	20,824	88.7	0.6	2.1	0.6	2.3	5.7
Butte	203,171	80.0	1.3	1.6	3.4	3.1	10.5
Sierra	3,555	90.3	0.2	1.6	0.2	1.7	5.9
Lassen	33,828	70.6	8.8	2.8	1.1	2.8	13.9
Yuba	60,219	65.3	3.0	2.2	7.6	4.6	17.3

Source: US Census 2000

[1] People of Hispanic origin may identify with any race (http://www.census.gov/population/ www/socdemo/compraceho.html). Because of this, summing the ethnic distribution in an area often results in a sum of greater than 100%; this is the case in this table.

American Indian Rights and Interests: Affected Environment

Laws Pertaining to American Indian Tribes

Laws pertaining to the rights of federally-recognized American Indian tribes acknowledge that these tribes have specific rights and interests, many unlike those accorded to other governments. An important distinction in U.S. law is that federally-recognized tribes are not a special interest group: they are sovereign governments distinct from Federal and state governments. This legal standing confers government-to-government relations between the Federal Government and each federally-recognized tribe. Powers that Federal laws do not expressly limit remain inherent powers of individual tribes. Reservations, Rancherias, and Indian colonies all make up “Indian Country” as defined in the 1948 Indian Country Statute. American Indian governments have jurisdiction and authority over resources on Indian Country lands. On lands outside Indian Country, rights reserved for tribal governments may include: hunting and fishing; traditional natural resources gathering for plants, mushrooms and minerals; and water rights.

Federal policy for tribes emphasizes self-determination and government-to-government relationships. The table below lists major laws that shape how the Federal Government supports tribal self-determination interests and government-to-government consultation. In addition, a long tradition of case law has defined reserved rights for American Indians, including water rights and the trust responsibilities of the Federal Government, among others (Getches et al. 1998).

Table 187. Federal Laws Relevant to American Indian Concerns Regarding National Forest Management

Law	Purpose
National Environmental Policy Act of 1969	Requires consideration of effects on cultural values and diversity.
American Indian Religious Freedom Act of 1978, as amended in 1994	Protects Indian religious practices and access to sacred sites.
Federal Land Policy and Management Act of 1976	Coordinates with Indian tribes to inventory, plan, and manage resources of value to tribes.
National Historic Preservation Act of 1976	Accounts for impacts of management on prehistoric and historic sites.
Archeological Resources Protection Act of 1979, as amended in 1992	Protects archeological resources and requires that affected tribes be notified if archeological studies might harm or destroy culturally or spiritually important sites.
American Indian Graves Protection and Repatriation Act of 1990	Requires consultation with tribes about disposition of American Indian remains, funerary objects, and other cultural relics.

American Indian groups exert influences at national, regional, and local levels. For this Environmental Impact Statement, their influence is most pronounced at the local level. There are seven Indian tribes and communities residing in or near the Plumas National Forest. Indian people make up approximately 3.8 percent of the total population within the Plumas National Forest region. This is high compared to the statewide average, which is 0.5 percent. The Forest Service consults with Federally recognized tribes, non-recognized tribes, organizations, and individuals to comply with the laws displayed in the table above.

American Indians and the Plumas National Forest

The seven federally-recognized tribes of concern for this analysis are as follows (the tribes of origin for each separate entity are stated in parentheses):

1. Concow Maidu Tribe of Mooretown Rancheria (Maidu)
2. Estom Yumeka Maidu Tribe of Enterprise Rancheria (Maidu)
3. Greenville Rancheria (Maidu)
4. Mechoopda Indian Tribe of Chico Rancheria (Maidu)
5. Susanville Indian Rancheria (Mountain Maidu, Pit River, Paiute, and Washoe)
6. Tyme Maidu Tribe of Berry Creek Rancheria (Maidu)
7. Washoe Tribe of Nevada and California

Importance of National Forest Lands and Resources to American Indian People

Contemporary American Indian uses of the Forest include, but are not limited to, cultural events, religious ceremonies, food gathering, and collection of medicinal plants and basketry materials (http://www.fs.fed.us/r5/Plumas /about/Plumas-history).

There are several known Traditional Cultural Properties (TCPs) on the Forest. TCPs are places that are critical to the continuation of the cultural traditions, beliefs, practices, life ways, arts, crafts, and social institutions of tribal communities. For example, a TCP may be a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world. Only one TCP on the Forest is listed the National Register of Historic Places (NRHP). Many more are known to exist, however, and may be nominated to the NRHP in the future (see NRHP Bulletin 38 www.nps.gov/history/nr/publications/bulletins.htm for additional information). While not specifically identified as TCPs, there are a number of sites on the Forest used for traditional ceremonies.

The Plumas National Forest also provides a variety of food resources that are vital to modern Indian communities. For example, acorns, berries, bulbs, and many other food sources are located on public lands. It is believed that such foods help to regulate health conditions for American Indians. As tribal people have been forced to abandon their traditional life ways, many negative health consequences have resulted including development of chronic conditions like diabetes and high blood pressure. Rancherias in the study area tend to be very small, with little in the way of natural resources. Access to public lands, and the resources managed by the Forest is an important issues to Tribes in the region.

Environmental Consequences for American Indian Population

Tribes are likely to continue to use Forest resources for the reasons discussed above. The ability to access and utilize Forest resources is clearly important to continuation of traditional life ways. Please see the Environmental Justice section below for further discussion.

Civil Rights Impact Analysis

USDA civil rights policy requires each agency to analyze the civil rights impact(s) of policies, actions, or decisions that will affect federally-conducted and federally-assisted programs and activities. A Civil Rights Impact Analysis (CRIA) facilitates the identification of the effects of eligibility criteria, methods of administration, or other agency-imposed requirements that may adversely and disproportionately impact employees or program beneficiaries based on their membership in a protected group. Protected groups include multiples of similarly situated persons who may be distinguished by their common race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetics, political beliefs, or receipt of income from any public assistance program.

Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory. However, some groups could be impacted more than others. This assessment addresses such concerns.

Public Involvement and Scoping

Public involvement concerning the proposed project began with travel analysis that focused on the identification of unauthorized routes and assessing the effects of prohibiting cross-country motorized travel on forest users. This initial phase of public involvement began during the summer and fall of 2004, when an independent contractor reviewed and mapped routes and areas used by OHVs on the Forest. During 2004 and 2005, the Forest also sought route information from the public and validated route locations and mapped them. On May 14, 2005, the Forest provided on-the-ground training for the public to locate and map their favorite riding areas so they could effectively provide that information to the Forest Service.

In December 2006, public meetings were held in Oroville, Portola, and Quincy explaining the temporary Forest Order (effective December 31, 2006) that restricted OHV use to mapped roads, trails and areas.

In the spring of 2007, a series of three public meetings and three workshops were conducted to identify which of the routes and areas should become part of the proposed action, the type of use that each would have, and locations to be considered for dispersed recreation use per the new Travel Management Rule. The concept of “mixed use” was also introduced during these meetings. At the first session of the two-part series, public meetings were held in Quincy (April 17) Portola (April 18), and Oroville (April 19). At the second set of workshops, individuals worked with Forest Service specialists to identify important routes. These meetings were held in Blairsden (May 2), Quincy (May 3) and Oroville (May 10). Groups shared their ideas and their various concerns. Roughly 300 people participated in these workshops. In early 2007, an e-mail update was issued sharing information on the meetings and the outcome. The Forest Service Interdisciplinary Team took this information and developed the proposed action for the NOI. The proposed action was designed to include as many routes as possible that were requested by the public, including some with known or suspected resource impacts.

Tribal consultation occurred concurrently with other public involvement activities. The project was discussed at multiple meetings with Concow Maidu Tribe of Mooretown Rancheria, Estom Yumeka Tribe of Enterprise Rancheria, Greenville Rancheria, Mechoopda Indian Tribe of Chico Rancheria, Susanville Indian Rancheria, Tyme Maidu Tribe of Berry Creek Rancheria, and Washoe Tribe of California and Nevada. Letters were sent to the tribes throughout the planning process, as well.

Public scoping for this environmental impact statement began with a Notice of Intent published in the Federal Register on January 3, 2008. Scoping for the proposal was conducted through March 3, 2008. Presentations to a variety of groups, phone calls, news releases, website postings and emails were used to alert the public of the opportunity to comment on the proposed action. Public meetings were held in Blairsden (January 15), in Quincy (January 22) and in Oroville (January 29) to explain the Proposed Action. Over 3,300 comments were received. Many were identical emails.

Following four years of work and over 20 public meetings and workshops, the Draft Environmental Impact Statement (DEIS) was released for public comment. Interested parties, tribes and reviewing agencies were sent a letter on December 18, 2008. The DEIS, maps, and specialist reports were posted on the web the same day. Hard copies and/or CDs of the DEIS were sent to tribes and reviewing agencies requiring them. Remaining interested and agencies received a summary and website location for downloading documents and maps. A followup letter was sent to the same mailing list on December 22, 2008 to correct the expected notice of availability date in the original letter. The notice of availability was published by the Environmental Protection Agency in the Federal Register on December 29, which initiated the 45-day comment period. A legal notice was published in the Feather River Bulletin on January 7, 2009. The Forest Service received several comments requesting an extension to the comment period. The Forest Supervisor decided to extend the comment period an additional 30 days. On February 4, 2009, a legal notice explaining the extension was published in the Feather River Bulletin. A letter was sent to interested parties and reviewing agencies on February 6, 2009. The Forest Tribal Relations Specialist contacted tribal representatives by phone. The Environmental Protection Agency published an amended notice in the Federal Register extending the comment period on February 13, 2009. A 75-day comment period on the Draft Environmental Impact Statement was completed on March 16, 2009

Concerns and Mitigations Related to Potential Civil Rights Impacts

Through these public involvement efforts and interdisciplinary discussions, several concerns were raised and are addressed below:

Impacts on People with Disabilities and the Elderly. Throughout scoping, concerns have been raised about the impact of this travel management proposal on people with disabilities and the elderly. Commenters have asserted that the proposal unfairly discriminates against these groups because they are more dependent on motor vehicles to access and enjoy our National Forests.

Comments from people with disabilities and the elderly, including references to specific sites or locations, were considered in the development of alternatives. Recreation opportunities and access needs for all users are some of the criteria used in the process of developing the selected alternative.

Implementation of the Travel Management Rule, Subpart B, including the prohibition of cross country travel, is forest-wide and applies to all forest users equally. Changes to the National Forest Transportation System are largely limited to changes in vehicle class. Motorized access on NFS routes is expected to be enhanced by the addition of unauthorized routes and the addition of vehicle classes on routes where such use has been prohibited.

There is no legal requirement to allow people with disabilities to use motor vehicles on roads, on trails, and in areas that are closed to motor vehicle use. Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory. Generally, granting an exemption from designations for people with disabilities would not be consistent with the resource protection and other management objectives of travel management and would fundamentally alter the nature of the Forest Service's travel management program (29 U.S.C. 794; 7 CFR 15e.103).

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. Consistent with 36 CFR 212.1, FSM 2353.05, and Title V, Section 507(c), of the Americans With Disabilities Act, wheelchairs and mobility devices, including those that are battery-powered, that are designed solely for use by a mobility-impaired person for locomotion and that are suitable for use in an indoor pedestrian area are allowed on all NFS lands that are open to foot travel.

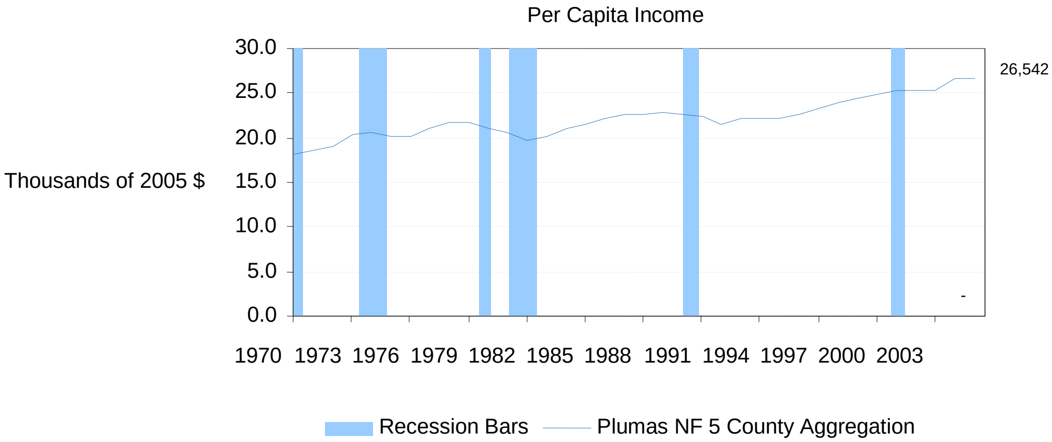
Impacts on People with Limited English Proficiency. In California, people of Hispanic origin comprise a large part of the population and enjoy access to the National Forests for a variety of recreation and business pursuits. Many of these users speak English as a second language and therefore may have limited ability to read maps or other publications pertaining to travel management. In particular, the Forest Motor Vehicle Use Map (MVUM) is a concern since the MVUM will be the basis for enforcing vehicle restrictions. NFTS routes that are open for public use will be designated on the MVUM and users that leave designated routes will be subject to fines. There is a concern that people with limited English proficiency will be more vulnerable to citation if they are unable to read or understand the MVUM.

Employment and Income: Environmental Consequences

Per Capita Income

Per capita income is often used as a measure of economic performance, but it should be combined with changes in earnings per job for a realistic picture of economic health: Since total personal income includes income from 401(k) plans as well as other non-labor income sources like transfer payments, dividends, and rent, it is possible for per capita income to rise, even if the average wage per job declines over time. In other words, non-labor sources of income can cause per capita income to rise, even if people are earning less per job.

Figure 10. Per Capita Income for the Plumas Five-County Area



Per capita income, adjusted for inflation, has risen from $18,243 in 1970 to $26,542 in 2005. In 2005, per capita income in Plumas NF Five-county Aggregation ($26,542) was lower than the state ($36,936) and the nation ($34,471).

Butte, Lassen and Yuba Counties rank in the top most impoverished counties, as measured by individuals below the poverty line.

The table below reports the number of individuals below the poverty level and poverty rates for the five counties in the study area and California in 2000 and 2007. Plumas and Sierra counties have poverty rates less than that of the state. Poverty rates remained relatively unchanged from 2000 to 2007.

Table 188. Poverty Status by State and County, 2000 and 2005

State or County	2007		2000	
	Number	Percent	Number	Percent
California	4,445,392	12.4	4,304,909	12.7
Plumas	2,340	11.5	2,290	11.1
Butte	36,435	17.1	34,558	17.2
Sierra	385	11.7	372	10.6
Lassen	4,240	17.2	4,312	17.5
Yuba	13,551	19.2	11,550	19.3

Source: US Census Bureau, Small Area Income and Poverty Estimates

The Forest supports employment opportunities from which local residents may generate income. This includes direct employment for the Federal agencies and the harvest of products from the Forest. Although the numbers may appear to be low when compared to the national levels, the effects to an individual or family may be profound if altered.

National Visitor Use Monitoring (NVUM)

The National Visitor Use Monitoring (NVUM) program provides reliable information about recreation visitors to National Forest System-managed lands at the national, regional, and Forest levels. Information about the quantity and quality of recreation visits is required for national Forest plans, Executive Order 12862 (Setting Customer Service Standards), and implementation of the National Recreation Agenda. To improve public service, the agency's Strategic and Annual Performance Plans require measuring trends in user satisfaction and use levels. NVUM information assists Congress, Forest Service leaders, and program managers in making sound decisions that best serve the public and protect valuable natural resources by providing science based, reliable information about the type, quantity, quality and location of recreation use on public lands. The information collected is also important to external customers including state agencies and private industry. NVUM methodology and analysis is explained in detail in the research paper entitled Forest Service National Visitor Use Monitoring Process: Research Method Documentation (English et al. 2002) (www.fs.fed.us/recreation/programs/nvum).

The Plumas National Forest participated in the National Visitor Use Monitoring (NVUM project from October 2004 through September 2005. There were approximately 587,000 national Forest visits on Plumas National Forest during fiscal year 2005. The full Plumas National Forest NVUM report is available from the Natural Resource Information System (NRIS) Human Dimensions Module and can be found in the project record.

The table below presents participation rates by activity for the Plumas National Forest during the NVUM survey period. The Total Activity Participation (%) column of the table presents the participation rates by activity. Participation rates will exceed 100 percent since visitors can participate in multiple activities. The Percent as Main Activity column presents the participation rates in terms of primary activity.

Table 189. Activity Participation on Plumas National Forest (NVUM FY2005 data)

Activity	Activity Emphasis for Road & Trail Use	Total Activity Participation (%) *	Percent as Main Activity (%) **
Snowmobiling	Motorized	8.6%	7.9%
Driving for Pleasure	Motorized	27.2%	2.9%
OHV Use	Motorized	0.7%	0.1%
Other Motorized Activity	Motorized	1.5%	0.2%
		Motorized Subtotal	**11.1%**
Hiking and Walking	Non-motorized	44.8%	13.4%
Bicycling	Non-motorized	1.6%	0.5%
Other Non-motorized	Non-motorized	17.2%	4.0%
Cross-country Skiing	Non-motorized	1.7%	1.5%
Backpacking	Non-motorized	1.1%	0.7%
Horseback Riding	Non-motorized	0.3%	0.1%
		Non-motorized Subtotal	**20.2%**
Downhill Skiing	Other	0.0%	0.0%
Fishing	Other	35.5%	27.8%
Viewing Natural Features	Other	75.3%	12.1%
Relaxing	Other	77.2%	12.0%
Motorized Water Activities	Other	34.3%	12.0%
Hunting	Other	0.8%	0.5%
Non-motorized Water	Other	4.1%	1.1%
Developed Camping	Other	12.5%	1.7%
Primitive Camping	Other	2.7%	0.1%
Picnicking	Other	10.5%	2.0%
Viewing Wildlife	Other	60.9%	1.2%
Sightseeing	Other	0.0%	0.0%
No Activity Reported	Other	4.7%	4.7%
Resort Use	Other	0.8%	0.6%
Visiting Historic Sites	Other	8.9%	0.3%
Nature Study	Other	4.9%	0.1%
Gathering Forest Products	Other	5.7%	2.6%
Nature Center Activities	Other	1.7%	0.0%
		Other Subtotal	**78.8%**
		Total	**110.1%**

* Survey respondents could select multiple activities, so this column may total more than 100%.\

* The number in this column is the percent of survey respondents who indicated participation in this activity.

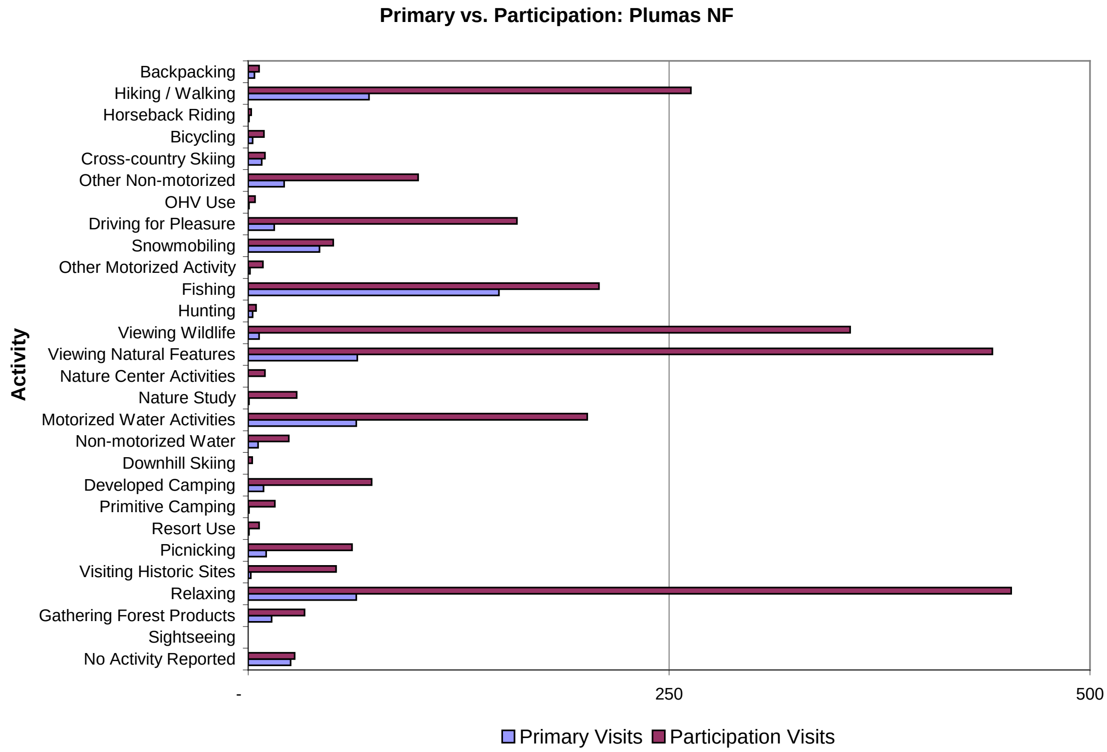
** Survey respondents were asked to select just one of their activities as their main reason for the Forest visit. Some respondents selected more than one, so this column totals more than 100%.

** The number in this column is the percent of survey respondents who indicated this activity was their main activity.

The EIS NVUM data measures only the number of visits in which OHV use was the principal activity. This number does not include visits in which OHV use was secondary to some other type of recreational activity (e.g. hunting, camping, fishing, hiking, etc.) The NVUM data only applies to OHV use for recreational purposes. Users of OHVs for commercial purposes (e.g. mining, maintenance of permitted infrastructure, collecting firewood, etc.) or transportation purposes (e.g. driving into town from a private inholding) would not be counted in the NVUM data. The NVUM data measures the number of visits, which is distinct and separate from the number of activity days. Consequently, a person who goes on a week-long vacation using their

OHV would be counted as only one visit according to NVUM data; but the forest may measure seven total visitor days for this visit.

Figure 11. Primary activities and other activities participated in on the Plumas National Forest



The primary activity participation rates (Percent as Main Activity) displayed in Table 189were used to estimate use by activity emphasis. The emphasis areas were grouped into those emphasizing non-motorized, motorized, and other activities. Motorized activities were those that used motor vehicles on Forest Service roads and trails. Non-motorized activities still used the Forest's roads and trails, but on foot or by non-motorized transportation such as cross-country skis or bicycles. All other activities are all the other Forest-based activities measured by the NVUM survey that didn't use roads or trails to pursue their primary activity. Examples of "other" are downhill skiing, motorized water activities, etc. Motor vehicles may have been used to reach a destination or participate in the activity, but it was not the primary emphasis of the visit. The most popular activities on the Plumas National Forest are hiking/walking, fishing, viewing natural features, driving for pleasure, motorized water activities and relaxing.

Table 190 displays the number of visits for these activities. The number of visits is based on the primary purpose for the visit (Percent as Main Activity) displayed in Table 189 and the total number of visits of 587,000 reported in the Plumas National Forest NVUM report. Users were determined to be either local or non-local based on the miles from the user's residence to the Forest boundary. If the user reported living within 50 miles of the Forest boundary, he or she is considered local; if over 50 miles, he or she is considered non-local. It is critically important to distinguish between local and non-local spending as only non-locals bring new money and new economic stimulus into the local community. Local spending is already accounted for in the study area base data. It is impossible to predict how locals would have spent money if they didn't have local recreation opportunities on the national Forest, but it is a safe guess that much of that money would not have been lost to the local economy. People tend to substitute other local recreation activities or change the time or place for continuing the same activity rather than traveling long distances and incurring high costs to do the same activity. The table indicates the most popular non-motorized use is hiking and walking, followed by other non-motorized activities. The most popular motorized use is snowmobiling, followed by driving for pleasure. Table 191 indicates that non-local visitors spend more per visit than local visitors primarily because of overnight lodging expenditures. Motorized day use expenditures are generally higher than for non-motorized activities, but non-local overnight visitors engaged in non-motorized activities generally expend more than non-local motorized users (except for snowmobiling). Snowmobilers spend the most per visit, especially non-local visitors.

Table 190. Number of Visits, by Activity

Activity	Non-local Day Use	Non-local Overnight	Local Day use	Local Overnight	Non-Primary
Motorized					
Snowmobiling	2,962	5,500	24,117	5,500	4,231
Driving for Pleasure	932	1,398	11,028	466	1,709
OHV Use	59	123	257	75	21
Other Motorized Activity	118	246	514	150	43
Non-motorized					
Hiking/Walking	5,741	12,201	45,214	4,306	4,306
Bicycling	214	455	1,687	161	161
Other Non-motorized	1,714	3,642	13,497	1,285	1,285
Cross-country Skiing	803	2,490	4,338	321	80
Backpacking	0	1,762	0	1,912	75
Horseback Riding	43	91	337	32	32
Other					
Downhill Skiing	0	0	0	0	0
Fishing	16,378	35,734	74,446	16,378	5,956
Viewing Wildlife	6,481	16,201	27,218	4,536	10,369
Relaxing	5,784	14,139	30,850	10,283	3,214
Motorized Water Activities	7,070	14,782	30,850	8,998	2,571
Hunting	134	536	1,339	589	80
Non-motorized Water	471	1,002	3,712	353	353
Developed Camping	819	2,003	4,370	1,457	455
Primitive Camping	0	252	0	273	11
Picnicking	964	2,357	5,142	1,714	536
Viewing Wildlife	643	1,607	2,699	450	1,028
Sightseeing	0	0	0	0	0
No Activity Reported	2,266	5,538	12,083	4,028	1,259
Resort Use	48	118	257	86	27
Visiting Historic Sites	145	353	771	257	80
Gathering Forest Products	54	134	225	37	86
Nature Study	1,253	3,064	6,684	2,228	696
Nature Center Activities	0	0	0	0	0

Table 191. Expenditures per visit (dollars)

Activity	Non-local Day Use	Non-local Overnight	Local Day use	Local Overnight	Non-Primary
Motorized					
Snowmobiling	49	129	30	69	28
Driving for Pleasure	18	67	13	43	10
OHV Use	29	65	19	49	15
Other Motorized Activity	29	65	19	49	15
Non-motorized					
Hiking/Walking	18	107	11	40	7
Bicycling	18	107	11	40	7
Other Non-motorized	18	107	11	40	7
Cross-country Skiing	19	120	15	87	14
Backpacking	0	40	0	36	0
Horseback Riding	18	107	11	40	7
Other					
Downhill Skiing	19	70	15	49	12
Fishing	21	96	20	48	20
Viewing Wildlife	21	83	11	54	10
Relaxing	19	70	15	49	12
Motorized Water Activities	29	65	19	49	15
Hunting	38	116	30	79	26
Non-motorized Water	18	107	11	40	7
Developed Camping	19	70	15	49	12
Primitive Camping	0	40	0	36	0
Picnicking	19	70	15	49	12
Viewing Wildlife	21	83	11	54	10
Sightseeing	0	0	0	0	0
No Activity Reported	19	70	15	49	12
Resort Use	19	70	15	49	12
Visiting Historic Sites	19	70	15	49	12
Gathering Forest Products	21	83	11	54	10
Nature Study	19	70	15	49	12
Nature Center Activities	21	83	11	54	10

Economic Effects Analysis Procedures

Economic effects can be categorized as direct, indirect and induced. Direct effects are changes directly associated with spending by a recreation visitor. Indirect and induced effects are the multiplier effects resulting from subsequent rounds of spending in the local economy. Input-output analysis was used to estimate the direct, indirect, and induced employment and labor income effects stemming from motorized and non-motorized use. Input-output analysis (Hewings 1985) is a means of examining relationships within an economy both between businesses as well as between businesses and final consumers. It captures all monetary market transactions for consumption in a given time period. The resulting mathematical representation allows one to examine the effect of a change in one or several economic activities on an entire economy. This examination is called impact analysis. Input-output analysis requires the identification of an economic impact area. The economic area that surrounds the Plumas National Forest used for this jobs and income analysis was Plumas, Butt, Sierra, Lassen and Yuba Counties.

The IMPLAN Pro input-output modeling system and 2006 IMPLAN data (the most recent data available) were used to develop the input-output model for this analysis (IMPLAN Professional 2004). IMPLAN translates changes in final demand for goods and services into resulting changes in economic effects, such as labor income and employment of the affected area's economy. For the economic impact area, employment and labor income estimates that were attributable to all current recreation use, motorized, non-motorized and other activities for the Plumas National Forest were generated.

The expenditure and use information collected by the NVUM survey are crucial elements in the economic analysis. As reported earlier, the NVUM survey collects use and expenditure information for various activity types. The expenditure information is collected by twelve activity groups within four trip segments (non-local overnight trips, non-local day trips, local overnight trips, and local day trips) (Stynes and White 2005; Stynes and White 2006). The reported spending for each of the spending categories is allocated to the appropriate industry within the IMPLAN model (the allocation process, also referred to as "bridging," was conducted by the USDA Forest Service, Planning Analysis Group in Fort Collins, CO). The bridged IMPLAN files were used to estimate economic effects (e.g., employment and labor income) related to changes in spending (i.e., changes in spending – technically referred to as changes in final demand - are caused by changes in use).

Estimated Economic Effects

Estimated economic effects (full and part-time jobs and labor income) are presented. Estimated employment and labor income by motorized and non-motorized activity types are presented.

Table 192 indicates the following: First, economic effects tied to local visitation generate lower employment and labor income effects. This is a result of local visitors spending less per visit in comparison to non-local visitors (see Table 191). Second, economic effects vary widely by motorized and non-motorized activity types. The lowest employment effect is tied to local hiking and walking, bicycling, other non-motorized, and horseback riding activities (Note: The economic effects are identical for these categories since they share the same spending profile). Third, the largest economic effect is associated with non-local cross-country skiing, but is followed fairly closely by non-local snowmobiling. In general, economic effects vary by the amount of spending and by the type of activity, but it cannot be generalized that motorized or non-motorized activities contribute more or less to the local economy on a per-visit basis. It is also important to be careful with the use of employment and labor income effects by activity type. They reflect an economic structure that is a snapshot in time; that is, they are not applicable to visitation numbers that are dramatically different from current recreation levels. If recreation activities or visits were to change radically, there would be a structural shift in the economy as spending patterns changed, and these response coefficients would no longer reflect underlying economic processes.

Motorized and Non-motorized Use

Table 192 displays the estimated employment and labor income effects for current use levels reported by NVUM for local and non-local non-motorized and motorized activities. Table 192 expresses these employment and labor income effects for total employment and income for each activity. In general, the estimated economic effects are a function of the number of visits and the dollars spent locally by the visitors. For example, non-local users typically spend more money per visit than local users. Also, activities that draw more users would be responsible for more economic activity in comparison to activities that draw fewer users, holding constant spending per visit. Given that the analysis is dependent on visitation and expenditure estimates, any changes to these estimates affect the estimated jobs and labor income.

Table 192 indicates that approximately 31 total jobs (direct, indirect and induced, full-time, temporary, and part-time) and $838,000 total labor income (direct, indirect and induced). The two largest motorized uses are snowmobiling and driving for pleasure. These two activities contribute about 10.6 percent of the jobs from the activities in the table, and provide about 10.4 percent of the labor income. Together these two activities contribute 31 jobs and provide about $820,000 in labor income to the area.

Non-Motorized activities were responsible for approximately 59 total average annual jobs in the five-county area (direct, indirect and induced) and $1,273,000 total labor income (direct, indirect and induced) are attributable to non-motorized visitation on the Plumas National Forest. The two largest activities among those in the table are hiking and walking and other non-motorized activities, together these account for about 16.4 percent of the jobs and 12.8 percent of the income generated from the activities analyzed. These activities account for about 48 jobs and provided $1,028,000 in labor income to the five county area.

“All Other Activities” (see Table 191 for a list) are significant economic contributors for the activities studied. They provide 202 jobs, or 69.2 percent of the jobs from the activities analyzed. Labor income is about $5,925,000, or 73.7 percent of the income generated by these activities.

Table 192 shows that about 10.6 percent of the jobs provided from these activities are from motorized use, 20.2 percent are from non-motorized use, and 69.2 percent from “Other Activities.” The contributions to labor income are 10.4 percent motorized use 15.8 percent non-motorized use, and 73.8 percent from “Other Activities.”

Table 192. Employment and Labor Income Effects by Activity Type (NVUM FY2005 data)

Activity	Activity Emphasis for Road & Trail Use	Employment	Total Income ($1,000)
Snowmobiling	Motorized	27	720
Driving for Pleasure	Motorized	4	100
OHV Use	Motorized	0	6
Other Motorized Activity	Motorized	0	12
Motorized Subtotal		**31**	**838**
Hiking and Walking	Non-motorized	36	792
Bicycling	Non-motorized	1	30
Other Non-motorized	Non-motorized	12	236
Cross-country Skiing	Non-motorized	8	160
Backpacking	Non-motorized	2	49
Horseback Riding	Non-motorized	0	6
Non-motorized Subtotal		**59**	**1,273**
Fishing	Other	75	2,102
Hunting	Other	2	49
Primitive Camping	Other	0	7
Nature Related	Other	32	876
All Other	Other	93	2,891
Nature Related and Other		**202**	**5,925**
Total		**292**	**8,036**

Table 193. Employment and Labor Income Effects in 2008 Dollars by Activity Type

Activity		Employment Direct Effects	Employment Indirect, Induced & Secondary Effects	Labor Income Direct Effects	Labor Income Indirect, Induced & Secondary Effects
Non-motorized Use:					
Backpacking, Hiking & Walking, Bicycling, Horseback Riding, Cross Country Skiing, Other Non-motorized	Local Day	6	4	163	81
	Local OVN	3	1	76	39
	Non-Local Day	1	0	39	18
	Non-Local OVN	25	16	556	283
	NP	0	0	10	5
Motorized Use:					
OHV Use	Local Day	0	0	1	0.5
	Local OVN	0	0	1	0.4
	Non-Local Day	0	0	1	1
	Non-Local OVN	0	0	2	0.2
	NP	0	0	0	0
Driving	Local Day	1	1	30	15
	Local OVN	0	0	6	3
	Non-Local Day	0	0	3	2

Activity		Employment Direct Effects	Employment Indirect, Induced & Secondary Effects	Labor Income Direct Effects	Labor Income Indirect, Induced & Secondary Effects
	Non-Local OVN	1	0	24	12
	NP	0	0	3	2
Snowmobile	Local Day	5	2	148	73
	Local OVN	5	1	95	49
	Non-Local Day	1	1	31	16
	Non-Local OVN	8	3	178	92
	NP	1	0	25	12
Other Motorized Activities	Local Day	6	3	181	89
	Local OVN	5	1	103	54
	Non-Local Day	1	1	36	18
	Non-Local OVN	9	3	207	107
	NP	1	0	29	14
All Other Use:					
All Other Activities*	Local Day	28	10	774	378
	Local OVN	23	9	676	328
	Non-Local Day	9	3	225	109
	Non-Local OVN	86	30	2,228	1,089
	NP	3	0	80	39
Total:					
	Local Day	40	17	1,119	548
	Local OVN	31	11	856	421
	Non-Local Day	11	4	300	145
	Non-Local OVN	120	49	2,992	1,480
	NP	4	0	119	58
Grand Total:		**209**	**83**	**5,386**	**2,650**

Table 194. Total Employment and Labor Income Effects

Uses		Employment Effects (Full- and part-time jobs)	Labor Income ($1,000)
Total Non-Motorized Use	Local	15	360
	Non-Local	44	897
Total Motorized Use	Local	15	427
	Non-Local	15	368
Total All Other Use	Local	71	2,155
	Non-Local	128	3,651
Total	Local	101	2,943
	Non-Local	187	4,916
	NP	4	178
Total for Area		**292**	**8,036**

Table 195. Percent of Total Area Employment and Total Area Labor Income Effects

Uses		Employment Effects (full- and part- time jobs)	Labor Income (2008 dollars)
Total Non-Motorized Use	Local	0.011%	0.006%
	Non-Local	0.033%	0.015%
Total Motorized Use	Local	0.011%	0.007%
	Non-Local	0.011%	0.006%
Total All Other Use	Local	0.053%	0.037%
	Non-Local	0.095%	0.063%
Total	Local	0.075%	0.051%
	Non-Local	0.139%	0.085%
	NP	0.003%	0.003%
Total Use		0.216%	0.138%

Table 196 shows the relationship of jobs and income generated from all recreation activities studied compared to total jobs and income in the five-county area. All of the recreation jobs together only account for about 0.22 percent of the total jobs in the area, and the income generated is about 0.14 percent of the total labor income in the area studied.

Table 196. Current Role of Forest Service Recreation-Related Contributions to the Area Economy

Industry	Employment (jobs)		Labor Income (millions of dollars)	
	Area Totals	FS-Related	Area Totals	FS-Related
Agriculture	6,768	2	$287	$0.084
Mining	200	0	$16	$0.004
Utilities	414	0	$47	$0.052
Construction	9,640	1	$549	$0.083
Manufacturing	5,953	6	$314	$0.369
Wholesale Trade	2,716	13	$156	$0.773
Transportation & Warehousing	3,554	8	$202	$0.406
Retail Trade	15,227	33	$478	$1.090
Information	1,600	3	$78	$0.137
Finance & Insurance	4,308	4	$237	$0.209
Real Estate & Rental & Leasing	4,106	9	$111	$0.238
Prof, Scientific, & Tech Services	6,045	7	$291	$0.286
Mngt of Companies	506	1	$33	$0.071
Admin, Waste Mngt & Rem Serv	5,067	6	$138	$0.156
Educational Services	1,294	1	$29	$0.022
Health Care & Social Assistance	18,059	10	$785	$0.434
Arts, Entertainment, and Rec	2,242	26	$40	$0.602
Accommodation & Food Services	9,062	135	$143	$2.296
Other Services	10,196	6	$218	$0.144
Government	28,018	9	$1,657	$0.580
Total	134,976	281	$5,811	$8.036
FS as Percent of Total	---	0.21%	---	0.14%

For OHV grants, the Plumas National Forest has needed to estimate a more accurate number of visits for people using OHVs on the Forest. The NVUM date does a poor job of sampling OHV use because OHV use is so dispersed and many of the participants visit the Forest with a different primary activity. It is estimated that OHV and snowmobile use should have similar number of visits and economic impact on the 5 county area. The following table shows a much different amount of use.

Table 197. National Survey on Recreation and the Environment

Activity	Age 16-34 %	Age 16-34 #	Age 35-54 %	Age 35-54 #	Age 55+ %	Age 55+ #	All Ages %	All Ages #
Day hiking	47.6	483,270	56.4	615,266	32.3	269,703	46.5	1,368,239
Visit a wilderness or primitive area	49.3	501,059	48.2	525,488	34.7	290,109	44.8	1,316,656
Developed camping	44.3	449,593	47.1	513,871	32.2	269,130	41.9	1,232,594
Mountain biking	38.6	391,917	31.4	342,352	11.9	99,310	28.3	833,579
Visit a farm or agricultural setting	26.9	272,840	30.9	336,982	20.3	170,073	26.5	779,895
Primitive camping	30.8	313,157	28.6	312,316	14.0	117,271	25.2	742,744
Drive off-road	30.6	311,105	21.4	233,714	13.7	114,508	22.4	659,327
Backpacking	21.3	216,364	21.2	231,397	6.2	52,118	17.0	499,879
Horseback riding on trails	10.4	106,003	9.0	98,471	5.9	49,455	8.6	253,929
Hunting (any type)	9.6	97,645	7.8	84,746	5.7	48,014	7.8	230,405
Big game hunting	5.7	58,096	5.3	57,454	4.2	34,972	5.1	150,522
Small game hunting	3.9	39,383	4.2	45,974	1.8	15,196	3.4	100,553
Migratory bird hunting	3.2	32,408	2.0	21,598	1.5	12,488	2.3	66,494

Source: 2000-2004 National Survey on Recreation and the Environment. USDA Forest Service. Southern Research Station. Athens, Georgia. Plumas NF local area: 25 counties

Another source to indicate OHV use is the California Fuel Use for Recreation.

Table 198. California Fuel Use for Recreation in the five county area.

County	Street Vehicle	Off Highway Vehicle	Total	Percent of Total
Butte	249,124	429,415	678,539	63.3
Lassen	1,293,973	209,460	1,503,433	13.9
Plumas	890,292	557,967	1,448,259	38.5
Sierra	473,734	983	474,717	0.2
Yuba	84,873	79,707	164,580	48.4

Direct, Indirect and Cumulative Economic Effects

The employment and labor income effects stemming from current motorized and non-motorized activities occurring on the Plumas National Forest were estimated. The economic effects of all other types of recreation combined on the Plumas NF have also been reported for comparison purposes.

Economic effects tied to motorized and non-motorized activities were estimated to address the economic impact issue tied directly to travel management. Also, the marginal economic effects (employment and labor income effects per 1,000 visits) of motorized and non-motorized use are provided. The marginal effects (also called "response coefficients") are useful for performing sensitivity analyses of various management alternatives.

Direct and Indirect Effects: If the prohibition of cross-country travel is implemented (Alternative 2, 3, 4 and 5), it may discourage OHV use on the Forest. This could result in a loss of OHV expenditures across the region. However, even if 100% of OHV use ceased on the Forest, this loss is not considered to be economically significant since it results in the loss of 0.1 jobs or approximately $4,000 total labor income and total annual total revenue to the region of approximately $6,000. The overall historical recreation use is very low on the Plumas, and under any alternative the capacity for motorized recreation is very high compared to expected demand.

Cumulative Effects: Based on the data collected from IMPLAN, it is apparent that recreation use generates very little to the overall economy of the region. Also, based on historic data and our best estimates, the Forest assumes that use will not change dramatically in the future because of this project. It is also assumed, that under all action alternatives, levels of use would be relatively static; although the use patterns may change. For example, even though cross-country travel is prohibited in all of the action alternatives, the same levels of use would simply become more concentrated on the system roads and motorized trails.

Plumas National Forest is an isolated Forest and although it is possible that use may increase by non-local users because of more restrictive regulations on their local Forest, it is unlikely that it would increase to any significant degree.

Based on the current numbers and these assumptions, the economic effects of this project across all of the alternatives will be insignificant to the economy of the region.

Attitudes, Beliefs, and Values

Plumas National Forest held several open houses which were designed to help the public better understand the project and to gather information and input that could be used to help create alternatives to the Proposed Action. During these open houses and from the scoping letters received on the Proposed Action (Alternative 2) two major perspectives emerged.

One group perceived this action as restrictive in nature. There were three themes expressed by this group: 1) do not close down the Forest 2) add all of the unauthorized roads to the system and 3) expand Mixed Use on Level 3 roads. Several individuals commented on specific roads that they use and have used historically which they would like to have added to the NFTS. There was a feeling of "ownership" of the Forest and the comments received reflected resentment at being restricted on what the public feels are their public lands. There were comments made during the meetings that reflected fear and resentment over not being able to use the lands in the way they were accustomed; such as to make a living or for family recreation.

Another group of commenters expressed the desire to see the Forest be more restrictive and protective of the resources. Almost universally, these commenters asked that we review our entire

NFTS and reduce it to a size that is within our means to maintain. There was also a strong emphasis from this group for “quiet use” recreation opportunities and a need to maintain and expand roadless and Wilderness areas.

These concerns captured during the scoping process are documented in the significant issues described in Chapter 1. All five of the significant issues are directly tied to these two major perspectives.

Direct, Indirect and Cumulative Social Effects

Social effects can be difficult to measure because each individual may be affected differently by the same action depending upon their experience and perspective. For example, American Indians use Forest products and landscapes to maintain their cultural heritage, and the local ranching communities have historical ties with the Forest’s resources for production purposes. Alternatively, the recreational opportunities supported by the Plumas NF have implications for the leisure activities participated in by many local residents. Hunting and fishing opportunities are just two of the many activities supported by the Forest that many individuals routinely participate in. There is also a contingent of people using the Forest for motorized recreation in the form of off-highway vehicles (OHVs) and motorcycles.

Direct and Indirect Effects: If the prohibition of cross-country travel is implemented (Alternative 2, 3, 4 and 5), it may negatively impact OHV users on the Forest. This action may also affect the very young and the very old by preventing them from participating in activities that require strenuous walking for access. This same action may enhance the recreation opportunity for users wishing to experience a “quiet use” form of recreation. What positively affects one faction of users may negatively affect the other. This may cause resentment between user groups but because of the low number of users on the Forest, it is unlikely that this will occur. The addition of trails to the system (Alternative 2, 4 and 5) may appeal to users who recreate by driving for pleasure. Conversely, this may negatively affect “quiet use” users. Again the social implication is that there may be conflict between the groups. Changes to the existing system in the form of increased Mixed Use (Alternatives 4 and 5) may appeal to OHV users because it allows for a more continuous loop recreation experience and not appeal to “quiet users” for the same reason.

Cumulative Effects: Based on historic data and our best estimates, the Forest assumes that use will not change dramatically in the future because of this project. It is also assumed, that under all action alternatives, levels of use would be relatively static; although the use patterns may change. For example, even though cross-country travel is prohibited in all of the action alternatives, the same levels of use would simply become more concentrated on the roads.

Plumas National Forest is an isolated Forest and although it is possible that use may increase by non-local users because of more restrictive regulations on their local Forest, it is unlikely that it would increase to any significant degree.

Based on the current numbers and these assumptions, the possibility of conflict between user groups is probably the most constant cumulative effect socially and may be present regardless of which alternative is chosen. However, based on current and predicted use on the Forest being so low, it is unlikely that such conflict would occur.

Forest Service Budget Projections

Roads

The roads on the Forest are gradually deteriorating due to surfacing being worn out or pushed off the edge of the roads, and by the occurrence of vegetation encroachment. Some of the roads are being encroached upon by brush; and unless the brush is cleared, the roads will eventually become impassable. Drainage concerns are currently being addressed and will continue to be addressed, so environmental degradation associated with erosion is not occurring due to lack of maintenance. There is the possibility that in some cases vegetation encroachment may result in less sight distance for drivers, which may result in a safety concern over time.

Table 199. Construction and Maintenance Budget, by Fiscal Year

Fiscal Year	Road	Trail
FY04	$839,000	$94,500
FY05	$1,174,600	225,000
FY06	$801,400	$71,700
FY07	$1,080,500	$77,800
FY08	$1,137,800	$124,900
FY09	$1,214,300	$88,000

It is predicted that the next five years will have similar numbers.

Timber sale operators perform maintenance on Forest roads each year. This figure will most likely remain at current levels or possibly go up if timber sale and biomass volumes increase.

The majority of the roads on the Forest are maintenance level 2 and do not get regular maintenance unless erosion or damage is occurring.

Forest Budget Effects

Alternative 1 and Alternative 3 do not add any trails to the existing system and continue current management. Therefore the cost for maintenance will remain constant or very similar over the next 5 years. In Alternative 2, 4 and 5 between 149 and 365 miles of trail will be added to the system. These trails will require between $159,000-$354,000 to bring them to current Forest Service standards. These costs are averaged over all miles and will be accomplished with grant money and volunteer labor. Prohibition of cross-country travel and changes in mixed use or season of use are not expected to affect the Forest Budget.

Environmental Justice

As stated in Executive Order 12898, it is required that all Federal actions consider the potential of disproportionate effects on minority and low-income populations in the local region. The principles of environmental justice require agencies to address the equity and fairness implications associated with Federal land management actions. The Council on Environmental Quality (CEQ) (1997) provides the following definitions in order to provide guidance with the compliance of environmental justice requirements:

- "Minority population: Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis..."
- "Low-income population: Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or American Indians), where either type of group experiences common conditions of environmental exposure or effect."

The five county region which makes up the Plumas National Forest has a large low income and American Indian population compared to the rest of California. Because the existing road system will remain in place on the Forest, it is unlikely that there would be a disproportionate effect on American Indian and low-income populations. The prohibition of cross-country travel may affect the American Indian population by limiting access to areas commonly used for traditional use. This is especially true for the very old and the very young that may not be physically able to participate in these activities if restricted to non-motorized travel. However, the tribes are guaranteed this right under law and the Forest Supervisor will also work with the tribes to ensure access outside of the Travel Management process. Low income users will most likely not be disproportionately affected by this project. Permitted use, such as firewood collection, will still be allowed and therefore should not adversely affect those who rely on this as an income source. The addition of trails to the NFTS will allow for more extensive travel across the Forest. Therefore, Alternatives 2, 4 and 5 would benefit anyone who uses trails for recreation or employment on the Forest. Changes to the existing system in the form of mixed use will probably not affect either group.

Table 200. Proposed Changes in Vehicle Class on NFTS Roads

Road Number	Road Name	Current Vehicle Class	Proposed Vehicle Class	Length (miles)
24N28	Slate Creek	Highway Legal Vehicles Only	All Vehicles	4.1
			Total	4.1

Appendix E: Watershed Maps

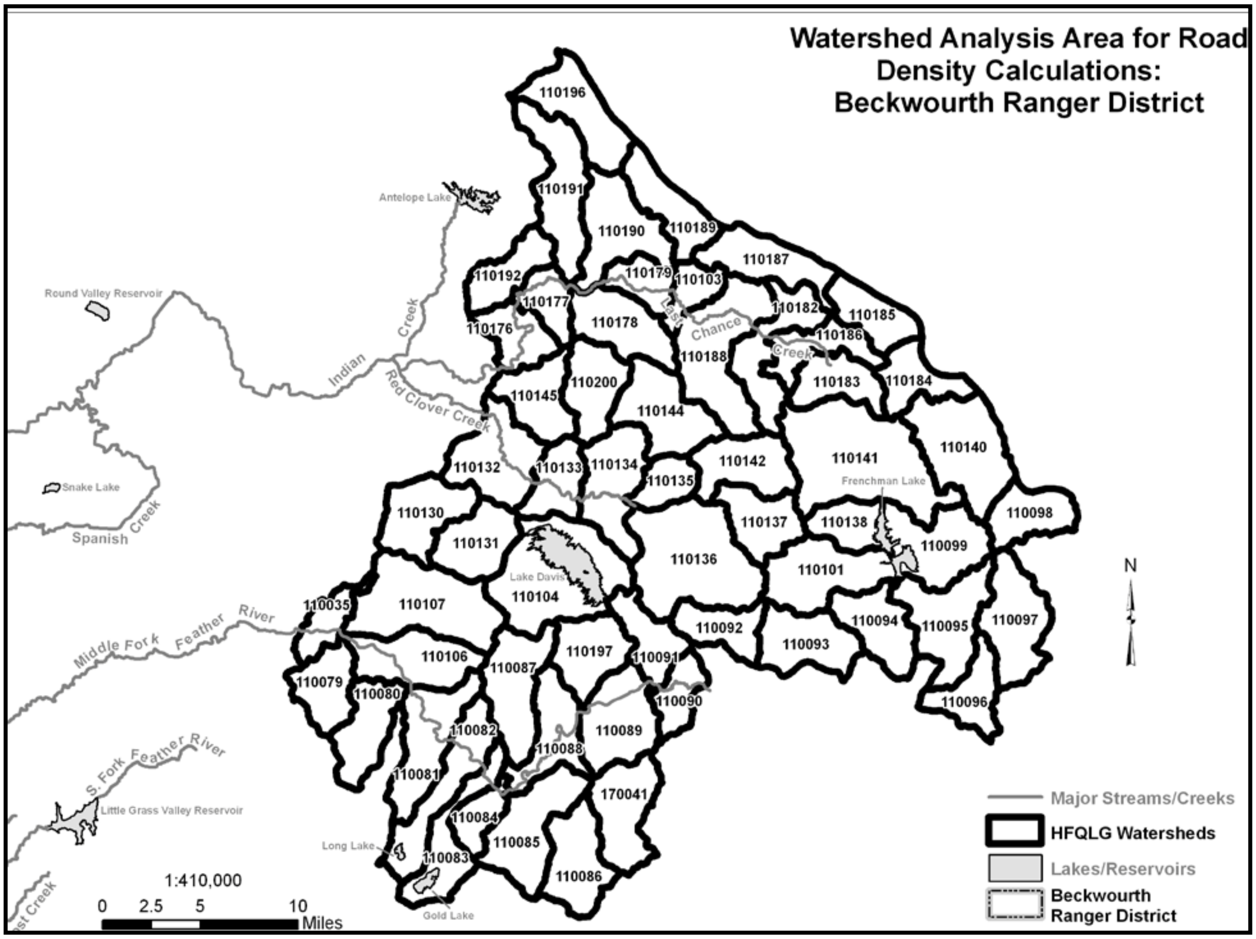
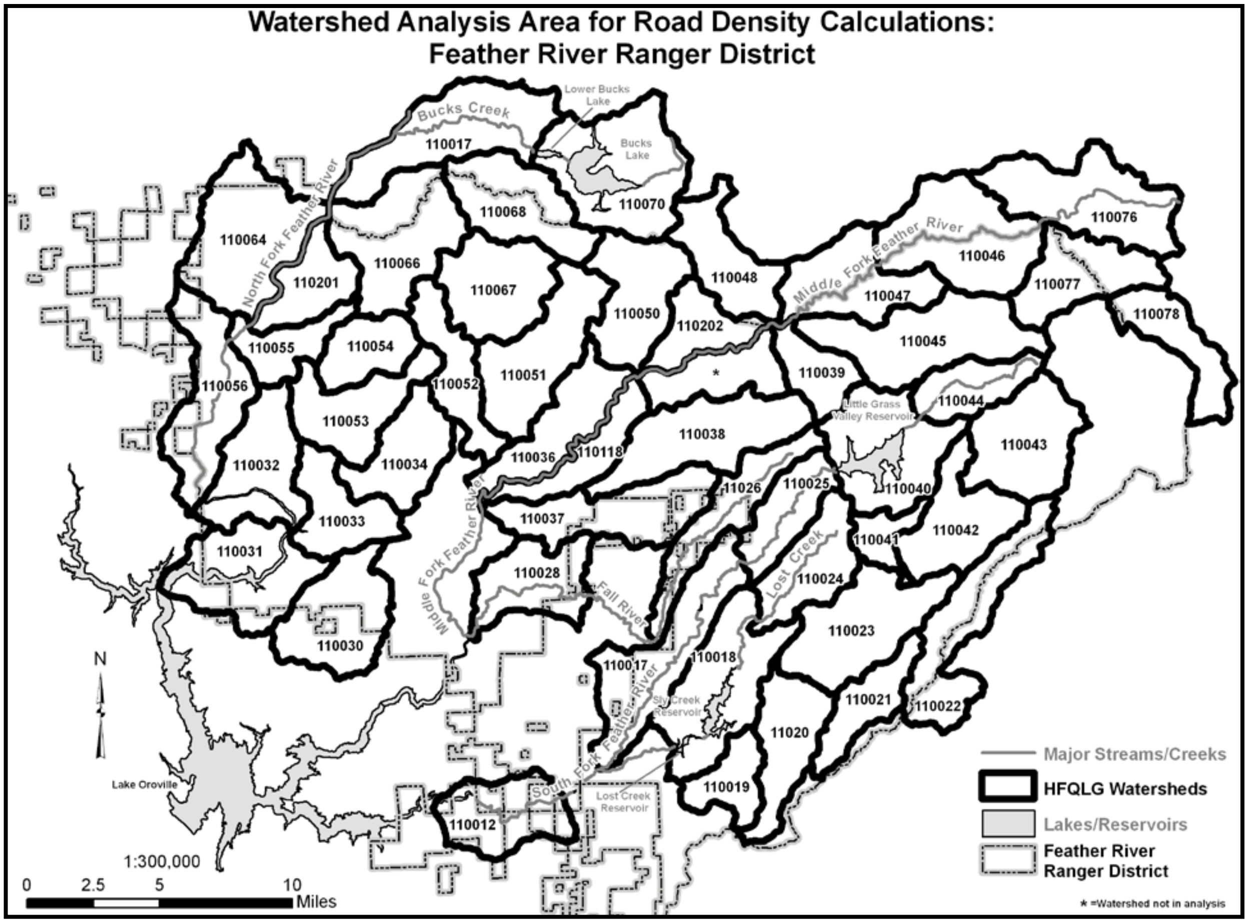


Figure 12. Watershed analysis area for the Beckwourth Ranger District

Figure 13. Watershed analysis area for the Feather River Ranger District



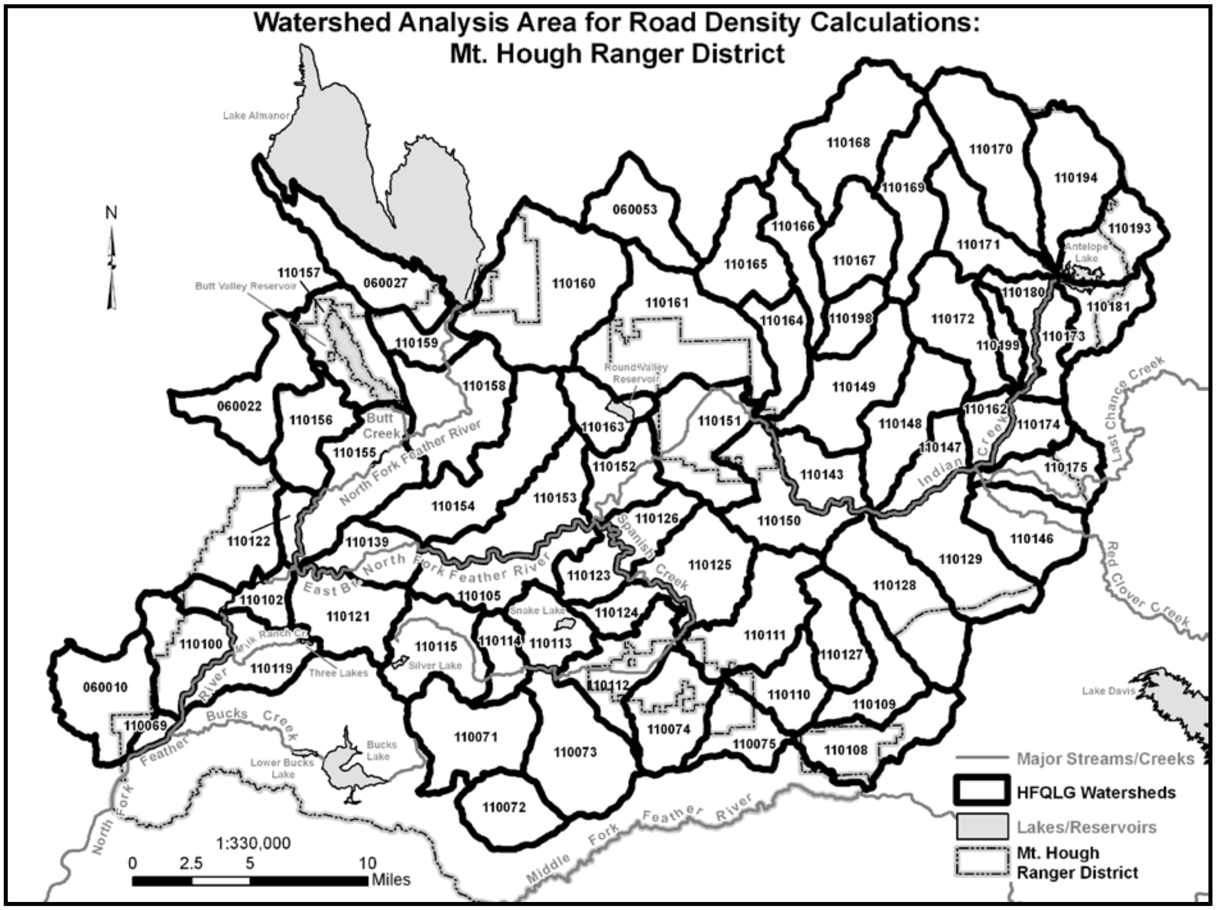


Figure 14. Watershed analysis area for the Mount Hough Ranger District

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Appendix G: Road System Development on the Plumas

Introduction

The definition of a Forest Road is "Any road wholly or partially within, or adjacent to, and serving the National Forest System (NFS) and which is necessary for the protection, administration, and utilization of the National Forest System" (Title 23, Section 101 of the United States Code). The Plumas National Forest (NF) road network facilitates Forest management, provides access to diverse recreational opportunities, and contributes to the rural transportation infrastructure of interspersed private lands. At the same time, agency and public awareness of the environmental costs and risks associated with Forest roads and attendant activities is increasing. As the agency's emphasis has shifted from commodity production to ecosystem health, the Forest Road system needs to be analyzed, managed and maintained to minimize environmental impacts and reduce costs, while providing sufficient access for public and agency needs. This appendix will provide background information and management strategies being employed to meet these objectives.

- Forest road management and maintenance strategies to meet public and Forest Service access and resource protection needs using limited funding sources.
- Impact of adding unauthorized roads under the Travel Management Rule.

Plumas National Forest Road System

State and County roads stretch across the Plumas NF and serve large tracts of federal land. Some of these County roads are also designated as Forest Highways, making them eligible under the Federal Lands Highway Program for disaster relief and major renovation funds. Examples are the Oro-Quincy Highway, LaPorte-Quincy Highway and Gold Lake Highway. Plumas National Forest System (NFS) roads, under Forest Service jurisdiction, branch off from these State and County roads as arterial, collector and local roads.

NFS roads are not public roads in the same sense as roads that are under the jurisdiction of State and County road agencies. These roads are not intended to meet the transportation needs of the public at large. Instead, they are authorized only for the use and administration of NFS lands. Although generally open and available for public use, that use is at the discretion of the Secretary of Agriculture. Through authorities delegated by the Secretary, the Forest Service may restrict or control traffic to meet specific management direction.

NFS roads are categorized using the following system:

Maintenance Level (ML) 5: Roads that provide a high degree of user comfort and convenience. Normally double lane paved facilities, or aggregate surface with dust abatement. This is the highest standard of maintenance.

Maintenance Level 4: Roads that provide a moderate degree of user comfort and convenience at moderate speeds. Most are double lane aggregate surfaced. Some may be single lane. Some may be chip sealed or dust abated.

Maintenance Level 3: Roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Typically these roads are low speed, single lane with turnouts and native or aggregate surfacing.

Maintenance Level 2: Roads open for use by high-clearance vehicles. Passenger car traffic is allowed but discouraged. Use by the public is unrestricted, and is generally focused on access to privately-owned lands or recreation sites, or permitted activities (i.e. grazing, woodcutting). The Forest Service uses these roads extensively for administrative purposes. Non-traffic generated maintenance is minimal.

Maintenance Level 1: These roads are closed year-round, but some intermittent use may be authorized. When closed, they must be physically closed with barricades, berms, gates, or other closure devices. When closed to vehicular traffic, they may be suitable and used for non-motorized uses, with custodial maintenance.

The current Plumas National Forest Transportation System (NFTS) encompasses 4,138 miles of roads in all maintenance levels (Table 201).

Table 201. Road Mileage on the Plumas NF by Maintenance Level.

Maintenance Level	Miles
Level 1	262
Level 2	3,240
Level 3	405
Level 4	106
Level 5	124
Total Miles:	4,138

Road Maintenance Terminology

Maintenance needs on NFS roads are categorized and quantified in several ways that must be understood to make sense of cost data and projected annual and deferred maintenance needs being reported at the National level. Common terms used in this appendix are defined here.

Traffic Generated and Non-Traffic Generated Maintenance: Traffic generated maintenance needs are those associated with the use of a road, such as rutting of the roadbed caused by traffic during wet weather. In general, as use on a particular route increases, so does the traffic-generated maintenance needs. Non-Traffic generated maintenance is independent of the use of a road. For example, the growth of tree limbs and brush creates a maintenance need, but the growth is independent of the volume of traffic the road receives.

Annual Maintenance: This term refers to the expected annual maintenance required on roadways and roadsides based on the Maintenance Level assigned to the road. The actual amount of maintenance required depends on the amount of use the road has received, the condition of the surface, and the season of use. Annual maintenance estimates include many work items that are not done yearly, but are annualized. For example, the aggregate surfacing on a mile of level 3 road may last 25 years and cost $60,000 to replace. This equates to a simple annualized cost of $2,400 per mile.

Deferred Maintenance: This is work that can be deferred, without loss of road serviceability, until such time as the work can be economically or efficiently performed. Using the example above, if the surfacing is completely worn down, the deferred maintenance is $60,000 per mile for replacement. Deferred maintenance needs can be reduced through a number of different actions and strategies, as discussed below.

Safety and User Related Maintenance: This term refers to activities that protect the public and agency employees and allow use of the road for the intended purpose. Examples include installation of warning devices (such as stop or bridge abutment signs); pothole patching on a level 5 road; maintaining surface and brush clearance for passenger car access to developed recreation sites; maintaining access for fire suppression initial attack equipment; or maintaining access for Forest health project planning and implementation.

Resource Protection Related Maintenance: These activities preserve the road prism for its intended use and minimize erosion and sediment delivery to aquatic systems. Examples include ditch and culvert cleaning; maintaining rolling dips to prevent stream diversion; or surface blading to remove wheel ruts that concentrate runoff.

Stormproofing and Aquatic Passage: These projects reconstruct a road using various techniques to minimize chronic and storm related resource damage, reduce future maintenance costs, and restore aquatic passage at stream crossings. Stormproofing includes out-sloping the road surface to the maximum extent possible and eliminating associated inboard ditches and cross drains; installing larger culverts and/or lowering the grade through stream crossings to reduce fill volume and prevent diversion; installing rolling dips on moderate road grades to minimize road surface erosion; armoring fills with rock to reduce erosion should they be overtopped; or completely replacing earth fills with rock. Aquatic passage involves replacing a pipe culvert with an open bottom culvert or bridge to restore the natural stream bottom.

Deferred Maintenance Backlog

The Plumas NFTS has developed over the past 100 years, generally in response to public access and resource extraction needs. The current inventory shows over 4,138 miles of road, with 85% in MLs 1 and 2, and only 15% in MLs 3, 4 and 5 (Table 201). Road maintenance budgets have declined over the past decade, and the Forest's internal capability to maintain roads has been reduced with loss of maintenance personnel and equipment. The Plumas Forest wide Roads Analysis completed in 2008 reported a Plumas NF deferred maintenance backlog of $70.0 million and the need for an annual maintenance budget of $9.5 million to cover all ML 1–5 roads on the system.

These national estimates require some explanation. The deferred and annual maintenance figures were generated using a national formula based on random sampling (less than 0.2% miles of system roads nationwide for 2009) and standard maintenance prescriptions. It is a useful tool for tracking national trends and producing auditable outputs, but was never intended for use at the Forest level, nor is it considered to be statistically valid at this scale. The 2008 deferred maintenance cost figures for ML 4 and 5 roads ($41.5 million) is a reasonably fair assessment of needs, since paved or chip sealed roads have clearly defined maintenance needs to preserve the surfacing and avoid rapid failure.

Annual maintenance cost figures ($3.2 million) for ML 4 and 5 roads are too high for the Plumas due to lighter traffic volumes and winter snow cover extending the pavement life. Local estimates are closer to $2 million. Maintenance Level 2 and 3 road maintenance costs are even more overstated. These roads account for $28.5 million (41%) of the 2008 deferred maintenance and $6.2 million (65%) of the annual maintenance needs; however these require far less maintenance expenditures to remain useable and protect natural resources. The nationally calculated cost figures for ML 2 and 3 roads are based on several assumptions:

- High cost aggregate surfacing should be replaced and maintained on most level 3 roads
- Culverts have fixed and relatively limited life spans
- ML 2 roads require high numbers of cross drain culverts
- Roadside vegetation and debris should be regularly removed from every road

These assumptions are not site-specific to the Plumas NF, and do not apply to many of the Forest's roads. Given the conditions on the ground and current maintenance and environmental objectives, the maintenance figures for ML 2 and 3 roads are considered to be unreasonably high, which artificially inflates the Forest deferred backlog figure. More reasonable figures for the entire Plumas ML 1 through ML 5 road system would be in the range of $20 million deferred maintenance and $3 million annual maintenance. While these figures may still appear high, they are slowly being reduced through a variety of activities that are part of a Forest-wide strategy.

Forest Strategy for Road Maintenance

Plumas NF line officers regularly make decisions about which roads to maintain or improve, and to what standard, in order to protect resources and minimize costs. These maintenance decisions, coupled with road projects such as stormproofing, fish passage construction, and decommissioning, reduce road maintenance needs and the deferred maintenance backlog. These actions are accomplished through carefully targeted maintenance planning, and aggressive pursuit of funding opportunities. The Forest has requested and received significant additional funding from several sources for road restoration and design projects since 2006. The ongoing decommissioning program has resulted in a net loss of road miles over the past 8 years. These actions have reduced annual road maintenance needs, allowing more regular maintenance funds to be focused on the deferred maintenance backlog.

Annual Maintenance

Road managers consider a number of factors in deciding when, where and on what to spend annual maintenance funds. Every road does not need or receive maintenance every year, nor is every type of maintenance task completed when a road is maintained. There is no expectation, either by Forest managers or the public that every mile of every Forest road will be passable every year. A description of the Plumas NFTS by maintenance level follows.

Maintenance Level 5: These roads are mostly double lane paved that do require care every year and significant mission and safety related maintenance every 8–10 years. Important to note is these roads only make up 3% of the system. An example is the 10 mile segment from Genesee to Antelope Lake. This road receives relatively low traffic volumes with significantly fewer log trucks than in years past, and most are not driven in winter due to snow cover. This substantially reduces maintenance costs as heavy vehicles and winter use greatly accelerate asphalt deterioration, and generate increases in safety related costs. Drainage is fully maintained and sediment run-off is negligible.

Maintenance Level 4: These are mostly chipsealed roads with some asphalt sections that also require annual care and significant mission and safety related maintenance every 8–10 years. These roads make up 3% of the Plumas NFTS. They generally service campgrounds, major trailheads, river accesses and administrative sites. These roads receive low traffic volumes and most are not driven in winter due to facility seasonal closures and snow cover. The vast majority of these roads have received the critical maintenance necessary to preserve the surfacing. Drainage is fully maintained and sediment run-off is negligible.

Maintenance Level 3: These roads make up 10% of the Plumas NFTS and 88% are in-sloped to a ditch, which reduces the probability that water will concentrate on the road and erode the surface. Most of these roads were aggregate surfaced at one time, but the rock has worn off and been pounded into the native material. In many cases, the aggregate surfacing was placed for the purpose of withstanding heavy use during logging operations. Since the mid 1990s, the traffic mix has shifted to predominately light administrative use and dispersed recreation. The maintenance objectives have shifted to drainage structure cleaning, debris removal, hazard tree removal and spot roadside brushing for safety. The road surfaces are generally hard, stable and bumpy, but are passable with most passenger cars having reasonable ground clearance. The majority of traffic on these roads is pickup trucks or sport utility vehicles, which offer even better ground clearance. These roads are graded only as necessary for proper drainage or for safety concerns such as severe wash boarding. This not only saves maintenance funds, but reduces fresh ground disturbance and reduces surface disturbance and the potential for sediment generation. We only plan to replace aggregate surfacing where needed for resource protection. From a road user perspective, the trip may take a little longer, but given the winding roads, steep drop offs, extremely light traffic volumes and beautiful country, this is probably a good thing.

The following summarizes the maintenance level 3 strategy and cost savings:

- **Aggregate Surfacing**—Applied only as needed for resource protection adjacent to major streams or in soft soils or for driver safety. Approximately 200 miles of road could be enhanced through the replenishment of aggregate surfacing, but since there are no associated resource problems, the decision has been made to forgo surfacing at this time.
- **Grading/Ditch Cleaning**—Conducted as needed to restore surface drainage or abate safety hazards. In many areas where the surface is hard and stable, the roadbed would need to be ripped in order to loosen enough soil to grade a smooth running surface. This ground disturbance could lead to an increase in sediment run-off until the road surface stabilizes, so roads with stable surfaces are generally not graded.
- **Culverts**—Check and clean as needed, with scheduled replacement of those that are deteriorated or of inadequate size. National standard for replacement life is 20 years; however,

inspections indicate that most culverts on the Plumas are 30–40 years old and still in good condition. Changing culvert lifespan directly affects calculated deferred maintenance costs.

- **Debris Removal—**Accomplished as required on all ML 4–5 and most ML 3 roads, but generally only as needed for specific projects on ML 2 roads. As an example, in fiscal year 2006 only 1,220 miles of ML 2 roads received maintenance.
- **Roadside Brushing**—Brushing needs depend on vegetation types and precipitation which decreases substantially from west to east across the Forest. The western-most roads on the Plumas NF with lower growing vegetation generally have higher brushing costs. Brushing is focused on areas with safety concerns (generally sight distance around curves). Force account crews assist with spot brushing, which is less expensive and more flexible than using contract crews.

Maintenance Level 2: These roads make up 78% of the Plumas NFTS. Eighteen percent are in-sloped to a ditch; the remainder are either out-sloped or flat. The majority of these roads are only maintained as needed to support Forest projects or provide access to lookouts or recreation facilities; therefore, many may not see any maintenance for several years. In some cases, roads may become impassable due to rocks or down trees. When needed, maintenance activities typically consist of debris removal and roadside brushing. The amount of brushing required can be substantial, depending on location and the last time it was done. Spot aggregate surfacing is only used to stabilize soft areas. By designing a maintenance scheme focused on roads needed specifically for project or recreation access, we can effectively utilize our maintenance budget on the highest-priority needs.

Maintenance Level 1: These roads make up 6% of the Plumas NFTS. Normal practice is to place these roads into self-maintaining hydrologic storage using a combination of water bars, rolling dips and pulling culverts. Closure device is either a gate or berm. No maintenance is typically performed except to check the closure device.

Change in Operational Maintenance Level

When roads no longer warrant or receive the type of use for which they were designed, the road manager may recommend that the road’s maintenance level be reduced. For example, in many cases on the Forest, ML 3 roads support little traffic, and may be subject to rocks, woody debris, encroaching vegetation and uneven surfaces. Over the past decade a number of ML 3 roads have been reduced to ML 2, and drainage function (rather than passenger comfort) has become the primary objective. These roads are then prioritized for maintenance with the rest of the ML 2 roads. Annual maintenance needs are reduced, and the dollar values assigned to these roads as part of the deferred maintenance backlog are also reduced.

Stormproofing, Decommissioning and Aquatic Passage

Stormproofing opportunities are evaluated at the watershed level on typically maintenance level 1 through 3 roads, to reduce the need for drainage maintenance and to prevent catastrophic soil loss during significant storm events.

Decommissioning is analyzed at the watershed level through the appropriate project-level environmental documentation. It may be as simple as taking a naturally revegetated road with no erosion issues off the system, or it may involve major reconstruction to remove culverts and fills, followed by aggressive outsloping to restore the original hillside contour to the extent possible. All decommissioned roads and associated deferred and annual maintenance costs are removed from the NFTS corporate database. Over the past decade, the Plumas NF has decommissioned 56 miles of NFS roads and 91 miles of unauthorized roads that were not needed and were causing or could potentially cause resource damage. The net result is that the existing NFTS roads open year round have been reduced by 1.4 percent. This has been accomplished through Forest Planning, vegetation management projects, watershed restoration projects, fuel treatment projects; trail management decisions, landscape analysis, watershed analysis and the Roads Analysis Process (RAP). All of these efforts have helped to identify and manage the current NFTS.

Aquatic passage projects have been completed on approximately 3 stream crossings, with 10 awaiting funding. The projects typically replace a culvert with an open bottom arch or a bridge that greatly reduces the fill volume in the stream and exceeds the 100 year storm flow. These projects do more than enhance aquatic habitat—they reduce the potential for culvert blockage and subsequent heavy sedimentation from loss of fill. In some cases, the old culvert was near the end of its useful life, so the replacement structure reduces future maintenance needs.

Adding Roads to the System

A logical question when proposing to add new roads to the NFTS is that of affordability. The ongoing efforts described in this appendix are aimed at providing a sustainable NFTS to meet a range of access needs and protect natural resources. The unauthorized routes being proposed for addition to the system under the Travel Management EIS have for years provided access to dispersed recreation opportunities, and connections between NFS roads. These routes have not needed nor received Forest Service maintenance, due in large measure to being mostly short lengths located over generally gentle slopes with no erosion potential. On-the-ground review of these routes indicates that we would not consider conducting maintenance for user access. Expected additional management costs are (1) installation of road signs at less than $100 each and (2) entry of data into the corporate INFRA database.

Summary

- Management of the Plumas NFTS has changed from an emphasis on commodity extraction to resource protection.
- The Plumas NF is working towards the minimum road system to meet agency and public uses.
- National maintenance cost models were not intended to be used at the Forest level.
- The Forest Road management program is focused on safety and resource protection while aggressively seeking to leverage maintenance funds through grants and special programs.
- Strategies to reduce annual maintenance costs include:
  - Prioritizing maintenance of ML 2 roads on project and recreation-related access needs
  - Downgrading maintenance levels where possible without compromising user needs.
  - Focusing on watershed level stormproofing and decommissioning to enhance resource protection and reduce future maintenance needs.

Appendix H: Summary of the Response to Comments

Introduction to Public Comment Process

This Executive Summary contains a concise summary of public comment for the Plumas National Forest (PNF) Public Motorized Travel Management Plan (TMP) and Draft Environmental Impact Statement (DEIS). The formal comment period on the PNF DEIS began on January 3, 2008, and ended March 3, 2008. Extension. The PNF received 4,310 total responses, including 340 original responses and 3,970 form letters. For a full demographic description and breakdown of these responses, please see Appendix A.

This summary begins with general background information on the PNF TMP, and follows with a short description of the content analysis process that was used to analyze comments initially. It concludes with a brief discussion of the main areas of public concern. This summary is not intended to provide an exhaustive account of public concerns. Indeed, the comments on the PNF DEIS are so varied and contain such specificity and detail that they do not lend themselves to a brief summarization. The Executive Summary, therefore, is intended only to give a general discussion of some pervasive themes running through public comment.

Reviewers should be aware that respondents are self-selected, and their comments do not necessarily represent the views of the public at large. In considering these views, it is important for the public and decision makers to understand that this process makes no attempt to treat input as if it were a vote. Instead, the content analysis process ensures that every comment is considered at some point in the decision process. In addition to this report, PNF has received a database containing all discrete public comments on the DEIS, has reviewed each of the comments, and has treated each comment according to regulations provided by the Council on Environmental Quality (CEQ) at 40 CFR 1503.4.

Project Background

Over the past few decades, the availability and capability of motor vehicles, particularly off-highway vehicles (OHVs) and sport utility vehicles has increased tremendously. Nationally, the number of OHV recreationists has climbed sevenfold in the past 30 years, from approximately 5 million in 1972 to 36 million in 2000. California is experiencing the highest level of OHV use of any state in the nation.

The PNF has 999,521 acres currently open to cross-country travel by motor vehicles. In 2005, the PNF completed an extensive inventory of unauthorized routes on National Forest System (NFS) lands open to cross-country travel. Approximately 1,109 miles of unauthorized routes were identified. These routes were developed without agency authorization, environmental analysis, or public involvement, and do not have the same status as National Forest Transportation System (NFTS) roads and NFTS trails.

Unmanaged motor vehicle use, particularly OHV use, has resulted in unplanned roads and trails, erosion, watershed and habitat degradation, and impacts to cultural resource sites. Compaction and erosion are the primary effects of motor vehicle use on soils. Riparian areas and aquatic dependent species are particularly vulnerable to damage from motor vehicle use.

The PNF's current proposal, if finalized, would (1) prohibit cross-country motor vehicle travel off designated NFTS roads, motorized trails and areas by the public except as allowed by permit or other authorization, (2) add approximately 364 miles of existing unauthorized routes to the NFTS, and (3) designate an additional area (36 acres) open to motor vehicle use.

A number of issues were identified in the public comments received for the project. Comments were organized and "coded" to reflect different resource issues and management actions that commenters expressed concern about. This summary is organized according the same coding categories. The public responses received in relation to the DEIS were diverse.

Content Analysis Process

Content analysis is a method of evaluating messages in order to elicit meanings and derive information. This approach has been applied to the analysis of public comment. While this summary does not seek to capture every specific concern, it strives to succinctly identify all key resource issues and themes for decisionmakers and the public.

Each public response is given a unique identifying number, which allows analysts to link specific comments to original letters. Respondents' names and addresses are then entered into a project-specific database program, enabling creation of a complete mailing list of all respondents. The database is also used to track pertinent demographic information such as responses from special interest groups or federal, state, tribal, county, and local governments.

All input is considered and reviewed by two analysts. Each response is first read by one analyst and sorted into comments addressing various concerns and themes. This sorting is accomplished by applying "codes" to each comment (see Appendix B for the coding structure). A second analyst reviews the coded comments to ensure accuracy and consistency. Comments are then entered verbatim into the database. In preparing the final summary analysis, public issues are reviewed again using database printouts. These reports track all coded input and allow analysts to identify a wide range of issues and concerns, and analyze the relationships between them.

Through the content analysis process, analysts strive to identify all relevant issues, not just those represented by the majority of respondents. The breadth, depth, and rationale of each comment are especially important. Content analysis is intended to facilitate good decision-making by helping the planning team to clarify, adjust, or incorporate technical information into preparation of planning documents and rules. All responses (i.e., public hearing transcripts, letters, emails, faxes, and other types of input) are included in this analysis.

The final product includes a narrative description of public comment by topic, which addresses and highlights the key ideas that were promoted by the public. This process and the resulting summary do not replace comments in their original form. Rather, they provide a concise summary of the letters and other input on file. Both the planning team and the public are encouraged to review the actual letters firsthand.

General Overview of Public Comment

Public comment on the PNF DEIS is far-reaching, often highly detailed, and represents a wide range of values and perspectives with respect to motorized travel management. Given this wide range of values and perspectives, only broad generalizations are possible to capture in this summary. The following subsections describe the public comments received in relation to different aspects of the TMP and DEIS. These sections do not treat site-specific comments, which the planning team is addressing in the response-to-comment effort.

Analysis

Though the public input regarding motorized travel management on the PNF addresses several resource areas and land-management actions, a large percentage of the comments, concerns, and requests relate to the adequacy of analysis. While many respondents comment on specific topics within the DEIS, such as the purpose and need, cumulative impacts, best management practices (BMPs), document composition, etc., most respondents request specific updates, changes, or additional data be added to various technical studies (resource reports). Many respondents also comment on the DEIS Alternatives.

Several individuals recommend the agency adjust the purpose and need statement to reflect more accurately the intent of the Executive Orders, Subparts A and B of the Travel Management regulations, and the purpose of travel planning. One respondent suggests incorporating the following statement to better identify the real purpose and need,

"The need to address public safety concerns, user conflicts, private property rights, lost non-motorized recreational opportunities, and impact to natural soundscapes and air quality that have arisen or might be expected to arise given recent trends in motorized use." (Ltr 214, Cmt 23, Preservation/Conservation)

Many individuals express concern about the process the agency used to determine routes for authorized designation. Some respondents would like the PNF to provide supporting documentation that highlights the agency's decision on routes within the transportation system. In general, both motorized and non-motorized proponents believe that a site-specific analysis of all inventoried routes would strengthen the analysis and should be included in the Final Environmental Impact Statement (FEIS).

In addition, many respondents believe the DEIS is inadequate because the PNF has not (1) identified the minimum road system needed for safe and efficient travel and administration of NFS lands; (2) identified the roads under their jurisdiction that are no longer needed to meet resource management objectives; and (3) completed a science-based analysis of the existing transportation system to inform transportation management decisions. Some respondents also believe that technical studies are written with a noticeable bias against OHV use, or that route determinations are made "pre-decisional". Some individuals comment the agency should use the best available data and research. Many respondents would like for the PNF to work closely with the public and local officials throughout the travel management process.

Numerous comments focus on semantic, grammatical, and technical/editorial improvements. Several respondents identify areas that report “inaccurate mileages” or contain other “misleading information”. Some respondents request that a glossary be inserted into the FEIS to explain acronyms and other unfamiliar terms.

Alternatives

Many comments address the five proposed Alternatives. Some respondents are dissatisfied with the range of proposed Alternatives and believe that “several relevant issues are not adequately addressed”. These respondents request that the PNF consider “a new action alternative that provides a better balance between access and environmental protection”. While some of these comments express general support or opposition to the Alternatives, many respondents provide detailed recommendations to modify a particular Alternative. The following paragraphs summarize general comments relating to each of the DEIS Alternatives.

Alternative 1 – Respondents express concern over restricted access to public lands. These respondents believe that “far too much is being taken away from the public” and that “all but Alternative 1 leaves too many roads and trails out of the system”. Some respondents also believe that Alternative 1 provides balanced forest recreation opportunities as well as appropriate resource protection.

Alternative 2 – Many comments are site-specific and express support or opposition to specific route designations. Some respondents believe that Alternative 2 would “best serve the public” and “protect the forest for future generations”.

Alternative 3 – Many respondents believe that Alternative 3 is the best alternative for the health of the forest because it closes all unauthorized OHV routes and prohibits cross-country travel. These respondents prefer this Alternative because it gives the best protection to wildlife and fish habitat against the impacts of OHVs. One organization supports this Alternative because it does not add any additional routes to environmentally stressed watersheds.

Alternative 4 – Few comments were received for this Alternative. Some respondents support this Alternative because it emphasizes natural resource protection and avoids development in roadless areas. One respondent believes Alternative 4 offers a reasonable balance between recreation opportunity and resource impacts.

Alternative 5 – Several individuals and organizations comment on this Alternative. One organization believes a modified Alternative 5 should be created and included in the FEIS. Some suggested revisions such as adding additional mixed use designations, designating additional expert level single track, or adding low-speed 4WD opportunities. One respondent believes the Preferred Alternative violates numerous laws and regulations and would conflict with the Plumas Land and Resource Management Plan. Another individual believes that Alternative 5 is a poor attempt to manage forest roads and trails.

Other Alternatives – Beyond the five proposed Alternatives, one organization proposes an additional Alternative (Alternative 6) for public consideration. The respondent believes this Alternative would address several issues that are not adequately evaluated under the five existing

Alternatives, some of which include: access to firewood and trees; access for the disabled and elderly; dispersed camping; other specific route designations; providing a balanced recreation experience for all OHV vehicle types and skill levels; and designating open-riding-areas near major communities.

Decision Making Process

Respondents express concerns regarding various aspects of the decision making process. These concerns primarily include adequacy of the public comment period, the Forest's decision-making philosophies, and consistency with other rules, regulations, or plans.

Several respondents comment on the inadequacy of public involvement. The majority of these comments relate to general public involvement methodologies, the adequacy of the comment period, working with volunteer groups and partnerships, and influence from interest groups and politics. Many individuals request an extension to the comment period because: 1) the DEIS is "lengthy and complex", or 2) various "errors, discrepancies, omissions, and contradictions" make the DEIS time-consuming and difficult to understand. Many respondents suggest forging partnerships with user or volunteer groups to avoid route closures or to preserve forest resources.

Many respondents comment on PNF's decision-making philosophy. While some respondents request the PNF to make travel-management decisions based on ecosystem or environmental protection, the majority of these respondents request that a multiple-use or mixed-use emphasis guide the decision making philosophy, especially when related to recreation opportunities. Additionally, some respondents believe the PNF is overly influenced by special interest groups and has consequently changed from a multiple-use forest to one that allows only a 'catered' single use of the land.

Respondents question some aspects of the project's legal consistency with numerous laws, executive orders, rules, regulations, or state, county, or municipal laws and plans. Some organizations criticize the DEIS for not being consist with adjacent PNF land management and other local planning regulations. For example, one respondent states:

"The DEIS does not adequately coordinate uses between National Forest routes and the County road system or consider the opportunities for County roads to serve as connectors between National Forest routes for OHV use." (Ltr 18, Cmt 8, County Government Agency/Elected Official)

Land Management

The majority of comments received in relation to activities on the PNF focus on recreation activities (primarily motorized versus non-motorized), and other resource activities such as hunting and firewood gathering. Very few comments were received related to management activities dealing with oil and gas mining, timber harvesting, livestock grazing, waste management, etc.

Respondents express polarized views on how motorized and non-motorized recreation activities should be managed. Regarding OHV use, many respondents believe the agency should recognize that unmanaged OHV use has resulted in unauthorized routes which have damaged the forest by increased soil compaction and erosion, increased sedimentation, water quality degradation, the spread of noxious weeds, increased fire risk, damage to cultural resources, habitat destruction and fragmentation, increased disturbance to sensitive wildlife, etc. Some individuals believe the current transportation system continues to allow motor vehicle use in ecologically and socially important roadless areas, in proposed Wild and Scenic River corridors, and in sensitive wildlife habitat. Individuals who oppose OHV use urge the PNF to “restrict and control, rather than enlarge, the road network in this forest that is open to OHVs” (Ltr 6, Cmt 1, Individual).

Conversely, many individuals support OHV use and believe that the PNF should preserve motorized access to public lands. Many respondents believe that OHV opportunities should be enhanced and expanded because of significant demand for sustainable and responsible motorized recreation. Many respondents also state that OHV groups donate time and manpower to not only maintain trails, but help clean up trails damaged by the carelessness of others. Furthermore, individuals who support OHV use also mention various social values and benefits attributed to OHV use.

In addition to these two polarized views on motorized recreation, some individuals request that OHV activities be managed better but not eliminated. One group believes that “OHV use can be managed in a proper way to protect critical forest resources while providing a recreational experience”. (Ltr 235, Cmt 32, Recreation/Conservation Organization)

Generally, respondents have concerns about the PNF being available to multiple forms of recreation. Several individuals comment on the need to maintain motorized access to non-motorized-related activities such as dispersed camping, woodcutting, wildlife game retrieval, etc. Individuals explain that these activities are an integral part of recreation on public lands. Some individuals request that cumulative impacts analysis adequately address impacts to these activities. Many individuals oppose restrictions that limit parking for dispersed camping opportunities to within one vehicle length of designated roads. Individuals argue that this restriction is unrealistic, presents safety issues, and would be difficult to enforce. One individual suggests designating spurs to camp sites, fishing spots, or parking areas.

Several comments address enforcement and funding issues related to motorized transportation and route maintenance. Individuals argue the need to prioritize maintenance funding to ensure that existing routes can be maintained, monitored, and patrolled. Several individuals believe the agency should not authorize additional routes because of a lack of funding. By contrast, some argue that scarce funds should not be spent on the decommissioning of routes. One individual requests that law enforcement issues be addressed in the DEIS.

Transportation Management

Comments relating to road and trail classification are the most common. These comments are far-reaching and include various transportation management topics, some of which include: road and trail classification, traffic control and safety, seasonal closures, disabled and elderly use, and adding or removing mileage.

Many comments relate to route classification of specific trails or areas (e.g., “Please close trail 15m05”, or “Trails in the Cascades Area should be classified as mixed-use”). These comments are not included in this summary and are included in the comment database.

Road and Trail Classification

Many respondents comment on the need to close existing system routes to motorized travel. Many individuals believe that routes should be closed to motorized travel because the routes: 1) have not been authorized by the Forest Service, 2) are poorly maintained, 3) cross areas not compatible with motorized travel. Many individuals believe the agency should reject adding the proposed 364 miles of unauthorized routes to the system. Some of these individuals are concerned that the addition of unauthorized routes would negatively impact non-motorized recreation activities and critical resources such as air, water, vegetation, and wildlife.

Citizens express concern over the proposed closure of routes within the forest. Many respondents argue the need for more OHV routes and urge the Forest Service to reconsider classification of transportation routes. Constituents are concerned that if the agency does not create more OHV routes, people will push onto private lands, or give up OHV riding altogether. Individuals are also concerned that closure of routes will impede access to other trails, as well as to hunting, fishing, and dispersed camping areas.

Respondents argue that mixed access should be considered on routes to allow OHV and motorcycle use. Other constituents submitted specific route numbers that they would like the Forest Service to consider for closure or authorization. Respondents also believe that closures would further concentrate recreation on remaining trails, increase impacts, reduce forest health, and harm the economy. Some respondents suggest that route maintenance be handled by volunteer groups and partnerships which will reduce costs to the Forest.

Many respondents believe that cross-country travel should be prohibited in the PNF. Several individuals feel that cross-country travel would be inconsistent with the Forest Service’s goal to develop, maintain, and enforce a consistent trail network. Some respondents favor prohibiting cross-country travel but request that sufficient motorized trails be designated to allow safe and dispersed OHV use, as well as providing better access for hunters, hikers, and bicyclists. To the contrary, some individuals believe that prohibiting cross-country travel will reduce the availability of acreage for both motorized recreation as well as motorized access to dispersed recreation activities. Several individuals believe cross-country travel and “loop” routes should be developed to provide connectivity between trails.

Several individuals comment on the need to prohibit motorized travel in roadless and wilderness areas. Respondents urge the agency to close all OHV routes within all six Inventoried Roadless Areas (IRA) and the roadless areas inventoried by citizen groups. Respondents expressed the need for prioritized protection of the proposed Feather Falls wilderness, the Middle Fork Feather River IRA, the Squaw Peak citizens’ roadless area, Wild and Scenic Rivers, and all mountain meadows. These respondents believe wilderness areas should be preserved for quiet recreation opportunities, to preserve fish and wildlife habitat, and to protect the forest from invasive plant species. One organization believes the DEIS significantly conflicts with the 2006 petition from the State of California to the Secretary of Agriculture, requesting that 100% of all IRAs in California remain in their current condition.

Some individuals are concerned that traffic-related injuries are likely to increase as areas available to motorized recreation are concentrated to smaller areas. One organization believes that the Forest Service's attempt to restrict OHV access to Level III roads for safety reasons is without merit and cannot be supported by the data. This organization contends that Level III roads pose no greater safety concerns than other roads. One organization encourages the Forest Service to work with the California Highway Patrol and State Off-highway Motor Vehicle Recreation (OHMVR) Division to determine if State safety requirements for minors need to be strengthened. Individuals also encourage the Forest Service to involve the public in engineering analyses for mixed-use when safety issues are raised.

Many respondents support seasonal closures of unpaved roads and trails during winter months (wet weather) and/or during peak game migration periods. Respondents argue that seasonal closures are critical to reduce erosion and sedimentation, maintenance costs, and disturbance of wildlife. However, many respondents believe that "a seasonal-based closure in effect would unreasonably limit the recreation opportunity during a dry time" (Ltr 200, Cmt 2, Individual). Instead of "fixed closure dates," some respondents request that rain gauges be used to determine route closures. One respondent argues that rainfall-based management "would allow the PNF to manage the area in a manner that protects resources during periods of wet weather unsuitable for OHV recreation and also allows for reasonable OHV recreation after soil conditions become suitable" (Ltr 227, Cmt 7, Individual).

Many individuals rely on OHVs as their only method of accessing certain areas of the forest. Several individuals believe that closing roads to OHV use is discriminating against "people with disabilities, against those who are elderly, and whose health does not permit them to walk or hike up the trails, cross country" (Ltr 1, Cmt 11, Multiple Use or Land Rights Organization). Individuals cite Section 504 of the Rehabilitation Act of 2003 as the basis of this discrimination. Individuals request that the DEIS fully consider how route designations will affect the disabled and elderly and their ability to enjoy the entire forest.

Demographics

Introduction to Demographics

Demographic coding allows managers to form an overall picture of who is submitting comments, where they live, their general affiliation with various organizations or government agencies, and the manner in which they respond. The database can be used to isolate specific combinations of information about public comment. For example, a report can include public comment only from people in California or a report can identify specific types of land users such as recreational groups, agricultural organizations, or businesses. Demographic coding allows managers to focus on specific areas of concern linked to respondent categories, geographic areas, and response types.

Although demographic information is captured and tracked, it is important to note that the consideration of public comment is not a vote-counting process. Every comment and suggestion has value, whether expressed by one or a thousand respondents. All input is considered, and the analysis team attempts to capture all relevant public concerns in the analysis process. For the Plumas NF

Proposed Transportation Management Plan and DEIS, 340 original letters and form letters with additional comments, representing 2849 signatures were received and processed. In addition, 3,970 form letters representing 3,998 signatures were received. Accordingly, this demographics appendix is divided into two sections: Original Responses and Form Letters.

Original Responses

In the tables displayed below, please note that demographic figures are given for number of responses, respondents, and signatures. For the purposes of this analysis, the following definitions apply: “response” refers to a discrete piece of correspondence; “respondent” refers to each individual or organization to whom a mail identification number is assigned (e.g., a single response may represent several organizations without one primary author); and “signature” simply refers to each individual who adds his or her name to a response, endorsing the view of the primary respondent(s).

Geographic Representation

Geographic representation is tracked for each respondent during the course of content analysis. Letters and emails were received from 12 of the United States (Table 202). States of residence for each individual signature were tracked for multiple respondent responses.

Table 202. Geographic Representation of Response by Country and State/Territory.

Country	State	Number of Respondents	Number of Signatures
United States	**Alaska**	1	1
	Alabama	1	2
	Arizona	1	1
	California	322	1,191
	Idaho	1	1
	Maryland	3	4
	Missouri	2	2
	Montana	1	1
	Nevada	1	1
	New Mexico	1	1
	Oregon	2	2
	Virginia	1	1
	Anonymous/Unknown	31	1,641
Total		368	2,849

Organizational Affiliation

Responses were received from various organizations and unaffiliated individuals. Organization types were tracked for each response received (Table 203). Organization Types of each individual signature were tracked for multiple respondent responses.

Table 203. Number of Respondents/Signatures by Organizational Affiliation.

Organization Field	Organization Type	Number of Respondents	Number of Signatures
C	County Government Agency/Elected Official/Association	4	4
F	Federal Agency/Elected Official	2	2
I	Individual	313	2,794
L	Timber or Wood Products Industry	3	3
P	Preservation/Conservation	11	11
Q	Tribal Government/Elected Official/Agency	1	1
R	Recreational (non-specific)	2	2
RC	Recreation/Conservation Organization	14	14
RM	Motorized Recreation	12	12
S	State Government Agency/Elected Official/Association	1	1
U	Utility Group	2	2
Z	Multiple Use or Land Rights Organization	3	3
Total		368	2,849

Response Type

Response types were tracked for each response received on the project (Table 204). Responses were received as Letters, Form/Letter Generators with additional comment (Forms Plus), Public Meeting Comment Forms, and Petitions.

Table 204. Number of Responses/Signatures by Response Type.

Response Type #	Response Type	Number of Responses	Number of Signatures
1	Letter/Form Master	166	203
3	Form/Letter Generator Plus	170	174
7	Public Meeting Comment Form	2	2
10	Petition	2	2470
Total		340	2,849

Delivery Type

Delivery types were tracked for each response received on the project (Table 205). Responses were received in the form of Email, Fax, and US Mail or Commercial Carrier.

Table 205. Number of Responses/Signatures by Delivery Type

Delivery Type Code	Delivery Type	Number of Responses	Number of Signatures
E	Email	199	235
F	Fax	2	2
M	US Mail or Commercial Carrier	139	2,611
Total		340	2,849

Form Responses

Organized response campaigns (form letters) represent 92.1 percent of the total responses received during the public comment period for the proposal (3970 forms out of 4310 responses) (Table 205). Forms are defined as five or more responses, received separately, but containing identical text. Once a form is identified, a "form master" is entered into the database with all of the content information. All responses with matching text are then linked to this master form within the database with a designated "form number." If a response does not contain all of the text presented in a given form, it is entered as an individual letter. Duplicate responses from four or fewer respondents are also entered as individual letters.

Forms are designated with a number for the purpose of tracking subsequent submissions. Form numbers are assigned as each "form master" is identified. The following table presents the number of responses, and signatures associated with each form as well as brief content summaries. Three forms were identified.

Table 206. Form Letters.

Number of Form	Number of Responses	Number of Signatures	Description of Form
1	3,550	3,578	Current proposal focuses too much on analyzing potential impacts of designating new user-created routes. The current transportation system allows motor vehicle use in ecologically and socially important roadless areas, in proposed Wild and Scenic River corridors, in habitat of sensitive wildlife species, and rare Montane Meadow habitat. Would like Alternative 3 selected because a science-based Travel Management Analysis has not been completed and an alternative that considers road closures on the existing NFTS has not been included.

Number of Form	Number of Responses	Number of Signatures	Description of Form
2	416	416	700 miles of inventoried routes from alternative 2 through 5 have been omitted and 1100 miles from alternative 3. Would like to have them added back in. Requests routes be left open until mitigation/repair occurs, and provide timeline and plan. Alternatives do not offer OHV alternative and should be added. Requests that all OHV/ORV routes indicated upon the Summer OHV map be added back into each alternative. Requests that a rain gauge measured closure together with a drying time is superior system to closure based solely on arbitrary dates. Requests that the Plumas designate all routes up to private boundaries. Request the FEIS address the impact that each route's width (single-track, 50" or less, etc) affect upon water quality. Requests the Plumas continue to allow non street legal vehicles on forest roads and trails. Requests that dispersed camping and wood cutting are addressed as outside the scope of the Public Motorized Travel Management EIS.
3	5	5	Supports the proposed alternative 2 action of the OHV Route designations DEIS. As residents of Oroville and frequent users of the Plumas National Forest, this plan best supports activities and protects the forest for future generations.
Total:	3,970	3,998	

The following table presents the geographic information tracked for each form response. The table only lists geographic units from which responses were actually received.

Table 207. Responses by Geographic District.

State	Form 1—Number of Responses & Signatures		Form 2—Number of Responses & Signatures		Form 3—Number of Responses & Signatures	
Arkansas			1	1		
California	3,550	3,578	401	401	5	5
Idaho			1	1		
Kentucky			1	1		
Michigan			1	1		
Nevada			8	8		
Ohio			1	1		
Oregon			1	1		
Pennsylvania			1	1		
Total	3,550	3,578	416	416	5	5

Coding Structure

Letter Attributes

Response Types

X–Undefined
1–Letter
2–Form or Letter Generator
3–Form or LG +
4–Resolution
5–Action Alert
6–Transcript (dictated audio, video or telephone response)
7–Public Meeting Comment Form
8–Public Meeting Transcript (hearing/oral testimony)
9–Public meeting/workshop group notes
10–Petition

Delivery Types

E–Email
F–FAX
H–Hand-delivered or Oral Testimony (Personally Delivered)
M–US Mail or Commercial Carrier (UPS, FedEx)
T–Telephone
W–Web-based submission
X–Unknown

Early Attention Items

1–Threat of harm
2–Notice of appeal or litigation
3–Freedom of Information Act request (FOIA)
4–Provides proposals for new alternatives
5–Requires detailed review
5a–Provides extensive technical edits – deletions/replacements
6–Government entities
6a–Government Entity Requests Cooperating Agency Status
7–Requests public hearing
X–None

Request for Information Codes

A–Mailing list only or nothing to code (do not attach a flag)
B–Request to be removed from mailing list (do not attach a flag)
C–Request copy of Federal Register Notice
D–Other request for specific information
E–Request for confirmation of receipt of letter
F–Request for hard copy of summary of the Planning Document
G–Request for full hard copy of Planning Document
H–Request for full CD version of Planning Document
X–None

Comment Period Extension Request

X–No extension requested
0–No specific time mentioned or other
15–Request for 15 Day comment period extension
30–Request for 30 Day comment period extension
45–Request for 45 Day comment period extension
60–Request for 60 Day comment period extension
90–Request for 90 Day comment period extension
120–Request for 120 Day comment period extension

4.2.1.1 Individual Attributes

4.2.1.1.1 Organization Types

0–Undefined
A–Agriculture Industry or Associations (Farm Bureau)
AE–Agency Employee (Analyzed Separately)
AR–Animal Rights (Humane Treatment Org)
B–Business (Affected Owner/CEO, Chamber of Commerce)
C–County Government Agency/Elected Official
CH–Church/Religious Group
D–Place Based Group (HOAs, Planning Cooperatives)
E–Government Employee/Union
F–Federal Agency/Elected Official
G–Domestic Livestock Industry (Incl. Permittees)
H–Consultants/Legal Representatives
I–Individual
J–Civic Group (Kiwanis, Elks, Community Councils)
K–Special Use Permittee
L–Timber or Wood Products Industry
LO–Private Land Inholding Owner
M–Mining Industry/Association (Locatable)
N–International Government Agency or Official
O–Oil, Natural Gas, Coal, or Pipeline Industry (Leasable)
P–Preservation/Conservation
PI–Public Interest Group/Political Party
Q–American Indian Govt. Agency/Elected Official
QQ–Tribal Non-Governmental Organization/Tribal Member
R–Recreational (non-specific)
RB–Mechanized Recreation (Bicycling)
RC–Recreation/Conservation Organization (Trout Unlimited, Elk Foundation)
RM–Motorized Recreation (4X4, OHV, snowmobiling)
RN–Non-Motorized/Non-Mechanized Recreation (hiking, x-c ski, horse/stock animals)
S–State Government Agency/Elected Official
T–Town/City Government Agency/Elected Official
U–Utility Group (Water, Electrical, Gas)
V–Professional Society
W–Academic (Researcher, University Department Head)
X–Conservation District

XX–Regional/other governmental agency (multi-jurisdictional)
Y–Other Organization
Z–Multiple Use or Land Rights Organization

Comment Attributes

Resources

AIR–Air Quality and Noise
CLM–Climate
CUL–Cultural Resources
ECO–General Ecological
FSH–Fisheries/Aquatics
GEN–General (No Natural Resource)
GEO–Geology and Minerals
HHS–Human Health and Safety
INF–Infrastructure
LGL–Legal and Regulatory (Incl. Process)
LND–Land Designation and Management
MUL–Multiple
NAC–Native American Concerns
PAL–Paleontological
RCR–Recreation
RNG–Range Resources
SOC–Socioeconomics
SOI–Soil Resources
SSP–Site Specific
TEC–Technical/Editorial
TES–T&E, Special Status (plants and animals)
TRA–Transportation
VEG–Vegetation (No TESS)
VIS–Visual Resources
WLF–Wildlife and Wildlife Habitat (No TESS)
WTL–Wetlands
WTR–Water Resources

Actions

GENERAL

100–Action not Specified
110–General Action (protect/save/do not destroy)
120–General Opposition (suspend/stop)
130–General Support
140–See Attachment

ANALYSIS

200–Technical Studies (Resource Reports, etc.)
201–Methodology and Assumptions
202–Adequacy of Studies (Best Available Science)
203–Update, Change, or Add Data to Existing Studies
204–Consider Additional Information

205–Monitoring, Inventories
206–Mapping, GIS
210–Planning Document (Rule, EIS, etc.)
211–Scope/Scale of analysis
212–Purpose and Need
213–Goals and Objectives/LRMP Consistency
214–Cumulative/Combined Effects
215–Connected Actions
216–Measurement Indicators
217–Mitigation/BMPs
218–Irreversible and Irretrievable Effects
219–Document Composition (clarity/grammar/spelling/punct.)
220–Alternatives General (add, change, delete)
221–Alternative 1 (No Action Alternative)
222–Alternative 2 (Proposed Action Alternative)
223–Alternative 3 (Adds no new trails/roads)
224–Alternative 4 (NR protection and CIRCAs)
225–Alternative 5 (Emphasizes access and motorized rec.)

PROCESS

300–Decisionmaking Philosophy
301–Multiple Use Emphasis
302–Ecosystem Emphasis
303–Adaptive Mgt Emphasis
304–Alternative Energy Sources
310–Public Involvement
311–Outreach/Education
312–Public Meetings
313–Adequacy of Comment Period/Project Timeframe
314–Volunteer Groups and Partnerships
315–Use of Public Comment (vote, majority opinion, etc.)
316–Influence of Interest Groups and Politics
320–NEPA Process General
321–Previous NEPA Related to the Project
322–Future NEPA on the Project
330–Other (Non-NEPA) Processes (e.g., leasing, permitting, acquisition, ROW)
331–Previous Processes Related to the Project
332–Future Processes Related to the Project
340–Legal Consistency General (E.g., democracy/welfare/public good)
341–Federal Constitution, laws, acts, EOs, rules, regulations, plans
342–Court decisions (past or pending)
343–Tribal Treaties
344–State Rules, Plans, etc.
345–County or Municipal Laws, Policies, etc.
346–Private Property
347–Valid, Existing Rights/Claims

LAND MANAGEMENT

500–Activities on Public Lands (General, Multiple)
501–Oil/Gas/Mining Permitting, Leasing, Exploration, Extraction
502–Timber Harvest/Fuel Management
503–Livestock Grazing Allotments/Improvements
504–Specially Permitted Uses (resorts, outfitters, etc.)
505–Waste Management and Disposal (incl. Hazardous Materials)
506–Infrastructure (pipes, utilities, bridges, gates, signs, parking lots, etc.)
507–Motorized (ATV, OHV, Snowmobile, etc.)
508–Non-Motorized/Dispersed (hiking, hunting, horseback, camping, fishing, etc.)
509–Other Forest Resource Uses (Firewood, Mushroom, etc.)
510–Protective Designation for Resources (e.g., Class 1 Air, AIZ, ROS, etc.)
520–Designation of Lands (e.g., Wilderness, IRAs, other specific areas)
530–Restoration/Reclamation/Bonding
540–Enforcement/Funding/Staffing
550–Research/Education
560–Tribal Activities

ROADS AND TRAILS

600–Roads and Trails (incl. access general)
601–Classification
602–Construction and maintenance
603–Removal/obliteration
604–Traffic control and safety
605–Seasonal Closures
606–Disabled and elderly use
607–User Conflict
608–Add more mileage to System/do not decrease mileage
609–Do not add more mileage/or do decrease existing mileage

SITE SPECIFICS

700–Feather River District
710–Mount Hough District
720–Beckwourth District
730–Other/Unspecified

Appendix I: Law Enforcement

Introduction

Forest Service Law Enforcement and Investigations (LEI) personnel are responsible for protecting the public, employees, natural resources and other property under the agency's jurisdiction. Additionally, LEI investigates and enforces applicable laws and regulations that affect the National Forest System (NFS) lands, and prevents criminal violations. The new Travel Management Rule is one such regulation.

The Travel Management Rule requires designation of roads, trails, and areas open to motor vehicle use, and the prohibition of cross-country wheeled motorized vehicle travel by the public. This is a considerable change in public motorized access management from previous conditions where most Forests were managed as "open to cross-country travel." The implementation of designated routes and areas for motorized vehicles will be the responsibility of all agency employees, especially in the area of education and enforcement. The law enforcement program is primarily responsible for issuing violations to the Travel Management Rule.

The national LEI budget is funded by appropriated dollars from Congress to provide law enforcement services on the NFS lands. The Travel Management program is one of many Forest programs to benefit from federal law enforcement funding. For the past few years, law enforcement funding has increased and that has translated into an increase in field law enforcement personnel[13].

To enhance enforcement of the Travel Management Rule, Region 5 Forest Recreation Programs have applied for and received grant dollars (green sticker funding) from the State of California Off-Highway Motor Vehicle Recreation Division Grants Program. These State funds are earmarked specifically for enforcement of off-highway vehicle laws and regulations on the various Forests, and enforcement would be performed primarily by Forest Protection Officers (FPOs). In addition, Law Enforcement Officers (LEOs) support the FPOs as needed, especially if serious violations have occurred. In recent years, State law enforcement grants have ranged from 3 to 4 million dollars annually with similar funding anticipated for the 2010-2011 grant cycle.

Authority and Jurisdiction

The Forest Service exercises its law enforcement authority when violation of laws or regulations occurs on NFS lands or when incidents affect the NFS. The existing authorities for enforcement are completely adequate, and no new laws will be needed to implement the Travel Management rule.

Every National Forest has a law enforcement plan that is updated annually. All Forest Service employees have a duty to know and understand their authorities and responsibilities, and to properly enforce laws and regulations relating to the Forest within their authority and capability. LEI and agency personnel provide a regular and recurring presence on vast amounts of public land, roads, trails and areas, and take appropriate action if illegal activity is discovered. Violations involving

[13] Region 5 Law Enforcement budget figures for the past 4 years have increased and the number of law enforcement officers has increased by 65.

motor vehicles are primarily enforced FPOs, who patrol off-highway use roads, trails, and areas. These include violations such as operating a motor vehicle in violation of federal regulations and California vehicle code, parking improperly, resource damage to soils, vegetation or wildlife, and disorderly or unruly behavior. LEOs have discretion when deciding what type of action to initiate when handling violations to the following federal laws that pertain specifically to motor vehicle use.

- The Act of June 4, 1897 (Title 16 United States Code 551) is the authority for issuing regulations at Title 36 Code of Federal Regulations, Part 261 (36 CFR 261). Specific OHV travel management regulations are in sections 261.9 – Property, 261.13 –Motor Vehicle Use, and 261.15 –Use of Vehicles Off-Road. These CFRs cover a wide array of misdemeanor infractions.
- The Act of March 3, 1905 (Title 16 United States Code 559) authorizes all employees of the Forest Service to make arrests for violation of the laws and regulations pertaining to National Forests. Normally, arrest authority is limited to trained law enforcement personnel. (Any employee may take immediate action when necessary to protect life and prevent serious damage to or destruction of property, escape of a suspect, or loss of material evidence when such action can be done with reasonable safety.)

Cooperation

The Forest Service shares responsibility and cooperates with local, State, and other Federal agencies in the execution of its law enforcement program. The authority for cooperation among agencies, especially as it pertains to Travel Management, is within the following laws:

- The Act of August 10, 1971 (Title 16 United States Code 551a) authorizes the Secretary of Agriculture to cooperate with, and provide reimbursement to, any State or political subdivision thereof, for the enforcement of their laws within NFS. This law does not deprive any State or local law enforcement agency from exercising its criminal and civil jurisdiction on lands that are part of the NFS.
- The California Penal Code, Section 830.8 provides that Forest Service law enforcement personnel may exercise State Peace Officer authority where the sheriff of the county wherein the officer works has provided specific written permission for the officer.
- The State vehicle code section 38301 allows State law enforcement officer to enforce any of the Federal CFRs related to motor vehicles on NFS lands.[14]

Each Forest maintains close working relationships with many State and local law enforcement agencies that have law enforcement responsibilities within/and or adjacent to the Forest boundary. Significant cooperating agencies relative to the Travel Management Rule include the local county sheriff departments, the California Department of Fish and Game, California Highway Patrol, California Department of Forestry and Fire Protection, and occasionally one or more Federal agencies

[14] State Vehicle code section 38301. (a) It is unlawful to operate a vehicle in violation of special regulations which have been promulgated by the governmental agency having jurisdiction over public lands, including, but not limited to, regulations governing access, routes of travel, plants, wildlife habitat, water resources and historical sites.

depending on the violation. Forest Service law enforcement personnel cooperate fully with these agencies in carrying out their law enforcement responsibilities by providing assistance; liaison, advice, and information.

Forests maintain Cooperative Law Enforcement Agreements with their respective county sheriff's office. In Region 5, the total cost for the 2008 Cooperative Law Enforcement Agreements is $891,397.[15] These dollars are for performance of duties in addition to the normal activities in which the sheriff's deputies handle crimes against persons and their property that may occur within the NFS boundary. In these agreements, both parties recognize that public use of NFS lands is usually located in areas that are remote or sparsely populated, and the enforcement of State and local law is related to the administration and regulation of NFS lands. Within the Cooperative Law Enforcement Agreements, an Operating Plan is developed outlining the supplemental work to be performed by the cooperating agency. Relative to the Travel Management Rule, operating plans may provide:

- Supplemental patrols in areas of high use.
- Supplemental patrols on weekends or during particular months of high use.
- Additional officers for large group gatherings or events (enduros).
- Vehicle checkpoints for vehicle registration, spark arrestors, and other miscellaneous items.

Implementation and Tracking

Implementation of the Forest Service law enforcement program is continually adapting as law enforcement personnel assess the changing patterns of visitor use and attitudes, and the trends in violations, especially for property and resource damage. One method of assessment is the analysis of Law Enforcement and Investigations Management Attainment Reporting System (LEIMARS) data. LEIMARS tracks all known violations of criminal law or regulation on NFS lands (FSH 5309.11, chapter 40 and FSM 5340). Additionally, embedded in LEIMARS is the Case Tracking System, which tracks all felony and serious misdemeanor cases. These tracking systems:

- Capture and record information on location, volume, damages, and type of violations occurring on NFS lands.
- Provide a retrieval system of data on incidents and violations that is responsive to the needs of all organizational levels.
- Provide agency managers with a means to identify and monitor law enforcement activities.
- Specifically identify problem areas and periods of activity.
- Provide a method to record and analyze incidents involving violations or suspected violations on NFS lands.

Trends in violations related to the Travel Management Rule can be analyzed and appropriate action(s) taken, if needed. Appropriate action(s) may involve one or more techniques or adaptive strategies. In the law enforcement community, this is often referred to as the "three E strategy" of engineering, education, and enforcement. With the change in the Travel Management Rule, it is

[15] Region 5 Law Enforcement Cooperative Agreement 2008 spreadsheet.

anticipated that the law enforcement program will use a combination of strategies, especially during the first five years of the rule implementation.

Implementation Strategy (Engineering Education Enforcement

The Engineering strategy is designed to prevent or reduce inadvertent violations, resource damage, and crime vulnerability. The strategy's goal is to remove the opportunity to commit a violation. LEI personnel work with each Forest, particularly the recreation and engineering programs, to implement some or all of the following specific tactics:

- Proper design of improvements and facilities.
- Facility security measures such as installation of barricades, gates, and other natural obstacles.
- Forest signing, both directional and informational, to assist the public to ensure they stay on designated trails, and out of the wilderness and other sensitive areas.
- Physically close and rehabilitate decommissioned roads and trails.

The Educational strategy focuses on specific user groups, school groups, recreation users, and the public. The goal is to develop responsible and concerned public land use attitudes in forest users; its violation prevention. Forest LEOs and FPOs make regular contacts in the field informing the users of the regulations and need for the prohibition. The LEI personnel work with each Forest, particularly the recreation and public information programs, to identify and implement some or all of the following specific tactics.

- Have motor vehicle use maps easily available to the public.
- Have route numbers visually marked on the ground.
- Distribute maps and brochures promoting responsible use.
- Conduct environmental interpretation activities in local communities, at schools, and with special interest groups.
- Use of all forms of the media (television, radio, and newspapers), especially prior to, and during, the high use periods.
- Ensure all employees understand the Travel Management Rule.
- Utilize high visibility prevention patrols and public information checkpoints, especially during the peak use periods.
- Encourage cooperating law enforcement agencies to make visitor contacts and provide violator information to Forest Officers.
- Ride with other agency officers to demonstrate solidarity to the public.
- Issue news releases of arrests and successful prosecutions, including offender names, criminal penalties, and court ordered restitution.

The Law Enforcement strategy is to affect crime prevention measures that are designed to reduce specific criminal activity, deter potential and repeat offenders, maximize enforcement actions and visibility, and increase prosecutorial successes. All enforcement actions should result in a better understanding of regulations pertaining to the management of NFS lands. LEI personnel work with each Forest, to identify and implement some or all of the following specific tactics:

- Schedule officers to work during the identified problem periods, including holidays and weekends.
- Utilize high profile “saturation patrols” and stationary surveillance posts in the identified problem areas.
- Utilize the most effective and efficient means of patrol, including foot, horseback, all-terrain vehicle, snowmobile, watercraft, and aircraft.
- Aerial over-flights to enforce restriction under Travel Management Rule.
- Enlist the aid of volunteers.
- Initiate an awards program.
- Supplement patrols with cooperating law enforcement agencies in areas of concern.
- Use technical investigative equipment (cameras, monitors, sensors) to assist officers with detecting and monitoring violations at known or suspected violation sites.
- Conduct planned and approved compliance checkpoints.
- Follow up on complaints to document violations, damages, and identify suspect vehicles or persons.
- Require cooperating law enforcement agencies to assist with reporting and/or enforcing violations within their authority.
- Patrol with other cooperating law enforcement agency officers.
- Conduct unpredictable patrol schedules.
- Conduct special enforcement actions (unmarked vehicle deployment, surveillance, traffic check-points).
- Utilize LEIMARS and Central Violations Bureau databases along with the State motor vehicle data, to identify repeat offenders for enhanced prosecution.
- Pursue court ordered restitution or civil collections for resource and property damages.
- Encourage prosecutorial and judicial support.
- Execute bench warrants related of off-highway vehicle violations.

Assumptions

Based on many years of enforcing off-highway vehicles, implementation of the Travel Management Rule from a law enforcement perspective assumes the following to be true. Additionally, these assumptions are based on several case studies in R5. These assumptions may change in time with analysis of the LEIMARS database.

Enforcement Assumptions:

- Enforcement of the laws and regulations related to Travel Management will be enforced equally in authority and weight as with all other Federal laws and regulations.

- As with any change in a regulation on NFS lands, there is usually a transitional period for the public to understand the changes. It is anticipated there will be a higher number of violations to the Travel Management Rule the first few years and the number of violations will decline as the users understand and comply with the rules. It is assumed :
  - Users in communities adjacent to the Forest will comply within 1-2 years.
  - Frequent users but further in distance from the Forest will comply within 2-3 years.
  - Infrequent users regardless of distance may take up to 5 years to comply.
- Law enforcement officer and agency personnel's presence and enforcement actions will positively affect OHV users' behaviors and attitudes.
- The Travel Management Rule and associated motor vehicle use map clearly define the designated routes; therefore, making violations to the rule unequivocal.
- Once the motor vehicle use map is published, the implementation of the established dedicated network of roads, trails, and areas with signs, and user education programs, will reduce the number of violations.
- FPOs spend a large percentage of their time on Travel Management issues, and depending on the Forest the estimates range from 30 to 50 percent. LEOs spend approximately 10 to 20 percent of their time on enforcement of off-highway vehicle issues.[16]

Agency Funding Assumptions:

- Appropriated program funding levels and number of law enforcement personnel does not affect enforcement of the Travel Management Rule. All laws and regulations are enforced equally.
- Appropriated funds will remain level or increase slightly in the next five years.
- The State of California Off-Highway Motor Vehicle Recreation Division Grants Program (green sticker funding) enhances and provides additional law enforcement presence in the field at the Forest level.

Public Attitude and Compliance Assumptions:

- Forest users want to do the right thing and will obey the rule[17], once they understand the rule and motor vehicle use map.
- User compliance[18] is based on the State of California Off-Highway Motor Vehicle Recreation Division data and is anticipated to be:
  - 95% of the users are fully compliant.
  - 2-3% of the users think about and may violate a law.
  - 1-2% of the users will violate the law.

[16] Barnett, G. 2004-2005 Law Enforcement Workload Analysis.
[17] Tyler, Tom R. *Why People Obey the Law*, Princeton University Press, 2006, p. 320
[18] User compliance was computed by using the State Vehicular Recreation Area Fiscal year 2006/2007 data: 4.2M SVRA visitors divided by the 210,000 citations written, is approximately 5 percent non-compliant, and 95% compliant.

Measure of Success

Measuring the success of the Travel Management Rule from a law enforcement perspective will be done using the LEIMARS database. An analysis of the data may alert a Forest to a particular problem area for violations such as a group campsite area that may be surrounded by flat meadow areas inviting riders to potentially violate the regulation. A successful program will see a positive change in the following measures:

- Measure 1: A reduction in the number of off-route travel violations.
- Measure 2: A reduction in the number of resource damage violations