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Motorized Travel Management

Draft Environmental Impact Statement
Volume 1

Modoc National Forest

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Motorized Travel Management EIS

Draft Environmental Impact Statement

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Abstract: This Draft Environmental Impact Statement (DEIS) describes the environmental effects of a proposal by the Modoc National Forest (MDF) to make the following changes to the National Forest Transportation System (NFTS) roads:

1. Prohibit cross-country motorized vehicle travel off designated NFTS roads by the public, except as allowed by permit or other authorization. Cross-country motor vehicle travel is defined as any travel off an authorized NFTS route. This includes travel on unauthorized routes or open land.
2. Add 1,158 existing unauthorized routes (336 miles) to its National Forest road system Approximately 20 miles, or 74 of the added routes, would have seasonal restrictions.
3. Make the following changes to existing NFTS roads:
    - Add seasonal restrictions to approximately 312 miles of 213 roads
    - Allow non-highway legal vehicle access on approximately 138 additional miles
    - Restrict use to "highway vehicles only on" roads 44N08 and 44N01
    - Close road 46B29HB
4. Amend the MDF Land and Resource Management Plan (LRMP) for areas not covered under the Sierra Nevada Forest Plan Amendment (SNFPA ROD, pg. 59, #69), by removing the objective to "Keep over 87% of the Forest open to Off-Highway Vehicles (OHVs)."
5. Amend the MDF LRMP to provide a specific area exemption to the bald eagle winter roost guidelines to allow for motor-vehicle use year round in the bald eagle winter roost area directly outside of Tionesta. Forest system roads 44A19D, 44A19C, 44N19, 44N20, and 44N04Y would be exempt from the winter roost guidelines.

These actions are needed 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 MDF. The DEIS discloses environmental impacts associated with the Proposed Action, a No Action Alternative

and three additional action alternatives developed in response to issues raised by the public during scoping of the Proposed Action. Of the alternatives under consideration at this stage, the Responsible Official prefers Alternatives 2, 4, and 5.

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Summary of the Draft Environmental Impact Statement (DEIS)

Proposed Action

The Modoc National Forest (MDF) proposes the following actions to the National Forest Transportation System (NFTS):

1. Prohibit cross-country motor vehicle travel off designated NFTS roads by the public, except as allowed by permit or other authorization. Cross-country motor vehicle travel is defined as any travel off an authorized, NFTS route. It could be on an unauthorized route or on no route at all.
2. Add 336 miles (1,158 existing unauthorized routes) to its National Forest road system (approximately 20 miles, or 74 of the added routes, would have seasonal restrictions)
3. Make the following changes to existing NFTS roads:
    a. Add seasonal restrictions to approximately 312 miles of 213 roads
    b. Change vehicle class to "open to all vehicles" on approximately 138 additional miles where it was previously open to street-legal vehicle only.
    c. Remove non- highway legal use from roads 44N08 and 44N01 and restrict use to "highway vehicles only".
    d. Close road 46B29HB to motor vehicle use
4. Amend the MDF Land and Resource Management Plan (LRMP) for areas not covered under the Sierra Nevada Forest Plan Amendment (SNFPA), by removing the objective to "Keep over 87% of the Forest open to Off-Highway Vehicles (OHVs)" (LRMP p. 4-11).
5. Amend the LRMP to provide a specific area exemption to the bald eagle winter roost guidelines to allow for motor-vehicle use year round in the bald eagle winter roost area directly outside of Tionesta. Forest system roads 44A19D, 44A19C, 44N19, 44N20, and 44N04Y would be exempt from the winter roost guidelines.

Significant Issues

Scoping for the Proposed Action and additional information brought forward during the process identified the following significant issues which were used to develop the action alternatives. The Significant Issues are displayed in the following table:

Table S-1. List of Significant Issues

Issue Topic	Cause and Effect
1. Access and Recreation Opportunity	The Proposed Action unreasonably restricts motorized recreation use by prohibiting cross-country travel. The addition of 336 miles of unauthorized roads to the National Forest Transportation System (NFTS) provides insufficient public access to MDF lands and unfairly limits motorized recreation.
2. Motorized recreation opportunity (Mixed Use)	Change of vehicle class of 138 miles to allow mixed use on the NFTS of level 3 roads does not provide adequate connectivity and recreational diversity for "non-street legal" motorized travel.
3. Resource Impacts	Some of the roads proposed for addition to the NFTS may cause adverse impacts to plants, wildlife, water quality, soils, the spread of noxious weeds and other natural resources.
4. Maintenance Cost	The NFTS is already too large to provide adequate maintenance. Current maintenance backlogs should be addressed before proposing the addition of new routes to an already overburdened system.

Issue Topic	Cause and Effect
5. Quiet Forms of Recreation	The addition of unauthorized routes to the NFTS will impact the ability of people to enjoy a quiet recreation experience.

Alternatives Considered In Detail

The MDF developed five alternatives: the No Action, the Proposed Action, and three other action alternatives generated in response to the significant issues listed above. The five alternatives considered in detail for this analysis are listed in Table S-2 below. Complete details of the alternatives are found in Chapter 2 of this document.

Table S-2. List of Alternatives Considered in Detail

Alternative 1: No Action Alternative	The No Action Alternative provides a baseline for comparing the other alternatives. 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 cross-country travel would continue. The Travel Management Rule would not be implemented, and no 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. • Adds no new NFTS facilities • Does not prohibit cross-country motorized travel
Alternative 2: Proposed Action	The Proposed Action makes changes to the NFTS and the proh bition of cross-country travel as described in the Notice of Intent (NOI) published May 12, 2008 (Volume 73, Number 92. It also responds to concerns over natural resource impacts and the concept of connector roads to improve motorized recreation opportunity: • Prohibit cross-country motorized travel • Add 336 miles (1,158 routes) of unauthorized routes to the NFTS system • Close 312 miles of NFTS road seasonally • Allow use by all vehicles on 138 miles (23 routes) of NFTS roads where use is currently limited to use by street legal vehicles only. • Close 46B29HB to motor vehicle use by the public. • Prohibit non-highway legal vehicle use on 44N08 from Glass Mountain Pumice Mine to 44N01 • Amend the LRMP for Travel Rule consistency • Amend LRMP to exclude Forest system roads 44A19D, 44A19C, 44N19, 44N20, and 44N04Y from the Bald Eagle winter roost guidelines
Alternative 3	Alternative 3 responds to maintenance cost and natural resource impacts by prohibiting cross-country travel without adding any additional facilities to the NFTS. It also responds to quiet use by not adding additional routes or expanding vehicle class on the existing system. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS. • Prohibit cross-country motorized travel • Do not add any unauthorized routes • Do not make any seasonal closures • Allow mixed use on level 2 roads only
Alternative 4	Alternative 4 responds to issues of impacts on natural resources and the concept of quiet use. This alternative prohibits cross-country travel, does not add routes where resource concerns were raised or additional information was brought forward during the scoping of the Proposed Action. • Prohibit cross-country motorized travel • Add 286 miles of unauthorized (1020 routes) (seasonal closures on 15 miles) • Close 425 (270 routes) miles of NFTS road seasonally • Allow mixed use on level 2 roads only. No change in vehicle class on existing roads. • Close 46B29HB to public use • Prohibit OHV use on 44N08 from Glass Mountain Pumice Mine to 44N01 • Amend the LRMP for Travel Rule consistency • Amend LRMP to exclude Forest system roads 44A19D, 44A19C, 44N19, 44N20, and 44N04Y from the Bald Eagle winter roost guidelines
Alternative 5	Alternative 5 responds to the issue of access and motorized recreation opportunity. This alternative prohibits cross-country travel and incorporates suggestions the MDF received during scoping of the

	Proposed Action requesting expansion of all-vehicle use roads on the NFTS that would better provide access and motorized recreation opportunity. Alternative 5 incorporates many of those suggestions. • Prohibit cross-country motorized travel • Add 336 miles of unauthorized (1,158 routes) • Close 312 miles (213 routes) of NFTS road seasonally • Change vehicle class on 531 miles (198) of level 3 roads to allow for mixed use • Close 46B29HB to public use • Prohibit OHV use on 44N08 from Glass Mountain Pumice Mine to 44N01 • Amend the LRMP for Travel Rule consistency • Amend LRMP to exclude Forest system roads 44A19D, 44A19C, 44N19, 44N20, and 44N04Y from the Bald Eagle winter roost guidelines

Table S-3. Maintenance Levels for Forest Service Roads

ML 5
• Highest traffic volume and speeds • Typically connect to state and county roads • Culverts for drainage • Usually arterial and collector • May include some developed recreation roads • Usually paved or chip-sealed
ML 4
• Subject to requirements of the Highway Safety Act • Moderate traffic volume and speeds • May connect to county roads • Culverts provide drainage • Usually a collector • May include some developed recreation roads
ML 3
• Roads have low to moderate traffic volumes • Subject to Highway Safety Act • Typically connect to arterial and collector roads • Combination of dips and culverts provide drainage • May include some dispersed recreation roads • Potholing or washboarding may occur
ML 2
• Low traffic volume and low speed • Typically local roads • Connect collectors or other local roads • Dips are the preferred drainage treatment • Not subject to Highway Safety Act

• Surface smoothness is not a consideration • Not suitable for passenger cars

Chapter 1. Purpose of and Need for Action

Document Structure

The Forest Service has prepared this Draft Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and state laws and regulations. This environmental impact statement 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 comparing 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.

Appendices: The appendices provide more detailed information to support the analyses presented in the environmental impact statement.

Glossary: The glossary lists specialized vocabulary and definitions.

Index: The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project record located at the MDF Supervisor's office at 800 W. 12th Street, Alturas, CA 96101

Background

Over the past few decades, the availability and capability of motor vehicles, particularly off-highway vehicles (OHVs) and sport utility vehicles (SUVs) has increased tremendously. Nationally, the number of OHV users has climbed seven-fold 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 ATVs and off-road motorcycles registered in 2004, up 330% since 1980. Annual sales of ATVs and off-road motorcycles in California were the highest in the U.S. for the last five years. Four-wheel-drive vehicle sales in California increased to 3,046,866 (1500%) from 1989 to 2002.

Across the nation, 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 "Designate OHV roads, trails, and any specifically defined open areas for motor vehicles on maps of the 19 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). This final Travel Management Rule requires designation of those roads, trails, and areas that are open to motor vehicle use on national Forests. Only roads 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. The final rule prohibits the use of motor vehicles off designated NFTS roads, NFTS trails and areas, as well as use of motor vehicles on roads and trails that are not specifically designated for public use.

On some 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 NFS roads and NFS trails included in the NFTS. Nevertheless, some unauthorized routes are well-sited, provide excellent opportunities for outdoor recreation by motorized and non-motorized users, and would enhance the NFTS. Other unauthorized routes are poorly located and cause unacceptable impacts. Only NFS roads and NFS trails can be designated for motor vehicle use. In order for an unauthorized route to be designated, it must first be added to the Forest transportation system.

In 2007, the MDF completed an inventory of unauthorized routes on NFS lands as described in the MOI and identified approximately 491 miles of unauthorized routes. The MDF then used an interdisciplinary process to conduct travel analysis that included working with the public to identify proposals for changes to the existing MDF transportation system. Roads, trails, and areas that are currently part of the MDF transportation system and open to motor vehicle travel would remain designated for such use, except as described below under the Proposed Action. This proposal makes needed changes (seasonal restrictions, vehicle class restrictions, etc.) to the Modoc National Forest NFTS roads, NFTS trails and areas on NFS lands in accordance with the Travel Management Rule (36 CFR Part 212, Subpart B).

In accordance with the Travel Management Rule and following a decision on this proposal, the MDF will publish a Motor Vehicle Use Map (MVUM) identifying all MDF NFTS roads that are designated for motor vehicle use. The MVUM will specify the classes of vehicles and, if appropriate, the times of year for which use is designated. Unauthorized routes not included in this proposal are not precluded from future consideration for addition to the National Forest Transportation System and inclusion on an MVUM. Future decisions associated with changes to the NFTS and the MVUM may trigger the need for additional environmental analysis, public involvement, and documentation.

Travel Management on the Modoc National Forest

The Modoc National Forest has the lowest recreational use of any national Forest in the country (Forest Service National Visitor Use Monitoring, NVUM). Road use on this Forest is completely different than any other Forest in California because of the low population and relative isolation of the Forest. It appears that, because of the low use; resource impacts or potential impacts from roads are considerably less than in other areas in the state.

Many of the inventoried unauthorized routes on the Modoc National Forest have been in place for over 40 years and despite their long existence, little impact has occurred. Two-thirds of the inventoried unauthorized routes are less than ¼ mile in length; another 20 percent are less that ½ mile in length; and only 5 percent are over a mile in length. Most of these are very short spurs, and were considered by the public to be a part of the existing road system; but were never officially added to the NFTS. (See table 1-1)

These short spur roads provide access to camping, picnic areas and parking off dusty roads for a variety of recreational and management purposes. Many of these short roads were probably established by recreationists; primarily hunters, when hunting licenses for deer were unlimited. The total hunting licenses sold in 1980, before they were limited, was 21,400. Total licenses in 2007 were 3,485. That is an 84 percent decrease in licenses since 1980. It is likely that a corresponding decrease in recreational hunting use has also occurred, along with a related reduction in unauthorized route use.

Today, many of these routes are used infrequently but do provide access to camp sites and parking off the existing roads. Based on feedback given to the Forest by the public, we know that these recreational opportunities are an important resource for the local community. It can be speculated that with the high cost of fuel and uncertainty of the economy, a substantial increase in non-local use will not occur over the next ten years. Another speculation is that local use on the Forest may increase due to the high cost of fuel and the unwillingness to travel far distances for recreational purposes. Although we cannot accurately predict what may occur in the future, it is believed that use on the Modoc will remain fairly consistent with current use.

Table 1-1. Length of Unauthorized Roads Common to all Action Alternatives

Number of Roads	Length	Percent
431	less than 0.1 mile	37%
334	between 0.1 and 0.25 mile	29%
214	between 0.25 and 0.50 mile	18%
129	between 0.5 and 1 mile	11%
62	more than 1 mile	5%
1,168	Total	100%

Previous decisions made over the past 10 years have led to a reduction in the number of miles of Forest Service system roads available for motorized use; and in some cases, decommissioning. These previous decisions have resulted in 28 miles being closed, 0 miles being seasonally closed, and 76.8 miles decommissioned. Analysis done during Forest planning, vegetation management projects, watershed restoration projects, fuel treatment projects, trail management decisions, landscape analysis, watershed analysis and the Roads Analysis Process (RAP) has helped to identify problems that led to management decisions of the current transportation system.

Implementation of this proposal and subsequent designation of motorized routes through publication of the Motor Vehicle Use MAP (MVUM) are only two steps in the ongoing, overall management of the MDF NFTS.

Scope of this Action

This proposal is not intended to revisit previous decisions that resulted in the current NFTS. The current NFTS was developed over many decades and provides access for fire suppression, vegetation management, private land access and a host of other purposes. This proposal is

narrowly focused on implementing the Travel Management Rule (36 CFR Part 212, Subpart B). Previous decisions concerning road construction, road reconstruction, road decommissioning, trail construction, and land suitability for motorized use are outside of the scope of this proposal. Further, the Responsible Official is limited as to staff and funding and, by necessity, must limit the scope of any project to that which is within his or her means to accomplish. Through travel analysis, the MDF identifies discreet projects, prioritizes them, and builds them into the future program of work. Only those projects within the capability of the Forest are brought forward by the Responsible Official and carried forward in accordance with the Purpose and Need for action.

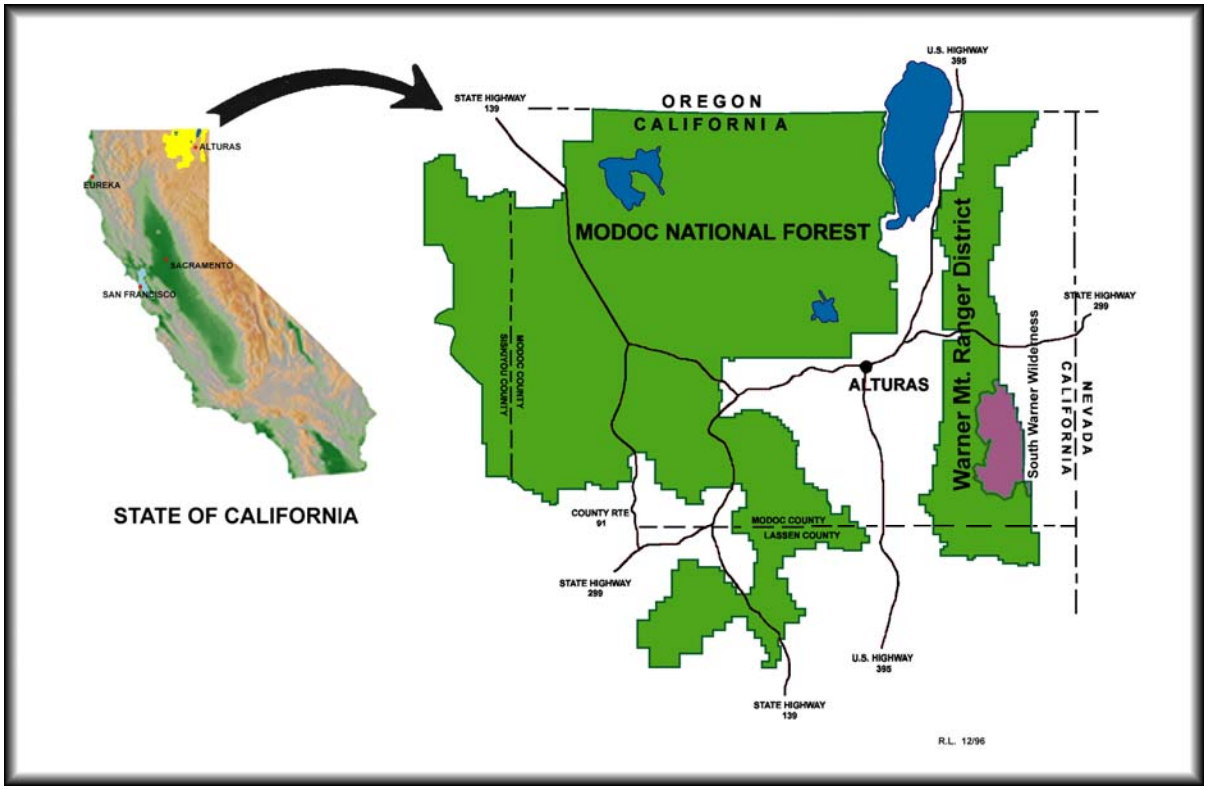
The infrastructure of a national Forest will always have room for improvement, and the MDF welcomes suggestions for improving the current NFTS and restoring the environment. Such suggestions are considered within the context of the overall mission of the MDF, and will be considered as availability of staff and funding allows. Scoping for this project resulted in many suggestions for improving the NFTS through NFS road and trail construction, decommissioning, closures, restoration, etc. These ideas and suggestions have been captured by the MDF and may be considered in future programs of work.

The following list is a summary of key elements considered when developing the scope of the action:

1. Previous decisions on the NFTS do not need to be revisited to implement the Travel Management Rule (36 CFR 212.50(b)). The NFTS contains existing facilities (roads & trails) that either underwent NEPA or predate NEPA. Allowing continued motor vehicle use of the facilities in the NFTS in accordance with existing laws and regulations does not require a NEPA analysis and decision.
2. User-created roads, trails, and areas as well as temporary Forest Service created roads are not NFTS facilities. They are unauthorized. Proposals to add these to the NFTS require a NEPA analysis and decision.
3. The unauthorized routes not included in the Proposed Action are not precluded from future consideration for either addition to the NFTS or removal from the landscape and restoration to the natural condition.
4. There are vehicles and uses that are exempt from the Travel Management Process, such as over snow vehicles, emergency purposes and vehicles, law enforcement responses, and other use that is specifically authorized. Refer to 36 CFR 212.51.
5. For travel management, the Federal action requiring NEPA analysis and decision is any change to the current NFTS (e.g., prohibiting cross-country travel, adding or removing facilities, or changing vehicle class or season of use). “Designation’ is an administrative act which does not require NEPA analysis and decision. Designation technically occurs with printing of the Motor Vehicle Use Map (MVUM), and NEPA is not required for printing a map.

Project Location

Figure S-1. Location of the Project



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 adversely impacts the environment. The 2005 Travel Management Rule, Subpart B, is intended to prevent resource damage caused by unmanaged motorized travel by the public. Subpart B provides policy for the designation of NFS roads, trails, and areas, and the prohibition of cross-country travel. In accordance with national direction, implementation of Subpart B of the Travel management rule for the Modoc National Forest is scheduled for completion in October 2009.

2. There is a need for limited changes to the MDF transportation system to—

> a. Provide motorized access to existing dispersed recreation opportunities (camping, hunting, fishing, hiking, horseback riding, etc.). There is a need to maintain motor vehicle access to dispersed recreation activities that historically have been accessed by motor vehicles. A substantial portion of known dispersed recreation activities (camping, fishing, hiking, horseback riding, hunting, etc.) are not located directly adjacent to an existing NFTS road or NFTS motorized trail. Some dispersed recreation activities depend on foot or horseback access, and some depend on motor vehicle access. Those activities accessed by motor vehicles consist of short spurs that have been created and maintained primarily by the passage of motor vehicles. Many such 'user-created' routes are not currently part of the National Forest Transportation System (NFTS). Without adding them to the NFTS, the regulatory changes noted above would make continued use of such routes illegal through

the prohibition of cross-country travel, and would preclude access to many dispersed recreation activities.

b. Provide a diversity of motorized recreation opportunities (four-wheel drive vehicles, motorcycles, ATVs, 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 (Forest Service Manual (FSM) 2353.03(2)). Implementation of Subpart B of the Travel Management Rule would severely reduce motorized recreation opportunities relative to current levels. As a result, there is a need to consider limited changes to the type of use permitted on existing NFTS roads, as well as potential additions to the NFTS.

3. There is a need for protection of heritage resources in the area along road 46B29HB (the road along Boles Creek between Clear Lake and Steel Swamp) due to documented cases of vandalism of heritage resources within this area.

4. There is a need to consider the safety of OHV users on 44N08 between the Glass Mountain Pumice Mine and 44N01 because this route is also used by large commercial haul trucks for hauling pumice.

5. There is a need for a non-significant LRMP amendment to create consistency between the 2005 Travel Management Rule and the Modoc NF Land and Resource Management Plan (Modoc LRMP). In 2004, the portion of the Modoc LRMP covered under the Sierra Nevada Forest Plan Amendment (SNFPA) was amended to include Standard and Guideline #69 (SNFPA Record of Decision, p. 59). Standard and Guideline #69 is consistent with the 2005 Travel Management Rule because it prohibits " vehicle travel off of designated routes, trails and limited off highway vehicle (OHV) areas." The remainder of the Modoc NF that is not covered by the SNFPA includes the objective "Keep over 87% of the Forest open to OHVs (Modoc LRMP p. 4-11)" and numerous other standards and guidelines in the LRMP regarding keeping areas open for OHV use. These remaining Modoc LRMP standards and guidelines are not consistent with the 2005 Travel Management Rule, which prohibits motor vehicle use except on designated NFTS roads, NFTS motorized trails and areas.

6. There is a need for a non-significan LRMP amendment that excludes the Tionesta area system roads 44A19D, 44A19C, 44N19, 44N20 and 44N04Y from the bald eagle winter roost road closure requirement. These roads have been open to public use with no discernable disturbance to the bald eagles during their wintering period. Bald eagles that roost here have become habituated to vehicle traffic. If these roads are closed seasonally, the community of Tionesta would be impacted by this action.

In meeting these needs, the Proposed Action should consider the following purposes:

a. Avoid impacts to cultural resources
b. Provide for public safety
c. Assure adequate access to public and private lands
d. Administer and maintain roads, trails, and areas based on availability of resources
e. Minimize damage to soil, vegetation, and other Forest resources
f. Avoid harassment of wildlife and significant disruption of wildlife habitat
g. Minimize conflicts between motor vehicles and existing or proposed recreational uses of NFS lands
h. Minimize conflicts among different classes of motor vehicle uses of NFS lands or neighboring Federal lands
i. Assure compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, etc.

j. Assure valid existing rights of use and access (rights-of-way)
k. Constrain the proposal to that which is within the capability of the Forest to analyze, given (1) the national schedule for regions to publish their Forest motor vehicle use maps (For the Modoc National Forest the publication deadline is in 2009), (2) available funding (road and trail management budgets), and (3) available resources (resource data and staff time).

The Proposed Action

1. Prohibition of motor vehicle travel off designated NFTS roads, NFTS trails, and areas by the public except as allowed by permit or other authorization.
2. Additions to the NFTS: The MDF currently manages and maintains approximately 4,996 miles of NFS roads. Based on the stated Purpose and Need for action, the MDF proposes to add 336 miles to its NFTS roads, bringing the total to approximately 5,332 miles.
3. Changes to Vehicle Class on Existing NFTS Roads: The Modoc National Forest proposes to change vehicle class on 138 miles of roads by allowing non-street legal vehicles to travel on existing NFTS roads where they are currently prohibited.
4. Changes to Season of Use on Existing NFTS Roads and Trails: The Modoc National Forest proposes to restrict motor vehicle use within specified dates on approximately 312 miles of existing NFS roads.
    a. There will be one closure date for roads in bald eagle winter roost areas
    b. There are 3 other closure dates for roads that are affected by wet weather.
5. Other Change on Existing NFS Roads: Prohibit OHV use on 1.45 miles of 44N08 and 44N01 due to safety issues. Close 46B29HB (along Boles Creek between Clear Lake and Steel Swamp) to public use for resource protection.
6. An LRMP non-significant amendment that amends the Modoc NF Land and Resource Management Plan for areas not covered under the Sierra Nevada Forest Plan Amendment by removing the objective to “keep over 87% of the Forest open to OHVs” (LRMP p. 4-11)
7. A non-significant LRMP amendment that will provide a one-area exemption to the bald eagle winter roost guidelines and allow for vehicle use year round in the bald eagle winter roost area directly outside of Tionesta. The new amendment will read: With the exception of Forest system roads 44A19D, 44A19C, 44N19, 44N20 and 44N04Y, existing roads in winter roosts will be closed during the wintering period.

A detailed description of the Proposed Action can be found in Chapter 2 of this EIS. Maps depicting the Proposed Action can be found at http://www.fs.fed.us/r5/modoc

Principal 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 that the public be given opportunity to comment. The regulations implementing NEPA further require that to the fullest extent possible, agencies will 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 review laws and executive orders. Principal among these are the Multiple Use and Sustained Yield Act of 1960, the National Forest Management Act of 1976 as expressed through the Modoc National Forest Land and Resource Management Plan, the Clean Air Act of 1970, the Clean Water Act of 1972, and the Forest and Rangeland Renewable Resources Planning Act of 1974.

Travel Management Rule, Subpart B – Designation of Roads, Trails and Areas for Motor Vehicle Use (36 CFR 212.50-57): The MDF Travel Management EIS is designed specifically to implement the requirements of 36 CFR 212, Subpart B, of the November 5, 2005, Rule for Travel Management

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, make changes to the existing Modoc National Forest Transportation System and amend the Modoc Land and Resource Management Plan.

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

The Forest Supervisor for the Modoc National Forest will be the Deciding Official. The Forest Supervisor will sign the Record of Decision.

Public Involvement

The Modoc National Forest relied upon the interdisciplinary team and public involvement to ensure that a full range of alternatives, representing a broad array of perspectives, would be analyzed in this Draft Environmental Impact Statement (DEIS). Public involvement occurred during three key periods. First, during the public collaboration process that began in 2007; second, during the 30-day public scoping period for the proposed action; and third, during meetings with public groups to explore issues they raised during scoping. However, scoping is ongoing and continual throughout the process.

The Modoc National Forest met with local elected officials, Indian tribes, Federal advisory groups, individuals, and community groups; including service and professional organizations, to discuss the Travel Management Rule and travel management on the Forest. Several news releases were also published in area papers along with public notices. In November 2007, four public open houses were held in Cedarville, Alturas, Adin, and Tulelake, California to gather information about which routes the public uses and to identify routes missed in the inventory of unauthorized routes. Additionally, maps of inventoried routes were available on the Forest's website and Forest Service offices. The public and the tribes used these maps to provide input into the process, and their suggestions were incorporated into the Proposed Action. The majority of public comments and discussion received during this initial phase of development favored the addition of all unauthorized routes to the NFTS unless a conflict with another resource was discovered. Information gathered during the initial collaboration process led in part to the development of the Proposed Action.

Thirty-day Public Scoping Period

In May 2008, the Forest Service completed the "Proposed Action and Notice of Intent to Prepare an Environmental Impact Statement" based on comments from the meetings held in the fall of 2007. The public comment period began with publication of a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) in the Federal Register on May 12, 2008 (Volume 73, Number 92), and ended June 10, 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 Cedarville (May 19), in Alturas (May 20), in Adin (May 28) and in Tulelake (May 29) to explain the Proposed Action. The concept of

"mixed use" was also introduced during these meetings. Mixed use is defined as allowing use by both highway-legal vehicles and off-highway vehicles. Approximately fifty comments were received from scoping, by email and regular mail. The majority of the comments were from individuals in the immediate community, but some came from individuals across the nation. Several comments were received from national organizations. Meetings were held throughout the scoping period with several groups, including the Modoc County Board of Supervisors, the community vitality group, the Wilderness Society, a local motocross group, and a local Rotary club. The tribal liaison for the Forest also met with the Pit River Tribe to further explain and receive comments on the Proposed Action. During the scoping period, we received some additional information that prompted us to make changes to our Proposed Action which included a non-significant LRMP amendment for bald eagle winter roost areas and the prohibition of OHV use on a Level 2 road that is used by Glass Mountain Pumice for hauling. On the week of July 21, 2008, an update notice was mailed to everyone on the mailing list and a notice was placed in the newspaper of record. This update notice was intended to keep people involved and to inform them of changes made to the Proposed Action. The scoping period was extended until August 8, 2008 for comments on these changes and 3 additional comments were received.

Issues

An issue is a matter of public concern regarding the Proposed Action and its environmental impacts. Comments from the public, other agencies, and affected Indian tribes were used to formulate issues concerning the Proposed Action. The Pit River Tribe brought up the issue of elders being able to access sacred places for ritual or food gathering. The Forest will work with, coordinate with, and consult with the tribes to provide access to meet their cultural, spiritual, gathering needs and will coordinate with the tribes outside of this process to provide access for these purposes.

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, LRMP, 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)…" The non-significant issues are listed below along with the reasons why they were determined to be non-significant.

Significant Issues

Issue 1

The Proposed Action unreasonably restricts motorized recreation use by prohibiting cross-country travel. The addition of 336 miles of unauthorized roads to the NFTS provides insufficient public access to MDF lands and unfairly limits motorized recreation.

Discussion: Concerns were raised that restricting cross-country travel across the entire Forest would impact motorized recreation opportunities and unfairly restrict access for hunting, fishing, camping and a host of other outdoor activities. The route inventory identified 491 miles of inventoried unauthorized routes across the Forest and the Proposed Action retains only 336 miles of these. This is considered insufficient by some users for a quality motorized recreation experience on the MDF.

Issue 2

The Proposed Action does not allow for easy and enjoyable travel across the Forest for motorized users. The addition of 138 miles of mixed use to the NFTS of level 3 roads does not provide for recreational diversity for motorized travel across the Forest.

Discussion: A concern was raised that by not opening up more roads for mixed use, the Forest was impacting the public and its ability to travel the Forest freely on OHVs. It was thought to be particularly punitive to the very young and elderly; those who may not be able to reach designations if they have to travel cross-country on foot to get to them. An example of such use is dispersed camping at a site that is not within close distance to an existing road or hunting where an ATV travels cross-country to haul the animal back to the vehicle. Another concern was that there is a lack of loop and connecting routes.

Issue 3

Many of the roads proposed for addition to the NFTS are poorly located and would cause adverse impacts to plants, wildlife, water quality, soils, riparian areas and other natural resources.

Discussion: Commenters expressed concern about impacts to a variety of natural resources, citing stream crossings, habitat fragmentation, wildlife disturbance, sedimentation, cultural sites and other resources that could be impacted by motorized use of roads. Concern was also expressed that the addition of unauthorized routes may increase the likelihood of spreading invasive species throughout the Forest, and that roads and OHV routes could possibly serve as corridors for exotic plant and disease invasion.

Issue 4

The NFTS is already too large to provide adequate maintenance and administration. Current maintenance backlogs should be addressed before proposing the addition of new routes to an already overburdened system.

Discussion: Concerns were expressed about how the types of use allowed on roads and trails would impact the need for maintenance and administration. It was expressed that some types of use, specifically motorcycles, ATVs, and four-wheel drive vehicles, result in higher maintenance costs due to resource damage caused by such uses. In addition, commenters felt that increasing the opportunities for such use by designating additional routes would result in an increased need for Forest Service administration of these roads, trails, and areas to prevent unauthorized uses, resolve user conflicts, and provide for public safety.

Issue 5

The Tribes expressed a concern that by prohibiting cross-country travel, the Forest would be unfairly restricting tribal elders from participating in traditional practices.

Concerns were expressed that by restricting cross-country travel, the elders and the very young in the tribe would be prohibited from participating in traditional practices such as vegetation gathering or ceremonies.

Discussion: The tribes were involved early in the process to insure that the roads necessary for their use were added to the NFTS. The Forest will work, coordinate, and consult with the tribes to provide access to meet their cultural, spiritual, and gathering needs. Due to the sensitive nature of this issue, the Forest will also coordinate with the tribes outside of this process to provide access for these purposes.

Issue 6

The addition of unauthorized routes to the NFTS will impact the ability of people to enjoy a quiet recreation experience. The addition of some of the routes will detract from the roadless characteristics of an area that may currently have a low density of roads.

Discussion: Concerns were expressed that the addition of roads would impact non-motorized recreational opportunities. Commenters suggested that Responsible Officials are required to "minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of National Forest System lands." (36 CFR 212.55) Concern was expressed that to allow OHV use in areas where there is currently a low number of roads would cause disproportionate conflict between quiet recreationists and OHV users and possibly risk precluding roadless areas from further consideration for Wilderness designation.

Non-significant Issues

Addressing maintenance and decommissioning needs on the existing National Forest Transportation System (NFTS)

Concerns were expressed that the Forest should re-consider previous decisions to establish system roads and trails in the NFTS. Commenters pointed out that some existing system roads and trails are in need of repair and maintenance and should be either repaired or closed as part of this proposal.

Reasons why not considered as a significant issue:

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 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 factored into cumulative effects analyses for the proposed action and alternatives.

Use travel analysis to develop a travel management plan for the existing National Forest Transportation System (NFTS).

Concerns were expressed that the Forest should analyze the entire existing road system and create a minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands in accordance with Travel Management Subpart A – Administration of the Forest Transportation System (36 CFR 212.1 – 212.10). Commenters believe that the current road density on the existing system is too great and that the impacts associated with the existing system should be analyzed for impacts to other resources and in light of funding limitations for maintenance, monitoring and enforcement.

Reasons why not considered as a significant issue:

The Proposed Action implements 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

analyzed to create a minimum system as part of this proposal. The infrastructure of a national Forest will always have room for improvement, and the MDF welcomes suggestions for improving the current NFTS and restoring the environment. Such suggestions are considered within the context of the overall mission of the MDF and will be considered as availability of staff and funding allows. Scoping for this project resulted in many suggestions for improving the NFTS through reconstruction, decommissioning, NFS road and trail closures, restoration projects, etc. These ideas and suggestions have been captured by the MDF and may be considered in future travel management analyses. 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 factored into cumulative-effects analyses for the Proposed Action and alternatives.

Parking off road and turning around safely

Concerns were expressed by the Back Country Horseman regarding their ability to park and turn around safely.

Reasons why not considered as a significant issue:

The 3,764 miles of existing Level 2 NFTS roads along with the additional proposed additions of unauthorized routes provide sufficient locations to park and turn around safely.

Travel management and snowmobile use

Concerns were expressed regarding potential impacts of snowmobile use on soils and aquatic systems when snow is less than one foot deep. A concern was also expressed regarding the potential adverse effects of snowmobile noise and air emissions.

Reasons why not considered as a significant issue:

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.

Chapter 2. The Alternatives

Introduction

This chapter describes and compares the alternatives considered for the Modoc National Forest 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 No Action, Proposed Action, and other action alternatives are described in detail below.

How the Alternatives Were Developed

The four action alternatives represent a wide range of perspectives designed to address the significant issues as described in the Purpose and Need (Chapter 1).

Refining Alternatives Submitted by the Public During Scoping

During the 30-day public scoping process, alternatives were submitted for consideration by three groups. After the scoping period concluded, the Forest Service reviewed and gave due consideration to their proposals. The resulting alternatives incorporate these and other proposals and information offered by the public and the work of the Interdisciplinary Team.

Also important in this process was the information gathered by the Forest Service in its consultation and discussions with tribal representatives, local counties, interested individuals and Forest Service employees. State and Federal agencies advised the Forest Service during the process through numerous informal contacts. During the scoping period, the Forest received additional information internally that was incorporated into the Proposed Action. First, it was determined that the 44N08 and 44N01 roads that go from the Glass Mountain Pumice Mine to County Road 97 are not safe for use by off-highway vehicles (OHVs) because of the high volume of large trucks that use the road. The Forest is proposing to close these 1.45 miles of road to use by OHVs; other vehicles will still be allowed to use the road. Second, a seasonal closure was initially proposed from November 1 through March 31 in bald eagle winter roost areas as required in the Modoc Land and Resource Management Plan (LRMP). After additional scoping, the Forest realized that in most cases this guideline can be implemented; however, there is one bald eagle roost area directly adjacent to the community of Tionesta. System roads 44A19D, 44A19C, 44N19, 44N20 and 44N04Y are within this area. These roads have been open to public use with no discernable disturbance to the bald eagle during their wintering period. Bald eagles that roost there have become habituated to vehicular traffic. If these roads are seasonally closed, the inholding community of Tionesta would be affected. As a result, the Forest is proposing a site-specific, non-significant Forest-plan amendment to the bald eagle winter roost guidelines that would allow for vehicle use year round in this specific eagle roost area on designated roads within that area. All other roads in bald eagle winter roost areas would have the seasonal closure implemented as directed by the LRMP. An update notice was sent out to the public and published in the newspapers of record the week of July 21, 2008. The scoping period to comment on these changes was extended until August 8, 2008 and three additional comments were received but did not vary from the scope of the other comments received.

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 DEIS. 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 National Environmental Policy Act (NEPA).

The planning area for the alternatives includes National Forest System lands on the Modoc National Forest. 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 will meet applicable state and Federal land-use regulations.

Monitoring

Monitoring is critical for evaluating the effectiveness of management decisions, the accuracy of analysis assumptions, and conclusions. Monitoring of road and trail conditions is required, and must meet regional and national standards. If monitoring determines additional resource damage is occurring, steps to prevent further damage may be taken. If the mitigations are not effective or are not possible, road or trail closures may be required, and may require additional NEPA analysis. Condition surveys are performed on all maintenance level 3, 4, and 5 roads every five years, with approximately 20 percent completed each year. Condition Surveys are performed on maintenance level 1 and 2 roads based on a relatively small random sample generated by the Washington Office. In addition to the formal condition surveys, the Forest will monitor road conditions continually as they are driven for other purposes. As problems are identified, they will be addressed as resources allow, and appropriate management actions will be undertaken in accordance with law, regulation and policy (such as emergency closures).

Descriptions of the Alternatives

This section describes each of the five alternatives considered in detail. The alternatives are described in three parts with the action alternatives having several common factors:

1. **Cross-country travel:** All of the action alternatives ban cross-country travel.
2. **Changes to the existing National Forest Transportation System (NFTS):** The alternatives vary in changes to the existing NFTS in terms of vehicle class or season of use.
3. **Additions to the NFTS:** Alternative 2, 4 and 5 include lists of roads that are proposed for addition to the NFTS. Each of these roads is identified by a unique road number or route ID. All proposed route additions have an assigned maintenance level based on specific road objectives, and any applicable vehicle class or season of use. All of the proposed additions on the MDF will be maintenance level 2 and open to all vehicles. All proposed routes will receive the appropriate level of routine maintenance such as clearing brush, posting signs, cleaning, clearing debris, etc. Each road, trail, or area is site-specifically addressed in Appendices A1 and A2, where site-specific reviews by resource specialists are documented. Resource specialists reviewed all proposed routes to determine site-specific impacts. For some routes, no work beyond routine maintenance is needed. For one road, additional work is needed to bring the route up to a safe and environmentally sustainable condition. Where specific actions are identified for a given road or trail, such actions will be completed prior to designation of the road or trail for public motorized use.

Seasonal Closures for All Alternatives

In the past, seasonal closures have been issued and enforced. Currently, there are no seasonal restriction closures in place on the Forest, although there are several standards and guides that indicate where closures may be beneficial.

Seasonal closures in this document are proposed for three of the four action alternatives. Most of the closures are weather related and are proposed because of the effects of rain and snow events on clay soils and the resulting damage to roads. The table below shows the closure name, date, and the reason for the closure. A variation of these closures is common to all three of the alternatives where seasonal closures are proposed. Only one closure date per road would be applied.

Table 2-1. Seasonal Closure Type and Dates

Closure name	Closure date	Closure type
SC1	11/1-3/31	Bald Eagle Winter Roost
SC2	11/1 - 4/30	Wet Weather
SC3	12/1-4/30	Wet Weather
SC4	12/16-4/30	Wet Weather
SC5	2/15-4/30	Wet Weather

Alternative 1: No Action

The No Action Alternative provides a baseline for comparing the other alternatives. 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 Travel Management Rule would not be implemented, and no MVUM would be produced. Motor vehicle travel by the public would not be limited to designated routes. Unauthorized routes would continue to proliferate and have no status or authorization as NFTS facilities.

1. **Cross-country Travel**: Motor vehicle travel off designated NFS roads and NFS trails and areas by the public would continue except as currently prohibited by Forest order. A total of 1,609,466 acres are currently open to cross-country travel.
2. **Changes to the existing NFTS**: No changes to the existing NFTS or to current LRMP direction. No seasonal restrictions exist under current management plan direction.
3. **Additions to the NFTS:** There would be no additions to the existing NFTS.

Alternative 2: The Proposed Action

The Proposed Action was created by the Interdisciplinary Team using input from the public regarding the inventoried unauthorized routes. It includes the prohibition of cross-country motorized travel, proposed changes to the existing NFTS, and the additions to the NFTS as described in the Notice of Intent (NOI) published May 12, 2008 (Volume 73, Number 92).

1. **Cross-country travel**: This alternative would prohibit motor vehicle travel off the designated NFTS roads by the public; except as allowed by permit or other authorization.
2. **Changes to the existing NFTS**: Close approximate 6 miles of 46B29HB (along Boles Creek between Clear Lake and Steel Swamp) to public motorized use.

Proposed seasonal restrictions: Seasonal restrictions on 312 miles of NFS roads due to weather restrictions. There would be three weather-related closure dates and one related to bald eagle winter roosting. The roads seasonally closed for bald eagle winter roost requirements total approximately five miles, with the remainder of closures being weather related.

Table 2-2. Alternative 2— Seasonal Closures Grouped By Date (Proposed Addition of Unauthorized Routes)

Group name	Date closed	Miles	Number	Type
SC1	11/1-3/31			
SC2	11/1-4/30			
SC3	12/1-4/30	9.44	23	Wet weather
SC4	12/16-3/31	10.36	51	Wet weather
Total		19.8	74	

Table 2-3. Alternative 2—Seasonal Closures Grouped By Date (Existing NFTS Roads)

Group name	Date closed	Miles	Number	Reason
SC1	11/1-3/31	4.85	2	bald eagle
SC2	11/1-4/30	14.25	15	weather & road condition
SC3	12/1-4/30	178.13	83	weather & road condition
SC4	12/16-3/31	115.23	113	weather & road condition
Total		312.46	213	

Changes in class of vehicles: There are currently 3,764 miles of level 2 road open to the public for mixed use. Mixed use is defined as allowing use by both highway-legal vehicles and off-highway vehicles. Alternative 2 proposes to change the class of vehicle on 138 additional miles of maintenance level 3 roads to allow for mixed use. It would restrict use on 44N08 and 44N01 roads to highway-legal vehicles only. The table below lists the vehicle class changes proposed under Alternative 2.

Table 2-4. Alternative 2—Proposed Changes in Vehicle Class (from Highway Only to all Vehicles – Mixed Use) on NFTS roads

Miles	Number of Routes
138	23

Note: See appendix A-1 for a list of all routes.

3. **Additions to the NFTS**: This Alternative proposes to add approximately 336 miles of existing, inventoried unauthorized routes to the NFTS as level 2 roads. There would be approximately 20 miles of these roads that would have seasonal restrictions. The following summary table shows the miles and types of roads, by district, to be added into the National Forest Transportation System. A more complete table with each road listed is located in appendix A.

Table 2-5. Alternative 2—Miles of Unauthorized Road Added to the NFTS, by District

Miles of Unauthorized Road Added	District
40	Warner Mountain
21	Big Valley
93	Doublehead
185	Devils Garden
336	Total

Of the 1,168 roads proposed to be added in Alternative 2, the majority of the roads are spur roads and under a quarter of a mile in length. Table 1-1 in Chapter 1 of this document shows the distribution of road lengths.

Alternative 3

Alternative 3 responds to the issues of cost, maintenance, inventoried roadless areas, quiet use, and natural resource impacts by prohibiting cross-country travel without adding any new facilities to the NFTS. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS in the form of new roads. None of the currently unauthorized roads would be added to the National Forest System under this alternative.

1. **Cross-country Travel:** Motor vehicle travel off the designated NFTS roads by the public; except as allowed by permit or other authorization would be prohibited.
2. **Changes to the existing NFTS**: Only those seasonal restrictions as specified in the MDF LRMP and contained in existing Forest orders would be continued. Currently, there are no seasonal restriction closures in place on the Forest. No changes to vehicle class are proposed in this Alternative.
3. **Additions to the NFTS**: There would be no additions to the existing NFTS.

Alternative 4

Alternative 4 was developed as a modified version of an alternative submitted during scoping by a coalition of environmental groups. Alternative 4 responds to issues of inventoried roadless areas, quiet use, and natural resource impacts and does not add routes where resource concerns were raised internally and externally.

1. **Cross-country Travel:** Motor vehicle travel off the designated NFTS roads by the public; except as allowed by permit or other authorization would be prohibited.
2. **Changes to the existing NFTS:** Close approximately 6 miles of 46B29HB (along Boles Creek between Clear Lake and Steel Swamp) to public use.

Proposed Seasonal restrictions: There would be four weather-related closures and one related to bald eagle winter roosts. System roads 44A19D, 44A19C, 44N19, 44N20 and 44N04Y east of Tionesta would be excluded as stated in the Proposed Action. The table below shows weather-related seasonal restrictions on an additional 15 miles of proposed routes, 419 miles on NFS roads, and approximately 5 miles for bald eagle winter roost requirements.

Table 2-6. Alternative 4—Seasonal Closure Grouped By Date (Proposed Addition of Unauthorized Routes)

Group name	Date closed	Miles	Number	Reason
SC1	11/1-3/31			

Group name	Date closed	Miles	Number	Reason
SC2	11/1-4/30			
SC3	12/1-4/30	6.13	18	weather & road condition
SC4	12/16-3/31	9.14	47	weather & road condition
	Total	15.27	65	

Table 2-7. Alternative 4—Seasonal Closure Grouped By Date (Existing NFTS Roads)

Group name	Date closed	Miles	Number	Reason
SC1	11/1-3/31	4.85	2	bald eagle
SC2	11/1-4/30	14.25	15	weather & road condition
SC3	12/1-4/30	178.13	83	weather & road condition
SC4	12/16-3/31	115.23	113	weather & road condition
SC5	2/15-4/30	112.17	57	
	Total	424.63	270	

Class of Vehicles Changes: There are currently 3,764 miles of level 2 road open to the public for mixed use. Mixed use is defined as allowed use by both highway legal vehicles and off-highway vehicles. Alternative 4 would not add any additional routes for mixed use. It would restrict use to highway vehicles only on approximately 1.45 miles of 44N08 and 44N01 roads near Glass Mountain Pumice Mine.

3. **Additions to the NFTS:** The Forest is proposing to add approximately 286 miles of existing unauthorized routes to the system as maintenance level 2 roads. Approximately 15 miles of these roads would have seasonal restrictions. The following summary table shows the miles and types of roads, by district, to be added into the National Forest Transportation System. A more complete table with each road listed is included in appendix A.

Table 2-8. Alternative 4—Miles of Road Added to the NFTS, by District

Miles of Unauthorized Road Added	District
32	Warner Mountain
20	Big Valley
85	Doublehead
149	Devils Garden
286	Total

Alternative 5

Alternative 5 responds to the issue of access and motorized recreation opportunity and was developed as a modified version of an alternative submitted by the Blue Ribbon Coalition and public comments. During scoping, the MDF also received recommendations for additional mixed use that would better provide for access and motorized recreation opportunity.

1. **Cross-country Travel**: Motor vehicle travel off the designated NFS roads, NFS trails and areas by the public would be prohibited except as allowed by permit or other authorization.
2. **Changes to the existing NFTS**: Close approximate 6 miles of 46B29HB (along Boles Creek between Clear Lake and Steel Swamp) to public use.

Proposed seasonal restrictions: Seasonal restrictions on 307 miles of NFS roads due to weather restrictions. There would be one season for wet weather closures and one season related to bald eagle winter roosting. The roads seasonally closed for bald eagle winter roost requirements total 5 miles and exclude system roads 44A19D, 44A19C, 44N19, 44N20 and 44N04Y east of Tionesta as stated in the Proposed Action.

Table 2-9. Alternative 5— Seasonal Closure Grouped by Date (Proposed Addition of Unauthorized Routes)

Group name	Date closed	Miles	Number	Reason
SC5	2/15-4/30	19.8	74	weather & road conditions
	Total	19.8	74	

Table 2-10. Alternative 5—Seasonal Closure Grouped by Date (Existing NFTS Roads)

Group name	Date closed	Miles	Number	Reason
SC1	11/1-3/31	4.85	2	bald eagle
	Total	312.46	213	

Class of vehicle changes: There are currently 3,764 miles of level 2 road open to the public for mixed use. Mixed use is defined as allowed use by both highway-legal vehicles and off-highway vehicles. Based on input from the public during scoping, Alternative 5 proposes to change the vehicle class on 544 additional miles of maintenance level 3 roads to allow for mixed use. The 44N01 road would not be recommended for inclusion due to safety issues related to the Glass Mountain Pumice Mine. Alternative 5 would restrict use on this 1.45 miles of 44N08 and 44N01 roads to highway vehicles only. The table below lists the vehicle changes proposed under Alternative 5.

Table 2-11. Alternative 5—Summary of NFTS Routes Proposed for Mixed Use

	Miles	Number of Routes
Alternative 5	544	197

Note: See Appendix A-1 for a complete table of all routes.

3. **Additions to the NFTS:** The Forest is proposing to add approximately 336 miles of existing unauthorized routes to the NFTS as maintenance level 2 roads. Approximately 20 miles of these roads would have seasonal restrictions. The following summary table shows the miles and types of roads, by district, to be added into the National Forest Transportation System. A more complete table with each road listed is included in appendix A.

Table 2-12. Alternative 5—Miles of Unauthorized Road Added to the NFTS, by District

Miles of Unauthorized Road Added	District
40	Warner Mountain
21	Big Valley
93	Doublehead
185	Devils Garden
336	Total miles

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 providing a summary of the effects analysis for all alternatives.

Table 2-13. Summary Comparison of Alternatives

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Cross-country Travel	Yes	No	No	No	No
Miles of Unauthorized Routes Added to NFTS	0	336	0	286	336
Number of Roads Proposed to be Added	0	1,158	0	1025	1,158
Miles of Seasonal Closures on Roads Proposed to be Added	0	20	0	15	20
Existing Miles of Seasonal Closures on NFTS	0	0	0	0	0
Proposed Miles of Seasonal Closures on existing roads on NFTS	0	312	0	425	312
Number of NFTS Roads Proposed for Seasonal Closure	0	213	0	270	213
Number of Closure Dates	0	4	0	5	2
Current Mixed Use Miles	3764	3761	3764	3761	3761
Additional Mixed Use Miles Proposed	0	138	0	0	531

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Number of Additional Roads Proposed for Mixed Use	0	23	0	0	197
Close 46B29HB	No	Yes	No	Yes	Yes
Close 44N01 road to OHVs	No	Yes	No	Yes	Yes

Summary Comparison of Alternatives, by Environmental Effects

Table 2-14. Rankings of Alternatives, Averaged Across Indicators[1]

	Rankings of Alternatives, averaged across indicators				
Resource Area	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Aquatic Biota	2.2	4.2	5	4.2	4.2
Botanical Resources	1.5	2.5	3.7	3.5	2.3
Heritage Resources	1	5	5	5	5
Noxious Weeds	1	3	5	4	2
Recreation Resources Motorized	5	3	1	2	4
Recreation Resources Non-Motorized	1	2	5	4	2
Soil Resource	1	3	5	4	3
Terrestrial Biota	1	3.5	5	2.75	3.5
Visual Resources	1	3	5	4	3
Water Resources	1	3	5	4	3

1. A score of 5 indicates the alternative has the lowest negative impact for the specified resource; a score of 1 indicates the alternative has the highest negative impact for the specified resource. See Chapter 3 for more details.

Alternatives Considered, but Eliminated from Detailed Analysis

The National Environmental Policy Act (NEPA) requires Federal officials to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). NEPA requires consideration of only those alternatives that would fulfill the Purpose and Need described in Chapter 1. The following describes those alternatives that were considered but eliminated from detailed study, and the rationale for their elimination.

Add All Unauthorized Routes to NFTS

This alternative was developed in response to initial comments from the public at open houses held in Modoc County who told us they did not want us closing any routes or placing any restrictions on their current use of the Forest. This alternative was suggested prior to creation of the Proposed Action. This approach would add all of the unauthorized routes that were inventoried, and not have any seasonal closures. Every level 3 road would be designated for mixed use.

Rationale for elimination: This Alternative does not meet the Purpose and Need. Several of the inventoried unauthorized routes have resource conflicts and create a potential for resource damage if added to the NFTS and allowed use by the public. Adding all of the unauthorized routes would not meet the purpose of minimizing damage to soil, vegetation and other Forest resources.

Designate several high-use areas where use is limited to existing routes.

Rationale for elimination: The current network of roads across the Forest is extensive, and already provides for a varied motorized-use experience. There is not a need to designate a "high use area" when the Forest provides an extensive network of roads available for OHV use already.

Develop and implement a rainfall-based wet weather closure.

Rationale for elimination: This does not meet the requirement of the Travel Rule to produce a Motor Vehicle Use Map that will be the final product of this process because it is not practical to change dates as they occur with different seasonal weather situations each year.

Reduce System Road Density based on a Comprehensive Travel Analysis.

Rationale for elimination: This alternative is outside of the scope of the project because it primarily points to Subpart A of the Travel Management Rule. The Proposed Action implements 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, 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 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, any analysis of our existing system and comprehensive changes made to that system are beyond the scope of this analysis.

Chapter 3. Affected Environment and Environmental Consequences

Introduction

This chapter summarizes the physical, biological, social, and economic environments that are affected by the proposed action and alternatives and the effects on that environment that would result from implementation of any of the alternatives. This chapter also presents the scientific and analytical basis for comparison of the alternatives presented in Chapter 2.

The *affected environment* section under each resource topic describes the existing, or baseline, condition against which environmental effects were evaluated, and from which progress toward the desired condition can be measured. The *environmental consequences* section forms the scientific and analytical basis for comparison of the alternatives, including the Proposed Action. This section discusses direct, indirect, and cumulative effects, together 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, of 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.

Analysis Process

The environmental consequences presented in chapter 3 address the impacts of the actions proposed under each alternative for the Modoc National Forest. This effects analysis was done at the Forest scale (the scale of the Proposed Action as discussed in chapter 1). However, the effects findings in this chapter are based on site-specific analyses of each road proposed for addition to the National Forest Transportation System (NFTS) and any changes in vehicle class or season of use for existing NFTS roads. Each affected road proposed in the alternatives has been reviewed by resource specialists; their findings are documented in appendix A. Readers seeking information concerning the environmental effects associated with a specific road are directed to appendices A through G, where details are documented.

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

1. ***Prohibition of cross-country motor 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,) to the National Forest Transportation System (NFTS):*** As described above, the impacts of new facilities are addressed in sum total in this chapter, while impacts of individual routes are addressed in appendices A-G. 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 by alternative. For some impacts (for example, public safety), impacts are also addressed by route. Where impacts associated with individual routes are warranted, the reader is directed to appendices or project files where this data is located.

Cumulative Effects

According to the Council on Environmental Quality (CEQ) NEPA regulations, "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 Modoc 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. See appendix H for a list of reasonably foreseeable actions.

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 action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions, risks ignoring the important residual effects of past natural events; and this may contribute to cumulative effects just as much as human actions. 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." See also 36 CFR 220.4(f). For these reasons, the analysis of past actions in this section is based on current environmental conditions.

The present and reasonably foreseeable actions potentially contributing to cumulative effects on this project are fuel treatments and fire, range management, dam construction and maintenance, minerals management, recreation, timber harvest and vegetation treatments, reforestation, road

and right-of-way management, state and county easements, railroads, special uses, and past road construction and decommissioning. For further discussion of these, see appendix H.

Table 3-1. Summary of Reasonably Foreseeable Vegetation-Altering Actions on Public Land in and Adjacent to the Modoc National Forest

Type of Vegetation Change	Estimated Average Impact	Federal Agency
Prescribed fire	4,000 acres/ year	Modoc NF
Mechanical fuels treatment	6,000 acres/ year	Modoc NF
Timber harvest	2,500 acres for saw logs/year 3,000 acres for wood fiber/year	Modoc NF Modoc NF
Sage-steppe restoration	15,000 acres first decade 19,000 acres second decade	Modoc NF & BLM* Modoc NF & BLM
Grazing	122,500 AUMs/year 147,346 AUMs/year	Modoc NF BLM
Power transmission corridor maintenance	3,000 acres/decade	Modoc NF
Road construction	0.95 miles/ year (based on last 10 years)	Modoc NF
Road decommissioning	7.68 miles/ year (based on last 10 years)	Modoc Nf

*Bureau of Land Management

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 Modoc 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 NFTS roads and NFTS trails included in the Forest transportation system.

Assumptions and Limitations

The following assumptions and limitations were applied in the effects analysis in each section:

1. No NEPA decision is necessary to continue use of the NFTS (i.e., by OHVs and other modes of transportation) as currently managed under the No Action Alternative. These decisions were made previously.
2. User-created roads, trails, and areas are not NFTS facilities. They are unauthorized. Proposals to add these to the NFTS require a NEPA decision.
3. Temporary roads, trails, and areas built to support emergency operations or temporarily authorized in association with contracts, permits or leases are not intended for public use. They are not NFTS facilities (i.e., they are unauthorized for public use). Any proposal to add these temporary roads to the NFTS will require a NEPA decision.

4. Any unauthorized routes not included in the Proposed Action are not precluded from consideration for addition to the NFTS in future travel-management actions.
5. The agency will continue to make changes to the NFTS on an as-needed basis. It will also continue to make decisions about temporary roads or trails on an as-needed basis associated with contract, permit, lease, or other written authorization.
6. Any activity associated with contract, permit, lease, or other written authorization is exempt from designation under the Travel Management Rule (36 CFR 212.51 (a) (8)), and should not be part of the proposal (e.g., fuelwood permits, motorized SUP permits, mining activity, etc.). Such actions are subject to separate NEPA analysis.
7. "Designation" is an administrative act that does not trigger NEPA. Designation technically occurs with printing of the Motor Vehicle Use Map (MVUM). NEPA is not required for printing a map.
8. For travel management, the Federal action triggering NEPA is any change to current restrictions or prohibitions regarding motorized travel by the public. Examples would be prohibiting cross-country travel, changing management (e.g., changing vehicle class or season of use), and any additions or deletions of facilities (roads, trails, or areas) to the NFTS.
9. Previous decisions on the NFTS do not need to be revisited to implement the Travel Management Rule (TMR) or the MVUM. That is, the NFTS contains existing facilities (roads and trails) that either underwent the NEPA process or predate NEPA. Allowing continued motorized use of the facilities in the NFTS in accordance with existing laws and regulations, does not require a NEPA decision.
10. Dispersed recreation activities (i.e., activities that occur after the motor vehicle stops, such as camping, hunting, fishing, hiking, etc.) are not part of the scope of the Proposed Action. The action and the analysis focus on motor vehicle use.
11. Travel analysis is a pre-NEPA planning exercise for transportation planning that informs travel management. Until new directives are published, the agency continues to follow existing policy related to transportation planning and analysis. For example, some roads analysis process requirements in FSM (Forest Service Manual) 7700 and 7710 are still applicable.
12. Setting road-maintenance levels and changing maintenance levels are administrative, and not subject to NEPA. However, changes in allowed vehicle class, season of use, access, and proposals to reconstruct facilities are subject to NEPA.
13. The system will be maintained to standard and all additions or changes to the NFTS will meet standards prior to availability for public use.
14. Seasonal Restrictions – Seasonal closures will be shown on the MVUM.

Resource Reports

Each section in this chapter provides a summary of the project-specific reports, assessments, and input prepared by Forest Service specialists, which are incorporated by reference in this Draft Environmental Impact Statement (DEIS). Each of following sections includes a summary of the report findings, including a description of the methodology used to determine impacts. The following reports and memoranda are incorporated by reference: Botanical Biological Evaluation, Botany Report, Noxious Weeds Risk Assessment; Biological Assessment and Biological Evaluation (BA and BE) for Fish and Wildlife; Hydrology and Soils Report; Recreation, Visual Resources, and the Heritage Resources Report. These reports or memorandums are part of the project record on file at the Forest Supervisor's Office in Alturas, California. Copies of these reports are available upon request by contacting Kathleen Borovac, Project Leader, at 530-233-8754.

Route-Specific Analysis Summary

During the planning stages of the travel management project for the Modoc National Forest (MDF), members of the public recommended changes to the existing NFTS with a focus on unauthorized routes. Comments regarding specific routes were also received during the public scoping period for the notice of intent (NOI). The disposition of these routes fell into two categories: routes brought forward for detailed study in alternative(s), and routes eliminated from detailed study. These decisions were made by the Responsible Official based upon the Purpose and Need, the scope of the EIS, and issues raised by the public and the Interdisciplinary Team. The Forest developed a spreadsheet for all routes considered in alternatives 2, 4, and 5. This spreadsheet is available in the appendices A1 and A2.

A number of the recommended routes are proposed to be added to the NFTS under one or more of the action alternatives. For these routes, the spreadsheet identifies the alternative(s) under which the route is proposed, the type of vehicles allowed, and the season when the route would be open. It describes any mitigation measures that would be implemented on the route prior to publication on an MVUM and allowing public use. It also contains effects determinations. Regular operation and maintenance activities (e.g., clearing brush, posting signs, cleaning and maintaining existing drainage structures, patrolling routes, etc.) are a part of regular maintenance and management strategies for the NFTS.

Law Enforcement

Law enforcement authority and jurisdiction, cooperation, implementation and tracking, implementation strategy, assumptions and measures of success are discussed in details in appendix J.

Enforcement Assumptions:

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. The emphasis for the first several years will be on education and gaining voluntary compliance. 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 that—

- Users in communities adjacent to the Forest would comply within 1 to 2 years.
- Frequent users, but further in distant from the Forest, would comply within 2 to 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, thereby 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, together with user education programs, will reduce the number of violations.
- FPOs (Forest protection officers) spend a large percentage of their time on travel management issues; depending on the Forest, the estimates range from 30 to 50 percent. LEOs (law enforcement officers) spend approximately 10 to 20 percent of their time enforcing off-highway vehicle rules.

- The Forest, through the Proposed Action, plans to facilitate the change from a cross-country travel system to one where such travel is prohibited. This would be done by providing motorized access in popular locations where it is already occurring. Providing this access would create an incentive to stay on the designated routes—helping reduce pressure to travel off those designated routes.

Information on Other Resource Areas

The Proposed Action and alternatives do not affect wilderness or air quality. However, a summary of why they are not included in chapter 3 is provided below, based upon input received during scoping.

Wilderness

Actions proposed are in compliance with wilderness designations and the Wilderness Act of 1964. Wilderness resources are not affected by the Proposed Action or the alternatives, and motorized activity would continue to be prohibited in wilderness under all the alternatives per the Wilderness Act of 1964.

Air Quality

Actions proposed are in compliance with state air quality regulations and the Modoc National Forest LRMP. Air emissions are generally managed and analyzed spatially by air basins (http://www.arb.ca.gov/knowzone/basin/basin.swf), where topographic features delineate common air-quality characteristics. Air quality conditions are largely determined by short- and long-term meteorological and climatic conditions.

Generally, the number of vehicle miles traveled annually by Forest users is not expected to change in any alternatives through the prohibition of cross-country travel and the redirection of motorized use onto a designated system of roads, trails and areas. As a result, no adverse effects are anticipated to air quality. It is possible, where seasonal restrictions are put into place, that there may be a slight benefit to air quality as a result of the actions. Where action alternatives propose adding routes to the NFTS, any air quality-related issues would be offset by the reduction of cross-country travel. These routes were pulled from the inventory of unauthorized routes open to public use as part of cross-country travel prior to this proposal. The following analysis led to a determination that no adverse effects to air quality would result from any of the action alternatives. None of the proposed routes passes through serpentine soils; none of the alternatives proposes routes, areas or terminal facilities that would result in a significant increase or change in concentration of use; and none of the alternatives proposes routes located in Federal (national) non-attainment areas for pm2.5 and ozone 8 hour. Tailpipe emissions have been accounted for by CARB in the green/red sticker program suggesting that CARB has a program to regulate these emissions to achieve state implementation plan targets. No adverse change in attainment status is expected to occur as a result of these projects

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

NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare Draft Environmental Impact Statements concurrently with and integrated with …other environmental review laws and executive orders." 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.

National Forest Management Act

The Forest Service is complying with the provisions of this law (see appendix B on monitoring for how the Forest complies with the NFMA in its monitoring activities).

2005 Travel Management Rule 36 CFR 212

The Forest Service is complying with the provisions of this law (see the project file for a copy of the rule).

Transportation Facilities

Introduction

This section of the environmental analysis examines the extent to which alternatives respond to transportation facilities direction established in the Modoc 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

Regulatory Framework: Compliance with the Forest Plan and Other Regulatory Direction

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

- Title 36, Code of Federal Regulations, part 212 (36CFR212) is the implementing regulation for the FRTA, and includes portions of the Travel Management Rule published in the Federal Register on November 9, 2005. Part 212 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 road management objectives (RMOs). The RMOs document the purpose of each road. The purpose for the road sets the parameters for maintenance standards needed to meet user needs, resource protection, and public safety. Forest Service Handbook 7709.58 describes the maintenance management system the Forest Service uses, and the maintenance standards needed to meet road management objectives (RMOs) for the road system. It also includes 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 the Pacific Southwest Region will use to evaluate safety aspects of public travel on roads, when proposed changes to the NFTS would 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, including motor vehicles used on the national Forests. The CVC sets safety standards 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.

Affected Environment

Background

People in northeastern California are used to driving to their destinations, because people and places are so far apart. Highways 299, 395, and 139 are important routes into and out of northeastern Lassen County and Modoc County.

Traveling east from Interstate 5 at Redding, California, State Highway 299 approaches the Modoc National Forest through Big Valley, passes over Adin Pass at an elevation of 5,200 feet, through the Upper Pit River valley, then up to an elevation of about 6,000 feet over Cedar Pass in the Warner Mountains to Surprise Valley and on to the Nevada border. Traveling north from Interstate 80 at Reno, Nevada, US Highway 395 moves onto the Modoc Plateau, across the Madeline Plains, and into the Upper Pit River valley, then proceeds along the east shore of Goose Lake to the Oregon border. State Highway 139 is an important cut-off route from Highway 299 to Klamath Falls, Oregon – the closest large town. These highways are important to local citizens and tourists, in both summer and winter. Local citizens use these routes as a means to reach amenities not available in the small rural communities. As truck routes used for import and export of goods and services, these highways are essential to the economic well-being of the area. They also connect to the Forest and county roads that provide access to the national Forest as well as other places favored by tourists and local residents.

The county road system within the interior of the national Forest provides public access and is valued for travel to recreation sites, mining, and livestock. These roads are gravel and most are safe for passenger cars when the road surface is dry. Most prominent of these county roads are Crowder Flat through Devil's Garden, Fandango Pass from the west side of the Warner Mountains east to Fort Bidwell, Tionesta Road from Highway 139 to Medicine Lake, and the Jess Valley road from Likely to Blue Lake. Other county roads that are not maintained for passenger car travel include a spur road from the west side of the Warner Mountains east to Lake City. Many Forest Service roads are tributary to the County road system.

Many Forest roads were constructed to permit access for fire suppression and to facilitate vegetation management. These roads also provide access for resource protection and for commercial activities or public uses such as grazing, mining, vegetation management, fire suppression and recreation outfitting and guiding. In addition, the system provides access for recreation activities such as hunting, fishing, skiing, bird watching, camping, hiking, and driving for pleasure. Roads also provide access for traditional rural activities such as woodcutting and hunting.

Public Safety

36CFR212.55 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. Refer to appendix A for specific information on each road or trail.

Motorized Mixed Use: The California Vehicle Code (CVC) requires motor vehicles operated on roads be highway legal and be operated by licensed drivers. The CVC has exceptions to those requirements for off-highway vehicles. The CVC allows the operation of non-highway-legal vehicles operated by unlicensed drivers on roughly graded roads. The Modoc National Forest consider roads maintained for high clearance vehicles as roughly graded and considers operation of OHVs on these roads to be consistent with state law. Roads maintained for passenger cars are not considered roughly graded, and operation of OHV's on those roads may not be consistent with state law.

The conclusion drawn from the mixed use analysis is that mixed use is safely occurring now. Continuing to allow mixed use would result in a low probability of a crash occurring on any of the roads proposed for mixed use. For maintenance level 2 roads the severity of the crash is likely to be low, and for maintenance level 3 roads the severity of the crash is likely to be moderate. Maintenance level 1 roads are closed to all use, and no mixed use is being proposed for maintenance level 4 & 5 roads.

Afforability

36CFR212.55 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) although this is not expected to occur. These costs may be for improving unauthorized routes that would 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.

An estimate of the deferred maintenance for roads on the Modoc National Forest is $128,053,267. Note that this number is based on a national random sample of deferred maintenance needs done in 2006. It is not statistically valid at the national Forest level; however, it can be used as an indicator of maintenance needs for the existing road system.

A more realistic estimate of the deferred maintenance needs for roads on the Modoc National Forest based on condition surveys completed during the last five years is as follows:

Table 3-2. Deferred Maintenance Needs for Roads

Maintenance Level	Dollar Amount	Source of Data
Maintenance level 4 & 5 roads	$409,311	From condition surveys done on 100%
Maintenance level 3 roads	$8,678,223	From condition surveys done on 98.46%
Maintenance level 1 & 2 roads	$1,873,500	Estimated at $500 per mile
Total estimated deferred maintenance needs	$10,961,034	

Estimates of the annual maintenance costs for the road system for each alternative are included in appendix N. 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 costs per mile are shown in the table below. The average costs per mile were derived using the Washington Office unit costs including overhead, and local information from condition surveys conducted in the field.

Table 3-3. Average Costs per Mile for Road Maintenance

Operational Maintenance Level	Annual Maintenance Cost
1	$78
2	$213
3	$538

Operational Maintenance Level	Annual Maintenance Cost
4	$828
5	$828

Funding

The Forest currently maintains it road system through a combination of appropriated funds, cooperators, timber sale operators, and other funding as it becomes available. The current year (FY 09) allocation to the Forest is $768,000. This is down slightly from $779,000 in FY 08. In addition to work done with appropriated funds, a substantial amount of work is done on the road system by cooperators (primarily timber operators hauling from private lands) and timber sale operators. It is estimated that the work performed by cooperators is valued at $30,000 annually, and from timber sale operators $100,000 annually. Additionally, other funding from the Resource Advisory Committee (RAC), Legacy road funding, and other sources contribute about $30,000 annually.

Environmental Consequences

Measurement Indicators

Measurement indicators are intended to address how each action (direct and indirect effects) and each alternative as the sum total of its proposed actions (cumulative effects) responds to the need for a safe and affordable NFTS. Direct effects of this decision are due to additions to the NFTS and changes in class of vehicle allowed on NFTS roads.

The measurement indicators used to display differences between the effects of the alternatives on NFTS roads are (1) public safety and (2) affordability.

Public Safety

Alternative 1

Direct and Indirect Effects

Because cross-country travel would not be prohibited, unauthorized routes may continue to be created. This could be a safety issue because the roads that are created have no standards and could be unsafe for users. With no seasonal closures to direct users away from potentially dangerous situations during wet weather, there is the potential for users to get stuck and be unable to get out. OHV users would continue to use all roads (NFTS and unauthorized) and the potential for accidents would exist on roads that are also used at higher speeds by highway vehicles. Law enforcement would continue to have a difficult time with enforcement and being able to keep track of where the public travels in motorized vehicles.

Cumulative Effects

Unauthorized routes would continue to be created and would continue to create potentially unsafe situations. Rutting would continue and on unauthorized routes would never be repaired because they are not part of the NFTS.

Alternative 2

Direct and Indirect Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited. This would eliminate the use by the public of routes that have not been constructed and maintained to FS standards. Seasonal closures would prevent use of wet roads, which are potentially dangerous. This would lessen the chance that users would get stuck. OHV use would be limited to level 2 roads and to selected Level 3 roads where mixed-use analysis has been conducted. This may lessen the possibility of accidents between OHVs and highway vehicles. An MVUM will be available for use by the public and will make law enforcement for officers easier. Signs will be on all roads that are on the MVUM.

Cumulative Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited. Over time the unauthorized routes would revegetate. Rutting would be reduced on existing roads with seasonal closures. Signing the roads may reduce the number of people getting lost on the Forest.

Alternative 3

Direct and Indirect Effects

Because cross-country travel, which includes the use of unauthorized routes, would be prohibited, there would no longer be a safety issue resulting from their use. With no seasonal closures to direct users away from potentially dangerous situations during wet weather, there is the potential for users to get stuck and be unable to get out. OHV users would only use level 2 roads and the potential of accidents would be reduced because these roads are generally not used by vehicles traveling at high speeds. Law enforcement would only have to monitor use on the existing NFTS and the MVUM would make enforcement less difficult. Signs will be in place on all roads on the MVUM.

Cumulative Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited.. Over time the unauthorized routes would revegetate. Rutting would continue on existing roads because there would be no seasonal closures. This may result in a dangerous driving situation. Signing the roads may reduce the number of people getting lost on the Forest.

Alternative 4

Direct and Indirect Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited. This would eliminate the use by the public of routes that have not been constructed and maintained to FS standards. Seasonal closures would prohibit use during wet weather on roads where it is considered potentially dangerous to use. This would lessen the potential for users getting stuck. OHV use would be limited to level 2 roads which are generally not used by highway vehicles traveling at high speeds. Signs would be in place on all roads on the MVUM.

Cumulative Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited.. Over time the unauthorized routes would revegetate. Rutting would be reduced on existing roads with seasonal closures. Signing the roads may reduce the number of people getting lost on the Forest.

Alternative 5

Direct and Indirect Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited.. This would eliminate the use by the public of routes that have not been constructed and maintained to FS standards. Seasonal closures would prevent use of wet roads, which are potentially dangerous. This would lessen users getting stuck. OHV use would be expanded to include all Level 3 roads, which may increase the possibility for accidents between highway vehicles and OHVs. Signs would be in place on all roads on the MVUM.

Cumulative Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited.. Over time the unauthorized routes would revegetate. Rutting would be reduced on existing roads with seasonal closures. Signing the roads may reduce the number of people getting lost on the Forest.

Table 3-4. Miles Of Roads Available for Mixed use, by Alternative

Public Safety Measurement Indicator (Miles)	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Passenger car roads reduced to high-clearance road	0	0	0	0	0
High-clearance roads improved to passenger car roads	0	0	0	0	0
Roads changed to trails	0	0	0	0	0
Unauthorized routes added as roads (miles)	0	336	0	286	336
Unauthorized routes added as trails	0	0	0	0	0
MMU, high-clearance roads, high-severity crash	0	0	0	0	0
MMU, high-clearance roads, high probability of crash	0	0	0	0	0
MMU, passenger car roads, high-severity crash	0	0	0	0	0
MMU, passenger car roads, high probability of crash	0	0	0	0	0
MMU, consistent with CVC	3,764	4,103	3,764	4,050	4,103
MMU, may not be consistent with CVC	0	138	0	0	530

Affordability

Annual maintenance costs for unauthorized routes proposed to be added to the transportation system would be similar to the maintenance level 1 roads in table 3-4, above. These roads are roughly graded roads that would not require surface maintenance or brush removal. Annual maintenance consists of conducting a condition survey every 5 years, and installing a route marker every 10 years. Any other maintenance needs identified while conducting condition surveys or from other sources would be prioritized and dealt with the same as any maintenance needs on the existing transportation system. Implementation costs for proposed changes to the NFTS would be installing a sign on each road segment. Carsonite posts with a vertical number would be used. These cost about $50 each installed. Alternatives 1 and 3 do not propose adding

any roads, so the implementation cost would be zero. Alternatives 2 and 5 propose adding 1,168 roads, the signs would cost $58,400. Alternative 4 proposes adding 1,022 roads, the signs would cost $51,100.

Additional implementation costs for all alternatives would be installing route markers where they do not currently exist. The NFTS currently has 4,055 maintenance level 1& 2 roads. Approximately 50 percent of these are missing a route marker. Approximately 2,023 vertical route markers are needed. This would cost approximately $101,150. The NFTS currently has 216 maintenance level 3, 4 & 5 roads. Approximately 50 percent of these are missing a route marker. Approximately 108 horizontal route markers would be needed. These need to be a post with a horizontal sign attached. These signs cost approximately $75 installed, for a total of $8,100.

The table below displays the NFTS and estimated costs for each alternative. The total cost shown at the bottom of the table includes the estimated annual maintenance costs from appendix D for roads and trails, as well as implementation costs described previously.

Table 3-5. Miles of NFTS Roads and Estimated Annual Maintenance Costs, by Alternative

Affordability ($ x 1000)	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
NFTS roads (miles)	4,579	4,918	4,579	4,865	4,918
2A. Annual road maintenance	$1,130,550	$1,155,975	$1,130,550	$1,152,000	$1,155,975
2B. Implementation costs					
High-clearance roads improved to passenger car road	$0	$0	$0	$0	$0
Passenger car roads reduced to high clearance road	$0	$0	$0	$0	$0
Roads converted to motorized trails	$0	$0	$0	$0	$0
Trails converted to roads	$0	$0	$0	$0	$0
Roads removed from the NFTS	$0	$0	$0	$0	$0
Trails removed from the NFTS	$0	$0	$0	$0	$0
Cost of implementing MVUM	$109,250	$160,950	$109,250	$147,650	$160,950
Total estimated cost for alternative	**$1,239,800**	**$1,316,925**	**$1,239,800**	**$1,299,650**	**$1,316,925**

Alternative 1

Direct and Indirect Effects

Because cross-country travel would not be prohibited, unauthorized routes may continue to be created. With no seasonal closures to direct users away from roads during wet weather, there is the potential for users to get stuck and cause rutting. OHV users would continue to use all roads (NFTS and unauthorized), and the potential of accidents would exist on roads that are also used at higher speeds by highway vehicles. Law enforcement would continue to have a difficult time with enforcement and being able to keep track of where the public travels in motor vehicles.

Cumulative Effects

Unauthorized routes would continue to be created. Rutting would continue and on unauthorized routes would never be repaired because they are not part of the NFTS. Rutting on existing roads would continue, and the cost for maintenance could rise because of this. No signs would be put in place. Degradation on existing system roads would continue and budgets would most likely remain flat, which would prevent repair when needed in some cases. This could result in the conversion of roads from maintenance level 3 to a level 2, which require less maintenance. Appropriated funding would continue to be received at close to the current rate, along with cooperative funding from timber operators, Resource Advisory Committee, Legacy road funding and others.

Alternative 2

Direct and Indirect Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited. This would eliminate use by the public of routes that have not been constructed and maintained to FS standards. The addition of 336 miles of unauthorized routes to the NFTS would require some maintenance. The potential expense of this maintenance is considered to be insignificant. Signing of both existing and proposed roads would add an additional cost. Seasonal closures would prohibit use during wet weather on roads where the likelihood of rutting is high. This would reduce rutting, which would in turn reduce maintenance costs. OHV use would be limited to level 2 roads and to selected level 3 roads where mixed use analysis has been conducted. OHV use on these roads is not expected to have any additional cost.

Cumulative Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited. Over time the unauthorized routes would revegetate. Rutting would be reduced on existing roads with seasonal closures. Maintenance costs may be reduced because of less rutting. The cost of signing roads would be higher initially and be reduced over time when signs are only replaced on an “as needed” basis. Appropriated funding would continue to be received at close to the current rate, along with cooperative funding from timber operators, Resource Advisory Committee, Legacy road funding and others.

Alternative 3

Direct and Indirect Effects

Because Cross-country travel, which includes the use of unauthorized routes, would be prohibited, there would no longer be use on any of the unauthorized routes. None of the unauthorized routes would be added to the NFTS so there would be no additional maintenance costs. With no seasonal closures to direct users away from roads affected by wet weather, there is the potential for rutting on existing NFTS roads, which would in turn require additional maintenance. OHV users would only use level 2 roads and there would be no effect from this vehicle use. Signing of all roads will be required once an MVUM is activated.

Cumulative Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited. Over time the unauthorized routes would revegetate. Rutting would continue on existing roads because there would be no seasonal closures. This may result in increased maintenance costs. If budgets decrease or remain flat, system roads would continue to degrade, and level 3 roads may have to be converted to level 2s. The cost of signing roads would be higher initially and be reduced over

time when signs are only replaced on an "as needed" basis. Appropriated funding would continue to be received at close to the current rate, along with cooperative funding from timber operators, Resource Advisory Committee, Legacy road funding and others.

Alternative 4

Direct and Indirect Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited. This would eliminate the use by the public of routes that have not been constructed and maintained to FS standards. The addition of 286 miles of unauthorized routes to the NFTS would require some maintenance. The potential expense of this maintenance is considered to be insignificant. Seasonal closures would prohibit use during wet weather on roads where the likelihood of rutting is high. This would reduce rutting, which would in turn reduce maintenance costs. Signs will be required on all roads on the MVUM is activated. This alternative has the highest number of miles of seasonal closures. OHV use would be limited to level 2 roads; OHV use on these roads is not expected to have any additional cost.

Cumulative Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited. Over time the unauthorized routes would revegetate. Rutting would be reduced on existing roads with seasonal closures. The cost of signing roads would be higher initially and be reduced over time when signs are only replaced on an "as needed" basis. Appropriated funding would continue to be received at close to the current rate, along with cooperative funding from timber operators, Resource Advisory Committee, Legacy road funding and others.

Alternative 5

Direct and Indirect Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited. This would eliminate the use by the public of routes that have not been constructed and maintained to FS standards. The addition of 336 miles of unauthorized routes to the NFTS would require some maintenance. The potential expense of this maintenance is considered to be insignificant. Seasonal closures would prohibit use during wet weather on roads where the likelihood of rutting is high. This would reduce rutting which would in turn reduce maintenance costs. OHV use would be expanded to include all Level 3 roads where mixed use analysis has been conducted. OHV use on these roads is not expected to have any additional cost.

Cumulative Effects

Cross-country travel, which includes the use of unauthorized routes, would be prohibited. Over time the unauthorized routes would revegetate. Rutting would be reduced on existing roads with seasonal closures. The cost of signing roads would be higher initially and be reduced over time when signs are only replaced on an "as needed" basis. Appropriated funding would continue to be received at close to the current rate, along with cooperative funding from timber operators, Resource Advisory Committee, Legacy road funding and others.

Compliance with the Forest Plan and Other Regulatory Direction

All alternatives are consistent with the Modoc LRMP.

Alternatives 2 and 5 may not be consistent with the California Vehicle Code. However, they are consistent with the Travel Management Rule 36 CFR 212.

Alternative 1 (No Action) would not address the issue of mixed use on maintenance level 3, 4 & 5 roads. Mixed use is currently occurring on these roads. Alternative 1 is not consistent with the Travel Management Rule 36 CFR 212.

The LRMP calls for providing a broad spectrum of recreational opportunities (Modoc NF LRMP, Standards and Guidelines, section 4-1 to 4-3 (Facilities)).

The applicable standards and guidelines from the Forest Plan for managing the Forest transportation system are listed below.

1. Provide and manage a Forest transportation system to achieve resource management objectives while protecting resource values.
    a. Plan, design, and construct local roads to the lowest standard commensurate with intended use.
    b. Maintain all Forest roads to their objective maintenance levels.
    c. Provide for signing in accordance with the road management objectives and the MUTCD (Manual on Uniform Traffic Control Devices) standards.
2. Manage and maintain the transportation system to protect soil, water, and all other resource values. Close local roads as needed to meet these objectives. Develop road closure and OHV plans.

Society, Culture, and Economy

Introduction

The Modoc National Forest is located in portions of three northern California counties: Modoc, Lassen and Siskiyou. Table 1 reports the total county size in acres and the proportion of land base in the Modoc National Forest. Additionally, since the Modoc National Forest is bordered by Oregon to the north, two Oregon counties have important interactions with the Forest both socially and economically. Cities and towns in Lake and Klamath Counties serve as bedroom communities for people working and recreating on the Modoc National Forest, and also provide important shopping outlets for residents nearby the Forest to purchase goods and services. In addition, several Forest products harvested on the national Forest are processed by facilities located in those Oregon counties. Thus, both Lake and Klamath counties are included in the Modoc National Forest Study Area and can be included in the Modoc National Forest region area. (Wilson Draft, 2008).

Table 3-6. Acres of Modoc National Forest Lands, by County

County	Total Acres [1]	Modoc NF Acres [2]	Percent of County
Modoc	2,689,920	1,378,994	83%
Lassen	3,020,800	156,375	9%
Siskiyou	4,062,080	128,032	8%

[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 relation to some of the more metropolitan counties in California, the counties in the Modoc Study Area are 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. The three California counties (Modoc, Lassen, and Siskiyou) are very different in terms of proximity to the Forest, demographics, economic base and tax structure than the Oregon counties (Lake and Klamath). Nonetheless, the Oregon counties provide important services for residents of the local area and resource production on the Forest (Wilson Draft, 2008).

Population and Demographics

Historical Background

People have lived in the Modoc National Forest (MDF) region for thousands of years. (See Cultural Resources, Chapter 3)

Today people in the MDF Region derive their livelihood in diverse ways. Ranching is still an important component of the community, and many of the families that are ranching today have historic roots in the area. Many of the American Indian families are also descended from historic families. The Forest currently has active logging, mining and recreation use. Exploration is occurring for geothermal, wind and hydroelectric resources. Permits are also issued for grazing, firewood cutting and other special uses.

Current Population and Growth Trends

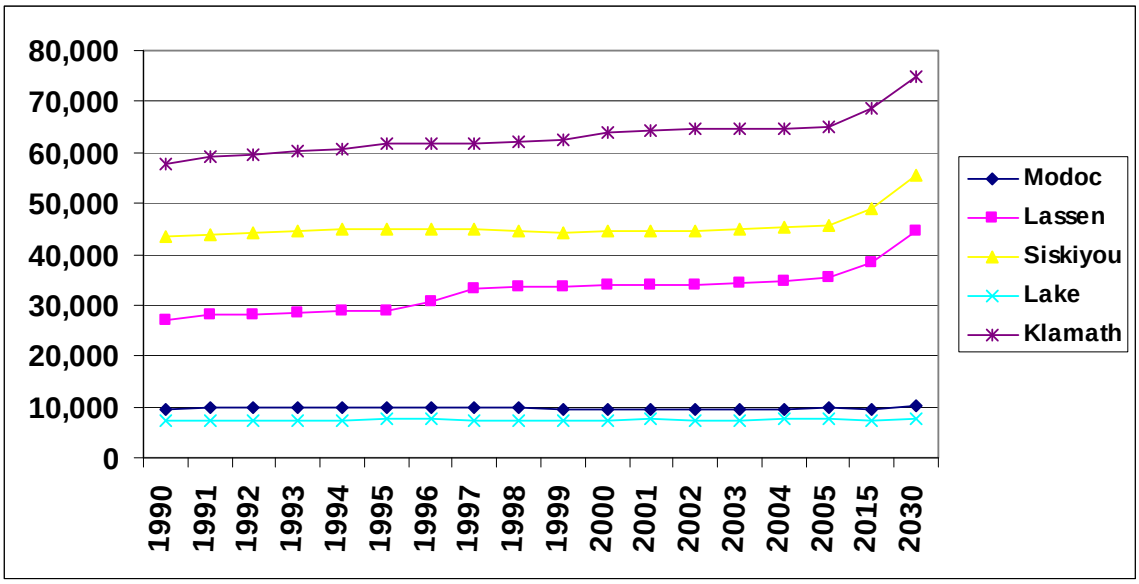
Population, age and racial distributions of counties are important socioeconomic considerations in land management planning. The following sections highlight demographic trends in the five-county study area. Population forecasts provide a projection of future population levels, which may help to indicate whether there may be the potential for increased pressures for uses and recreational opportunities on the Modoc National Forest. Age distributions provide insights into the socioeconomic dynamic in the local area in terms of assessing 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 the local area may affect the cultural and heritage uses of public lands (Wilson Draft, 2008).

Population

The following section highlights trends and considerations of the five counties surrounding the Modoc National Forest. Population projections predict what the population levels may be in the future. These numbers help to indicate whether there is the potential for increased pressures for uses and recreational opportunities on the national Forests. Future population demands may increase the desire for different travel management patterns dependent upon desired uses, recreational opportunities and values (Cordell and Overdevest, 2001). Population increases may lead to conflicts over Forest uses, travel management, recreation activities and values; these are conflicts that Forest Service managers may have to contend with and attempt to balance in land management decisions (Wilson Draft, 2008).

Figure 3-1 reports the population in the five-county area from 1990 to 2005, along with projections out to 2030. In recent years populations have remained relatively stable; Modoc and Lake Counties have experienced minimal population growth, while Klamath, Siskiyou and Lassen Counties have had slow, but steady, growth since 1990. There have been no sharp increases or decreases in population to suggest significant changes in the economic or social structure of the counties. Growth rates in each county are very slow; and Modoc, Lassen, and Lake Counties all experienced negative growth during some of the years. (Wilson Draft, 2008)

Figure 3-1. Population Estimates [1] and Projections [2] for Modoc National Forest Study Area Counties



[1] Population estimates for California counties provided by the Center for Economic Development, CSU Chico. Population estimates for Oregon counties provided by the Oregon Employment Department.

[2] Population forecasts for California counties provided by the Center for Economic Development, CSU Chico. Population forecasts for Oregon counties provided by the Oregon Office of Economic Analysis.

Some rural areas in California and Oregon have seen substantial population growth in recent years due to the attraction of nearby natural amenities. 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 Modoc National Forest, nearby counties have been experiencing slow growth. This is likely due to the remoteness of the area and immense distance from metropolitan centers. Furthermore, retirees often demand medical services not readily available in Modoc County, which may be a cause of the slower population growth in that County (Wilson Draft, 2008).

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 participate in different natural resource-based activities. The median age in each county of this region is higher than the median age for their respective states (Table 3-7). This suggests that residents in the Modoc National Forest study area are older than residents in more metropolitan areas of California and Oregon. This is likely due to there not being adequate job opportunities in the area to draw a younger demographic. (Wilson Draft, 2008).

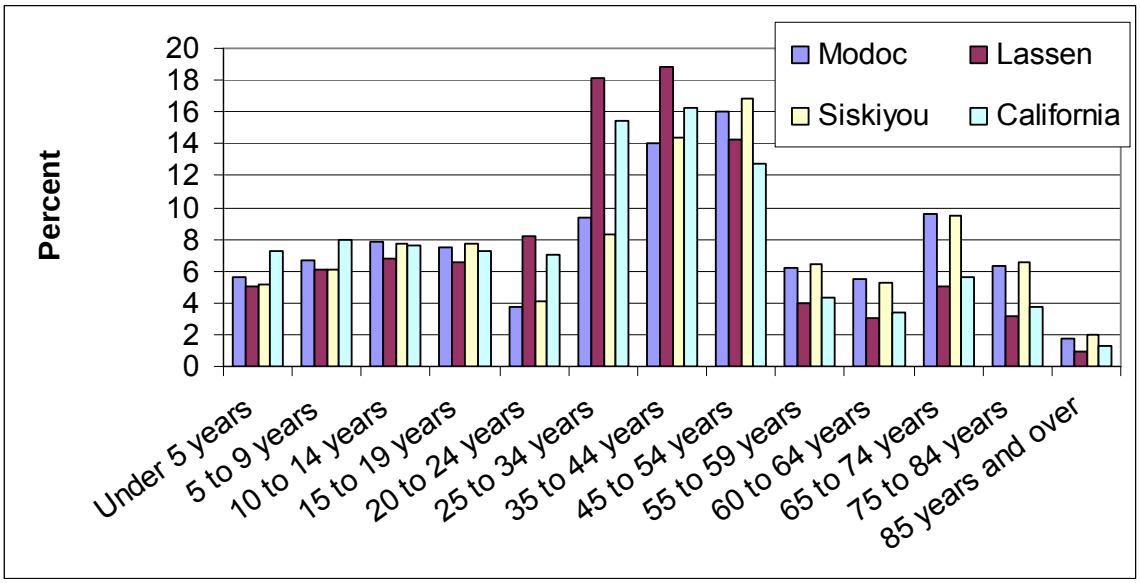
Table 3-7. Median Age by State and County

State of California	**33.3**
Modoc County	41.8
Lassen County	34.6
Siskiyou County	43.0
State of Oregon	**36.3**
Lake County	42.7
Klamath County	38.2

Source: US Census 2000

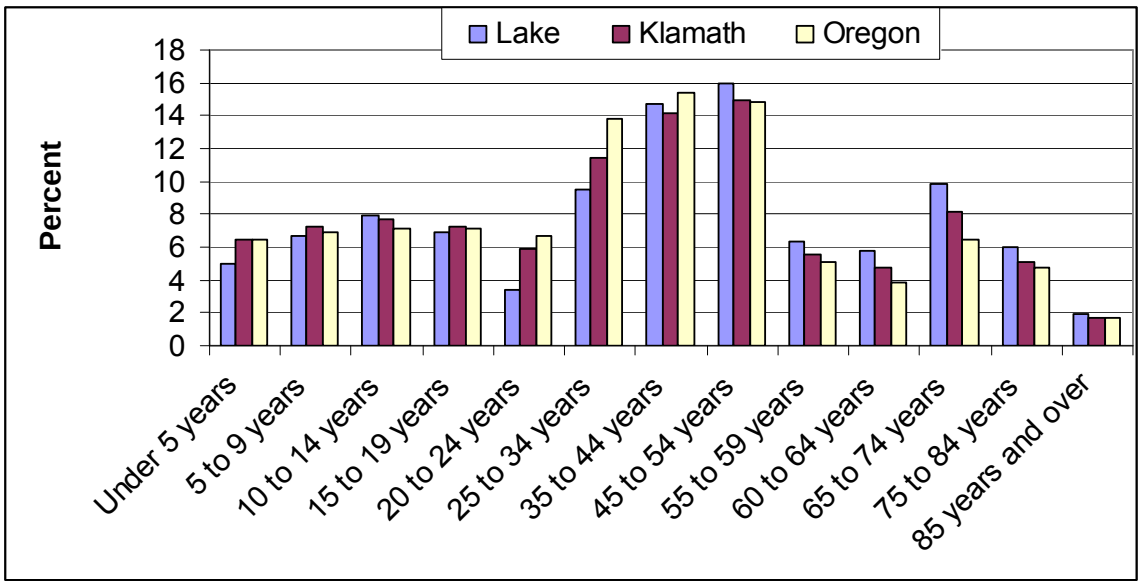
In terms of the distribution of age groups, all counties in the Modoc National Forest study area are predominantly middle aged. Figures 3-2 and 3-3 report the age distribution for California and Oregon Counties respectively. In all counties there is a slight decline in the percentage of residents in the 15- to 19-year old age group and the 20- to 24-year old age group. This is likely due to the lack of higher education facilities in the immediate vicinity of the Modoc National Forest, and lack of employment opportunities for laborers in that age group. Most individuals in each county lie within the 25- to 54-year old age group; suggesting that the majority of residents in the study area are of working age and likely dependent on their employment status to 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. Modoc and Siskiyou Counties in California, and Lake County, Oregon have a substantial proportion of individuals over the age of 65, more so than the states as a whole. (Wilson Draft, 2008)

Figure 3-2. Age Distribution inin California, by County



Source: US Census 2000

Figure 3-3. Age Distribution in Oregon, by County



Source: US Census 2000

Ethnicity

Table 3-5 reports the racial distribution for the five-county analysis area. The vast majority (86 percent) of residents around the Modoc National Forest are Caucasian. This is a very different ethnic composition than the state average for both California and Oregon. Table 3-8 reports the racial percentages for the five counties in the analysis area and their respective states. California is a more ethnically diverse state than Oregon. Oregon's population is nearly 87 percent

Caucasian, where California is just under 60 percent. Over 34 percent of California's population comes from a Hispanic origin versus 8 percent in Oregon. At the county level, all counties have a higher percentage of Caucasian residents than their respective states. Of the five counties, Lassen is the most ethnically diverse with nearly 20 percent of the population being something other than Caucasian. The Modoc National Forest region has had large American Indian population. In the five county area, American Indians and Pacific Islanders make up 3.8 percent of the total population. At the individual county level, Modoc and Klamath counties have the highest proportions of American Indians, both at 4.2 percent (Wilson Draft, 2008).

Table 3-8. Racial Percentages of Total Population by County and State, Census 2000

	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	59.5	6.7	1	11.2	16.8	32.4
Modoc	9,449	85.9	0.7	4.2	0.7	5.7	11.5
Lassen	33,828	80.8	8.8	3.3	1.1	3.2	13.8
Siskiyou	44,301	87.1	1.3	3.9	1.3	2.8	7.6
Oregon	3,421,399	86.6	1.6	1.3	3.2	4.2	8
Lake	7,422	91	0.1	2.4	0.8	3.2	5.4
Klamath	63,775	87.3	0.6	4.2	0.9	3.4	7.8

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 distr bution in an area often results in a sum of greater than 100%; this is the case in Table 4

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 American Indian 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 rights to hunt and fish; rights to gather traditional plants, mushrooms, and lichens; and rights to water.

Federal policy for tribes emphasizes self-determination and government-to-government relationships. Table 3-9 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 trust responsibility of the Federal Government, among others (Getches et al. 1998).

Table 3-9. 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 tr bes.
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 Draft Environmental Impact Statement (DEIS), their influence is most pronounced at the local level. There are six Indian tribes and communities residing in or near the Modoc National Forest. Indian people make up approximately 3.8 percent of the total population within the Modoc National Forest region. This is high compared to the statewide average, which is .5 percent. The Forest Service consults with Federally recognized tribes, non-recognized tribes, organizations, and individuals to comply with the laws displayed in Table 3-9.

American Indians and the Modoc National Forest

The six Federally recognized tribes of concern for this analysis area are as follows (the tribes of origin for each separate entity are stated in parentheses):

1. Alturas Indian Rancheria, California (Pit River)
2. Cedarville Rancheria, California (Northern Paiute)
3. Fort Bidwell Indian Community, California (Northern Paiute)
4. Susanville Indian Rancheria, California (Pit River)
5. Pit River Tribe, California
6. Klamath Tribes, Oregon (Klamath, Modoc and Yahooskin)

There are also two unrecognized tribes in the area: (1) the Shasta Tribe and (2) the Confederate Bands of Shasta and Upper Klamath River Indians (Skye, 2008). The American Indian Indians living in or around the Modoc National Forest live throughout the five county area and have a significant ongoing interest in the management of the Forest.

Special Lands and Associated Activities

Contemporary American Indian uses of the Forest include cultural and spiritual events, food gathering, collection of medicinal plants, and the collection of basketry materials (http://www.fs.fed.us/r5/modoc /about/modoc-history). Several places on the Forest serve as traditional cultural properties; seven of which are listed the National Register of Historic Places (NRHP). Many more may be considered for listing in the future. Additionally, there are several

species of plants on the Forest that have been identified as culturally significant by local American Indian groups (Skye, 2008).

Often, important places to local American Indians are those that supply native foods or provide a spiritual connection to the land. Harvesting of native foods is very important to local tribes. Modoc National Forest lands provide wild plums, berries, bulbs, and many other foods sources vital to their diet. Traditional food sources serve to regulate health conditions of many American Indians (Martinez, 2008). For example, a diet of traditional food sources is believed to aid in the regulation of blood pressure. As American Indians have been forced to get away from traditional foods, negative health effects have been encountered; diabetes is one chronic condition affecting many American Indians forced away from traditional foods (Martinez, 2008). Thus, the availability of Federal lands for food harvesting is an important issue to tribes in the Modoc National Forest study area.

Local tribes may use Modoc National Forest lands for a variety of activities. Certain sites on the Forest serve as a social gathering place for tribal communities, allowing them opportunities for spiritual rejuvenation, hunting, fishing, harvesting a variety of wild crops, food processing, construction and trade of arts and crafts, education, and preservation of family ties (Allison, 1994). Allison (1994) concludes that access to areas that provide different cultural and economic functions are "fundamental to the integrity of the social system and to continuity of cultural values." The Modoc National Forest may serve as an outlet for such activities, helping local tribes to maintain social and cultural bonds (Wilson Draft, 2008).

Importance of National Forest Lands and Resources to American Indian People

American Indians have a spiritual connection to the environment and native landscapes. Maintaining this type of relationship with the lands managed by the Modoc National Forest is important to local tribes for passing along knowledge to future generations.

Familiar landscapes can be both cultural and natural to tribes in the Modoc study area, and may serve a symbolic cultural function (Allison, 1994). Such cultural functions may be influenced by the management of the Modoc National Forest. Areas of "major cultural importance" exist in Klamath, Lake and Modoc Counties (Allison, 1994). Maintaining access to such places is important for many local American Indians. Changes to the natural landscape may affect access as well as the occurrence of traditional activities with which local tribes may identify themselves. (Wilson Draft, 2008).

The Pit River Tribal Council was advised by the Modoc National Forest about the Travel Management Guidelines during a scheduled consultation held on Wednesday, 3 September 2008. [1] Irvin Brown, Tribal Councilman-*Kosealekte* Alternate, stated during the meeting that the plan was acceptable provided that road closures not impede tribal members from accessing sacred sites or traditional cultural properties. [2]

Environmental Consequences for American Indian Population

Tribes are likely to continue to use Forest resources for cultural, spiritual and medicinal purposes; and local American Indians consider it very important to be able to maintain the ability to make use of Forest resources in traditional ways. Please see the Environmental Justice piece in this section for further elaboration of effects on American Indian Populations. Also appendix O.

[1] Modoc National Forest, Tribal Relations Program, "Government-to-Government Consultation Standard Form" [Wednesday, 3 September 2008].
[2] Ibid.

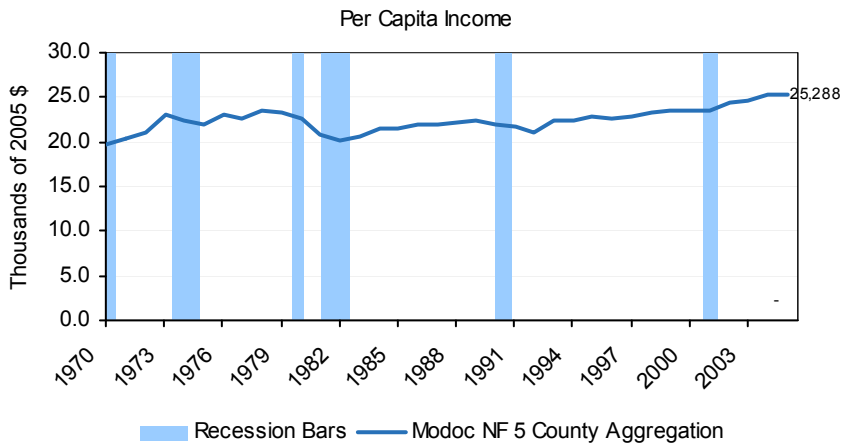
Employment and Income: Environmental Consequences

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 3-4. Per Capita Income for the Modoc Five-County Area



Per capita income, adjusted for inflation, has risen from $19,752 in 1970 to $25,288 in 2005.In 2005, per capita income in Modoc NF Five-county Aggregation ($25,288) was lower than the state ($36,511) and the nation ($34,471).

All three of the California counties fall below the poverty line, and Modoc County ranks in the top five most impoverished counties, as measured by individuals below the poverty line.

Table 3-10 reports the number of individuals below the poverty level and poverty rates for the five counties in the study area and their respective states in 2000 and 2005. All counties have poverty rates higher than that of the states. Poverty rates in all counties except Lassen increased from 2000 to 2005. As of 2005, Modoc and Klamath counties have the highest poverty rates in the local region at just over 20 percent. Such poverty rates suggest that a substantial proportion of the existing population should be considered as a low-income group.

Table 3-10. Poverty Status by State and County, 2000 and 2005

State or County	2005		2000	
	Number	Percent	Number	Percent
California	4,669,056	13.3%	4,304,909	12.7%
Modoc County	1,853	20.4%	1,772	19.7%
Lassen County	4,280	16.9%	4,312	17.5%
Siskiyou County	7,771	17.5%	7,235	16.7%
Oregon	497,318	14.1%	361,280	10.6%

State or County	2005		2000	
Lake County	1,305	18.1%	1,134	15.2%
Klamath County	13,062	20.3%	9,072	14.3%

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 Modoc National Forest participated in the National Visitor Use Monitoring (NVUM) project from October 2004 through September 2005. There were approximately 107,960 national Forest visits on Modoc National Forest during fiscal year 2005. The full Modoc National Forest NVUM report is available from the Natural Resource Information System (NRIS) Human Dimensions Module and can be found in the project record.

Table 3-11 presents participation rates by activity for the Modoc 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 3-11. Activity Participation on Modoc National Forest (NVUM FY2005 data)

Activity	Activity Emphasis for Road & Trail Use	Total Activity Participation (%) *	Percent as Main Activity (%) **
Snowmobiling	Motorized	1.3%	0.2%
Driving for Pleasure	Motorized	41.5%	17.9%
OHV Use	Motorized	16.9%	0.8%
Other Motorized Activity	Motorized	0.0%	0.0%
		Motorized Subtotal	**18.86%**
Hiking and Walking	Non-motorized	20.3%	2.0%
Bicycling	Non-motorized	1.1%	0.0%
Other Non-motorized	Non-motorized	3.2%	0.2%
Cross-country Skiing	Non-motorized	0.6%	0.4%

Activity	Activity Emphasis for Road & Trail Use	Total Activity Participation (%) *	Percent as Main Activity (%) **
Backpacking	Non-motorized	2.8%	0.6%
Horseback Riding	Non-motorized	0.9%	0.0%
		Non-motorized Subtotal	**3.3%**
Downhill Skiing	Other	0.3%	0.3%
Fishing	Other	47.4%	34.0%
Viewing Natural Features	Other	67.4%	23.1%
Relaxing	Other	57.7%	11.7%
Motorized Water Activities	Other	1.5%	0.0%
Hunting	Other	3.1%	2.6%
Non-motorized Water	Other	2.0%	0.1%
Developed Camping	Other	10.7%	5.5%
Primitive Camping	Other	4.5%	0.2%
Picnicking	Other	24.5%	8.1%
Viewing Wildlife	Other	0.0%	0.0%
Sightseeing	Other	51.0%	5.6%
No Activity Reported	Other	2.5%	3.2%
Resort Use	Other	0.8%	0.6%
Visiting Historic Sites	Other	4.7%	0.9%
Nature Study	Other	3.4%	0.9%
Gathering Forest Products	Other	5.7%	4.1%
Nature Center Activities	Other	3.1%	0.0%
		Other Subtotal	**100.9%**
		Total	**123.0%**

* 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 may total more than 100%.

** The number in this column is the percent of survey respondents who indicated this activity was their main activity.

The primary activity participation rates (Percent as Main Activity) displayed in Table 3-11 were 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 Modoc National Forest are fishing, viewing natural features, driving for pleasure, and relaxing.

Table 3-12 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 3-11 and the total number of visits of 107,960 reported in the Modoc 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 backpacking. The most popular motorized use is driving for pleasure, followed by OHV use. Table 3-12 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 3-12. Number of Visits, by Activity

	Non-local Day Use	Non-local Overnight	Local Day use	Local Overnight	Non-Primary
Non-motorized					
Hiking & Walking	68	132	624	49	40
Bicycling	0	0	0	0	0
Other Non-motorized	8	16	74	6	5
Cross-country Skiing	14	43	91	7	2
Backpacking	0	43	0	67	4
Horseback Riding	0	0	0	0	0
Motorized					
Snowmobiling	6	7	33	5	5
Driving for Pleasure	449	544	6,204	214	721
OHV Use	36	64	166	49	11
Other Motorized Activity	0	0	0	0	0
Other					
Fishing	1,641	3,114	7,105	1,313	568
Hunting	55	242	676	266	34
Viewing Wildlife	0	0	0	0	0
Motorized Water Activities	0	0	0	0	0
Non-motorized Water	349	506	4,653	189	597
Downhill Skiing	17	28	53	8	3
Developed Camping	22	761	32	719	117
Primitive Camping	0	16	0	25	2
Resort Use	There are no NVUM estimates for trip type segment shares for these activities				
Picnicking					
Viewing Natural Features					
Visiting Historic Sites					
Nature Center Activities					
Nature Study					

	Non-local Day Use	Non-local Overnight	Local Day use	Local Overnight	Non-Primary
Relaxing					
Gathering Forest Products					
Sightseeing					
No Activity Reported					
Subtotal	**1,700**	**4,008**	**10,202**	**3,265**	**879**

Table 3-13. Expenditures per visit

	Non-local Day Use	Non-local Overnight	Local Day use	Local Overnight	Non-Primary
Non-motorized					
Hiking/Walking	$17.62	$106.96	$11.11	$39.55	$7.41
Bicycling	17.62	106.96	11.11	39.55	7.41
Other Non-motorized	17.62	106.96	11.11	39.55	7.41
Cross-country Skiing	18.93	119.64	14.78	87.39	13.60
Backpacking	0.00	19.09	0.00	24.10	0.00
Horseback Riding	17.62	106.96	11.11	39.55	7.41
Motorized					
Snowmobiling	49.09	128.80	29.57	68.93	28.33
Driving for Pleasure	17.62	66.54	13.33	42.73	10.00
OHV Use	28.57	64.80	19.00	48.50	14.62
Other Motorized Activity	28.57	64.80	19.00	48.50	14.62
Other					
Fishing	21.00	95.65	20.00	48.00	20.00
Hunting	38.10	116.32	30.00	79.47	25.50
Viewing Wildlife	20.80	82.59	10.80	53.75	10.00
Motorized Water Activities	18.52	70.36	15.00	49.20	12.41
Non-motorized Water	18.52	70.36	15.00	49.20	12.41
Downhill Skiing	36.36	117.93	25.24	89.13	27.89
Developed Camping	0.00	50.36	0.00	41.29	0.00
Primitive Camping	0.00	19.09	0.00	24.10	0.00
Resort Use	18.52	70.36	15.00	49.20	12.41
Picnicking	18.52	70.36	15.00	49.20	12.41
Viewing Natural Features	18.52	70.36	15.00	49.20	12.41
Visiting Historic Sites	18.52	70.36	15.00	49.20	12.41
Nature Center Activities	18.52	70.36	15.00	49.20	12.41
Nature Study	18.52	70.36	15.00	49.20	12.41
Relaxing	18.52	70.36	15.00	49.20	12.41
Gathering Forest Products	18.52	70.36	15.00	49.20	12.41
Sightseeing	18.52	70.36	15.00	49.20	12.41
No Activity Reported	18.52	70.36	15.00	49.20	12.41

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 Modoc National Forest used for this jobs and income analysis was three counties in Northern California and two in Oregon surrounding the Modoc National Forest. The counties included in California are Siskiyou, Lassen, and Modoc. The counties included in Oregon are Klamath and Lake.

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 (wildlife and non-wildlife activities), motorized, non-motorized and other activities for the Modoc 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 day trips and local overnight 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 economic effects are displayed in the following ways:

- Direct, indirect and induced employment, and labor income response coefficients by activity type (jobs and labor income per 1,000 visits); and
- Estimated employment and labor income by motorized and non-motorized activity types.

Response Coefficients by Activity Type

Table 3-10 displays the estimated employment and labor income response coefficients (employment and labor income per 1,000 visits) by local and non-local activity types. The response coefficients indicate the number of full and part-time jobs and dollars of labor income per thousand visits by activity type. The response coefficients are useful in (1) understanding the economic effects tied to a given use level; (2) understanding projected employment effects for

various use scenarios (sensitivity analysis); and 3) understanding the differences in employment effects by activity type. The response coefficients displayed in Table 3 -14 along with the visits presented in Table 3-8 were used to estimate the economic effects for local and non-local use by activity type.

Table 3-14 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 3-9). 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 response coefficients. 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.

Table 3-14. Employment and Labor Income Response Coefficients, by Activity Type

		Employment (Jobs per 1,000 Party-Trips)		Labor Income (2006 dollars) ($ per 1,000 Party-Trips)	
		Direct Effects	Indirect & Induced Effects	Direct Effects	Indirect & Induced Effects
					Non-motorized Use
Hiking & Walking, Bicycling, Horseback Riding, Other Non-motorized	Local Day	0.175	0.057	$4,050	$1,658
	Local OVN	0.755	0.241	15,684	7,372
	Non-Local Day	0.347	0.101	7,831	2,797
	Non-Local OVN	1.598	0.473	33,486	13,970
	NP	0.175	0.057	4,050	1,658
Backpacking	Local Day			0	0
	Local OVN	0.629	0.221	14,578	6,775
	Non-Local Day			0	0
	Non-Local OVN	0.744	0.241	17,226	7,136
	NP	0.629	0.221	14,578	6,775
					Motorized Use
OHV Use	Local Day	0.370	0.121	8,575	3,602
	Local OVN	0.641	0.211	14,347	6,417
	Non-Local Day	0.425	0.139	9,917	4,113
	Non-Local OVN	1.069	0.351	23,907	10,693
	NP	0.370	0.121	8,575	3,602
Driving	Local Day	0.192	0.059	4,411	1,718
	Local OVN	0.842	0.242	16,582	7,287
	Non-Local Day	0.275	0.085	6,323	2,463

		Employment (Jobs per 1,000 Party-Trips)		Labor Income (2006 dollars) ($ per 1,000 Party-Trips)	
		Direct Effects	Indirect & Induced Effects	Direct Effects	Indirect & Induced Effects
	Non-Local OVN	1.403	0.403	$27,638	$12,145
	NP	0.192	0.059	4,411	1,718
Snowmobile	Local Day	0.529	0.173	12,403	5,122
	Local OVN	1.553	0.449	30,386	13,519
	Non-Local Day	0.829	0.264	19,128	7,637
	Non-Local OVN	2.589	0.748	50,644	22,533
	NP	0.529	0.173	12,403	5,122
Cross-Country Ski	Local Day	0.342	0.100	6,755	2,968
	Local OVN	1.638	0.490	32,853	14,907
	Non-Local Day	0.491	0.144	9,686	4,255
	Non-Local OVN	2.729	0.816	54,747	24,845
	NP	0.342	0.100	6,755	2,968
					All Other Use
All Other Activities*	Local Day	0.280	0.098	7,643	2,668
	Local OVN	0.852	0.326	25,501	8,942
	Non-Local Day	0.465	0.149	11,329	4,105
	Non-Local OVN	1.390	0.493	38,997	13,416
	NP	0.280	0.098	7,643	2,668

*All Other Activities includes Developed Camping, Primitive Camping, Resort Use, Picnicking, Viewing Natural Features, Visiting Historic Sites, Nature Center Activities, Nature Study, Relaxing, Fishing, Hunting, Motorized Water Activities, Non-motorized Water, Downhill Skiing, Gathering Forest Products, Viewing Wildlife, Sightseeing, and No Activity Reported.

Motorized and Non-motorized Use

Table 3-15 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 3-15 expresses these employment and labor income effects as a percent of 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 3 -15 indicates that approximately one total average annual jobs in the five-county area (direct, indirect and induced, full-time, temporary, and part-time) and $21,019 total labor income (direct, indirect and induced) are attributable to non-motorized visitation on the Modoc National Forest. The two largest activities among those in the table are hiking and walking and cross-country skiing, together these account for about 1.8 percent of the jobs and 1.5 percent of the income generated from the activities analyzed. These activities account for about one job and provided $17,025 in labor income to the five county area.

Motorized activities were responsible for approximately three total jobs (direct, indirect and induced) and $78,608 total labor income (direct, indirect and induced). The two largest motorized uses are OHV Use and driving for pleasure. These two activities contribute about 8.3 percent of

the jobs from the activities in the table, and provide about 6.2 percent of the labor income. Together these two activities contribute three jobs and provide about $77,118 in labor income to the area.

"All Other Activities" (see Table 3-7 for a list) are significant economic contributors for the activities studied. They provide 34 jobs, or 89 percent of the jobs from the activities analyzed. Labor income is about $252,838, or 90 percent of the income generated by these activities.

Table 3-15 shows that about 2 percent of the jobs provided from these activities are from non-motorized use, 9 percent from motorized use and 90 percent from "Other Activities." The contributions to labor income are 2 percent non-motorized use, 7 percent motorized use and 90 percent from "Other Activities."

Table 3-15. Employment and Labor Income Effects by Activity Type

	Employment (full- & part-time jobs)		Labor Income (2008 dollars)	
	Direct	Indirect & Induced	Direct	Indirect & Induced
				Non-Motorized Use
Backpacking - Local	<0.1	<0.1	$1,004	$467
Non-local	<0.1	<0.1	776	321
Hiking and Walking - Local	<0.1	<0.1	3,403	1,441
Non-local	<0.1	<0.1	5,115	2,101
Horseback Riding - Local	<0.1	<0.1	<0.1	<0.1
Non-local	<0.1	<0.1	<0.1	<0.1
Bicycling - Local	<0.1	<0.1	<0.1	<0.1
Non-local	<0.1	<0.1	<0.1	<0.1
Cross-country Skiing - Local	<0.1	<0.1	862	382
Non-local	<0.1	<0.1	2,561	160
Other Non-motorized - Local	<0.1	<0.1	402	170
Non-local	<0.1	<0.1	605	248
Total Non-motorized	**1**	**<0.1**	**$14,729**	**$6,291**
Subtotal		**1**		**$21,019**
	Employment (full- & part-time jobs)		**Labor Income (2008 dollars)**	
	Direct	**Indirect & Induced**	**Direct**	**Indirect & Induced**
				Motorized Use
OHV Use - Local	0.1	<0.1	$2,197.9	$943
Non-local	0.1	<0.1	1,951.4	861
Driving for Pleasure - Local	1.4	0.4	32,006	12,653
Non-local	0.9	0.3	18,516	7,990
Snowmobiling - Local	<0.1	<0.1	567	239
Non-local	<0.1	<0.1	477	207
Other Motorized Activity - Local	<0.1	<0.1	0	0

	Employment (full- & part-time jobs)		Labor Income (2008 dollars)	
	Direct	Indirect & Induced	Direct	Indirect & Induced
Non-local	<0.1	<0.1	0	0
Total Motorized	**2**	**1**	**$55,716**	**$22,893**
Subtotal		**3**		**$78,608**
	Employment (full- & part-time jobs)		**Labor Income (2008 dollars)**	
	Direct	**Indirect & Induced**	**Direct**	**Indirect & Induced**
				All Other Use
All Other Activities - Local	11	4.10	$332,448	$116,280
Non-local	14	5	394,580	136,559
Total Other	**25**	**9**	**$727,028**	**$252,839**
Subtotal		**34**		**$979,866**
Grand Total	**28**	**10**	**$797,472**	**$282,022**
Grand subtotal		**38**		**$1,079,494**

Table 3-16. Percent of Total Employment and Labor Income Effects, by Activity Type

	Employment (% of full- & part-time jobs)		Labor Income (2008 dollars) (% of Total Income)	
	Direct	Indirect & Induced	Direct	Indirect & Induced
		Non-Motorized Use		
Backpacking - Local	0.1%	0.0%	0.1%	0.0%
Non-local	0.1%	0.0%	0.1%	0.0%
Hiking and Walking - Local	0.4%	0.1%	0.3%	0.1%
Non-local	0.6%	0.2%	0.5%	0.2%
Horseback Riding - Local	0.0%	0.0%	0.0%	0.0%
Non-local	0.0%	0.0%	0.0%	0.0%
Bicycling - Local	0.0%	0.0%	0.0%	0.0%
Non-local	0.0%	0.0%	0.0%	0.0%
Cross-country Skiing - Local	0.1%	0.0%	0.1%	0.0%
Non-local	0.3%	0.1%	0.2%	0.1%
Other Non-motorized - Local	0.0%	0.0%	0.0%	0.0%
Non-local	0.1%	0.0%	0.1%	0.0%
Total Non-motorized	1.7%	0.5%	1.4%	0.6%

	Employment (% of full & part-time jobs)		Labor Income (2008 dollars) % of Total Income	
	Direct	*Indirect & Induced*	*Direct*	*Indirect & Induced*
Motorized Use				
OHV Use - Local	0.2%	0.1%	0.2%	0.1%
Non-local	0.2%	0.1%	0.2%	0.1%
Driving for Pleasure - Local	3.6%	1.1%	3.0%	1.2%
Non-local	2.3%	0.7%	1.7%	0.7%
Snowmobiling - Local	0.1%	0.0%	0.1%	0.0%
Non-local	0.1%	0.0%	0.0%	0.0%
Other Motorized Activity - Local	0.0%	0.0%	0.0%	0.0%
Non-local	0.0%	0.0%	0.0%	0.0%
Total Motorized	6.5%	2.0%	5.2%	2.1%
	Employment (% of full- & part-time jobs)		**Labor Income (2008 dollars) % of Total Income**	
All Other Use				
All Other Activities - Local	29.6%	10.8%	30.8%	10.8%
Non-local	36.2%	12.7%	36.6%	12.7%
Total Other	65.8%	23.4%	67.3%	23.4%
Totals	74.1%	25.9%	73.9%	26.1%
	100.0%		100.0%	

Table 3-17. Total Employment and Labor Income Effects

		Employment Effects	Labor Income
		(Full- and part-time jobs)	(2008 dollars)
Total Non-Motorized Use	Local	0.2	$2,460.00
	Non-Local	0.4	3,830.80
Total Motorized Use	Local	1.5	13,834.80
	Non-Local	1.0	9,057.80
Total All Other Use	Local	11.3	116,279.80
	Non-Local	13.8	136,558.70
Total	Local	13.0	132,574.60
	Non-Local	15.2	149,447.30
	Total for Area	**28.3**	**$282,021.90**

Table 3-18. Percent of Total Area Employment and Total Area Labor Income Effects

		Employment Effects	Labor Income
		(full- and part- time jobs)	(2008 dollars)
Total Non-Motorized Use	Local	0.000%	0.000%
	Non-Local	0.001%	0.000%
Total Motorized Use	Local	0.003%	0.002%
	Non-Local	0.002%	0.001%
Total All Other Use	Local	0.021%	0.016%
	Non-Local	0.026%	0.019%
	Total Use	0.054%	0.040%

Table 3-18 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 0.05 percent of the total jobs in the area, and the income generated is about 0.04 percent of the total labor income in the area studied.

Direct, Indirect and Cumulative Economic Effects

The employment and labor income effects stemming from current motorized and non-motorized activities occurring on the Modoc National Forest were estimated. The economic effects of all other types of recreation combined on the Modoc 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 .1 job or approximately $5,000 total labor income and a total annual total revenue to the region of approximately $11,000. The addition of roads to the system (Alternative 3, 4 and 5) may appeal to users who recreate by driving for pleasure. Changes to the existing system in the form of increased Mixed Use (Alternatives 2 and 5) may appeal to OHV users because it allows for a more continuous loop recreation experience. The overall historical recreation use is very low on the Modoc, 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 roads.

Modoc 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

Modoc 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 commentors expressed the desire to see the Forest be more restrictive and protective of the resources. Almost universally, these commentors 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 Modoc 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. (Wilson Draft, 2008).

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 roads to the system (Alternative 3, 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 2 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.

Modoc 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 (Parkinson, 2008).

Table 3-19. Construction and Maintenance Budget, by Fiscal Year

Fiscal Year	Road	Trail
FY04	$814,000	$89,000
FY05	$359,000	$58,000
FY06	$459,000	$49,000
FY07	$800,000	$29,000
FY08	$779,000	$39,000

Projection for fiscal year 2009 is $688,000 for roads and $39,000 for trails. It is predicted that the next five years will have similar numbers (Parkinson, 2008).

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 roads 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 286 and 336 miles of road will be added to the system. These roads will be brought in as Level 2 roads and will require no maintenance and we currently do not maintain level 2 roads. Therefore the cost of maintenance will remain constant if

predictions are accurate. 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 Modoc 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 roads to the NFTS will allow for more extensive travel across the Forest. Therefore, Alternatives 2, 4 and 5 would benefit anyone who uses roads for recreation or employment on the Forest. Changes to the existing system in the form of mixed use or seasonal closures will probably not affect either group.

Recreation

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 motorized vehicles to access trailheads, facilities, destinations, or geographic areas that are utilized for non-motorized recreational activities. This section of the Motorized Travel Management DEIS examines the extent to which alternatives respond to recreation management direction established in the Modoc National Forest Land and Resource Management Plan (LRMP), The Sierra Nevada Forest Plan Amendment (SNFPA) the Travel Management (TM) Rule, and the diversity of opportunities and access available on the forest.

The LRMP recreation direction was established under the implementing regulations of the National Forest Management Act (NFMA). The NFMA requires the provision of a broad spectrum of forest and rangeland-related outdoor recreation opportunities that respond to current and anticipated user demands. The LRMP satisfies this requirement through its use of the Recreation Opportunity Spectrum (ROS) classification system in the LRMP. In addition, specifically for "off-highway vehicle" use, the NFMA requires that these motor vehicle opportunities be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the National Forest System (NFS) lands. The SNFPA amended portions of the MDF to prohibit wheeled vehicle travel off of designated routes, trails, and limited off-highway use areas. Travel Management Rule requires that we examine the compatibility of motor vehicle use with existing conditions in populated areas; the conflict between motor vehicle use and existing or proposed recreational uses of NFS lands or neighboring federal lands; and the provision of recreational opportunities and access needs. It requires the production of a Motor Vehicle Use Map (MVUM) that designates the roads, trails and areas available for public motor vehicle use on a national forest or ranger district.

The LRMP 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 Recreation Opportunity Spectrum (ROS) is the basic inventory that was used to create recreation-opportunity "zoning" in these plans. The intent is to provide for these recreation opportunities within these zones to meet NFMA requirements for a broad spectrum of forest and rangeland-related outdoor recreation opportunities that respond to current and anticipated user demands.

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

Regulatory Direction relevant and specific to the proposed action as it affects recreation resources consists of the following:

National Forest Management Act (NFMA)

Specifically for Off-Highway Vehicle management, NFMA requires that this use be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the NFS lands. NFMA also requires that a broad spectrum of forest and rangeland-related outdoor recreation opportunities be provided that respond to current and anticipated user demands.

Sierra Nevada Forest Plan Amendment (SNFPA)

The SNFPA established the direction to prohibit wheeled vehicle travel off of designated routes, trails, and limited of-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, Subpart B (36 CFR 212.50-57)

The responsible official shall consider the effects of designated roads, trails and areas on the provision of recreational opportunities, access needs, and conflicts among uses of National Forest System lands. 36 CFR 212.55 (a)

The responsible official shall consider effects on the following, with the objective of minimizing: Conflicts between motor vehicle use and existing or proposed recreational uses of National Forest System lands or neighboring federal lands; Conflicts among different classes of motor vehicle uses of National Forest System lands or neighboring federal lands; and the compatibility of motor vehicle uses with existing conditions in populated areas, taking into account sound, emissions, and other factors. 36 CFR 212.55 (b).

MDF National Forest LRMP

The LRMP provides goals for the recreation resource and requires a broad range of developed and dispersed recreation opportunities in balance with existing and future demand. For management and conceptual convenience possible mixes or combinations of activities, settings, and probable experience opportunities have been arranged along a spectrum, or continuum. This continuum is called the Recreation Opportunity Spectrum (ROS), and planning for recreation opportunities using the ROS is conducted as part of Land and Resource Management Planning. The ROS provides a framework for defining the types of outdoor recreation the public might desire, and identifies that portion of the spectrum a given National Forest might be able to provide. ROS is divided into six classes: Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, Rural and Urban. Each class is defined in terms of its combination of activity, setting, and experience opportunities (ROS Users Guide USDA Forest Service). The intent is to use ROS and its associated settings to provide recreation input into LRMP which in turn may be incorporated into LRMP management prescriptions or used in project level planning beyond the programmatic planning used to develop the LRMP. These efforts provide for these recreation opportunities to meet NFMA requirements for a broad spectrum of forest and rangeland-related outdoor recreation opportunities that respond to current and anticipated user demands. As noted above, NFMA requires that “off-highway vehicle” opportunities be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the NFS lands. For the purposes of travel management actions, ‘off-highway vehicles’ is applied to public wheeled motor vehicle use (highway legal and non-highway legal). On the Modoc National Forest, ROS is integrated into the management prescriptions and associated standards and guides in the forest LRMP and guide decisions and resource management activities.

The following are standards (S) and guidelines (G) as stated in the LRMP that are relevant to Travel Management. Pages 4-19 to 4-20 state the following:

> 3. (G) Manage a full spectrum of trail opportunities.
>
> C. Use the Recreation Opportunity Spectrum system to guide decisions.
>
> D. Provide loop trails whenever appropriate, allowing return to the point of departure without covering the same ground twice.

4. (G) Design resource management activities to complement the Recreation Opportunity Spectrum (ROS) classes delineated on the ROS map and referred to in each prescription.

B. Semi-Primitive Motorized:

Provide opportunities for such recreation activities as off-highway vehicle touring, hunting, and camping in areas characterized by predominantly natural or natural-appearing environments with low concentrations of users.

Limit site development to resource protection.

Minimize construction or reconstruction of system roads.

C. Semi-Primitive Non-Motorized:

Provide opportunities for such recreation activities as hiking, fishing, and tent camping in predominantly natural environments with low incidence of interactions between users.

Prohibit motorized recreation; eliminate and prevent OHV use.

Limit site development to resource protection.

Apply the Semi-Primitive Non-Motorized Dispersed Recreation Prescription to specified areas (generally at least 2,500 acre units).

5. (G) Allow dispersed recreation activities in undeveloped areas of the forest unless otherwise prohibited for resource protection. Adjust land management activities at popular locations to maintain or enhance the natural setting and functional use of the site.

6. (G) Provide off-highway vehicle (OHV) recreation where OHV activities will not cause resource damage or conflict with other uses. Reference the OHV map for use areas.

7. (G) The following concerns will be addressed and may require corrective action to OHV opportunities identified in the Plan:

A. excessive soil erosion or compaction resulting in reduced productivity;

B. degradation of water quality;

C. unnecessary disturbance to deer and pronghorn on fall and winter range, and during fawning and kidding periods;

D. adverse impact to threatened, endangered, and sensitive species not fully accommodated in the Plan; and

E. New technological changes in OHVs and their uses.

Corrective actions may include, but are not limited to, improved trail maintenance, adjusting seasons of use, reducing OHV use, signing barriers to redistribute use, partially closing areas, rotating use, prohibiting specific vehicle types causing damage, or totally closing an area.

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 the NFS lands. For the purposes of travel management actions, the term off-road vehicles is applied to public motor vehicle use (highway-legal and non-highway-legal). The ROS inventory provides for a spectrum of classes from urban to primitive. There is a distinction between

motorized and non-motorized spectrum classes (or 'zones'). Motorized use falls in the motorized ROS classes (urban, rural, roaded-modified, roaded-natural, and semi-primitive-motorized). Non-motorized classes include semi-primitive non-motorized and primitive.

Impacts Relevant to Recreation

1. The compatibility of proposed changes to the NFTS with LRMP recreation and OHV management prescriptions and ROS.
2. The impact of proposed changes to the NFTS on non-motorized recreation (dust, noise, use conflicts).
3. The amount of motorized recreation opportunity by alternative.
4. The diversity of motorized access to dispersed recreation by alternative.

Assumptions Specific to Recreation Analysis

1. The prohibition of cross-country travel is not a change to ROS (semi-primitive motorized for example), it is simply a prohibition within that ROS 'zone' to travel off of designated routes.
2. The change from an open to cross-country travel condition to a cross-country travel prohibited condition would reduce the availability of acreage for both motorized recreation as well as motorized access to dispersed recreation activities.
3. The change from an open to cross-country travel condition to a cross-country travel prohibited condition would increase the availability of acreage for non-motorized recreation as well as non-motorized access to dispersed recreation activities.
4. Proposed additions to the NFTS would have a beneficial effect on motorized recreation opportunities by providing a variety of trail riding experiences and increasing the amount of motorized recreation opportunities (loops, connectors).
5. Proposed changes and additions to the NFTS would have a beneficial effect on the amount of motorized access to dispersed recreation opportunities available.
6. The Forest's NVUM report accurately expresses the most popular motorized and non-motorized recreation activities for use in this analysis.
7. The area of influence (dust, noise) of motorized use on populated areas or 'quiet recreation' opportunities is ¼ mile from associated boundaries (e.g. wilderness, RNA, property line, urban limit line).
8. There has never been any use analysis of the unauthorized routes and no data exists (traffic counts, etc). As a result it would be highly speculative to make assumptions of use levels on the unauthorized routes.
9. The majority of the motorized public use occurring on NFS land is occurring within the existing NFTS based on observation and NVUM data.
10. For each unauthorized route added to the NFTS as a road or trail for the purpose of accessing dispersed recreation, a minimum of one site is accessed. In many instances, multiple sites may be accessed through the addition of these routes to the system, but this number acts as a surrogate to determine how many dispersed areas are accessed under each alternative.

Data Sources

1. MDF LRMP for distribution of ROS classes.
2. The Forest's NVUM report for most popular non-motorized recreation activities.
3. Recreation, Law enforcement and other Resource staff observations.
4. Engineering Report on Mixed Use Analysis (Appendix N)

Recreation Indicator Measures

Indicator measures are intended to address how each alternative as the sum total of its proposed actions respond to the LRMP and Subpart B of 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 private and federal lands; the quality of the motorized recreation experience; and the quality of motorized access to dispersed areas for both motorized and non-motorized uses. It also responds to the diversity of motorized access available on the unit. Conflicts with other resources (including air quality) are examined in other resource sections. Public Safety is addressed in the Transportation Section.

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, indicator measures were used. Mileage available for each class of vehicle 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 is 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 would not be allowed to use designated roads, trails or areas and, conversely, the time of year that conflicts between motorized and non-motorized uses would 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 along with the ROS acreages available in each class. Finally, to determine the amount of dispersed recreation access provided under each alternative, a method was applied that a minimum of one site is accessed by each route (in many instances multiple sites are accessed, but one site is used as a proxy).

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 1/4 mile of an area where motorized use is allowed (designated roads, trails and areas in the NFTS miles that would result under each alternative).

The table below shows acreage outside ¼ mile of routes proposed for public use under each alternative. This serves as a measurement indicator of acreage available for quiet recreation and non-motorized activities without the potential for use conflicts with motorized vehicles. Alternative 1 continues to allow cross-country travel unabated and would have the highest impact to non-motorized use whereas the other alternatives prohibit cross-country travel. Therefore, the reader must keep in mind the intent is to compare the effect of motorized recreation on quiet recreation. The table below shows the acres remaining with a buffer on all roads. If only levels 3, 4, and 5 are buffered the remaining acres is 1,521,852. This is probably a more accurate representation of what is available for quiet use on the Forest.

Table 3-20. Acreage Outside ¼ Mile of Routes Proposed for Public Use Under Each Alternative

	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Acres outside of ¼ mile NFTS Only	738,344	44%	738,344	44%	738,344	44%	738,344	44%	738,344	44%
Acres outside of ¼ mile Proposed Routes Only	0		167,939	10%	0		143,240	9	167,939	10%
Total Acres Outside of ¼ mile	738,344	44%	570,405	34%	738,344	44%	595,104	35%	570,405	34%

% of Total Forest Service Acres

The Forest is best known for its remote location and uncrowded recreation opportunities. This is due to the small population in Modoc County and tourism is not a primary economic base for the area. The total Forest Service acres available for use are 1,679,771. Of this total 91,714 acres are designated for Semi-Primitive Non-Motorized Use and 70,384 acres are designated for Wilderness.

Of these acres, a fairly large portion is available for quiet recreation as the table above indicates. Additionally, a quiet recreation experience can be found in almost every area of the forest due to how little the forest is used. A count of users on Level 3 roads, which are roads that receive higher use on the Forest because they are connector roads; showed that on any day of the week the average use was 2 cars per hour. Based on that tally, and on observations from Forest Service personnel, use on Level 2 roads (which make up 87% of the Modoc FTS) is much lower. It is not uncommon for recreationists using the NFTS to not encounter another forest user during their visit. The table above displays only 1% difference between alternatives proposing the addition of miles of road to the NFTS.

The National Recreation Use Monitoring results display visitors rated their perception of how crowded the general forest area they were recreating in felt to them. General forest areas or "dispersed areas" are defined as areas that are not developed for intense recreation use. More than 80 percent of the recreation use on the Forest occurs in dispersed areas. This information is useful in that it displays a direct relationship to the Forest's low visitor use and the vast opportunities for quiet recreation despite the number of miles of NFTS existing on the Forest. Table 3-21 summaries mean perception of crowding on a scale of 1 to 10 where 1 means hardly anyone was there, and a 10 means the area was perceived as overcrowded.

Table 3-21. Perception of Crowding by Forest Visitors

Perception of Crowding (Rated 1 to10)	Percent of People Rating General Forest Areas
10 overcrowded	0%
9	0%
8	0%
7	0%
6	0%
5	7%
4	11%
3	36%
2	0%
1 hardly anyone there	46%

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

Number of miles available by vehicle class and season of use

Data was not available for miles available by vehicle class at the time to this report. The miles available in each Road Maintenance Level (RML) for each alternative were used to display the miles potentially available per vehicle class for comparison purposes. RMLs are defined by the USDA Forest Service Handbook as the level of service provided by, and maintenance required for, a specific road. The levels range from Level 1 to Level 5, lowest service to highest service respectfully. Level 1 is defined as intermittent service roads and closed to vehicle traffic. For comparative purposes in this report, Level 2 roads are open to use by motorcycles, ATV's, and some four wheel drive vehicles and level 3, 4 and 5 roads are open to use by passenger vehicles. Mixed use (OHVs and passenger vehicles) roads include Level 2 roads and some specific Level 3 roads.

Table 3-22. Total Mileage Available for each Vehicle Type

Vehicle Class	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
	Mileage	%*	Mileage	%*	Mileage	%*	Mileage	%*	Mileage	%*
Total NFTS Miles	4339	100%	4339	100%	4339	100%	4339	100%	4339	100%
Proposed Additions Miles	0		336		0		286		336	
Total NFTS and Proposed Addition Miles	4339		4675	108%	4339	100%	4625	107%	4675	108%
	Mileage	%**	Mileage	%**	Mileage	%**	Mileage	%**	Mileage	%**
Highway Vehicle Only (Level 3, 4, 5)	575	13%	437	9%	575	13%	575	12%	44	1%
Open to All Vehicles	3764	87%	4238	90%	3764	87%	4050	88%	4631	99%

(Level 2)										
Change in Vehicle Class (Mixed Use)	0		138	3%	0		0		531	11%
Seasonal Closure Miles	0		312	7%	0		425	9%	312	7%

%* Percent of Total NFTS Miles

%** Percent of Total NFTS and Proposed Addition Miles

Measurement Indicator 3

Miles available to access dispersed campsites

Description

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

Method

Miles of proposed routes accessing dispersed sites, by alternative

Quality of Road or Dispersed Experience: Number of facilities provided as surrogate for number of dispersed sites accessed. One site per route addition for the purposes of access to dispersed recreation will be used as a proxy (in some instances multiple sites are accessed via a single route addition).

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. They prefer the freedom to engage in activities not appropriate in developed locations, such as OHV use, bringing along a noisy dog, and altering the site to meet their needs. In addition, dispersed sites provide large group members better opportunity to camp in close proximity to each other, and away from others, than do most developed group campgrounds.

The table below shows, by alternative, the additional access to dispersed camping that becomes available by adding routes. These short spur roads can be used for a camping experience that is away from the concentrated use areas and provide a quiet use opportunity for those seeking this type of experience.

Table 3-23. Miles and Routes Available for Dispersed Camping Opportunity

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Number of proposed routes	0	744	0	666	744
Miles of proposed routes	0	80	0	70	80

The table above shows the number of additional routes that will provide access to dispersed camping opportunities.

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.

Method

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

(Acts as surrogate indicates how much conflict off NFTS may occur by alternative)

The Forest is a very rural and sparsely populated area. Visitors could expect that the potential impacts to populated areas may differ among the alternatives, with those alternatives with fewer roads having a lower impact of noise, dust and physical presence in populated areas. The area of influence (dust, noise) of motorized use on populated areas is considered to be ½ mile of neighboring private and federal lands boundaries.

Table 3-24. Number of Miles of Routes Proposed for Addition to the NFTS, by Alternative, Within ½ Mile of Neighboring Private and Federal Lands (Included is NFTS Mileage for Comparison)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Miles of Proposed	0	48	0	44	48
Miles of NFTS	1038	1038	1038	1038	1038
Total NFTS and Proposed	1038	1086	1038	1084	1086
Percent Change	0%	4%	0%	4%	4%

Affected Environment and Environmental Consequences

Affected Environment

The Modoc National Forest is best known for its remote location and low use recreation opportunities. Most visitors enjoy hunting, fishing, and camping, while others delight in touring, hiking, horseback riding, swimming, picnicking, and gathering firewood. These activities are enhanced by the abundance of wildlife, variety of landscape settings, and sparsely populated conditions.

The 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), snowmobiles, and four-wheel-drive vehicles (4WDs). Non-motorized recreational activities include hiking, camping, mountain bike riding, horseback riding, wildlife viewing, picnicking, rock climbing, hunting, fishing, cross-country skiing, snowshoeing, snow camping, and snow play (National Visitor Use Monitoring Results For Modoc National Forest, August 2001, USDA Forest Service Region 5).

The MDF is mostly flat to gently sloping topography allowing easy access. In addition to cross-country travel, more than 1,000 miles of level 2 roads provide challenging routes. Gathering firewood and hunting are the primary activities associated with OHV use. People are creating

additional trails to access firewood areas. Although past use has not been significant, some resource damage is occurring (LRMP pp. 3-21, 22).

Recreation Visitor Use

Visitor use estimates for the Forest were generated based on the National Visitor Use Monitoring (NVUM) survey that was conducted from January 1 through December 31, 2000. Recreation use on the Modoc National Forest for calendar year 2000 was 146,155 national forest visits and 175,206 site visits. 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 that users participated in and main activity. It highlighted the fact that the two may or may not be related. For example, 67 percent of forest visitors reported participating in the viewing of natural features, but only 23 percent reported that as their main activity. During their visit to the Modoc National Forest, the top five recreation activities of the visitors were viewing scenery, general relaxation, sightseeing, fishing, and driving for pleasure. Each visitor also picked one of these activities as his or her primary activity for the current recreation visit to the forest. The top primary activities were viewing natural features, driving for pleasure on forest roads, fishing, general (relaxing, hanging out, and escaping noise), and sightseeing.

The second-most popular activities were picnicking, hiking and walking, and off-highway vehicle travel, respectively. Of those activities, the primary activities reported were picnicking and hiking and walking, while OHV use was measured less than one percent of the primary activity (Table 3-25).

Table 3-25. Highest Percent Visits by Participation and Primary Activity

Activity	Percent Participation	Percent Saying it was Favorite Activity
Viewing natural features such as scenery, flowers, etc. on NFS lands	67.44%	23.09%
General & other: relaxing, hanging out, escaping noise & heat, etc.	57.67%	11.72%
Sightseeing	51.02%	5.6%
Fishing—all types	47.43%	34%
Driving for pleasure on roads	41.45%	17.92%

Table 3-26. Second-Highest Percent Visits by Participation and Primary Activity

Activity	Percent Participation	Percent Saying it was Primary Activity
Picnicking and family day gatherings in developed sites (family or group)	24.52%	8.05%
Hiking or walking	20.29%	2.03%
Off-highway vehicle travel (4-wheelers, dirt bikes, etc.)	16.9%	.79%

Environmental Consequences

Alternative 1: No Action

1. Direct and Indirect Effects of the Prohibition of Cross-Country Wheeled

Motorized Vehicle Travel

No cross-country prohibition would be put into place. No net change of current opportunities to motorized recreation would occur resulting in no direct or indirect effects to motorized recreation. Non-motorized recreation could have direct and indirect effects due to dust, noise or the presence of motor vehicles but these effects are currently very low because of the low use on the Forest. There would be no change to the access of dispersed recreation activities or impacts to adjacent lands.

2. Direct and Indirect Effects of adding facilities to the NFTS

There would be no new routes added to the existing NFTS under this alternative; therefore, there would be no direct or indirect effects.

3. Direct and Indirect Effects of Changes to the Existing NFTS, Including Identifying Seasons of use and Vehicle Class

There would be no changes to the existing NFTS; therefore there would be no direct or indirect effects.

Cumulative Effects

Cross-country travel would continue unabated, potentially creating additional resource issues in the future. This alternative has the greatest potential to negatively alter recreation settings and cause resource damage and would have the most impact to populated areas because of the continuation of cross country travel. Dust, noise and vehicle traffic are possible impacts that motorized use may have when carried out within the proximity of non-motorized use. This alternative has the highest potential impact on non-motorized users.

This alternative provides motorized access to all of the dispersed campsites on the Forest. Since no change is proposed to the managed use of existing NFS roads, and cross-country travel would not be prohibited, this alternative results in the lowest impact to motorized recreation.

Alternative 2: Proposed Action

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

Direct Effects

Motorized cross-country recreation opportunities would be eliminated. Visitors engaging in non-motorized quiet recreation choosing to recreate away from the road system would no longer be impacted by motorized users. Impacts to adjacent land by motorized use would be reduced. Access to dispersed recreation activities would be reduced to authorized routes.

Indirect Effects

The recreation setting in areas that received significant cross-country use would change from a predominately motorized environment to a predominately non-motorized environment. Dust and noise from motorized vehicles would be restricted to the areas within close proximity to the roads.

2. Direct and Indirect Effects of Adding Facilities to the NFTS

Direct Effects

Adding facilities would continue to provide a variety of riding opportunities for OHV vehicle classes. Noise and dust from motorized use could slightly affect the use of neighboring private

and federal lands. Adding 336 miles of routes will greatly enhance opportunities for dispersed camping.

Indirect Effects

A slight increase in use of OHVs on the NFTS Level 3 roads could increase the frequency in which highway legal vehicles encounter OHVs.

3. Direct and Indirect Effects of Changes to the Existing NFTS, Including Identifying Seasons of use and Vehicle Class

Direct Effects

This alternative would prohibit OHV use on 44N08 and 44N01 due to safety issues and would close 46B29HB (along Boles Creek between Clear Lake and Steel Swamp) to public use very slightly effecting OHV opportunities on the forest. Additionally, this alternative proposes a change in vehicle class on 138 miles of road to allow for mixed use. This change will contribute to the continuity of the motor-touring experience including access to dispersed campsites and loop trails. There would be a slight decrease in riding opportunities during seasonal closures affecting early and late season use. The impacts to adjacent land could increase slightly, but would be tempered by seasonal closures. Changes of vehicle class from highway vehicle only to all vehicles will expand recreation opportunities on the forest.

Indirect Effects

Dispersed recreation activities could be slightly impacted during seasonal closures occurring in early and late seasons of use.

Cumulative Effects

Alternative 2 provides the second highest motorized mileage available to all OHV use including motorcycles, ATV's, and four wheel drive vehicles of all the action alternatives. The quality of the motorized recreation use would be enhanced compared to Alternative 3 and 4 due to the designation of 138 miles of mixed use, the second highest of the action alternatives. The Forest would be closed to cross-country travel and would impose seasonal closures on 312 miles of NFTS roads slightly impacting motorized recreation opportunities.

Although primary use of the Forest for recreation would continue to be motorized, the recreation setting in areas primarily used for cross-country travel would change from a predominately motorized setting to a predominately non-motorized setting. Non-motorized recreation experience could be enhanced because users choosing to recreate away from the road system would no longer be impacted by motorized users. Dust and noise from motorized vehicles would be restricted to the areas within close proximity to the roads. A large percent of acreage is available to quiet recreation activities and is equal to alternative 5.

Alternative 3

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

Direct Effects

Motorized cross-country recreation riding opportunities would be eliminated. Visitors engaging in non-motorized recreation choosing to recreate away from the road system would no longer be impacted by motorized users. Impacts to adjacent land by motorized use would be reduced. Access to dispersed recreation activities would be reduced to authorized routes.

Indirect Effects

The recreation setting in areas that received significant cross-country use would change from a predominately motorized environment to a predominately non-motorized environment. Dust and noise from motorized vehicles would be restricted to the areas within close proximity to the roads.

2. Direct and Indirect Effects of Adding Facilities to the NFTS, Including Identifying Seasons of use and Vehicle Class

There would be no new routes added to the existing NFTS under this alternative; therefore, there would be no direct or indirect effects.

3. Direct and Indirect Effects of Changes to the Existing NFTS

There would be no changes to the existing NFTS under this alternative; therefore, there would be no direct or indirect effects.

Cumulative Effects

Alternative 3 is the most restrictive to motorized users because it does not add any unauthorized routes and prohibits cross-country travel restricting use to approved routes. Mixed use would not be allowed on level 3 roads limiting opportunities for motor-touring which includes providing a continuous motor-touring experience for motorized recreationists. This alternative enhances non-motorized quiet recreation by eliminating cross-country travel and by not adding any additional miles to the NFTS. This alternative provides for the highest percentage of acreage available for quiet recreation.

Alternative 4

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

Direct Effects

Motorized cross-country recreation riding opportunities would be eliminated. Visitors engaging in non-motorized recreation choosing to recreate away from the road system would no longer be impacted by motorized users. Impacts to adjacent land by motorized use would be reduced. Access to dispersed recreation activities would be reduced to authorized routes.

Indirect Effects

The recreation setting in areas that received significant cross-country use would change from a predominately motorized environment to a predominately non-motorized environment. Dust and noise from motorized vehicles would be restricted to the areas within close proximity to the roads.

2. Direct and Indirect Effects of Adding Facilities (presently unauthorized roads, trails, or areas) to the NFTS, Including Identifying Seasons of use and Vehicle Class

Direct Effects

This alternative has the most miles of road subject to seasonal closures (424 miles) that would have a slight negative impact on motorized recreation by limiting motorized activities in the early and late seasons. OHV use would be allowed on Level 2 roads only that are segmented and would not provide a continuous motor-touring experience for motorized recreationists. Noise and dust from motorized use could slightly affect the use of neighboring private and federal lands. Access to dispersed recreation activities would be restricted to approved routes

Indirect Effects

A slight increase in use of OHVs on the NFTS could increase the frequency in which highway legal vehicles encounter OHVs.

3. Direct and Indirect effects of changes to the existing NFTS

(This can include deletions of facilities and changing the vehicle class and season of use.)

Direct Effects

This alternative would prohibit OHV use on 44N08 and 44N01 due to safety issues and would close 46B29HB (along Boles Creek between Clear Lake and Steel Swamp) to public use very slightly effecting OHV opportunities on the forest. Mixed use would be limited to existing Level 2 roads. Seasonal closures would have a slight negative impact on motorized recreation by limiting motorized activities in the early and late seasons. This alternative has the highest percentage of routes subject to seasonal closures enhancing quiet recreation and tempering negative impacts caused by vehicles.

Indirect Effects

Access by OHVs to activities such as dispersed camping would be restricted to designated routes.

Cumulative Effects

Alternative 4 has the second least mileage available to motorcycles, ATV's, and some four wheel drive vehicles of all the action alternatives (286 miles) and the greatest miles (424) of seasonal closure to motor vehicles. In addition, mixed use would be limited to existing Level 2 roads which do not necessarily provide continuity or loop experiences for people seeking a continuous motor-touring experience. Seasonal closures would have a slight negative impact on motorized recreation by limiting motorized activities in the early and late seasons.

This alternative provides slightly lower potential than Alternatives 2 and 5 for negatively altering recreation settings and causing resource damage. Motorized recreation would be limited to designated routes and this could enhance the non-motorized recreation experience. Users choosing to recreate away from the road system would no longer be impacted by motorized users. Dust and noise resulting from motorized use would be restricted to the area surrounding designated routes. This alternative provides 1% more acreage available to quiet recreation compared to alternatives 2 and 5.

This alternative provides access to the second fewest number of dispersed camping opportunities, compared to Alternative 3 which does not add any unauthorized routes to the NFTS. This would directly impact recreationists with campers and trailers, limiting their choices in camping locations to developed campgrounds and dispersed sites along designated routes. However, with the addition of many short spur roads to the system, the impact from prohibiting cross-country travel would be tempered.

Alternative 5

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

Direct Effects

Motorized cross-country recreation riding opportunities would be eliminated. Visitors engaging in non-motorized recreation choosing to recreate away from the road system would no longer be impacted by motorized users. Impacts to adjacent land by motorized use would be reduced. Access to dispersed recreation activities would be reduced to authorized routes.

Indirect Effects

The recreation setting in areas that received significant cross-country use would change from a predominately motorized environment to a predominately non-motorized environment. Dust and noise from motorized vehicles would be restricted to the areas within close proximity to the roads.

2. Direct and Indirect Effects of Adding Facilities to the NFTS, Including Identifying Seasons of use and Vehicle Class

Direct Effects

This alternative has the same number and miles of added routes as Alternative 2 and includes the highest motorized mileage available to motorcycles, ATV's, and some four wheel drive vehicles of all the action alternatives. This includes 339 miles added to the NFTS totaling 4,919 miles of roads. Of the 4,919 miles of NFTS, 4,630 miles would be designated for mixed use providing the most diverse riding experience for OHV users, including loop opportunities and would provide the greatest amount of access to dispersed recreation activities.

Adding facilities would continue to provide a variety of riding opportunities for OHV vehicle classes. However, there would be a slight decrease in riding opportunities during seasonal closures effecting early and late season use. Changes of vehicle class from highway vehicle only to all vehicles would expand recreation opportunities on the forest. . Noise and dust from motorized use could slightly affect the use of neighboring private and federal lands. Access to dispersed recreation activities would be restricted to approved routes

Indirect Effects

A slight increase in use of OHVs on the NFTS could increase the frequency in which highway legal vehicles encounter OHVs. There would be a slight decrease in riding opportunities during seasonal closures effecting early and late season use.

3. Direct and Indirect Effects of Changes to the Existing NFTS

(This can include deletions of facilities and changing the vehicle class and season of use.)

Direct Effects

Level 3 connector routes would be available for use by all vehicles providing the most diverse riding experience; however 312 miles of seasonal restrictions would be imposed on NFTS roads slightly impacting riding opportunities during early and late seasons. The impacts to adjacent land could increase slightly, but would be tempered by seasonal closures.

Indirect Effects

This alternative provides the highest motorized mileage available to motorcycles, ATV's, and some four wheel drive vehicles of all the action alternatives. This includes 4,630 miles would be designated for mixed use providing the most diverse riding experience for OHV users, including loop opportunities and would provide the greatest amount of access to dispersed recreation activities. This increase in use of OHVs on the NFTS could increase the frequency in which highway legal vehicles encounter OHVs.

Cumulative Effects

With the exception of Alternative 1, Alternative 5 provides the widest range of opportunity for motorized recreation. This alternative has the same number and miles of added routes as Alternative 2 and includes the highest motorized mileage available to motorcycles, ATV's, and some four wheel drive vehicles of all the action alternatives. Of the 4,919 miles of NFTS, 4,630 miles would be designated for mixed use providing the most diverse riding experience for OHV users, including loop opportunities and would provide the greatest amount of access to dispersed

recreation activities. The motor touring experience would be enhanced because all of the Level 3 connector routes would be available for use by all vehicles. Forest Roads 44N08 and 44N01 would be prohibited to OHV use due to safety issues.

This alternative has the second greatest potential to negatively alter recreation settings, cause resource damage and impact populated areas. Motorized recreation would be limited to designated routes and this could enhance the non-motorized recreation experience. A large percent of acreage is available to quiet recreation activities and is equal to alternative 2. Users choosing to recreate away from the road system would no longer be impacted by motorized users. Dust and noise resulting from motorized vehicles would be restricted to the area surrounding designated routes. With the exception of Alternative 1, this alternative has the highest potential impact on non-motorized users.

Summary of Effects Analysis Across all Alternatives

Motorized Recreation

Alternative 1 does not propose a change to the managed use of existing NFS roads and cross-country travel would not be prohibited. Alternative 2 provides the second highest motorized mileage available of all the action alternatives followed by Alternative 5 and 4. Alternative 5 provides the widest range of opportunity for motorized recreation of all the action alternatives and provides to most mixed use opportunities. Alternative 1 results in the lowest impact to motorized recreation followed by Alternative 5, 2 and 4 respectively. Alternative 3 is the most restrictive and provides the least amount of opportunity for motorized recreation.

Non-motorized Recreation

Alternative 1 allows cross-country travel to continue unabated and dust and noise from vehicle traffic could impact non-motorized recreation. Alternative 1 has the highest potential impact on non-motorized users. Alternative 3 is the most beneficial to non-motorized recreation of all the alternatives. This alternative does not add any unauthorized routes, eliminates cross-country travel, and provides for the highest percentage of acreage available for quiet recreation therefore, users choosing to recreate away from the road system would no longer be impacted by motorized use. Alternative 3 is the most beneficial to non-motorized recreation followed by Alternatives 4, 2, 5 and 1 respectively.

Compliance with the Forest Plan and Other Regulatory Direction

Alternative 1 does not comply with the 2004 Sierra Nevada Forest Plan Amendment Record of Decision because it allows wheeled vehicle travel off designated routes and trails. The action alternatives do not comply with the LRMP because unless amended, it states that 87 percent of the Forest should be left open to cross-country travel.

Visual Resources

Introduction

This section of the motorized travel management environmental analysis examines the extent to which alternatives respond to visual resources management direction established in the 1991 Modoc National Forest Land and Resource Management Plan (LRMP) and the Travel Management (TM) Rule. The LRMP visual resources direction was established under the implementing regulations of the National Forest Management Act (NFMA).

In the development of the Modoc National Forest's Land and Resource Management 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 VQO's 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.

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.

Analysis Framework: Statute, Regulation, LRMP, and Other Direction

Direction relevant to the Proposed Action as it affects visual resources includes the following:

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 lands 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 trails or areas, the Responsible Official must consider effects on Forest resources, with the objective of minimizing effects of motor vehicle use.

Modoc National Forest LRMP, as Amended

The LRMP contains Forest-wide management direction in the form of Visual Quality Objectives and specific management area direction for visual resources. The visual standards and guidelines in the LRMP applicable to motorized travel management include the following:

20. Visual Resources (Forest Standards and Guidelines)

> (G) Manage visual resources to prevent unacceptable alteration of landscapes by designing and implementing management activities to meet or exceed adopted Visual Quality Objectives (VQOs).

(G) Allow temporary departures of less than ten years and one VQO class to protect long-term visual values, such as in timbered areas highly susceptible to insect or disease epidemics.

(G) Capitalize on opportunities to achieve rehabilitation of unacceptable modification conditions during management activities with other resources.

(G) Meet assigned VQOs when activities are planned within the foreground zone of State Highways 139 and 299. Specific objectives are to:

Minimize the visual impact of all existing human-made structures. Locate new structures out of view, or mitigate the impact of them.

Blend treated vegetation with adjacent untreated areas for a natural appearance. No distinct edge between treated and untreated areas should be evident.

(Visual Resources standards and guidelines were not modified by the Sierra Nevada Forest Plan Amendment (SNFPA) or by the Northwest Forest Plan (NWFP) Final Environmental Impact Statement Record of Decision.)

Visual Retention Management Prescription – 7

p. 4-77 - Off-highway vehicle use is permitted, but with restrictions.

p. 4-78 – Manage for roaded natural dispersed recreation opportunities as defined in the Forest-wide standards and guidelines.

Random entry from main roads is discouraged by maintenance of ditches, natural barriers, vegetation, signing, etc. Use is subject to restrictions identified on the OHV map.

Areas with this prescription are open to off-highway vehicle (OHV) use if impacts cannot be seen from the primary roads.

Effects Analysis Methodology

Roads and trails can create a change in the natural-appearing landscape as measured in form, line, color, texture, and pattern. The visual effects of roads and trails can be described from different points of view: (1) the view of the surrounding landscape as seen by travelers on the route (the route is the viewshed); and (2) the view of the route by Forest visitors (hikers, campers, skiers, etc.) looking from other user areas.

The type of visual experience differs whether the landscape is viewed from a motorized, a non-motorized mode of travel (walking, hiking, skiing), or from a fixed viewpoint such as a user area. The speed of the traveler also has a direct relationship on the visual perception of landscape. The ability to identify and discern individual objects, and their relationship to the whole, become more difficult the faster you travel because you decrease the duration of the viewing period. Deviations from the natural landscape are hard to discern while driving in a vehicle at 35 to 65 mph. Those same deviations for a hiker on a trail become very evident because the viewing period increases dramatically.

The proposed alternatives have the potential to affect both the visual resource itself, as well as the Forest visitor's opportunity to view the resource. The degree of deviation from the natural-appearing landscape determines whether a route is in compliance with the VQO. The VQOs establish minimum acceptable thresholds for landscape alterations from an otherwise natural-appearing Forest landscape.

General Guidelines for Effects Analysis for Visual Resources

Spatial: The "viewshed" is the unit of spatial analysis when considering effects on visual resources.

Effects Time frames: Short-term effects occur within one year. Long-term effects occur up to 20 years.

Measurement Indicators and Rationale: The measurement indicators are intended to address how each action individually (direct and indirect effects), and each alternative as the sum total of its Proposed Actions (cumulative effects), respond to the LRMP and the TM Rule: whether the motorized recreation opportunity affects the natural appearance of the Forest landscapes.

Measurement Indicator: Compliance with the Retention and Partial Retention Visual Quality Objectives (VQOs) - For each alternative, determine the extent to which the proposed National Forest Transportation System (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). Field-check representative samples to verify VQO compliance).

Impacts Relevant to Visual Resources

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.

Assumptions Specific to Visual Resources Analysis

Based upon the review of the Modoc NF LRMP, the basic measurement indicator for the visual resources is in compliance with the Retention and Partial Retention VQOs.

The Preservation VQO is not addressed as it occurs only in designated wilderness areas. Motorized access is not authorized in designated wilderness.

The Modification VQO is not addressed, since this VQO allows for areas that have alterations, such as roads and trails that do not look natural.

The prohibition of cross-country, wheeled motorized vehicles should have a positive effect on the Forest's visual resources.

Sensitivity level 1 roads and trails include all roads classified as "scenic highways", and roads and trails leading directly to major areas of interest such as national parks, wilderness areas, major recreation areas, historic sites, recreation sites, and concentrated recreation areas.

All areas with a Semi-Primitive Recreation management prescription meet the direction for visual resources to meet or exceed the Partial Retention VQO.

For classification, analysis, and inventory of the visual resource landscape, viewing is identified by the distance zones of foreground (300 feet to 1/2 mile), middle ground (1/2 to 4 miles), and background (4 miles to the horizon).

Agriculture Handbook Number 462 (USDA Forest Service, 1974) provides a description of the VQO's used for the visual management of lands administered by the Modoc National Forest.

> **Preservation** – Only allows for ecological changes and all other management activities, except for very low visual impact recreation facilities, are prohibited.
>
> **Retention** – Provides for management activities that are not visually evident and landscape character appears unaltered with only minimal deviations. Activities may only repeat form, line, color, and texture of the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc. should not be evident.

Partial Retention – Provides for management activities that remain visually subordinate to the landscape and landscape character may appear slightly altered. Activities may repeat form, line, color, and texture of the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc. should remain visually subordinate to the characteristic landscape. Activities may also introduce form, line, color, or texture which are found infrequently or not at all in the characteristic landscape but still remain subordinate to the visual strength of the characteristic landscape.

Modification – Management activities may visually dominate the characteristic landscape. Activities such as roads should borrow naturally established form, line, color, and texture so completely and at such scale that its visual characteristics are compatible with the natural surroundings.

Data Sources

The Modoc LRMP data set was used to intersect route segments with the areas visual quality objectives of Partial Retention or Retention.

The Forest's National Visitor Use Monitoring (NVUM) report determined that 75 percent of those who visited the Forest participated in viewing natural features such as scenery, flowers, etc. on National Forest System (NFS) lands. Thirty-seven percent of those participated in driving for pleasure on roads, and 30 percent participated in viewing wildlife, birds, fish, etc.

In 2008 the Forest received a "Landscape Character Description" report, written by Nicole Hill. This report was developed to support LRMP revision activities for the Modoc National Forest. The report found that "Travel management activities often provide the platform for viewing scenery. Most travel management activities make the landscape appear slightly altered. The activities, although noticeable, generally remain visually subordinate to the landscape character being viewed."

Visual Resources Indicators

The extent to which the proposed additional roads falls within the Retention and Partial Retention VQOs as measured in the (number of miles traversing landscapes that are to remain natural to near-natural appearing in character).

Visual Resources Methodology, by Action

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

The prohibition of cross-country motorized vehicles should have a positive effect on the Forest's visual resources because it would remove the chance of continued route proliferation and the impact to visual resources.

Methodology: GIS analysis of added routes in relation to location within Retention and Partial Retention VQO

Rationale: Any increase in the number of closed routes as measured against the No Action Alternative would lead to a general trend of improving visual resources in areas identified with a Retention and Partial Retention VQO.

Affected Environment and Environmental Consequences

Affected Environment

Large-scale uplift and faulting and volcanic activity have dominated the recent geologic history of the Modoc Plateau. Virtually the entire Forest landscape has evolved during the last five million years, and a significant portion of it during the last 0.75 million years from volcanic activity. These recent geologic processes have created a distinct landscape of mountain vistas, wide valleys, high-desert rocky plateaus, volcanic landscapes, and lakes.

The quality of the Modoc National Forest's scenic resources can be described as distinctive (30 percent), Typical (68 percent), and Indistinctive (2 percent) (2008 visual analysis).

Over the last 100 years, the visual quality of the Modoc Plateau has declined somewhat as power lines and pipelines with the associated ground disturbance have encroached on the natural environment. Surveys of Modoc National Forest recreation visitors found 58 percent were "very satisfied" with the general Forest scenery with 42 percent being "satisfied." Viewing natural features was the third-most popular activity for visitors on the Modoc National Forest (USDA Forest Service, 2001).

> The Modoc National Forest is a recreation destination for California residents as well as visitors from neighboring states. The 1.6 million acre Forest is located in northeastern California along the southernmost portions of the Cascade Mountains, and on the western edge of the Great Basin. People are drawn to the area for its open spaces, remoteness, tranquility, beautiful scenery, and spirit of the west. Known as Modoc Country, a land "where the west still lives," the scenery is diverse, including mountains, pine Forests, meadows, lakes, streams, rugged canyons, wetlands, lava beds, and high-desert plateaus. This spectrum of contrasts provides for sweeping, expansive views and sparsely populated spaces. The variety of historic elements is rich in character and culture. Excellent wildlife and waterfowl viewing and hunting opportunities are found throughout the landscape. As part of the Pacific Flyway, migratory birds provide a spectacular show at specific locations in the Forest. Winding through various parts of the Forest, travelers enjoy viewing scenery and reliving history on scenic byways and auto tours, including the Modoc Volcanic Scenic Byway and Emigrant Trails Scenic Byway. (USDA, Modoc NF, 2008 Landscape Character Description)

Scenery

The pictures below are all from the "Landscape Character Description" of the Modoc National Forest prepared in August 2008 by Nicole Hill, Landscape Architect, in support of the Comprehensive Evaluation Report being developed to initiate the revision of our LRMP. These photos depict the landscapes found on the Modoc National Forest.

Figure 3-5. Typical landscape of Medicine Lake Lava Flows. View from Modoc Volcanic Historic Loop near Lava Beds National Monument

Figure 3-6 Homestead Flat viewed from South Warner Auto Loop Tour

Figure 3-7. Devil's Garden North of Big Sage Reservoir

Figure 3-8. View West From Hwy 139 (Highway fence prevented unauthorized routes.)

Figure 3-9. View of Highway 139 Corridor just Inside the Forest Boundary Looking North (Emigrant Trails Scenic Byway); note that highway fencing prevented unauthorized routes from developing along this corridor.

Figure 3-10. Fandango Valley Viewed from North Warner Auto Loop Tour

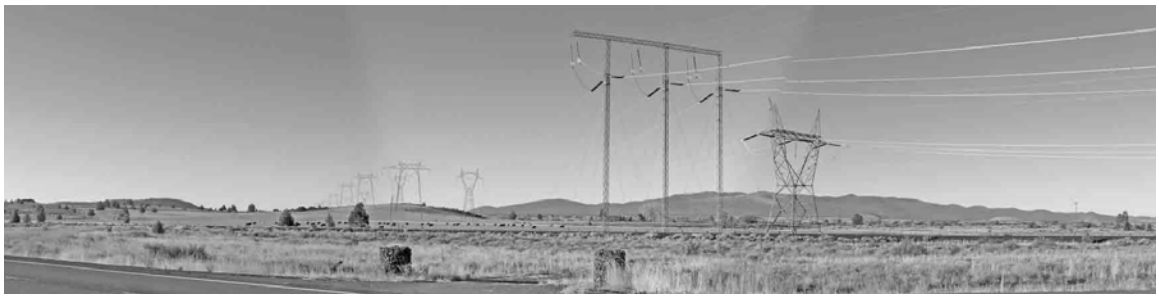
Figure 3-11. Warner Mountain uplift Viewed from Surprise Valley-Barrel Springs Backcountry Byway

Figure 3-12. Vegetation on Western Warner Mountain in North Parker Creek Drainage

Figure 3-13. Regeneration Harvest Along Hunters Ridge Road

Figure 3-14. Vegetation and Landform Features near the Dibble Place on Ash Valley Road

Figure 3-15. Utility Corridor Viewed from Highway 139



Effects Common to all Alternatives

Roads and trails can create a change in the natural-appearing landscape as measured in form, line, color, texture, and pattern. As shown above in the photos of common landscapes of the Modoc National Forest system, authorized and unauthorized roads are generally not apparent in the middle or distance views of the Forest. As seen in Figure 3-6, the system maintenance level two road fits into the landscape, and is hardly noticeable. In Figure 3-13, the old regeneration harvests make some roads more apparent but they are subordinate in form, line, color, texture, and pattern to the regeneration harvest alone. The roads to and from the regeneration harvest in the uncut areas are not apparent.

As shown in Figures 3-13 and 3-15, vegetation manipulation (short-term visual impacts) and power lines (long-term visual impacts) are the main detractors from visual integrity on the Modoc National Forest. Authorized and unauthorized roads generally fit into the landscape and are accepted by the public as common and not seen as visual detractors. Scenery satisfaction was rated as good (65 percent) to very good (45 percent) for visitors at day use developed sites, and a

satisfaction rating of very good (100 percent) for visitors at Overnight Developed Sites. Visitors of the general Forest areas rated scenery at good (42 percent) and very good (58 percent), (2001 National Visitor Use Monitoring results).

In her evaluation of twelve distinct ecological landscapes, landscape architect Nichole Hill found for each of the landscapes that "Travel management activities often provide the platform for viewing scenery. Most travel management activities make the landscape appear slightly altered. The activities, although noticeable, generally remain visually subordinate to the landscape character being viewed."

Highway fencing along State Highways 139 and 299 has prevented the development of unauthorized routes to or from these highways. Thus, all alternatives meet the standard and guideline that requires all activities to meet the assigned VQO along these routes.

Typical Views of Roads being added to the System

From a visual standpoint, the impact of new roads is not easily to detect. The foreground views are visible from the current road system only at the junction of the roads, and many small unauthorized roads are even difficult to find.

Figure 3-16. View of Unauthorized Spur Road from Level 3 Road. ML2054 is beginning to be hidden by vegetation.

Figure 3-17. Approaching unauthorized Road ML1300 from System Road 42A61A. The unauthorized road appears smaller and less used than the System road, which turns to the left.

Figure 3-18. Approaching unauthorized road ML 2046; the road is not visible.

Environmental Consequences

Prohibition of Cross-country Travel

Effects Common to All Action Alternatives (2-5)

Direct and Indirect Effects of prohibiting cross-country travel

Closing the Forest to cross-country travel would stop the creation of additional unauthorized routes by recreation users, thus preserving the visual character of the Forest.

Cumulative Effects of prohibiting cross-country travel

There would be limited cumulative effects of stopping cross-country travel. Over time stopping cross-country travel would allow tracks left by recreation users in the past to grow over and become more natural in appearance, thus adding to the roadless character of the areas.

Changes to NFTS

Direct and Indirect Effects of changes in NFTS

There would be no direct or indirect effects on the visual characteristics of the Forest. Seasonal use does not change the roadless characteristics of an area. Change in vehicle class will not affect visual characteristics of the Forest.

Cumulative Effects of changes in NFTS

Since there would be no direct or indirect effects on the visual character, there would be no cumulative effects when season of use or change in vehicle class is instituted in any of the alternatives.

Additions to NFTS

All alternatives have the potential to affect the existing landscape in any of the scenic integrity objectives (Table 3-30). All alternatives would retain 993 miles of existing system routes in the Partial Retention VQO and 208 miles in the Retention VQOs. Alternative 1 would not prohibit cross-country travel which would include the use of 491 miles of unauthorized routes within areas with Partial Retention and Retention VQOs and therefore this alternative has the highest impact on visual resources. Alternatives 2 and 5 would add 80.81 miles of unauthorized routes to the existing transportation system within the Partial Retention and Retention VQOs, and Alternative 4 would add 70.14 miles. Alternative 3 would have no additional routes available for use and would have the least amount of miles in each class, which reflects the existing system routes and the elimination of cross-country travel.

Table 3-30. Miles of Unauthorized Routes Added to the NFTS by VQO Class

Indicators – Visual Resources	Miles of Unauthorized Routes Added to the NFTS, by Alternative				
	Alt 1 (Miles)	Alt 2 (Miles)	Alt 3 (Miles)	Alt 4 (Miles)	Alt 5 (Miles)
Inventoried Unauthorized Routes in Partial Retention VQO	0	65.69	0	58	65.69
Inventoried Unauthorized Routes in Partial Retention VQO	0	15.12	0	13	15.12
Total	0	80.81	0	71	80.81

Table 3-31. Combined Miles of NFTS and Unauthorized Routes by VQO Class

Indicators – Visual Resources	Combined Miles of NFTS and Unauthorized Routes				
	Alt 1 (Miles)	Alt 2 (Miles)	Alt 3 (Miles)	Alt 4 (Miles)	Alt 5 (Miles)
NFS & Unauthorized Routes in Partial Retention VQOs	963	1028.69	963	1021	1028
NFS & Unauthorized Routes in Retention VQOs	208	223.12	208	221	223
Total	1171	1251.81	1171	1242	1251

On the one hand, roads within Retention or Partial Retention areas provide viewing opportunities for a greater number of people. Reciprocally, limiting roads within these areas would be more beneficial to the scenery. The views in areas where there are fewer roads may be of a greater quality because of less dust and congestion. Furthermore, limiting roads, especially unauthorized routes that are not built and maintained to Forest Service standards will also reduce erosion which contributes to visual integrity.

Alternative 1 would provide the most opportunity for public travel cross-country which includes utilizing the unauthorized roads that currently exist. The quality of the scenic resources would not be as high as in Alternative 4 because cross-country travel would not be prohibited. Alternative 3 would prohibit cross-country travel and add no routes to the system. Therefore, it would have potential for the highest quality of scenic resource because unauthorized routes are no longer used and will eventually revegetate.

Alternative 4 emphasizes natural resource and habitat values, which are essential to the scenic management system's underlying ecological aesthetic. Under the scenic management system, activities that improve Forest health also improve Forest aesthetics in order to reach the long-term desired condition stated in the LRMP. The alternative that best protects natural resources would thus best protect scenic resources, although fewer people would have access to the scenery.

Given the terrain and vegetation cover of the Modoc National Forest, adding the small percentage of roads within the Retention or Partial Retention categories would not have an adverse effect on the scenic values of the Forest.

Cumulative effects

Management of multiple resources has altered the natural landscape character, creating the existing condition of the landscape. The most obvious and significant effects on scenic resources are from vegetation and landform alterations. Multiple-resource management that has altered scenic resources includes, but is not limited to: timber management, mining, recreational facility development (including roads and trails, campgrounds and picnic grounds), utility corridors, fire management (suppression and prescribed burning), and livestock grazing.

A wide variety of use occurs on the Forest. This use, as well as new uses; are expected to continue in the future. Sightseeing and driving outdoors for pleasure are examples of activities that directly use roads as part of the recreational experience. The character of, and access to scenic views; will directly depend on the road system in place. Increasing the recreational use of areas may provide scenery benefits to more people. Alteration of road systems can disrupt long-established access and use patterns.

Placement, scale, class, and setting of roads can also greatly affect the quality of scenic views and access to outstanding scenic vistas. It is important to be aware of the indirect effects that roads have on the scenic resource. As demand for Forest recreational opportunities continues to grow,

the use of Forest roads will likely increase in congestion, and thus lower the quality of scenery. However use on the Modoc National Forest is expected to remain static and therefore use will continue to be low.

Given time, all actions within these alternatives are reversible; this includes the decommissioning of roads. The continued reduction of visual quality may be an irretrievable loss until full re-contouring and revegetation of decommissioned roads occur.

Compliance with the Forest Plan and Other Direction

All alternatives currently meet the objectives and standards and guidelines of the LRMP as amended. However, Alternative 1 could affect the foreground views in heavily used areas if unrestricted travel was to allow more roads and access to be created than the visual environment could absorb.

Cultural Resources

Introduction

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 lands (36 CFR 212.55(a), 212.55(b)(1)).

Cultural resources provide information on the Forest's unique prehistoric and historic ethnic heritage, including evidence of several American Indian groups (the Pit River Tribe, Modoc-Klamath, and Northern Paiute) and their predecessors. In addition to providing archaeological evidence of past lifeways and adaptation to the environment, cultural resources also lend a historic perspective on today's technological and sociological change.

Cultural resources are buildings, sites, areas, architecture, memorials, and properties having scientific, historic, and cultural importance. Cultural resources comprise an irreplaceable and non-renewable resource relating to past human life. Physical remains of over 11,000 years of human history are found throughout the Modoc National Forest (Gates 1983). Except for the last 180 years of written history, the only record of this long, unwritten history are the abandoned villages, camps, and other remains left by the native prehistoric peoples and their descendants.

Paleo-Indians were the earliest inhabitants of the Forest who lived 10,000 to 11,000 years ago at the end of the last Ice Age. Using fluted projectile (spear or dart) points, they hunted big game such as mammoth, bison, ground sloth and other extinct animals. Little evidence of this period has been found.

Indian peoples who lived in this area about 8,000 years ago left abundant evidence of their habitation. Most prehistoric archaeological sites contain surface materials (chipping debris and projectile points) spanning the last 4,000 to 6,000 years. During this period, various native cultures specialized in their adaptations to locally available resources.

Today, the Modoc-Klamath, Northern Paiute, and Pit River Indian tribes are the principal occupants of the area. All followed a "hunting and gathering," semi-sedentary existence. Groups seasonally inhabited settlements, and generally returned to the same village sites and camping spots year after year. Food resources were used on a seasonal basis whenever and wherever they occurred. These groups still use the Forest area today for the collection of various plant resources for basketry, food, and medicines, and continue to access and use certain locations for continuing traditional cultural and religious practices (Allison 1994, Roybal-Evans 1982, USDA Forest Service 2007).

Prehistoric site types on the Forest range from winter village complexes to scattered hunting stations, tool-manufacturing sites, and plant processing areas. They also include petroglyphs, pictographs, bedrock mortars, rock shelters, caves and obsidian and basalt toolstone quarries. Of particular significance are the well-know obsidian quarries in the Medicine Lake Highlands and the Warner Mountains, and the numerous rock art sites within the Devil's Garden area.

Hudson's Bay Company fur trappers, who came in the late 1820s, were the first Euro-American explorers in the area, In the 1840s and 1850s, explorers made topographic and railroad surveys. Throngs of emigrants streamed toward Oregon and California farmlands and gold fields on their way into or through Modoc County.

By the 1860s, white settlers in Oregon and California wanted the Klamath and Modoc Indians moved to a reservation and the rest of their traditional territory opened for settlement. The treaty of 1864 established the Klamath Indian Reservation for the Klamath, Modoc and Yahooskin (Northern Paiute) Indians. The Modoc War (1872-1873) effectively ended Indian and white hostilities in the area.

Settlement of the area rapidly increased in the 1870s and 1880s. Sawmills, mining operations, and ranching businesses were soon in full operation. Ranching and limited logging activities continue to be the major economic focus of Modoc County.

The most common historic sites on the Forest are homesteaders' cabins and ranchers' line shacks; mining-related sites; logging railroads and camps and dumps; and emigrant trails and wagon roads (i.e., Applegate, Lassen and Burnett emigrant trails). Of particular importance are several sites associated with the Modoc War of 1872-1873 located in the northwestern portion of the Forest outside of the Lava Beds National Monument. An intense period of Indian-white hostilities is also represented by reputed massacre sites at Fandango Valley and Bloody Point.

Historic ethnic groups – American Indian, Basque, Euro-American, and Chinese – made significant contributions to the local ranching, dairy, logging and mining industries. Ethnic sites include American Indian religious, cultural and resource gathering sites, Basque aspen carvings (dendroglyphs), and Chinese occupation sites. The Civilian Conservation Corps has left its unique legacy on the Forest in the form of roads and trails, fire lookouts, administration sites, recreation facilities, former camp locations and wildlife and fisheries projects. In addition, the Forest was the scene of an early twentieth-century gold rush in the High Grade Mining District in the Warner Mountains.

Collectively, all of the Forest's heritage and cultural resources form a valuable part of the history of this area and the nation as a whole. These non-renewable resources are an irreplaceable part of the fabric of the nation.

Analysis Framework: Statute, Regulation, Land and Resource Management Plan (LRMP), and Other Direction

Direction relevant and specific to the Proposed Action as it affects cultural resources includes the following:

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. 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. 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 ACHP's 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 Programmatic Agreement (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.

According to the Modoc National Forest Land and Resource Management Plan (LRMP 1991) the following standards (S) and guidelines (G) are designed to facilitate proper identification and management of the Forest's cultural resources:

1. (S) Inventory to identify cultural resource properties prior to any project, activity or license which may affect significant cultural resources consistent with the National Historic Preservation Act of 1966 (as amended) and other pertinent laws and regulations. Adjustments will be made to projects to comply with cultural resource laws.
2. (S) Evaluate cultural resources to determine National Register of Historic Places eligibility.

3. (S) Conserve properties that have been designated on, or are eligible for designation to, the National Register of Historic Places. (Eligibility is assumed if evaluation is incomplete.)
4. (G) Provide for the use and enhancement of cultural resources for educational, scientific, recreational, and other public purposes to the extent consistent with management requirements.
    a. Interpret significant cultural resources through signing, brochures, displays, self-guided tours, and programs. Treat and interpret significant cultural resources appropriate to their assessed value and associated level of public interest.
    b. Continue cooperative efforts with local groups such as the Modoc County Historical society.
5. (S) Protect access and use of sites and locations important to traditional American Indian religious and cultural practices consistent with the American Indian Religious Freedom Act of 1978.
6. (G) Protect cultural resources largely by directing activities or use away from sensitive areas, by maintaining confidentiality, and by informing Forest users of cultural resource protection requirements.

The Forest LRMP had listed as program goals for 1990-1999 the following for cultural resources:

- Protect and manage cultural resources as a non-renewable resource.
- Complete an inventory and evaluation of the Forest's cultural resources by 2050.
- Provide information for public education and enjoyment of the Forest's cultural resources.
- Protect access and use of sites and locations important to traditional American Indian religious and cultural practices.

Effects Analysis Methodology

Each individual route was assessed by either undertaking actual new on-the-ground inventories or using data from prior adequate archaeological surveys. In some instances the actual inventories have been deferred as per specifications within the Motorized Recreation Programmatic Agreement (2006) with the State Historic Preservation Office. Deferred inventory routes are known or believed to receive light use of fewer than 25 vehicles per week. Generally, the overall use of most unauthorized, routes on the Forest; fall within the light use category with overall average use of far less than 25 vehicles per week on average throughout the year. Many of these roads are simply not drivable during some fall, winter, and spring months due to snow cover or muddy conditions. Their main periods of use most likely are from May to November.

For the purposes of this strategy, all cultural resources within route APEs are considered historic properties, even if they have not been formally evaluated using National Register of Historic Places (NRHP) Criteria (36 CFR 60.4), unless they already have been determined not eligible in consultation with the State Historic Preservation Office (SHPO) or through other agreed on procedures (36 CFR 60.4; 36 CFR 800; CARIDAP, etc.). If designation of off-highway vehicle (OHV) routes and specifically defined areas may diminish historic property prospective NRHP values, Forests shall follow the provisions of 36 CFR 800 regarding evaluation and determination of effects, except as provided below.

NRHP evaluation, however, can be deferred for historic properties where (1) no physical damage or reasonable potential for physical damage exists, (2) effects are ambiguous and monitoring is prescribed, or (3) Standard Resource Protection Measures (cf., OHV Programmatic Agreement (PA)) can be prescribed to ensure that the values or potential values of the historic property can be protected. If effects are ambiguous (i.e., origin, age, severity, etc.), then limited-term monitoring (see Monitoring) may be employed to more fully characterize the nature of any

effects, the need for evaluation, or whether additional management measures might be implemented in lieu of NRHP evaluation or other procedures under 36 CFR 800. NRHP evaluation is required at sites where physical damage from past vehicle use is noted, and Forests cannot or will not protect properties from new or ongoing effects using prescribed protection or treatment measures listed in this strategy, the OHV PA, or other measures identified in consultation with the SHPO.

General Guidelines for Effects Analysis for Cultural Resources

The following factors were considered, in part, in making our effects determinations:

1. Spatial: The location of the historic property is the unit of spatial analysis when considering effects in action alternatives. For some historic properties (e.g., Traditional Cultural Property), the setting beyond the historic property's location must also be considered when determining whether an adverse effect will occur.
2. Effects Time Frames:
    - Short-term effects occur within one year.
    - Long-term effects occur up to 20 years.
    - Cumulative effects should be analyzed at a 20-year interval.
3. Measurement Indicator and Rationale: All cultural resources identified within the APE for all alternatives adding facilities to the National Forest Transportation System (NFTS) are considered historic properties for the purposes of this undertaking (Motorized Recreation PA), unless they already have been determined not eligible in consultation with the SHPO or through other agreed on procedures (36 CFR 60.4; 36 CFR 800). When assessing direct, indirect, and cumulative effects, base assessments on a historic property possessing at least one of the following NRHP values (36 CFR 60.4(a – d)) unless specific information already exists:
    - Prehistoric archaeological site: Criterion D
    - Historic archaeological sites: Criterion D
    - Historic structures: Criterion C
4. Identify any Additional Prospective NRHP Values Where Needed (36 CFR 60.4(a)(b)). Use of NFTS roads and trails within historic properties can be approved where such use is recommended by a professional archaeologist (i.e., there is no additional impact to the property expected through managed use of the route or area). Information about past effects can be used in determining whether continued use would cause additional effects.

When assessing effects under Section 106 of the NHPA, an undertaking can have no effect, no adverse effect, or an adverse effect. An adverse effect to a historic property can occur when an undertaking directly or indirectly causes alterations in its character or use. An adverse effect on a historic property occurs when an undertaking alters its important characteristics and is measured by the degree to which it diminishes its location, design, setting, materials, workmanship, feeling or association (Integrity Measures) (36 CFR 800.5(a)(1)). These integrity measures can also be used to characterize the nature of any potential effects, whether they are direct, indirect or cumulative effects; and their severity, whether they are negligible, minor, moderate, or major. The degree to which historic property values are diminished will be used to measure the direct, indirect and cumulative effects of motorized vehicle use on the NFTS.

A direct effect is caused by motorized vehicle uses, or the consequences of such use, including physical damage resulting in or from erosion, down-cutting, rutting, or displacement or damage to cultural features.

Indirect effects are associated with motorized vehicle uses but occur outside designated routes and areas, such as adjacent dispersed camping areas or areas where motorized travel off designated routes or areas may occur. The proximity of sensitive cultural resources, such as rock art, rock shelters, historic structures, and Traditional Cultural Properties, to designated routes or areas is important when determining where resources could be susceptible to greater threats or risks. Indirect effects could include those listed for direct effects, but also include destructive actions like vandalism and looting.

For the purposes of this project and the assumption of NRHP eligibility for all properties, it is not clearly known what the actual effects are from past and continuing use of the proposed OHV routes. It is the professional opinion of the Forest Archaeologist that, while many routes do directly pass through many archaeological sites, and so there is an effect, it is unclear if that effect is "adverse" or not. For most properties the apparent effects are relatively minor, some are negligible and a few, possibly moderate in nature. None has been clearly identified that would significantly lessen potential NRHP values. Therefore, it is proposed to implement the OHVPA recommendation where "effects are ambiguous and monitoring is prescribed" to get a more realistic idea of the nature of the actual effects. Again, given the overall "light" use of these routes by vehicles, it is unlikely that the actual direct use effects are significant.

In determining whether the proposed alternatives could have a direct, indirect, or cumulative effect on historic properties, the following factors were considered:

- Defined route or area. Is use restricted or confined to the established prism? (Road prisms are defined as the archaeological survey "corridor" examined adjacent to the actual road. The Modoc NF archaeological survey (ASR 05-09-1437: Off-Highway Vehicle Corridors. Gates, 2008) covers an area of 30 meters to either side of the physical road.) Is the road well defined with established tracks vs. interweaving, multiple tracks, or otherwise confined to established imprint by vegetation or other limiting physical features?
- Stability of ground surface. Are soils loose or friable and subject to erosion, or stable consisting of natural pavement or other hardened surface?
- Potential subsurface cultural deposits. Does the archaeological or historical site have known subsurface cultural deposits, or is it a type that is likely to have such deposits?
- Public use. Is there evidence of parking on the archaeological or historic site, or people visiting or walking on the site?
- Visibility or public attraction. Is the archaeological or historic site visible to the public, or does it possess cultural or natural features attractive to the public?

Table 3-32. Comparison of Effect Categories under NEPA and NHPA

NEPA	NHPA	Severity
None	No Effect	None – Negligible
Direct Effect	No Adverse Effect	Minor – Moderate – Major
	Adverse Effect	Minor – Moderate – Major
Indirect Effect	No Adverse Effect	Minor – Moderate – Major
	Adverse Effect	Minor – Moderate – Major
Cumulative Effect	No Adverse Effect	Minor – Moderate – Major
	Adverse Effect	Minor – Moderate – Major

If designation or use of routes could diminish the known or prospective values of a historic property, then there is a direct or indirect effect. Their use would result in the historic property

not being affected (i.e., equivalent of no adverse effect). The protection and management measures in appendix B of the Motorized Recreation Programmatic Agreement (PA) should be used where applicable and feasible to lessen or diminish identified effects. Direct or Indirect effects that cannot be treated using measures in appendix B of the Motorized Recreation PA may have an adverse effect on historic properties and require consultation with the SHPO. (A copy of the Motorized Recreation PA is available in the project record.) Where these measures are not applicable or feasible, consultation with SHPO is necessary to identify other alternative protection measures, or evaluation and determination of effects must comply with 36 CFR 800. Where there is uncertainty about possible direct or indirect effects to properties within or in proximity to the APE, including at risk properties described in the Motorized Recreation PA, monitoring may be prescribed.

Assumptions Specific to Cultural Resources Analysis

6. Unauthorized, user-created routes have already affected historic properties within road prisms.
7. Under the action alternatives, use will continue at current levels or possibly slightly increase over time on the designated system, with the prohibition of cross-country motorized travel.

Data Sources

1. Site-specific cultural resource inventories from adequate “prior coverage” inventories or from the OHV route designation project-specific inventory (ASR 05-09-1437: Off-Highway Vehicle Corridors. Gates, 2008).
2. Existing information from cultural resource records, historic archives, maps, and GIS spatial layers

Cultural Resources Indicators

- Degree to which the integrity of historic property values are diminished
- Number of historic properties within unauthorized routes at risk from ongoing use
- Average number of historic properties per acre at risk if new routes or areas are created

Recreation Resources Methodology by Action

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

The prohibition of motor vehicle use off designated NFTS roads would have a beneficial effect on cultural resources throughout the Forest in the short and long terms. It would curtail ongoing effects and reduce the risk and threat to cultural and historic properties that would occur if use were to continue on all unauthorized roads. It would also help eliminate potential effects resulting from the creation of any new routes if cross-country motorized vehicle use were not prohibited. Under this prohibition, most if not all future permitted or other authorized motorized vehicle travel off designated NFTS roads would be subject to NHPA Section 106 compliance, and potential effects to cultural and historic properties could be identified at that time.

Short-term time frame: 1 year

Long-term time frame: 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 new routes or areas are created

Methodology: GIS analysis to identify (1) the number of historic properties at risk within existing unauthorized routes (estimate of ongoing direct and indirect effects curtailed), and (2) the average number of historic properties per acre that would be protected from any new routes created in the future without a prohibition (estimate of indirect effects).

Rationale: Motorized Recreation PA

2. Direct and indirect Effects of Adding Facilities

(adding presently unauthorized roads to the NFTS, including identifying seasons of use and vehicle class)

Short-term time frame: 1 year

Long-term time frame: 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. Changes to the Existing NFTS

(This can include deletions of facilities and changing the vehicle class and season of use)

None of these actions is 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)). Motorized vehicles can already use NFTS roads. Allowing or prohibiting non-highway vehicle use would have no direct, indirect, or cumulative effect on cultural resources.

4. Cumulative Effects

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

Long-term time frame: 20 years

Spatial boundary: Forest administrative boundary (outside of designated wilderness). The geographic scope of the cumulative effects analysis is the project boundary. It was selected because impacts to cultural resources accumulate at the specific location of the cultural resources, irrespective of actions in surrounding areas. Due to this fixed nature of cultural resource sites, the geographical scope is limited to the Forest's 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: The cumulative effects of each alternative (all actions) will describe the additive impact of the alternatives to the existing Forest situation. Under the No Action Alternative, we would expect adverse impacts to be higher than under the action alternatives. Future actions – policy is to avoid effects. Stochastic effects (effects involving chance or probability), such as fire, may have impacts. However, each alternative, when added to past, present, and reasonably foreseeable future actions is not expected to cumulatively lead to increased impacts to cultural resources and historic properties

Rationale: Motorized Recreation PA

Affected Environment and Environmental Consequences

Affected Environment

As of 2008, about 7,000 archaeological (prehistoric and historic) properties have been located and recorded on the Modoc National Forest as a result of over 1,500 primarily project-related archaeological surveys in compliance with provisions of the National Historic Preservation Act. Over 350,000 acres have been adequately inventoried for archaeological properties in this process. At present, it is estimated that the Forest contains about 35,000 or more archaeological sites, primarily prehistoric, but with numerous historic sites as well. There are currently seven archaeological properties listed on the National Register of Historic Places, portions of three major emigrant trails (Applegate, Lassen and Burnett) that are part of the congressionally designated California National Historic Trail and Oregon National Historic Trail systems. Additionally, more than 900 archaeological sites have been determined to be eligible for the National Register of Historic Places, including a major portion of the Medicine Lake Highlands and several archaeological districts, and a thematic class of prehistoric archaeological site (small prehistoric "foraging and logistic locations; Gates 2007) that have potential to yield significant archaeological information. Other locations important to the past and ongoing traditional cultural (including resource gathering and collection) and religious practices of local American Indian tribes are also major cultural locations.

All of these cultural resources are in varying states of integrity – some have been severely degraded by natural processes, livestock grazing, past timber operations and other projects across the landscape, including general use of the Forest by the public for hunting and dispersed recreation activities. Existing roads bisect sites or allow unrestricted access to sites and locations containing recorded and unrecorded archaeological sites and locations of concern for American Indians.

No systematic monitoring on a Forest-wide basis has been undertaken, so there is a lacking of good baseline data for the overall condition of most of the known and recorded archaeological resources on the Forest. Project-specific monitoring does occur to assure that ongoing projects are not significantly or adversely affecting known archaeological resources. Generally, however, most prehistoric archaeological sites appear to be in good condition, with most effects being related to natural weathering processes, and secondarily by effects from livestock grazing and man-made actions.

On an "as-needed" basis in support of various undertakings, as per Section 106 direction, numerous archaeological sites have been evaluated for eligibility to the National Register of Historic Places and either protected from undertaking effects, or have had the effects mitigated. In the past this has been primarily for third-party related undertakings such as natural gas pipelines, electrical transmission lines, and a military defense installation. However, within the past few years there has been a significant increase in Section 110 evaluations for the NRHP.

Environmental Consequences

The environmental consequences for the unauthorized user-created routes have been identified and analyzed based on the nature of the effect that the routes have, or are believed to have, on the associated archaeological sites. The nature of effect varies greatly depending upon how each site is associated with a route. For example, a site may be bisected by a route, it may be adjacent to a route (within 30 meters of either side of the route), it may be adjacent or bisected and have a dispersed recreation camp site (hunters' camp) associated with it, it may have past wood-cutting activity present, etc. Table 1 in Appendix I shows the affected sites within the Proposed Action and the perceived effects. A "direct effect" means that the route actually crosses the site or some associated activity, such as a hunters' camp, and is directly on the site. An "indirect effect" means that the site is adjacent to the road and that there may be signs that users of the road are somehow affecting the site ("pot hunting" or looting); and "none" means that the site is adjacent to the route, but there is no evidence that it has been affected. Cumulative effects are the anticipated effects that would occur through time to sites that continue to be accessible by these routes.

As a note, for the most part, no significant "erosion" was noted on any of the sites visited; this may be due to the relatively flat nature of most of the Forest. The "rutting" may range from very minor visible "two-track traces" to very deep ruts caused by using the road in mudding conditions creating ruts up to 10-20 centimeters in depth. Generally, the overall use of these routes by OHVs and other vehicles is very light, with few roads appearing to get any major use. Also of note are the routes to be added that are actually access and/or maintenance roads for power lines (e.g., COTP, BPA Malin-Warner, WAPA), natural gas transmission lines (e.g., PGT-PG&E and Tuscarora), and the OTH-B Radar Installation. All of the associated sites, if directly affected by these routes, have been subjected to evaluation for the National Register of Historic Places and were either determined to be ineligible and therefore, not affected, or they were determined eligible and had data recovery undertaken as mitigation for the affect. Continued use of these routes by the public, however, could continue to affect those sites determined to be eligible, and still substantially intact and adjacent to the routes.

For the "Severity of Effect" column in appendix I, we have used negligible, minor, moderate, or major. Only the "major" category has the potential to significantly affect potential NRHP eligibility criteria to the point that the eligibility status may be jeopardized. Both the "major" and "moderate" categories may warrant the use of protection measures to lessen or mitigate the effects. For the most part, monitoring is recommended for these sites to determine the exact nature of the effects and to enable the decision as to what would be the best or most practicable mitigation measure to implement on a site-by-site basis. All recorded archaeological sites associated with proposed routes are listed in the following table even if determined ineligible for the NRHP for a previous undertaking. Sites ineligible for the NRHP and sites determined to be unaffected by the route designations will not be proposed for monitoring of effects of the route designations. Routes that have deferred inventory under the Motorized Recreation PA and have known or suspected recorded sites associated with them, but did not have the sites field verified, have the site identified for relocation to confirm their association and assess the nature of potential route effects.

Tribal consultation has not identified any significant effect on access to or use of traditional plant-gathering and collection areas or areas of other traditional cultural practices or religious uses.

See the effects methodology section above regarding how this analysis was conducted.

Alternative 1 – No Action

Direct and Indirect Effects: The effects under this alternative would result in a "status quo", in that any effects occurring at present to cultural and archaeological resources would persist into the future. The creation of new unauthorized roads cross-country would result in the potential for effects on additional cultural and archaeological resources as new areas are opened up and made accessible by the routes. New roads would continue to run across archaeological sites resulting in surface disturbances, some possible erosion activity, establishment of new camping locations on sites and the illegal collection of surface artifacts, woodcutting activities, and threats to cultural and archaeological features and historic structures, etc. At present there are 374 archaeological sites associated with 347 of the total of 1,660 unauthorized routes. One year and 20-year effects would be similar, with some user-created effects continuing on some of the archaeological sites.

Cumulative Effects: The cumulative effects of this action would result in the continuation of the creation of new unauthorized routes. This would continue to open up new areas that may subject cultural and archaeological resources to potential impacts and vandalism that are now relatively protected by their present inaccessibility by motor vehicle. Thus, the lessening of cultural and archaeological values by public impacts would continue at its present pace, and more resources would continue to be placed in jeopardy.

Alternative 2 – Proposed Action.

Direct and Indirect Effects: This action would allow for the reduction in impacts to cultural and archaeological resources by prohibiting cross–country travel which includes the use of some unauthorized routes that are affecting resources. When effects on sites are currently considered to be negligible or minor; monitoring done for a period of three years on a random sample of sites, will be used for the identification of any further effects. Possible effects might be looting, rutting, or those caused by camping on the sites. The information gathered from monitoring will be the basis for the design of measures used to lessen those effects. Possible measures to lessen the effects might be closing the route, rerouting the road or closing the area to camping. Additionally the closure of FS RD 46B29HB would help to lessen the known negative effects to cultural and archaeological resources in that vicinity. Specifying periods of use for certain roads may reduce or prevent serious "rutting" of the roads through archaeological sites and lessen some amount of artifact displacement and disturbance. There may be some increase in effects to the archaeological sites associated with the routes being added to the NFTS as a result of increased use due to the ban on cross-country travel and the creation of new routes. Overall, however, this alternative should reduce negative effects on cultural and archaeological resources across the Forest and limit the creation of new effects to sites not currently associated with a route due to the ban on cross-country travel. At present there are 234 archaeological sites associated with 195 of the total of 1,168 unauthorized routes proposed for adding to the NFTS. One-year and 20-year effects would be similar, with effects continuing on some of the archaeological sites associated with designated routes; those sites associated with routes not designated for use should have reduced effects.

Cumulative Effects: This action would allow for the continued reduction of potential impacts to cultural and archaeological resources by banning cross-country travel. Additionally, the closure of FS RD 46B29HB would help to lessen the known negative effects to cultural and archaeological resources in that vicinity. By specifying periods of use for certain roads, this action may reduce or prevent serious "rutting" of the roads through archaeological sites and lessen some amount of artifact displacement or disturbance. Overall, this alternative should reduce negative effects on cultural and archaeological resources across the Forest.

Alternative 3

Direct and Indirect Effects: In this alternative cross-country travel would be prohibited which includes the use and creation of unauthorized roads. At present there are 374 archaeological sites associated with 347 of the total of 1,660 unauthorized routes. This action would allow for the reduction of potential impacts to cultural and archaeological resources associated with these routes. This alternative does not close FS RD 46B29HB, therefore the known negative effects to cultural and archaeological resources would continue in that vicinity.

Cumulative Effects: This action would reduce potential impacts to cultural and archaeological resources by banning cross-country travel which includes the use of unauthorized routes. Additionally, keeping FS RD 46B29HB open for public use would perpetuate the known negative effects to cultural and archaeological resources in that vicinity.

Alternative 4

Direct and Indirect Effects: This action would allow for the reduction in impacts to cultural and archaeological resources by prohibiting cross-country travel which includes the use of certain routes that are affecting resources. When effects on sites are currently considered to be negligible or minor; monitoring done for a period of three years on a random sample of sites, will be used for the identification of any further effects. Possible effects might be looting, rutting, or those caused by camping on the site. The information gathered from monitoring will be the basis for the design of measures used to lessen those effects. Possible measures to lessen the effects might be closing the route, re-routing the road or closing the area to camping. Additionally the closure of FS RD 46B29HB would help to lessen the known negative effects to cultural and archaeological resources in that vicinity. By specifying periods of use for certain roads, this action may reduce or prevent serious “rutting” of the roads through archaeological sites and lessen some amount of artifact displacement or disturbance. Overall, this alternative should reduce negative effects on cultural and archaeological resources across the Forest. At present there are 209 archaeological sites associated with 181 of the total of 1,024 unauthorized routes to be added to the NFTS. One-year and 20-year effects would be similar, with some user-created effects continuing on some of the archaeological sites associated with designated routes; those sites associated with routes not designated for use should have reduced effects.

Cumulative Effects: This action would allow for the continued reduction of potential impacts to cultural and archaeological resources by banning cross-country travel. Additionally, the closure of FS RD 46B29HB would help to lessen the known negative effects to cultural and archaeological resources in that vicinity. By specifying periods of use for certain roads, this action may reduce or prevent serious “rutting” of the roads through archaeological sites and lessen some amount of artifact displacement or disturbance. Overall, this alternative should reduce negative effects on cultural and archaeological resources across the Forest

Alternative 5

Direct and Indirect Effects: This action would allow for the reduction in impacts to cultural and archaeological resources by prohibiting cross-country travel which includes the use of certain routes that are affecting resources. When effects on sites are currently considered to be negligible or minor; monitoring done for a period of three years on a random sample of sites, will be used for the identification of any further effects. Possible effects might be looting, rutting, or those caused by camping on the site. The information gathered from monitoring will be the basis for the design of measures used to lessen those effects. Possible measures to lessen the effects might be closing the route, re-routing the road or closing the area to camping. Additionally, the closure of FS RD 46B29HB would help to lessen the known negative effects to cultural and archaeological resources in that vicinity. By specifying periods of use for certain roads, this

action may reduce or prevent serious "rutting" of the roads through archaeological sites and lessen some amount of artifact displacement or disturbance. There may be some increase in effects to the archaeological sites associated with the routes being added to the NFTS as a result of increased usage. Overall, however, this alternative should reduce negative effects on cultural and archaeological resources across the Forest and limit the creation of new effects to sites not currently associated with a route due to the ban on cross-country travel. At present there are 234 archaeological sites associated with 195 of the total of 1,168 unauthorized routes proposed for adding to the NFTS. One-year and 20-year effects would be similar, with some user-created effects continuing on some of the archaeological sites associated with designated routes; those sites associated with routes not designated for use should have reduced effects.

Cumulative Effects: This action would allow for the continued reduction of potential impacts to cultural and archaeological resources by banning cross-country travel. Additionally, the closure of FS RD 46B29HB would help to lessen the known negative effects to cultural and archaeological resources in that vicinity. By specifying periods of use for certain roads this action may reduce or prevent serious "rutting" of the roads through archaeological sites and lessen some amount of artifact displacement or disturbance. Overall, this alternative should reduce negative effects on cultural and archaeological resources across the Forest.

Summary of Effects Analysis Across all Alternatives

Based upon the ranking of alternatives and their potential to affect cultural and archaeological resources it appears that both the Proposed Action (Alternative 2) and Alternative 5 have equal ranking. The alternative with the most continuing effects on cultural and archaeological resources is the No Action Alternative (Alternative 1). Alternative 3 could have been ranked higher if it actually "closed" all of the unauthorized routes. This alternative does *not* include these routes on the MVUM for the Forest. The assumption is that these routes will no longer be used by the public.

Figure 3-19. Number of Unauthorized Routes to be Added, by Alternative

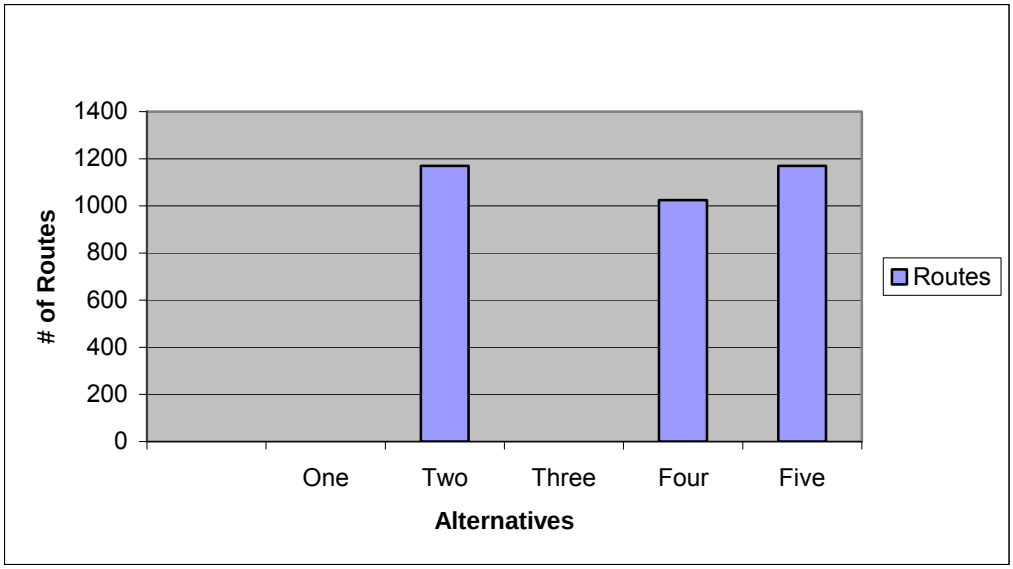


Figure 3-20. Comparison of Number of Potentially Affected Sites Across all Alternatives

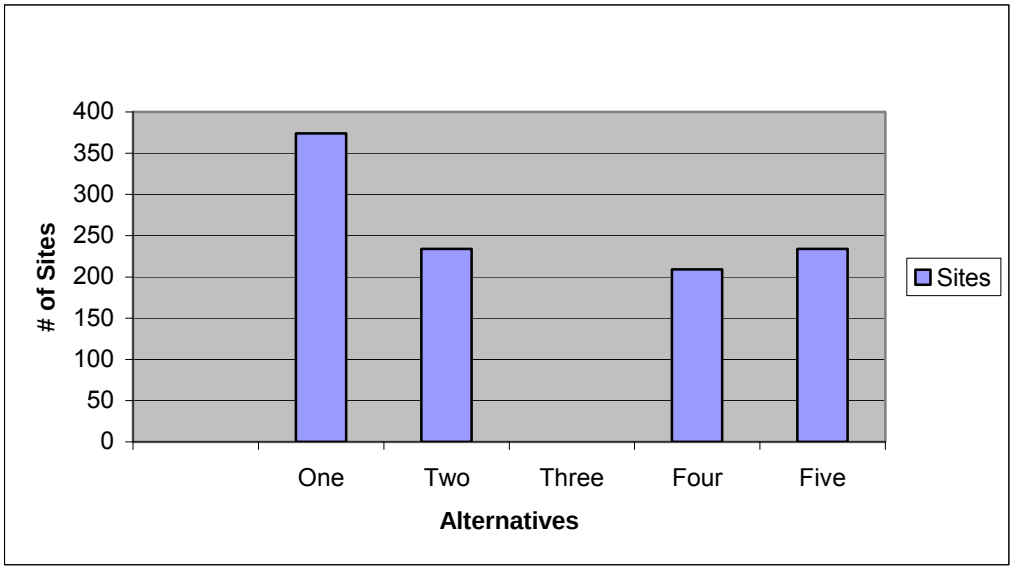


Table 3-33. Summary of Effects Analysis Across all Alternatives

	Rankings of Alternatives for each Indicator[1]				
Indicators – Cultural Resources	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Degree to which the integrity of historic property values are diminished	1	4	4	4	4
Number of historic properties within unauthorized routes at risk from ongoing use	1	2	4	4	2
Average number of historic properties per acre protected from creation of new routes	1	5	5	5	5
Average for Cultural Resources	1	3.7	4.3	4.3	3.7

1. A score of 5 indicates the has the least impact for cultural resources related to the indicator; a score of 1 indicates the alternative has the highest impact for cultural resources related to the indicator.

Compliance with the LRMP and Other Direction

All proposed alternatives would be in compliance with LRMP standards and guidelines and existing historic preservation law, policy and regulation to the extent that the Forest is in current compliance with those regulatory directions. As with all compliance-related measures, funding is a key factor in the Forest's ability to fully comply with directions.

Soils and Water

Introduction

A healthy and functional watershed relies on an equilibrium, or balance, in the soil productivity, soil quality, water quantity, and water quality. The soil resource provides many essential functions for national Forest 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.

Protection of water quantity and quality is an important part of the mission of the Forest Service (Forest Service Strategic Plan for 2007 to 2012, July 2007). Management activities on national Forest lands must be planned and implemented to protect the hydrologic functions of Forest watersheds, including the volume, timing, and quality of stream flow. 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 (e.g., Foltz, 2006). Management decisions to eliminate cross-county motorized travel, add new routes and areas to the National Forest Transportation System (NFTS), and make changes to the existing NFTS must consider effects on watershed functions.

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

Direction relevant to the Proposed Action as it affects the soil resource includes the following:

National Forest Management Act of 1976: Renewable Resource Program. "(C) 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. The analysis standards address three basic elements for the soil resource: (1) soil productivity (including soil loss, porosity and organic matter), (2) soil hydrologic function, and (3) 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. Use of the thresholds and indicators provides a consistent method to analyze, describe, and report on soil condition throughout the region.

Clean Water Act of 1948 (as amended in 1972 and 1987): establishes as Federal policy for 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).

Non-point source pollution on national Forests is managed through the Regional Water Quality Management Plan (USDA Forest Service, Pacific Southwest Region, 2000), which relies on implementation of prescribed best management practices (BMPs). The Water Quality Management Plan includes one BMP for off-highway vehicle (OHV) use (4-7) and 28 BMPs related to road construction and maintenance (2-1 to 2-28) (See appendix G). All NFTS roads and trails open to OHV use are required to comply with these BMPs.

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.

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 non-point-source pollution and best management practices.

The Porter-Cologne Water-Quality Act, as amended in 2006, is 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 Northwest Forest Plan (NWFP) Aquatic Conservation Strategy (ACS) includes standards and guidelines that apply to the six Forests included entirely or partially within the Northwest Forest Plan. The ACS standards and guidelines require that a watershed analysis be completed that determines the influence of each road on ACS objectives, and that roads be designed to minimize impacts on riparian and aquatic resources. Construction of new roads in wetlands is prohibited. Adding unauthorized routes to the NFTS in meadows or wetlands constitutes road construction, and should be avoided. Stream crossings are required to be designed to pass a 100-year flood and allow for passage of aquatic fauna.

The Sierra Nevada Forest Plan Amendment (SNFPA): The Record of Decision (ROD) for the 2004 SNFPA includes standards and guidelines that apply to the 10 Sierra Nevada Forests for construction and relocation of roads, and for management of riparian conservation areas (RCAs). These standards and guidelines require the Forest Service to avoid road construction, reconstruction, and relocation in meadows and wetlands (SNFPA S&G 70). Reconstructing unauthorized routes to bring them to NFTS standards in meadows or wetlands should therefore be avoided. Only routes that already meet NFTS standards in meadows and wetlands should be proposed for addition to the NFTS. SNFPA S&G 92 requires that the Forest Service evaluate new management activities within RCAs and critical aquatic refuges (CARS) during

environmental analysis to determine consistency with riparian conservation objectives (RCOs) at the project level and the Aquatic Management Strategy (AMS) goals for the landscape. Adding an unauthorized route to the NFTS is a new management activity and must comply with S&G 92. SNFPA S&G 100 requires the Forest Service to maintain and restore the hydrologic connectivity of streams, meadows, and wetlands by identifying roads and trails that intercept, divert, or disrupt flows paths and implementing corrective actions. SNFPA S&G 102 requires that the Forest Service determine if stream characteristics are within the range of natural variability prior to taking actions that could adversely affect streams.

There is a small portion of the Modoc National Forest covered by the NWFP ROD, as well as areas of the Forest that are exempt form the SNFPA ROD. Where that situation exists, the appropriate standard and guideline would be based on the Modoc National Forest (MDF) Land and Resource Management Plan (LRMP) prior to 2004.

The Modoc National Forest LRMP provides for standards and guidelines for management areas. The General Forest Management Area includes areas for multiple use and soil and water standards and guidelines have been developed. These S&Gs are as follows:

MDF LRMP Soils and Watershed Standards and Guidelines for General Forest

Soils

Maintain soil productivity by applying guidelines to areas where management prescriptions are applied.

Monitor for implementation and effectiveness. Areas not meeting guidelines will be rehabilitated. As a minimum, 85 percent of areas affected by soil disturbing activities will not exceed soil property thresholds.

- Soil porosity is at least 90 percent of its natural conditions.
- During wet soil conditions limit mechanical or heavy equipment and other soil disturbing activities to designated routes.
- The mineral organic matter in the upper 12 inches of soil should be at least 85 percent of its natural conditions.
- Design management activities not to exceed an average allowable soil loss of one ton per acre per year.
- During project planning, verify areas where soil productivity has been degraded.
- Complete an SRI Order 2 or field verify an SRI Order 3 during the planning phase of each site disturbing or vegetation manipulating project. [SRI order is the soil resource inventory. It describes the level of intensity of a soil survey. An SRI order of 3 is a broader-level soil survey than an SRI order 2.] Develop specific soil mitigation measures and soil conservation management practice for each project site as needed.

Water

1. Implement Best Management Practices (BMPs) to meet water quality standards and maintain and improve the quality of surface water on the Forest
2. Identify methods and techniques for applying BMPs during project-level analysis and incorporate into project plan.

3. Evaluate the effectiveness of BMPs in attaining standards and protecting beneficial uses through on-site inspection, field observation, and water data collection on a case-by-case basis.
4. To minimize the risk of off-site cumulative impacts from management activities on stream channel conditions and water quality, conduct a cumulative watershed effects analysis of each land-disturbing activity on the appropriate second- or third-order watershed prior to undertaking.

Effects Analysis Methodology

Direct and indirect effect analysis to soil and water quality was based on identifying areas of risk on the Modoc National Forest. This used GIS and completed and published Order 3 SRI. From the Order 3 SRI the topography, maximum erosion hazard rating (MEHR), water runoff potential (WROP), watershed sensitivity (WSS), and slope stability hazard were tabulated in a data sheet.

1. Overlaying the proposed routes from the Alternatives 1 through 5 over GIS coverage layers, a risk assessment of a adverse effect to soil and water quality was completed. The following is a description of the risk assessment:
2. When the MEHR for a soil was low or moderate and water runoff potential was very slow to moderate and watershed sensitivity was low to moderate and slope stability hazard was low to moderate, no field checking was completed.
3. When the above rating factors were exceeded, then the route was field checked and it was noted if the trail was eroding. If so, it is field determined if the erosion exceeds MDF LRMP standards and guidelines.
4. Determination of where on the Forest the land forms are present on the National Forest System (NFS) lands that would likely to become unstable from the addition of unauthorized OHV routes.
5. Determination by field checking the route to determine if the route in its current condition was consistent with BMP 1.17 (Erosion Control on Skid Trails), 1.19 (Stream course and Aquatic Protection), and 2.26 (Obliteration or Decommissioning of Roads).
6. All of the routes proposed within RCAs were field checked, and it was determined if there was a hydrologic connectivity to a perennial or seasonally flowing stream course.
7. All of the routes on soils with high to very high, or rapid to very rapid water runoff potential (WROP) within the Warner Mountain Ranger District, were field checked.
8. Bulk density samples were taken on the routes and immediately off-route, and the results compared at selected sites across the Forest to determine the level of disturbance. These sites were randomly selected across the Forest and the results disclosed in cumulative effects section of this report.

Cumulative effects analysis to soil and water quality was based on the percentage of sub-watershed (less than 5 percent) being affected by the proposed routes, whether the sub-watershed had the risk factors (slope stability hazard (SSH), water runoff potential (WROP), watershed sensitivity (WSS) and maximum erosion hazard rating (MEHR)) present that made it prone to sustain a adverse cumulative effect to soil or water quality.

1. Within a 6th Field HUC, when the high risk factors for the occurrence of a CWE (cumulative watershed effect) are not present, then a modified approach to cumulative effect was completed. It was determined by the Forest hydrologist that when 80 percent of the sub-watershed did not have a SSH High, WROP Rapid or greater, WSS of High or greater and MEHR of High or greater, and less then 5 percent of the 6th Field HUC was in roaded acres (combination of existing system roads and proposed additions to the transportation system) then soil bulk density samples were obtained on the route and off route for comparison

instead of completion of the ERA-TOC (equivalent roaded acres threshold of concern). Methodology as used in the R5 Cumulative Watershed Effects (CWE) Analysis.

2. When the sub-watershed had more then 20 percent of the sub-watershed had the high risk factors, then a detailed R5 CWE Analysis was completed, without regard to the percent of the 6th field HUC that contains roaded acres.

Second, there is the analysis of each alternative as a whole, which is informed by the site-specific route analysis noted above and other pertinent information, such as soil type or soil map unit, soil compaction, soil erosion potential and proximity of the route to water. The discussion of the direct, indirect, and cumulative effects of each alternative is in a summary form. For ease of documentation and understanding, the effects of the alternatives are described separately for five discreet actions and then combined to provide the total direct and indirect effects of each alternative (see below). The combination of these discreet actions is then added to the past, present, and reasonably foreseeable actions in the cumulative effects analysis. The three discreet actions common to all action alternatives are (1) The prohibition of cross-country motor vehicle travel; (2) The addition of facilities (unauthorized roads, trails, or areas) to the National Forest Transportation System (NFTS), including identifying seasons of use and vehicle class; and (3) Changes to the existing NFTS [this can include deletions of facilities and changing the vehicle class and season of use]. This discussion goes in Chapter 3 of the EIS, and is the focus of this Effects Analysis Methodology section.

Affected Environment and Environmental Consequences

Affected Environment

The Modoc National Forest is covered by three unique settings that have greatly influenced the development of the soils. These unique settings are as follows:

1. Basalt Plateau and lava fields: The soils over the majority of the Doublehead and Devils Garden Ranger Districts are derived of volcanic deposits. They are coarse-textured soils for the most part due to the high amount of surface and subsurface rock content with a low percentage of fine textured clays. For the most part, the slopes are relatively gentle (5 to 20 percent), the water runoff potential is very slow to moderate, maximum soil erosion hazard rating of low to moderate, and slope stability hazard/watershed sensitivity is low to moderate. The Tionesta area of the Devils Garden Ranger District is composed of moderately deep to deep volcanic overburden. These are very porous soils that are well drained, have rapid to extremely rapid permeability, and do not easily compact under a heavy load. The occasional presence of rock outcrop causes the water runoff potential to increase to rapid, but this accounts for generally less than 5 to 10 percent of the area.
2. Undulating hillsides: The soils over the majority of the Big Valley Ranger District are moderately deep soils with gentle to undulating slopes (5 to 25 percent), the water runoff potential is very slow to moderate, maximum soil erosion hazard rating is low to moderate, and slope stability hazard/watershed sensitivity is low to moderate. There are isolated patches of soils that have a high and very high maximum erosion hazard rating based on steeper hillsides. But this generally does not constitute more than 10 percent of the Big Valley Ranger District.
3. Steep mountainsides: the soils associated with the Warner Mountains are moderately deep, and fragile. The slopes of the Warner's are steeper than at any other location on the Forest, with more acreage of slopes greater 40 percent than on other two land forms. The erosion hazard rating is moderate to high and very high on approximately on 40 to 60 percent of the

soils, a water runoff potential of rapid to very rapid, and a slope stability/watershed sensitivity of moderate to high on more than 25 percent of the hillsides.

Table 3-34. Soils with High Risk Factors, by District

Ranger District	Acreage	Miles of Routes on Soils with High Risk Factors
BV	494,307	0
DG and DH	1166,638	0
WM	361,564	20.1
Totals	2,022,509	20.1

These same land forms have greatly influenced the water quantity and quality across the national Forest.

Doublehead and Devils Garden Ranger Districts

The Doublehead and Devils Garden Ranger Districts generally have a lack of hydrologic connectivity of its stream network. There are few if any perennial streams, but a relatively large amount of seasonally flowing streams that drain into a reservoir, stock pond, or other depression in the ground and act to recharge the groundwater table. The Basalt Plateau is a highly fractured substrate that is not prone to holding surface waters unless there is a subsurface hardpan present. These areas are up on the basalt plateau and over geologic time have been subject to lava flows. The reservoirs on the above-referenced districts have a tendency for seasonally wet bodies of water that have a tendency to dry out in August and September, with the exception of the larger bodies of water like Clear Lake and Big Sage Reservoirs.

Big Valley Ranger District

The Big Valley Ranger District has hydrologic connectivity of its stream network to the Pit River. These perennial streams (most notably Rush Creek, Ash Creek and a few lesser-known streams), and a relatively large amount of seasonally flowing streams, drain into the Pit River. In the northwestern portion of the district there are sizeable areas of lava flows, rock outcrops, and rubble lands there have depressions formed by the lava flows that seasonally store water that act to recharge basins for the groundwater table.

Lava tubes that have collapsed support riparian areas in the northwestern portion of the district in and around the Long Bell and Hollenbeck Butte area of the district. But generally these tubes do not have hydrologic connectivity to other streams and eventually the water either evaporates to the atmosphere or recharges the groundwater table in the late summer. The reservoirs on the above-referenced district have a tendency to be seasonally wet bodies of water that dry out in August and September.

The topography of the Big Valley Ranger District has gently sloping hillsides with moderately deep to deep soils. These hillsides are generally in the slope range of 5 to 25 percent with a noticeable lack of inner gorges, steep slopes, or unstable hillsides. The soils on these hillsides are a coarse-textured soil with a relatively high amount of rock content in the subsoil and on the surface. There is a general lack of soils that have either a high to very high MEHR or rapid to very rapid WROP.

Warner Mountain Ranger District

The Warner Mountain Ranger District has hydrologic connectivity of its stream network to the North and South Fork of the Pit River and Goose Lake (slope break westward) and Alkali Lakes (Upper, Middle and Lower) and Fort Bidwell Indian Reservation (slope break eastward). The district has largest amount of perennial streams on the Forest. They drain from the slope break of the Warner Mountains eastward (most notably Parker Creek, Joseph Basin Creek, Fitzhugh Creek, and a few lesser-known perennial streams) into North Fork of the Pit River. There are a series of seasonally flowing streams associated with the perennial streams on both sides of the slope break of the Warner Mountains. There are a series of fens, meadows and other special aquatic features all up and down on both sides of the slope break of the Warner Mountain Range.

Davis Creek, Lassen Creek, and a few lesser-know perennial streams located in the northeastern portion of the districts drain into Goose Lake. Goose Lake appears on the map to drain into North Fork of the Pit River, but in reality is a closed basin with no hydrologic connectivity or outlet and only adds water to the North Fork of the Pit River when it overtops its dam during an extremely wet year. In essence it is a giant sediment retention pond. In the southeastern portion of the district there is a perennial lake known as Blue Lake. It supports a year-round fishery, but is a closed basin.

Bidwell Creek, Cedar Creek, and Emerson Creek are the most notable perennial streams located on the east side of the slope break of the Warner Mountains. Bidwell Creek and its tributary flow into the Fort Bidwell Indian Reservation, into storage basins, then eventually into Upper Alkali Lake. Cedar Creek flows through the community of Cedarville, into irrigation ditches, then eventually into Middle Alkali Lake. Emerson Creek drains south of Eagleville into irrigation ditches, then eventually into Lower Alkali Lake.

The land forms of the Warner Mountains on both sides of the slope break have portions of steep, unstable hillsides with the presence of inner gorges and down-cut stream channels. Depending on which side of the slope break you are on, the soils associated with the Warner Mountains are moderately deep to deep, and fragile. On approximately 40 to 60 percent of the land base of the Warner Mountains, the MEHR is high to very high; the remaining acreage in the Warner Mountains is moderate. These soils within the Warner Mountains have a water runoff potential of rapid to very rapid, and a slope stability/watershed sensitivity of moderate to high on more then 25 percent of the hillsides.

The stream channels of the Warner Mountains sustained a disturbance from the warm rain on cold snowpack event in 1997. In many places across the district with Cedar Creek being the most notable, the main stems sustained elevated bulked stream flow of an event similar to a 100-year event. As a result, many streams that had a Pfankuch rating of good to excellent now have a rating of good to fair, with a few having a rating of poor. (The PFC Rating also went from fully functional—PFC rating of proper—to functional at risk). [Pfankuch rating is a standardized methodology used in the Forest Service to evaluate the hydrologic and geologic stability of stream courses.] These streams are recovering over time as the natural healing processes are occurring.

There are no known municipal watersheds located on the district or Forest. The Fort Bidwell Indian Reservation uses a sub-watershed located within T 46N, and Range 15/16E as a public water source. It is a capped well and not a surface water resource.

Environmental Consequences

Alternative 1: No Action

Under Alternative 1, no new routes would be added to the road system. There would be no seasonal closure of system roads and mixed use would be allowed only on existing level 2 roads. There would be no addition of unauthorized routes to the transportation system. The Boles road would not be closed, and the Pumice Mine roads would not be closed to OHV use. There would be no seasonal closures.

Under Alternative 1, since there would be no unauthorized routes added to the transportation system there would be no routes added on soils that had high to very high MEHR. No OHV trail monitoring (red-yellow-green) has been completed on the mixed use roads. (The red-yellow-green system establishes priorities for maintaining OHV routes.) Routes that were identified as having high to very high maximum erosion hazard were field checked to determine if they were actively eroding. It should be noted under Alternative 1, unauthorized routes on the Forest would continue and there would be no change to the potential for additional unauthorized routes to be created and there would be no ban on cross-country travel.

Mixed use of roads was not analyzed, as it was assumed that there would not be any additions to the NFTS. Therefore, existing routes would be subject to maintenance and erosion control as specified under BMPs 2.7 (Control of Road Drainage), 2.22 (Maintenance of Roads), 2.23 (Road Surface Treatment to Prevent Loss of Materials), and 2.24 (Traffic Control During Wet Periods).

No Riparian Conservation Area (RCA) Analysis was completed on Alternatives 1, as there was no action to analyze.

Conclusion: Under Alternative 1, no new routes would be added to the NFTS, and the only routes that would be used are already part of the transportation system. Since the above-referenced best management practices (BMPs) would be applied, it was determined that neither Alternative 1 nor 3 would result in a direct or indirect adverse effect to soil or water quality.

All of the existing unauthorized routes (491 miles) would still be available for use along with cross-country travel. It was determined by the Forest hydrologist that under Alternative 1, it is unlikely that the selection of Alternative 1 would result in an adverse direct, indirect, or cumulative effect to soil or water quality beyond what is occurring now.

Alternative 2 Proposed Action

Under Alternative 2, there are 1167 unauthorized routes that are proposed to be added to the transportation system. The average road length to be added would be less then a third of a mile long. These routes add approximately 339 miles and constitute approximately 616 acres of roadways with a disturbance coefficient of 110.9 to 166.4 compacted acres across the Modoc National Forest, or approximately 0.01 percent of the land base of the Modoc National Forest. This alternative has the largest number of miles and routes (the same as Alternative 5) to be added to the National Forest Transportation System (NFTS) on the Modoc National Forest. This alternative has the most ground-disturbed sites being added to the transportation system. A total of 6.3 percent of the number of routes (approximately 5.9 percent of the total miles) proposed to be added to the transportation system would have some form of seasonal closure. The Boles Road would be closed to all use and the Pumice road would be closed to OHV use.

- Approximately 78.9 percent of these additions to the transportation system are located on soils with a low to moderate MEHR, very slow to slow WROP, and low to moderate SSH and WSS.

- Approximately 20.1 percent of these additions to the transportation system are located on soils with a high to very high MEHR, rapid to very rapid WROP, and high or greater SSH and WSS. These are predominately located in the Warner Mountain Ranger District and were field checked by the Forest hydrologist during the summer of 2008.
- Approximately 0.3 percent of these additions to the transportation system are located within the RCAs for perennial streams and lakes. Approximately 5.1 percent are located within the RCAs for seasonally flow streams and seasonally wet lakes. These are predominately located in the Warner Mountain Ranger District and were field checked by the Forest hydrologist during summer of 2008.
- The routes in the Warner Mountains are predominately old skid trails or pre-existing temporary roads that have functional water bars, and are generally not actively eroding. These routes did not display either diversion potential or hydrologic connectivity to the stream courses. In addition, the routes near the higher elevations are generally located on very rocky ground with a high concentration of surface rock that is cobble sized.
- No OHV trail monitoring (red-yellow-green) has been completed on the mixed use roads. Those routes that were identified as having high to very high maximum erosion hazard were field checked to determine if they were actively eroding.
- It should be noted from past project level analysis across the Forest that the consistency of the MDF Order 3 Soil Survey has been field checked. The order 3 SRI has demonstrated a high level of accuracy.

Within the Warner Mountain Ranger District, approximately 40 to 60 percent of the land base contains soils that have a high to very high MEHR and rapid to very rapid WROP. This was estimated from review of the MDF Soil Survey and Home Camp Soil Survey Soil Map Units, and estimating the acres of soils and the range of slopes. This included both 1802 and 1808 HUCs.

During field visits, no evidence was observed of cross-country travel occurring. As discussed under Alternatives 1 and 3, the OHV use on the Forest is generally associated with other Forest recreational activities and predominately consists of ATVs and other OHVs, with a small percentage of motorcycles.

Currently there are approximately 491 miles of unauthorized routes that may be used for OHV travel. This alternative proposes to add 339 miles of those routes and 20 miles or 5.9 percent would receive seasonal closure for resource protection. Most routes were left over from timber harvest activities, stock drives, utility access roads, railroad and utility corridor access, cow trails, or cowboy trails. The most typical condition is the trail tread having a strip of grass on both sides with a strip in the middle. This is characteristic of use by ATVs or pickup trucks, rather than motorcycles. OHV use on the Forest is highest during hunting season.

Currently there are 3,761 miles of existing level 2 system roads designated for mixed use. This alternative proposes to change vehicle class to allow an additional 138 miles of Level 3 system roads for mixed use. The mixed use was not analyzed for direct, indirect or cumulative effects to soil or water quality because the mixed-use roads were already a part of the NFTS.

A high level of long-term, sustained OHV use is not expected as a result of adding unauthorized OHV routes to the NFTS. This is because near the population centers (i.e., towns and cities near the Lassen, Klamath, and Fremont-Winema national Forests and adjacent BLM lands), there are already OHV use areas. Occasionally there is OHV use on the Forest, but it is generally in association with other activities, (e.g., camping, woodcutting, hunting or other Forest recreational use). The typical OHV use on Forest is generally restricted to ATVs and other four-wheel-drive vehicles, with limited motorcycle use. These users tend to use system roads and skid trails or temporary roads.

The majority of the unauthorized routes existing on the Doublehead and Devils Garden (DH and DG) Ranger Districts are open year-round due to the nature of the landscape. In general terms, this area of the Forest has the tendency to receive rainfall rather than snowfall. During the field review, no evidence was observed that cross-country travel was occurring on the DH and DG Ranger Districts. On the Doublehead and Devils Garden Ranger Districts there are approximately seventy-seven 6th Field Sub-watersheds with approximately 1.2 million acres of NFS lands or 58 percent of the Modoc National Forest land base.

The soils in the Tionesta 6th Field sub-watershed are generally deep soils that consist of volcanic overburden that has a rapid permeability and does not have the tendency toward compaction even when wet. A long-term soil productivity (LTSP) study was completed on these soils, and the findings of their research report is incorporated into the analysis by reference (Powers, Robert and et al., The North American long-term soil productivity experiment: Findings from the first decade of research, Journal of Forest Ecology and Management 220 pages 31-50, 2005.). During 2008, BMPEP monitoring of skid trails, temporary roads and landings was completed on these soils. It was observed that even without the use of water bars, these temporary roads, skid trails and landings are not prone to surface runoff occurring. There was no evidence that these soils are prone to rilling, rutting or erosion from overland water movement or runoff.

Eastward from Cedar Pass to the Forest boundary (east side of the Warner Mountains) and north to the Oregon state line and south to the Forest boundary, there is a lack of a SRI Order 3 that identified maximum erosion hazard or slope stability. The land forms are steep with presence of inner gorges, down-cut channels and unstable slopes. These soils on the east side of the Warner Mountains are more sensitive, have a higher clay content, have less rock content, and are presumed to be more prone to higher erosion rates. Past land management activities have shown a lighter touch on the ground due to the sensitivity of these soils and the associated land forms.

For the purpose of this analysis it was presumed that on slopes greater than 30 percent the MEHR was high to very high, WROP was rapid to very rapid, and WSS and SSH was high or greater (basic assumption). This extends eastward approximately eastward from Cedar Pass campground to the Forest boundary. Approximately 20.1 miles of unauthorized routes that are proposed to be added to the transportation system are on soils with a high to very high MEHR and rapid to very rapid WROP.

The remaining routes are spread out across the Warner Mountain Ranger District (thirty six 6th Field Sub-watersheds with approximately 18 percent of the Modoc National Forest land base) and Big Valley Ranger District (fifty 6th Field Sub-watersheds with approximately 24 percent of the Modoc National Forest land base). However, these unauthorized routes are not consistent with BMP 2.26 (Obliteration or Decommissioning of Roads). While these unauthorized routes are made hydrologically stable, they have not been closed to low-level casual use, as identified under explanation of BMP 2.26 (page 80, Water Quality Management for Forest System Lands in California-Best Management Practices, USDA Forest Service, Pacific Southwest Region, September 2000).

The results of the field review done in 2008 showed that only one route on the Warner Mountain district was actively eroding. This was proposed route SS563. The remainder routes would receive a fully compliant with BMPEP T02 (Skid Trails) and E14 (Temporary Roads). Even the route that was actively eroding was only eroding from the water bar to the system road. The eroding treadway was less than 25 feet long and 15 feet wide. It was located on a steep pitch of the hillside, and the roadway of the system road was not hydrologically connected to a perennial or seasonally flowing stream. Under BMPEP T02 would have received a minor departure based on presence of rills but occurrence on less then 20% of the skid trail surface and no evidence of transport into the SMZ.

Mixed use of roads was not analyzed, as they were assumed not to be new additions to the NFTS and are subject to maintenance and erosion control as specified under BMPs 2.7 (Control of Road Drainage), 2.22 (Maintenance of Roads), 2.23 (Road Surface Treatment to Prevent Loss of Materials), and 2.24 (Traffic Control During Wet Periods).

Direct and Indirect Effects to Soil and Water Quality

Alternative 2 and 5 contain the largest amount of acreage of unauthorized routes to be added to the NFTS on NFS lands. Of approximately eighty 6th Field HUCs on the Modoc National Forest, only 9 or 11.5 percent have soils that have maximum erosion hazard (MEHR) of high or very high, and these are limited to the Warner Mountain Ranger District.

Big Valley Ranger District

While the Big Valley Ranger District (BVRD) has soils that have high to very high MEHR and WROP of rapid to very rapid, it has a very low number of routes that are proposed to be added. There are a total 39.1 miles of unauthorized routes that are proposed to be added to the transportation system across 494,307 acres or 0.14 percent of the BVRD. There were no routes that are proposed to be added on soils with a high or very MEHR, and none of these routes is hydrologically connected to perennial streams or lakes, or has diversion potential to streams or lakes. Approximately 90 percent of these routes are located in four 6th Field HUCs.

Since none of these routes is located soils that have either high to very high MEHR or high SSH, none of these routes was field checked. No RCAs were field checked by the Forest hydrologist; they were reviewed, however, by the field crew during sampling for bulk density. No erosion or stream diversion potential was identified during the field visits by the soil sampling crew.

Doublehead and Devils Garden Ranger Districts

Approximately 268.5 miles of the 339 miles are located on the Doublehead and Devils Garden Ranger Districts, or approximately 79 percent of the proposed routes on the Modoc National Forest. This accounts for approximately 0.04 percent of the NFS lands.

These are located on soils that have a low to moderate MEHR and a low to moderate SSH, and have either high rock content in the soil or rock on the surface. These routes are presumed to be compacted and are an average width of 15 feet with a disturbance coefficient of 0.18 to 0.27 acres per mile of unauthorized route. This is based on bulk density samples taken on 60-plus sites across the Forest. To put this in perspective, an acre of fully compacted soil would produce approximately 1.82 acres per mile and a cow trail would result in disturbance coefficient of 0.12 to 0.24 acres per mile of trail. A skid trail created by logging activity would, on the average, result in a disturbance coefficient 0.27 to 0.55 acres per mile. This, of course, is dependent on soil type (deep sandy soil versus clayey soil, and high rock content versus low rock content).

Since none of these routes is located on soils that have either high to very high MEHR or high SSH, none of these routes was field checked by the Forest hydrologist. Approximately 50 routes were sampled for bulk density, and there was no evidence of erosion or of inconsistency with BMPs or R5 SQS standards noted. The field review was completed by archaeological technicians that were trained by the Forest hydrologist on soil sampling. The routes visited were picked at random by the Forest hydrologist. RCA's were selected at random and field checked by the Forest Hydrologist. Not all RCA's were field checked by the Forest Hydrologist, selected sites picked at random were field reviewed by the field crew during sampling for bulk density. No erosion or stream diversion potential was identified during the field visits by the soil sampling crew.

Of the 268.5 miles, only 0.08 miles or 0.15 acres are located within the RCAs for perennial streams or lakes. There are approximately 32 acres within seasonally flowing RCAs created by

the proposed routes. None of these routes was identified as being hydrologically connected to the stream network or has diversion potential to streams or lakes.

Warner Mountain Ranger District

The Warner Mountain RD has soils that have high to very high MEHR and WROP of rapid to very rapid. However, it has a very low amount of routes that are proposed to be added. There are a total 31.4 miles of unauthorized routes that are proposed to be added to the transportation system across 361,564 acres, or 0.02 percent of the WMRD. Approximately 40 to 60 percent of the routes that are proposed to be added are on soils with a high or very high MEHR. The routes that are proposed to be added are old skid trails and temporary roads that have been made hydrologically stable by the installation of water bars. They are compacted, not eroding, and are consistent with BMP 1.17 (Erosion Control on Skid Trails) and BMP 2.26 (Obliteration of Temporary Roads), with the exception of access to the road or skid trail is blocked to low-level casual use.

All of the routes that are located on soils that have either high to very high MEHR or high SSH were field checked. The results of the field review show that only one small section of a trail within the Warner Mountain RD is actively eroding. The portion of the route that was eroding was on a steep pitch of the hillside (slope greater than 30 percent) and the eroding portion was less the 25 feet and was connected to a system road. The system road or route was not hydrologically connected to a perennial stream or lake and was not within the RCA.

There are 1.72 miles of authorized routes or 3.1 acres within RCAs for perennial stream or lakes. The largest concentration is associated with Lassen Creek (0.5 miles or less than 1 acre) and Northwest Shore Middle Alkali Lake (0.7 miles or 1.3 acres). While the routes are located within the RCAs for perennial streams and lakes, they are not hydrologically connected to the stream courses nor are they contributing sediment to the water column.

It is recommended that the following project design standards (PDS) would be applied to Alternative 2. These PDSs are as follows:

BMPs 2.7 (Control of Road Drainage), 2.22 (Maintenance of Roads) and 2.23 (Road Surface Treatment to Prevent loss of Materials)

While these BMPs were designed to prevent unacceptable levels of road runoff and erosion of system roads, the same principles should be applied to the routes added to the transportation system. These routes would be added as ML 2 roads and not as trails. These are mostly preventive measures, but a key component of this BMP is the development of an erosion control plan and maintenance of erosion control structures.

BMP 2.24 (Traffic Control during Wet Periods)

The application of this BMP is a preventive measure in nature, and is dependent on the changing effect of climate. As the authorized routes become saturated, the use of the roads should be restricted to times when rutting of the tread is not likely to occur. Under normal conditions, this is unlikely to occur except for a few times during the year. This should be accomplished by coordination between the OHV manager and the Forest hydrologist. The final decision will be made by the line officer.

BMP 4.7 (Water Quality Monitoring of OHV Use According to a Developed Plan)

Under this plan, the OHV Soil Monitoring Protocol (green-yellow-red) was developed in Region 5 as a standardized, region-wide trail-monitoring methodology, and should be implemented. (The green-yellow-red system establishes priorities for maintaining OHV routes.) It is expected that all trails with a distance greater then 0.5 miles in length would be monitored by the OHV manager or

his or her designated representative over the next ten years. The results of the monitoring would enable the OHV manager to prioritize the need for trail maintenance.

Conclusion

With the adoption of the above-referenced PDS, it is unlikely that Alternative 2 would result in a direct or indirect adverse effect to soil or water quality.

Cumulative Effects to Soil and Water Quality

Of the 120-plus 6th Field HUCs on the Modoc National Forest, approximately 80 sub-watersheds contain unauthorized routes that are proposed to be added to the transportation system under Alternative 2. Of these nearly eighty affected sub-watersheds, all but nine had over 80 percent of their land base acreage with low risk factors that would make them likely lead to the occurrence of a cumulative effect to soil or water quality. These risk factors are as follows:

- Maximum Erosion Hazard Rating (MEHR) of high to very high
- Slope Stability Hazard Rating (SSH) of high to very high
- Water Runoff Potential (WROP) of rapid to very rapid
- Watershed Sensitivity (WSS) of high to very high
- Slopes greater than 40 percent

The nine 6th Field sub-watersheds that have more then 20 percent of the land base with the above-referenced risk factors are located within the Warner Mountain Ranger District and are included in both the 1802 and 1808 HUCs. These 1802 HUCs or sub-watersheds drain predominately into Goose Lake with little or no hydrologic connectivity to the Pit River. The 1808 HUCs drain into the alkali lakes to the east of the Forest boundary and do not have hydrologic connectivity to perennial waters downstream.

Modified CWE Process

The modified CWE process stipulated that when a 6th Field sub-watershed contains less than 20 percent occurrence of high risk factors and less than five percent of the land base would be compacted from the transportation system and proposed routes, then soil bulk density samples would be obtained, and the results compared instead of the traditional ERA-TOC Methodology.

Of the 120-plus 6th Field HUCs on the Modoc National Forest, approximately 80 sub-watersheds contain unauthorized routes that are proposed to be added to the transportation system under Alternative 2. All of these affected sub-watersheds contain less than five percent of its land base that would be compacted from the existing transportation system plus addition of proposed routes.

Of these nearly eighty affected sub-watersheds, all but nine had more than 80 percent of their land base acreage with low risk factors that would make them likely to lead to the occurrence of a cumulative effect to soil or water quality. Soil bulk density samples were taken at random across the 80 affected sub-watersheds to compare the amount of compaction that was occurring on the routes, versus the amount of compaction occurring adjacent to the routes.

Bulk density is a direct field measurement that includes air space, as well as soil volume; thus, these measurements are related to soil porosity. Excessive trampling by grazing animals, use of heavy machinery, and intensive recreational use or disturbance while soils are wet will increase bulk density, particularly of finely textured soils (Pritchett, William L., Properties and management of Forest Soils, John Wiley and Sons, 1979). The change of bulk density shows how the roadway has changed or altered the soil porosity.

It is expected that on the Big Valley, Devils Garden and Doublehead Ranger Districts, there would be a relatively low amount of change of the bulk density (0 to 15 percent) of the OHV routes. This is due to the low amount of fines (clay content) in the soil, and the high amount of coarse material (rock, gravel and cobbles on the soil surface and in the subsoil) in the soil. Within the Warner Mountain Ranger District, there should be a relatively higher amount of change in the bulk density (15 to 30 percent) of the soil in the OHV Routes, mainly due to the higher amount of fines (clay content) and a lower amount of coarse material in the soil and subsoil.

Bulk density was sampled across the Modoc National Forest on sites that were picked at random that sampled a wide range of soils and watershed conditions.

- The results of the sampling across the Modoc National Forest show that, of the 62 routes that were sampled, 23 routes or 37.1 percent showed no discernable change in soil compaction on the routes, as compared to the undisturbed areas of the Forest. Twenty-five routes had less than 20 percent increase in soils compaction of the undisturbed adjacent area, or 40.3 percent. Only 14 routes showed a soil compaction increase of 20 to 40 percent or 22.6 percent over undisturbed areas of the national Forest.
- Of the routes that showed an increase in soil compaction greater then 20 percent over the undisturbed areas, five samples were obtained in the Lassen Creek, Ross Creek and Willow Creek sub-watersheds. The Lassen and Ross Creek had more than 20 percent of the land base with high risk factors and were analyzed under the R5 CWE TOC-ERA methodology. Willow Creek sub-watershed did not have more then 20 percent high risk factors. Less than five percent of the affected sub-watershed had roaded acres, it was analyzed under the modified CWE approach.

Assuming the worst-case scenario that 22.6 percent of the routes would have increased soil compaction over undisturbed areas by 20 to 40 percent, this would equate to approximately 113 to 225 roaded acres that would have some form of soil compaction, but not be fully compacted. These acres are spread out across approximately 80 sub-watersheds with less than one percent of the land base that would have an increase in the potential runoff. Since the routes are disconnected from stream crossings and these soils has either rapid permeability or a high percent of rock on the surface or rock content in the soil profile, this small increase of runoff would not adversely affect the sub-watershed process. These sub-watersheds have less than five percent of the land base in roaded acres, and do not have the high-risk factors present.

Conclusion

None of the sub-watersheds, with the exception of the nine affected sub-watersheds within the Warner Mountain Ranger District, has a high risk factor of WROP, SSH, or WSS. The routes are not hydrologically connected to perennial or seasonally flowing stream network, and the runoff potential increased by the soil compaction levels of the routes is generally less then 1 percent over adjacent undisturbed areas. Based on these facts, it has been determined that under Alternative 2, the addition of the proposed routes to the NFTS is unlikely to result in an adverse cumulative effect to soil or water quality.

Region 5 Cumulative Watershed Effect Process

Nine of the 80 identified 6th field sub-watersheds (see following table) were analyzed under the ERA-TOC methodology. Threshold of Concern (TOC) was developed by determining the amount of acreage in each sub-watershed of the above referenced high risk factors. The identified TOC was established at 12 percent, and ERAs for the sub-watersheds were identified based on ground disturbing activities that have occurred over the past 30 years. The proposed routes were originally skid trails and pre-existing temporary roads associated with past harvest activities. The

ERAs created by them were originally incorporated as an infrastructure associated with harvest activities, and part of the disturbance coefficient.

The following are the result of the ERA-TOC Methodology CWE Analysis completed on the nine affected sub-watersheds that are not covered under the Modified CWE Process. Please refer to Table 3-35, below.

Table 3-35. Summary of Results of ERA-TOC CWE Analysis

6th Field HUC #	6th Field HUC Name	2008 % TOC	2013 % TOC	2018 % TOC
180200010305	Lassen Creek	32.4	27.4	24.3
180200010306	Ross Creek	28.5	26	24.8
180200010307	Davis Creek	31.1	27.9	25.4
180800010102	Bidwell Creek	21.9	21.5	21.3
180800010103	Upper West Shore Upper Alkali Lake	27.4	23.1	20.2
180800010104	Lower West Shore Upper Alkali Lake	28.3	25.2	22.3
180800010201	Northwest Shore Middle Alkali Lake	42.2	40.4	33.7
180800010202	West Shore Middle Alkali Lake	15.4	14.2	13.1
180800010303	Bare Creek	23.2	20.1	17

The results of the ERA-TOC R5 CWE methodology displayed above show that none of the sub-watersheds above are approaching 80 percent of TOC. Over the next 10 years, the 6th Field sub-watersheds will recover and the percent of TOC will drop into the 20 to 30 percent range. In addition, the routes are hydrologically stable and are not connected to perennial or seasonally flowing stream courses. Therefore, it has been determined that under this action alternative, it is unlikely that an adverse cumulative effect to soil or water quality would occur.

Reasonably Foreseeable Actions

Devils Garden and Doublehead Ranger Districts: Over the next 10 years, fuels reduction and plantation thinning are proposed to be implemented across the Devils Garden Ranger District. At this point in time there little is known of a site-specific nature on the acres to be treated by mechanical activities. But one could presume that approximately 1,000 to 2,000 acres could be potentially treated by hand and the same amount of acres could be treated mechanically. This would most likely occur in the Taylor Creek 5th Field sub-watersheds (1802000211) Since these sub-watersheds do not have the occurrence of high risk factors, it is not likely that they would add to the risk of a cumulative effect. These projects would be analyzed for direct, indirect, and cumulative effects to soil and water quality during a separate NEPA process. The effects to soil and water quality would be minimized through the application of MDF LRMP S&G, BMPs and R5 SQSs.

Big Valley Ranger District: A fuels reduction project is being analyzed in the Ash Creek 5th Field Watershed. However, there are no unauthorized routes proposed within its affected sub-watershed. These projects would be analyzed for direct, indirect, and cumulative effects to soil and water quality in a separate NEPA process. The effects to soil and water quality would be minimized through the application of MDF LRMP S&G, BMPs and R5 SQSs.

Warner Mountain Ranger District: At this time, the Lassen Creek and Cedar Pass projects are being planned. The Lassen Creek fuels reduction encompasses areas of Lassen Creek, Willow Creek, Davis Creek, and Ross Creek. This project is most likely to contain mechanical activity

that could create additional soil compaction. At this point in time, the Lassen Creek project is a 2010-and-beyond project. Little is known on the exact treatment acres, but the history has been incorporated into the CWE-ERA-TOC analysis for the FEIS. The guidance to the silviculturist is to develop acres and treatment plans based on not exceeding 80 to 82 percent TOC. Once project-level activities become defined, it will be analyzed under the R5 CWE analysis. Any ERAs created by this project will be incorporated into the CWE analysis for Lassen Creek.

Project-level analysis for the Cedar Creek Fuels Reduction Project has been completed and the EA has been signed. This project contains mechanical activity that could create additional soil compaction. The results of project-level CWE analysis were incorporated into the Travel Management DEIS.

At this time, no other projects are known that could create additional soil compaction. Both of the above-referenced projects would be consistent with MDF LRMP standards and guidelines, BMPs, and R5 SQS.

Alternative 3

Under Alternative 3, no new routes would be added to the road system. There would be no seasonal closure of system roads, and mixed use of approximately 3,764 miles of Maintenance Level 2 (ML 2) would continue. The Boles Road would not be closed and the Pumice Mine Roads would not be closed to OHV use. There would be no additional seasonal closures.

No OHV trail monitoring (red-yellow-green) has been completed on the mixed-use roads. There would be no change of vehicle class on level 3 roads that would result in a change of mixed use. It should be noted that under Alternative 3, cross-country travel would be banned and there would be a decrease in the potential for additional unauthorized routes to be created.

Since only the existing road system would be used for motorized use and these routes would meet the identified BMPs as identified under Alternative 1, it is unlikely that a direct, indirect or cumulative effect to soil or water quality would occur.

Alternative 4

Under Alternative 4, a total of 1,025 unauthorized routes are proposed to be added to the transportation system. The average road length to be added would be less then a third of a mile. These routes would add approximately 286 miles and constitute approximately 521 acres of roadways with a disturbance coefficient of 110.9 to 166.4 compacted acres across the Modoc National Forest. The Boles Road would be closed to all vehicles, and the Pumice Mine Road would be closed to OHV use. There are more seasonal closures on the transportation system under this action alternative than all of the other Alternatives.

This alternative has fewer miles and number of routes to be added to the National Forest Transportation System (NFTS) on the Modoc National Forest than does Alternative 2. There are no routes proposed to be added to the transportation system that were not analyzed under Alternative 2. The analysis that was completed for Alternative 2 is incorporated here by reference.

Direct and Indirect Effects to Soil and Water Quality

There are fewer routes, acres of NFS lands disturbed, and miles of routes across the Modoc National Forest under Alternative 4 than Alternative 2 (286 miles versus 339). No routes are being added that were not analyzed under Alternative 2.The same project design standards would be applied as discussed under Alternative 2. Therefore, it is unlikely that this action alternative would result in an adverse direct or indirect effect to soil or water quality.

Cumulative Effects to Soil and Water Quality

There are fewer acres of NFS lands disturbed under Alternative 4 than Alternative 2 (521 versus 617). No routes are being added that were not analyzed under Alternative 2, and the same project design standards would be applied as discussed under Alternative 2. Therefore, it is unlikely that this action alternative would result in an adverse cumulative effect to soil or water quality.

Alternative 5

Under Alternative 5, there are 1,168 unauthorized routes that are proposed to be added to the transportation system, which is the same as Alternative 2. The average road length to be added would be less then a third of a mile long. These routes would add approximately 339 miles and constitutes approximately 617 acres of roadways with a disturbance coefficient of 110.9 to 166.4 compacted acres across the Modoc National Forest. The Boles Road would be closed to all vehicles and the Pumice Mine Roads would be closed to OHV use. The seasonal closures to the transportation system under this action alternative, are the same as Alternative 2, with the exception that there are two versus four different closure dates. There are nearly four times as many miles of mixed use (Alternative 5-531 miles versus Alternative 2-138 miles).

These routes would add approximately 339 miles and constitute approximately 616 acres of roadways with a disturbance coefficient of 110.9 to 166.4 compacted acres across the Modoc National Forest, or approximately 0.01 percent of the land base of the Modoc National Forest.

This alternative has same amounts of miles and routes to be added to the National Forest Transportation System (NFTS) on the Modoc National Forest as Alternative 2. There are no routes proposed to be added to the transportation system that were not analyzed under Alternative 2. The analysis that was completed for Alternative 2 is incorporated here by reference

Direct and Indirect Effects to Soil and Water Quality

Since there are the same number of routes, acres of NFS lands disturbed and miles of routes across the Modoc National Forest under Alternative 5 then Alternative 2, no routes are being added that were not analyzed under Alternative 2, and the same project design standards to be applied as discussed under Alternative 2, it is logical to determine that it is unlikely that this action alternative would result in an adverse direct or indirect effect to soil or water quality.

Cumulative Effects to Soil and Water Quality

There are the same number of routes, acres of NFS lands disturbed, and miles of routes across the Modoc National Forest under Alternative 5 as under Alternative 2. No routes are being added that were not analyzed under Alternative 2, and the same project design standards would be applied as discussed under Alternative 2. Therefore, it is unlikely that this action alternative would result in an adverse cumulative effect to soil or water quality.

Botanical Resources

This section describes the affected environment for rare, threatened, and endangered plant species, as well of the effects of the Alternatives. It will describe the area potentially affected by the alternatives and existing resource conditions within that area. Measurement indicators are used to describe the existing conditions for the Modoc National Forest. The measurement indicators will be used in the analysis to quantify and describe how well the proposed action and alternatives meet the project objectives and address resource concerns.

Introduction

Of the Forest Service Regions, the Pacific Southwest Region contains the largest assemblage of sensitive plant species in comparison to its land base. Of the more than 8,000 vascular plant species occurring in California, well over half are known to occur on National Forest System (NFS) lands. This is due to topography, geography, geology and soils, climate and vegetation, the same factors that account for the exceptionally high endemic flora of the State. Over 100 plant species are found only on Forest Service (FS) lands and nowhere else in the world (Powell 2001).

Management of plant and fungi species and habitat, and maintenance of a diversity of plant 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 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 rare plants and natural communities to the degree consistent with multiple-use objectives established in each Forest Land and Resource Management Plan (LRMP). Key parts include developing and implementing management practices to ensure that species do not become threatened or endangered because of FS actions; maintaining viable populations of all native and desired non-native wildlife, fish, and plant species in habitats distributed throughout their geographic range on NFS lands; and developing and implementing management objectives for populations and/or habitats of rare species. The Pacific Southwest Region has over 425 rare plant species to manage for.

In addition to the Regional Forester's Sensitive plant list, the Modoc National Forest maintains a Watch List of plant species. Watch List plants are species that do not currently meet the criteria to be included on the Regional Forester's Sensitive list, but are of sufficient concern that they should be considered in the planning process (Regional Forester letter to Forest Supervisors, 07/27/2006). The Watch List species list may include species that are locally rare, are of special interest, are widely disjunct from the main distribution of the species, are largely endemic to the Forest, and/or species for which very little, if any, information is available but existing information may indicate some cause for concern. Watch List species are typically represented by more individuals, more occurrences, and/or a wider overall distribution than most Sensitive species; however, in general, there is less information on specific locations of occurrences and on habitat requirements for Watch List species than for Sensitive species.

Management decisions related to motorized travel can affect plant and fungi species, their habitats, and natural communities. Effects include, but are not limited to, death or injury to plants and habitat modification, habitat fragmentation, and habitat quality including increased risk of weed introduction and spread, change in hydrology, increased erosion, compaction, and sediment, risk to pollinators, loss of vegetation, over-collection, or other factors reducing or eliminating

plant growth and reproduction (Trombulek and Frissell 2000). The FS provides a process and standard through which rare plants receive full consideration throughout the planning process, reducing negative impacts on species and enhancing opportunities for mitigation by developing and implementing management objectives for populations and/or habitats of sensitive species. It is Forest Service policy to minimize damage to soils and vegetation, avoid harassment to wildlife, and avoid significant disruption of wildlife habitat while providing for motorized public use on NFS lands (FSM (Forest Service Manual) 2353.03(2)). Therefore, management decisions related to motorized travel on NFS lands must consider effects to plant species, fungi species, and their habitats.

Analysis Framework: Statute, Regulation, Modoc LRMP, and Other Direction

Direction Relevant to the Proposed Action as it Affects Botanical Resources

Endangered Species Act (ESA): The Endangered Species Act (ESA) 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) species, 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 U.S. 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 species to ensure management activities are not be likely to jeopardize the continued existence of a TE species, 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.

Executive Order 13112: Invasive Species 64 FR 6183 (February 8, 1999): to prevent and control the introduction and spread of invasive species

Forest Service Manual and Handbooks (FSM/H 2670): Forest Service Sensitive (FSS) 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 (Management Standard & Guidelines 36-49)
- Wetland and Meadow Habitat (Management Standard & Guideline 70): See Water Resources section.
- Riparian Habitat (Management Standard & Guideline 92): See Water Resources section.
- Bog and Fen Habitat (SNFPA ROD page 65, S&G #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, Proposed, and Sensitive (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 (Management Standard & Guideline 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).

Modoc National Forest Land and Resource Management Plant (MDF LRMP): Guidelines for Sensitive plant management are enumerated on page 4-21 of the Modoc LRMP (USDA Forest Service 1991). Our direction is to "manage and conserve sensitive plant species and their habitats to ensure that viable populations are maintained." To these ends, we are to

- Conduct inventories prior to project implementation if potential habitat or known populations are identified, in accordance with FS Handbook procedures.
- Allow no new disturbance of identified sensitive plant habitat without an environmental analysis.

Effects Analysis Methodology

Area of Effect for Botanical Resources

Three geographic areas were chosen to analyze the effects of the proposed routes on botanical resources:

- The No Action Alternative (Alternative 1), which allows for cross-country travel, was assessed using the entire Modoc National Forest, except for the South Warner Wilderness. This analysis area was also used to analyze cumulative effects to rare species for all alternatives.
- Direct and indirect effects to Sensitive and Watch List plant species were assessed using the area within 100 feet of existing or proposed routes. In general, direct effects are most likely to occur within a zone of 30 feet on either side of the route, due to the need for parking and pulling off to allow 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.
- Direct and indirect effects to Federally Listed species were assess using the area within 300 feet of existing or proposed routes. This buffer was used to meet the criteria established by USFWS in its programmatic consultation agreement with Region 5 USFS, Route Designation: Project Design Criteria for "No effect" or "May Affect Not Likely to Adversely Affect" Determination for TE Species (USFWS 2006). This buffer meets the 250 foot buffer designated by USFWS, with additional buffer space to accommodate the average distance from road center (baseline for the buffer) to the road edge plus potential mapping error. This 300-foot distance is also used as the default buffer to assess impacts to the vernal pools providing habitat for the two Federally Listed species, *Tuctoria greenei* and *Orcuttia tenuis*.

Analysis of Methodology

The analysis of effects on rare plant species was a two-step process. 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 Modoc National Forest (USFWS 2008), Region 5 Sensitive Plant List (USDA FS 2006), Modoc National Forest rare plant records, TEPS and Watch List GIS plant layers (2008), as well as California Natural Diversity Database (CNDDB) records (2008). The Watch List plant species included are those submitted for the 2008 Modoc Land and Resource Management Plan (LRMP) Revision.

All of this information was used in step two of the analysis—conflict determination. Data were imported into a Global Information System (GIS) and used to analyze potential habitat, identify proximity of known TES and Watch List plant occurrences to routes, and analyze effects.

Assumptions for Botanical Resource Effects Analyses

- Vehicle use on and off established routes 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 functioning, or by the introduction of non-native, invasive plant species that can out-compete sensitive species for water, sunlight, and nutrients.
- 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 and lava caps, which exist on gentle slopes or flat terrain with little or no vegetation or natural barriers to motor vehicles.
- Without specific prevention and/or control measures, invasive non-native plants (weeds) will continue to spread along and within surfaced and unsurfaced motor vehicle roads and trails.
- Motor vehicle use of unsurfaced vehicle roads and trails will increase sediment production and erosion. As use increases, sediment production and erosion will increase.
- Change of vehicle class on NFTS roads has no impact to rare plants or their associated habitats.
- Seasonal closures of NFTS roads have no impact to rare plants or their associated habitats.

Data Sources

1) Route inventories collected in Step 1 of the Travel Management project.

2) Existing botanical records within the Modoc National Forest GIS databases. These botanical records include the following:

    - Occurrences of Threatened, Sensitive, and Watch list (TESW) plant populations which have been surveyed and delineated by Modoc NF Botany staff
    - California Natural Diversity Database (CNDDB) rare plant data
    - Vernal pools delineated by Dr. Robert Holland (2006)
    - Fens and wet meadows, delineated by Dr. Robert Holland (2006) and partially updated by the Modoc National Forest Botany staff
    - Soils mapped to the level of Great Groups

- Maps of existing vegetation (EVeg)
- Modoc National Forest Terrestrial Ecological Unit Inventory (TEUI) data
- Previous botany surveys. No road-specific surveys were performed for this project, although some proposed roads pass through previously surveyed areas.
- Botany surveys conducted in July 2008 for *Orcuttia tenuis* in all previously unsurveyed vernal pools within 300 feet of proposed routes.

GIS Data Analysis Assumptions

For the purposes of GIS analysis, the following assumptions were made for determining effects of routes on TES and WL plant species and their habitats:

- Roads are assumed to be 12 feet wide, and the road inventory lines demarcating roads to be added are assumed to be center lines.
- Nine feet of error in delineating plant population occurrences is assumed based on typical Garmin GPS accuracy (http://www8.garmin.com/aboutGPS/). Garmin GPS units were most commonly used for collecting rare plant occurrence data on this Forest; otherwise, more accurate Trimble GPS units have sometimes been used as well.
- Thirty six feet of error in delineating vernal pools and fen and wet meadow habitats is assumed, based on typical accuracy of digitizing polygons based on paper maps or, in this case, digital aerial photos.
- Vernal pools and swales delineated by Dr. Robert Holland (2006) are potential habitat for the Threatened vernal pool plant species *Orcuttia tenuis* and the Sensitive vernal pool plant species *Mimulus evanescens* and *Phacelia inundata*. They also provide habitat for three Modoc National Forest Watch List plant species: *Gratiola heterosepala, Pogogyne floribunda*, and *Potentilla newberryi*. All unsurveyed vernal pool habitats are assumed to be occupied by these species for the purposes of analysis.
- Fens and other wet meadow habitats delineated by Dr. Robert Holland (2006) and updated by the Modoc National Forest Botany staff are potential habitat for the Sensitive plant species *Botrychium ascendens, B. crenulatum, B. minganense, B. montanum, Bruchia bolanderi, Buxbaumia viridis, Meesia triquetra*, and *M. uliginosa*. Again, all unsurveyed fen habitats are assumed to be occupied by these species for the purposes of analysis.
- For Sensitive and Watch List plants that are neither fen nor vernal pool species (or at least, not exclusively such), the Forest Botany layer was overlain with the Forest Soils GIS layer, the Forest Existing Vegetation GIS layer, and Terrestrial Ecological Unit Inventory (TEUI) (Smith and Davidson 2003) ecological region GIS layer. Using existing Sensitive and Watch List plant occurrences, and their locations within certain soil, vegetation, and eco-region types (TEUI 2003), predictions were made for the locations of potential habitats that might exist across the Forest for these plant species. This methodology provides a coarse filter for potential TES plant habitat. Although limited in its predictive accuracy, it provides our best available method for estimating potential habitat across the Forest, based on available information. These were broken down into barren, Forested, riparian, and sage steppe habitats, in addition to the vernal pool-swale and fen-wet meadow-seep habitats mentioned above.

Please note that GIS data are derived from a variety of different sources (*e.g.*, remote sensing, GPS data, data digitized from hardcopy maps and aerial photos), which will have differing levels of accuracy. The amount by which these approximations of natural phenomena (such as soil type, habitat type, TES plant occurrence boundaries, and ecological unit boundaries) differ from

nature is extremely difficult to quantify. However, we have used the best available data for our analyses. Therefore, although the numbers presented as a result of GIS analysis can appear very precise, please understand that they are only approximations; which, however, are still useful as estimates. Using our best professional judgment, we have insured that our analyses are meaningful and can reasonably account for mapping errors.

Botanical Resources Indicators

The following indicator measures related to motorized routes located in or near rare plant occurrences or habitats were used to assess the impacts of the alternatives.

- Miles of unauthorized routes within or adjacent to sensitive plant sites or within suitable sensitive plant habitat
- Miles of unauthorized routes within or adjacent to fens or wet meadows
- Miles of unauthorized routes within or adjacent to vernal pools
- Acres of potential habitat within 100 feet of routes, to address the effects on potential habitat for rare plants
- Miles of routes and areas open for motor vehicle use within riparian habitat, including lake margins and stream banks

Botanical Resources Methodology by Action

For all the actions described below, botanical resources will be analyzed for short-term impacts (1 year) and long-term impacts (20 years). Indicators are described for each action below.

Direct and Indirect Effects of the Prohibition of Cross-Country Motor vehicle Travel

Indicator(s): (1) miles of unauthorized routes within 100 feet of rare plant sites or within or adjacent to suitable rare plant habitat, (2) the number of acres of potential habitat for rare plants within 100 feet of unauthorized routes, and (3) the number of known rare plant occurrences within 100 feet of unauthorized routes.

Spatial boundary: Forest

Methodology: GIS analysis of existing unauthorized routes within or adjacent to rare plant sites or potential habitat

Direct and Indirect Effects of adding Facilities (presently unauthorized roads, trails, or areas) to the National Forest Transportation System (NFTS), including identifying Seasons of Use and Vehicle Class

Indicator(s): (1) miles of routes open for motor vehicle use within or adjacent to sensitive plant sites, (2) miles of routes open for motor vehicle use within riparian habitat, including lake margins and stream banks, (3) number of vernal pools and fens within 100 feet of routes, and (4) number of known rare plant occurrences within 100 feet of routes

Spatial boundary: Forest. Direct and indirect effects will be analyzed using a 100-foot buffer along roads.

Methodology: GIS analysis of existing unauthorized routes with or adjacent to rare plant sites or potential habitat.

Direct and Indirect Effects of Changes to the Existing NFTS—Mixed Use on Level 3 Roads, and Seasonal Closures

Indicator(s): (1) miles of NFTS roads open for motor vehicle use within or adjacent to sensitive plant sites, (2) miles of NFTS roads with seasonal closures within or adjacent to sensitive plant sites, (3) number of vernal pools and fens within 100 feet of NFTS Level 3 roads open to mixed use, (4) number of vernal pools and fens within 100 feet of NFTS Level 3 with seasonal closures, (5) number of known rare plant occurrences within 100 feet of NFTS Level 3 roads open to mixed use, and (6) number of known rare plant occurrences within 100 feet of NFTS Level 3 roads with seasonal closures

Spatial boundary: Forest. Direct and Indirect effects will be analyzed using a 100 foot buffer along roads.

Methodology: GIS analysis of NFTS roads within or adjacent to rare plant sites or potential habitat.

Cumulative Effects

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

Long-term time frame: 20 years

Spatial boundary: Forest

Indicator(s): (1) miles of routes open for motor vehicle use within or adjacent to sensitive plant sites, (2) miles of routes open for motor vehicle use within riparian habitat, including lake margins and stream banks, and (3) number of TES plant occurrences and acreage of TES habitat within 100 feet of routes.

Miles of routes within rare plant habitats was used for analysis rather than number of routes. Because many of the routes are short road segments of less than one mile, while others are several miles in length, the total mileage of routes potentially impacting rare plant habitats provides a more accurate indicator value than does the number of routes.

Methodology: GIS analysis of all routes and sensitive plant sites and habitat

Affected Environment and Environmental Consequences

Affected Environment

The Modoc National Forest is located in the extreme northeastern corner of the State of California. Federally-owned lands within the proclaimed Forest boundary amount to over 1.6 million acres. Elevations range from 4,000 to 10,000 feet. A coarse overview of the landscapes and vegetation of the Forest shows five major landscapes: the Warner Mountains, the Devil's Garden sage-steppe plateau, yellow pine Forest, the Big Valley Mountains, and the Medicine Lake Highlands.

The Warner Mountains are generally steep, rather cold and moist, and well-Forested with yellow pine, fir, and high-elevation pine species such as lodgepole and western white pine, with whitebark pine at the highest elevations. Because of its variety of elevations, temperature regimes, precipitation regimes, and its complex topography, the Warner Mountains are home to many of the Forest's Sensitive plant species. Fens, although very rare throughout the Forest, are most common in the Warner Mountains.

The central and northwest areas of the Forest are a sage-steppe plateau, called the Devil's Garden or Clear Lake Plateau. It is relatively warm and dry, and is characterized by extensive sage

steppe scrub and woodland communities of varying densities. Vernal pools, vernal playas, and other vernally wet places are the principle rare plant habitats in this area. The only Federally listed Threatened plant species on the Forest is a vernal pool endemic.

The Big Valley conifer Forest covers a large area in the southwestern portions of the Forest. The Big Valley Mountains are mostly mixed white fir and ponderosa pine, and contain special shallow, gravelly flats which constitute a special habitat for a suite of local endemic Sensitive plant species.

Affected Environment and Existing Conditions

The Modoc National Forest encompasses a diversity of floristic regions, including the Modoc Plateau and Warner Mountain regions of the Great Basin Province, extending into the Southern Cascades Province. The Warner Mountain Ranger District encompasses the highest elevations on the Forest, rising to 9,892 feet on Eagle Peak. Vegetation ranges from sagebrush grading into ponderosa pine and mixed conifer Forest, and extending up through whitebark pine subalpine Forest into alpine ridge tops. This is the most botanically diverse district on the Forest. The Devil's Garden Ranger District encompasses the Modoc Plateau, and is largely vegetated with sagebrush interspersed with juniper woodlands; this is known as the Sage Steppe. This district is rich in vernal pools. Big Valley Ranger District consists primarily of low elevation mountains covered with mixed conifer Forests, interspersed with sagebrush flats and vernal pools. The Doublehead Ranger District encompasses the Medicine Lake Highlands, a vegetatively diverse area which includes mixed conifer Forests, sagebrush flats, lava flows, and chaparral.

Rare Species

The Modoc National Forest provides habitat for 1,087 vascular plant taxa (Modoc National Forest Plant List, 2007), which represents approximately 17 percent of the California Flora (Hickman 1993). Of these, 98 are considered rare plants (S and WL) on the Modoc NF.

There is currently two Federally Listed plant species within the analysis area: *Tuctoria greenei* (awnless spiralgrass, an Endangered species) and *Orcuttia tenuis* (slender Orcutt grass, a Threatened species).

Tuctoria greenei, awnless spiralgrass, is Federally listed as Endangered and State listed as Rare; no critical habitat on the Modoc National Forest has been designated by the U.S. Fish and Wildlife service. It is a small annual grass which can be identified by its distinctive spikelets, which resemble those of *Orcuttia tenuis* but have more numerous yet smaller, less regular and more ragged teeth on the lemma. It inhabits vernal pools or similar habitats with clayey soils. The only known occurrence on the Modoc National Forest is 33 acres contained within a vernal pool, with small patches of this plant dispersed throughout this area in favorable microsites. Although potentially affected by unmanaged cross-country travel, no known unauthorized routes have been identified within or nearby this occurrence. No routes proposed for addition in any Alternative are within or nearby the occurrence.

Orcuttia tenuis, slender Orcutt grass, is Federally listed as Threatened and state listed as Endangered; currently, no critical habitat for this species has been designated by U.S. Fish and Wildlife Service on the Modoc National Forest. It is a small, annual grass distinguishable from other grasses by its five-toothed lemma. It is limited to drying and dried beds of relatively deep vernal pools or vernal pool-type habitat with clay soils. On the Modoc NF it is known from fifteen occurrences totaling approximately 284.33 acres, and all of these occurrences are found within areas currently open to cross-country travel.

Rare plant species, as referred to in this analysis, include Federally Listed, as well as Sensitive and Watch List species. Sensitive plant species are those species identified by the Regional

Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution, or such low numbers or limited distribution that special management consideration is required to maintain their presence and viability, regardless of current trend (FSM 2670.5, FSH 2609.25, 1.31). A viable population is defined as one that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range within the planning area (FSM 2670.5).

In addition to the Regional Forester's Sensitive plant list, the Modoc National Forest maintains a Watch List of plant species that are of special interest. Watch List plants are species that do not currently meet the criteria to be included on the Regional Forester's Sensitive list, but are of sufficient concern that they should be considered in the planning process (Regional Forester letter to Forest Supervisors, 07/27/2006). The Watch List species list may include species that are locally rare, are of special interest, are widely disjunct from the main distribution of the species, are largely endemic to the Forest, and/or species for which very little, if any, information is available but existing information may indicate some cause for concern. Watch List species are typically represented by more individuals, more occurrences, and/or a wider overall distribution than most Sensitive species; however, in general, there is less information on specific locations of occurrences and on habitat requirements for Watch List species than for Sensitive species.

So, currently, there are one Federally listed Endangered, one Federally listed Threatened, 30 Region 5 Sensitive, and 68 Modoc NF Watch List plant species designated on the Forest. A majority of these have known occurrences on the Forest; however, some are only suspected to occur at this point, as potential habitat may exist, but no occurrences have been documented. For most species, an occurrence refers to a relatively discreet group of individuals, separated from the next nearest group of the same species by at least ¼ mile. Of the 99 species designated as rare on the Forest, one Endangered, one Threatened, 24 Sensitive, and 29 Watch List species (53 total) are known to occur within the analysis area for this project. There are 276 mapped occurrences of TES species, and 191 mapped occurrences of Watch List plant species within the project boundary (Table 3-36). Table 3-36 lists all Federally Listed, Region 5 Sensitive and Modoc National Forest Special Interest plant species that are known on the Modoc National Forest. Also included are the listings, number of Modoc National Forest occurrences, and habitat groupings (described below) for each species.

A few species are omitted from this analysis because they grow in aquatic habitats and are inaccessible to off-highway vehicles (OHVs). These unanalyzed aquatic species are *Alisma gramineum*, *Potamogeton filiformis*, *Potamogeton zosteriformis*, *Riella americana*, and *Utricularia intermedia*, all of which are Special Interest species.

In addition, those Sensitive and Watch List plant species that have no known occurrences on the Forest were also dropped from the analysis because it is unknown if these species exist on the Forest, and the location of potential habitat is undetermined. See the Biological Evaluation and Watch List Botanical Report for a complete list of these species and why they were dropped from the analysis.

Table 3-36. Species Considered in Analysis, Status, Known Occurrences, and Habitats

Species	Status[1]	Number of mapped occurrences in Project Area	Habitats[2]
Tuctoria greenei (Greene's tuctoria)	E, CR	1	VP

Species	Status[1]	Number of mapped occurrences in Project Area	Habitats[2]
Orcuttia tenuis (Slender Orcutt grass)	T, CE	9	VP
Astragalus anxius (Ash Valley milkvetch)	S	4	B in sage steppe
Astragalus lemmonii (Lemmon's milkvetch)	S	1	R
Astragalus pulsiferae var. *coronensis* (Crown milkvetch)	S	15	SS, F
Botrychium ascendens (Upswept moonwort)	S	1	R, FE
Botrychium crenulatum (Scalloped moonwort)	S	8	R, FE
Botrychium lunaria (Moonwort)	S	5	MS, R
Botrychium minganense (Mingan moonwort)	S	1	MS, R, FE
Botrychium montanum (Western goblin)	S	1	R, FE
Botrychium pinnatum (Northwestern moonwort)	S	1	FE, R
Bruchia bolanderi (Bolander's candlemoss)	S	2	R, FE
Buxbaumia viridis (Bug-on-a-stick)	S	8	On rotting logs in R, FE
Calochortus longebarbatus var. *longebarbatus* (Long-haired star tulip)	S	91	Meadows in F
Cypripedium montanum (Mountain lady's-slipper)	S	34	F
Eriogonum prociduum (Prostrate buckwheat)	S	19	B, SS
Eriogonum umbellatum var. *glaberrimum* (Green buckwheat)	S	6	SS, F
Galium glabrescens ssp. *modocense* (Modoc bedstraw)	S	17	B in sage steppe
Galium serpenticum ssp. *warnerense* (Warner Mountain bedstraw)	S	12	B, R, F
Ivesia paniculata (Ash Creek mousetail)	S	32	B, SS, F
Lupinus latifolius var. *barbatus* (Bearded lupine)	S	1	R, F
Meesia triquetra (Three-ranked hump-moss)	S	5	FE
Meesia uliginosa (Broad-nerved hump-moss)	S	1	FE
Mimulus evanescens (Ephemeral monkey-flower)	S	5	VP, R
Phacelia inundata (Playa phacelia)	S	3	VP, R
Rorippa columbiae (Columbia yellow-cress)	S	3	R
Arnica fulgens (Hillside arnica)	WL	8	SS
Betula pumila var. *glandulosa* (Bog birch)	WL	3	FE
Carex halliana (Hall's sedge)	WL	11	Openings in F
Carex vallicola (Valley sedge)	WL	1	MS
Carex petasata (Liddon sedge)	WL	1	F, FE
Cordylanthus capitatus (Yakima bird's-beak)	WL	6	SS
Delphinium stachydeum (Spiked larkspur)	WL	10	SS
Dimeresia howellii (Doublet)	WL	11	F
Drosera anglica (English sundew)	WL	3	FE, FE
Erigeron acris ssp. *debilis* (Snowy fleabane)	WL	1	FE, B
Gratiola heterosepala (Boggs lake hedge-hyssop)	WL, CE	17	VP, R
Hulsea nana (Little hulsea)	WL	4	B
Iliamna bakeri (Baker's globemallow)	WL	44	especially post-fire in SS, B
Ivesia baileyi var. *beneolens* (Owyhee ivesia)	WL	1	F
Lomatium foeniculaceum var. *macdougalii* (MacDougal's lomatium)	WL	3	SS

Species	Status[1]	Number of mapped occurrences in Project Area	Habitats[2]
Mertensia longiflora (Long bluebells)	WL	2	SS
Nemophila breviflora (Great Basin nemophila)	WL	2	FE, R, F
Phacelia sericea var. *ciliosa* (Blue alpine phacelia)	WL	9	SS, B
Phlox hoodii ssp. *muscoides* (Moss phlox)	WL	13	B, SS
Pogogyne floribunda (Profuse-flowered pogogyne)	WL	51	VP, RA
Potentilla newberryi (Newberry's cinquefoil)	WL	7	VP, R
Ribes hudsonianum var. *petiolare* (Western black currant)	WL	1	R
Salix bebbiana (Gray willow)	WL	2	R
Scutellaria galericulata (Marsh skullcap)	WL	2	FE, R
Silene oregana (Oregon campion)	WL	1	SS, F
Sphagnum spp. (Sphagnum)	WL	3	FE, F
Stenotus lanuginosus (Woolly stenotus)	WL	2	SS, FE
Triteleia grandiflora ssp. *howellii* (Howell's triteleia)	WL	2	SS

[1] Status: E – Federally listed Endangered, T – Federally listed Threatened, S – Forest Service Sensitive,

WL—Forest Service Watch List, CR – State listed Rare, CE – State listed Endangered

[2] Habitats: B–Barren; FE – Fens, Wet Meadows, and Seeps; F – Forest; R – Riparian Areas; SS—Sage Steppe; VP—Vernal Pools and Swales

Aggregating Rare Species for Analysis of Effects

As many of these species occur in the same or similar habitats, and the effects of motor vehicle use may vary by habitat, the rare plant species being considered in this analysis have been grouped into different habitats, based on habitat requirements. The following habitats have been selected to represent the species being addressed:

Habitat Descriptions

The following describes the six habitats and lists the rare plant species assigned to each group. Each of the habitats includes one or more vegetation types identified in the Terrestrial Ecological Unit Inventory (TEUI) Land Type Associations Modoc National Forest (Smith and Davidson 2003), or are in existing Modoc National Forest GIS data layers for fens and vernal pools. Each of the species may occur in one or more habitats; *e.g.*, crown milkvetch occurs in Sage Steppe (SS) and Forest (F) habitats. There are also several species which occur in edge habitats, sites where two habitats come together. For these species, elements of two different habitat types are important. The project record for this analysis contains additional information on the species contained within each habitat, and the vegetation types assigned to each habitat.

Barren (B) – includes species found in talus, rocky gravel, scree, rock outcrops and lava flows.

Fens, Wet Meadows, and Seeps (FE) – includes species found in wetland sites sub-irrigated by cold water, with substantial accumulations of peat, as well as meadows with more or less dense grasses, sedges, and herbs that grow under moist or saturated conditions.

Forested (F) – includes those species found in ponderosa pine, Jeffrey pine, lodgepole pine, white fir, or mixed conifer Forested communities, generally montane to subalpine.

Riparian Areas (R) – includes species found along the margins of perennial or intermittent streams, natural lakes, reservoirs, playas or stock ponds.

Sage Steppe (SS) – includes species found in Great Basin and montane woodland and shrub communities, *e.g.*, western juniper, big sagebrush, silver sage, low sage, greasewood, and bitterbrush.

Vernal Pools and Swales (VP) – includes species found in depressions and swales with relatively impermeable soils that accumulate rainwater during winter and spring, and dry up during warm weather.

Barren (B)

This plant habitat embraces a wide variety of rocky habitat types. It includes alpine scree and talus fields, which occur only at the highest points within the Forest. It also includes rock outcrops, open gravelly hill slopes, bare road cuts, and lava beds and talus fields occurring at all elevations throughout the Forest. These sites provide harsh growing conditions for plants, with little soil, although cracks and shallow basins within the rocks can capture and hold water for plants. These sites provide specialized niches for several rare plant species.

The single Modoc National Forest Sensitive species occurring in Barren sites is *Galium serpenticum* ssp. *warnerense*. Modoc National Forest WL species occurring in Barren habitats include *Erigeron acris* ssp. *debilis*, *Hulsea nana*, *Ivesia baileyi* var. *beneolens*, *Phacelia sericea* var. *ciliosa*, and *Phlox hoodii* ssp. *muscoides*.

There are currently no known Barren species occurring within 100 feet of existing unauthorized routes, and no routes within Barren habitats.

Fens and Wet Meadows (FE)

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, Cooper, and Parsons 2002).

Fens are thought to be one of the most sensitive wet habitats in the Sierra Nevada Region (Rundel, Gordon, and Parsons 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 (Chimner and Cooper 1998, Weixelman 2007). They support a suite of plants, many of which occur only in fens, as well as other species which may occur in wet meadows as well.

There were 132 mapped fens within the Warner Mountains Ranger District from the fen mapping project completed by Dr. Robert Holland in 2006. However, only 21 percent of these were ground-verified, and based on ground-verified results, Dr. Holland estimates approximately 60 true fens are present in the Warner Mountains outside of the South Warner Wilderness Area (Holland 2006). The remaining 72 sites mapped by Dr. Holland are classified as wet meadows. Because these sites have not all been analyzed to determine whether they are true fens or wet meadows, and because many of these plants grow in both habitats, these sites are grouped together as a habitat. As a result, this habitat type includes open areas vegetated with more or less dense grasses, sedges, and forbs that prefer seasonally moist or saturated conditions, as well as moist areas surrounding small seeps. Sensitive species that occur in Fens and Wet Meadows are *Botrychium ascendens, B. crenulatum, B. lunaria, B. minganense, B. montanum, B. pinnatum, Bruchia bolanderi, Buxbaumia viridis, Meesia triquetra*, and *M. uliginosa*. Modoc National

Forest WL species occurring in fens and wet meadows are *Betula pumila* var. *glandulosa, Drosera anglica*, and *Sphagnum* spp.

The following Fen and Wet Meadow species are found within 100 feet of existing unauthorized routes: *Botrychium lunaria*, *B. pinnatum*, *Calochortus longebarbatus* var. *longebarbatus*, and *Sphagnum* spp.

Forested (F)

The Forest habitat includes mixed conifer Forests and white fir Forests. They may include any possible canopy mix of white fir, Douglas fir, Shasta fir, Jeffrey pine, ponderosa pine, Washoe pine, whitebark pine, sugar pine, western white pine, lodgepole pine, knobcone pine, mountain hemlock, and incense cedar. These range from relatively dense Forests with high canopy covers in the Warner Mountains and the Medicine Lake Highlands, to relatively open yellow pine Forests. These Forests extend from the sagebrush and chaparral zones up to subalpine Forest, ranging in elevation from approximately 4,000 to over 9,500 feet. Understory plant communities are often sparse, ranging from communities of annual and bunchgrasses, and forb species in yellow pine Forests, to almost no understory plants under dense white fir canopies.

Modoc National Forest Sensitive species that occur in Forest habitat are *Astragalus pulsiferae* var. *coronensis, Calochortus longebarbatus* var. *longebarbatus, Cypripedium montanum, Eriogonum umbellatum* var. *glaberrimum, Galium serpenticum* ssp. *warnerense, Ivesia paniculata*, and *Lupinus latifolius* var. *barbatus*. Modoc National Forest WL species that occur in Forest habitat are *Cordylanthus capitatus, Dimeresia howellii, Ivesia baileyi* var. *beneolens, Nemophila breviflora*, and *Silene oregana*.

The following Forest species are found within 100 feet of existing unauthorized routes: *Calochortus longebarbatus* var. *longebarbatus, Carex halliana, Cypripedium montanum, Eriogonum umbellatum* var. *glaberrimum*, and *Dimeresia howellii*.

Riparian Areas (R)

These are areas immediately bordering the edges of streams, rivers, lakes, or other water sources. Forested riparian areas include stream banks under dense Forest canopies in mixed conifer Forests, but they also occur in aspen, yellow pine, and lodgepole pine Forests. More open riparian areas range from montane meadows with willows, alders, and dense sedges, to alkaline playas adjacent to lakes, as well as borders of reservoirs and stock ponds. Riparian vegetation along streams helps to maintain the water table by holding stream banks in place, and shades the water to keep stream temperatures cooler. It is also critically important for preventing erosion and sedimentation in streams and other water bodies.

Modoc National Forest TES species that occur in Riparian Areas are *Botrychium ascendens, B. crenulatum, B. lunaria, B. minganense, B. montanum, B. pinnatum, Bruchia bolanderi, Buxbaumia viridis, Galium serpenticum* ssp. *warnerense, Lupinus latifolius* ssp. *barbatus, Mimulus evanescens*, and *Phacelia inundata*. Modoc National Forest WL species occurring in Riparian Areas are *Gratiola heterosepala, Nemophila breviflora, Pogogyne floribunda, Potentilla newberryi, Ribes hudsonianum* var. *petiolare, Salix bebbiana*, and *Scutellaria galericulata*.

The following Riparian species are found within 100 feet of existing unauthorized routes: *Botrychium lunaria*, *B. pinnatum*, *Buxbaumia viridis*, *Gratiola heterosepala*, *Pogogyne floribunda*, *Potentilla newberryi*, *Ribes hudsonianum* var. *petiolare*, and *Salix bebbiana*.

Sage Steppe (SS)

This habitat type includes typical Great Basin sagebrush habitats, such as big sagebrush, silver sagebrush habitat, and low sagebrush flats. Soils are commonly shallow heavy clays, resting on basalt bedrock. Sites are often rocky, with sagebrush shrub communities frequently forming

mosaics with juniper woodlands and yellow pine Forests of varying tree densities. Sage steppe habitats are also common surrounding vernal pool sites. Much of the Devil's Garden District consists of this habitat type. In the Warner Mountains, sagebrush habitat is more mesic and occurs at higher elevations, often grading into yellow pine and white fir Forests. Southwest of the Medicine Lake Highlands, is an area that includes sagebrush but grades into manzanita and Ceanothus chaparral. Because there are no Modoc National Forest TES or WL species that occur exclusively or even primarily in this habitat, it is included with the sage steppe habitat type for the purposes of this analysis.

Modoc National Forest Sensitive species that occur in sage steppe habitats are *Astragalus anxius*, *A. pulsiferae* var. *coronensis, Eriogonum prociduum, E. umbellatum* var. *glaberrimum*, and *Ivesia paniculata*. Modoc National Forest WL species occurring in sage steppe sites are *Arnica fulgens, Carex petasata, Cordylanthus capitatus, Delphinium stachydeum, Iliamna bakeri, Lomatium foeniculaceum* var. *macdougalii, Mertensia longiflora, Phacelia sericea* var. *ciliosa, Phlox hoodii* ssp. *muscoides, Stenotus lanuginosus*, and *Triteleia grandiflora* ssp. *howellii*.

The following sage steppe species, a watchlist plant, is found within 100 feet of existing unauthorized routes: *Cordylanthus capitatus.*

Vernal Pools and Swales (VP)

These are depressions or swales with relatively impermeable soils that fill with water in the winter and during spring snowmelt, and gradually dry out as summer progresses. This group includes vernal pools as well as other vernally wet areas, such as low sage and silver sage communities that hold water early in the season. They areas are dominated by low-growing species of annual grasses and forbs adapted to germination and early growth under water. On the Modoc National Forest these areas and associated species can be found primarily upon sage steppe in the Devil's Garden Ranger District, but are also common within yellow pine Forests of the Big Valley and parts of the Doublehead Districts. A vernal pool study completed by Dr. Robert Holland in 2006 delineated 660 vernal pools within the Devil's Garden and Doublehead Ranger Districts based on aerial photography with partial ground-verifying to test accuracy. However, many of these have been negatively affected by livestock and/or wildlife management activities (Holland 2006). Range management activities have been responsible for hydrologically altering natural vernal pools by digging them out, making the pools deeper but sometimes removing the underlying hardpan and allowing the pools to drain more easily in spring, drying them out earlier in the year and thus not permitting them to maintain the same flora as previously. Also, vernal pool outlets have sometimes been dammed, flooding the pool to depths that create a perennial pond instead of one that slowly dries out over the course of the warm seasons. This flooded rare plant habitats and/or pushed rare plants to the new edge of the pool, which in some cases is former upland that is not necessarily suitable and perhaps not sustainable as rare plant habitat. Some of these reservoirs, stock tanks, and naturally occurring vernal pools had been given over to nesting island construction. These roughly circular piles of aggregate, which often harbor invasive weeds such as Canada thistle, are intended as nesting sites for migratory birds; if they are successful, they may serve as an attractant to cross-country vehicle travel by bird hunters. If built atop rare plant habitat, they prevent light from reaching the plants. The effect of their weight upon the topography and the soils underlying vernal pools is as yet unknown. Constructing the islands (sometimes referred to as "goosebumps") caused disturbance to vernal pool environs in the past, in some instances degrading rare plant habitat by compacting the soil with heavy machinery.

Currently the Modoc National Forest has two Federally listed plant species. One, *Tuctoria greenei*, is Endangered, and the other, *Orcuttia tenuis*, is Threatened; these only occur in vernal pool habitat. Modoc National Forest Sensitive species occurring in vernal pools and swales are

Mimulus evanescens and *Phacelia inundata*. Modoc National Forest WL species occurring in vernal pools and swales are *Gratiola heterosepala, Pogogyne floribunda,* and *Potentilla newberryi*.

The following Vernal Pool and Swale species are found within 100 feet of existing unauthorized routes: *Gratiola heterosepala, Pogogyne floribunda, Potentilla newberryi*, and *Orcuttia tenuis*.

Environmental Consequences

General Types of Impacts

Impacts to rare plants and their habitats vary across all alternatives, and no alternative completely eliminates adverse affects to rare plants. In general, alternatives with fewer miles of routes open for public wheeled motor vehicle use show reduced effects to rare plants and their habitats.

Direct Effects

Direct effects occur when individual plants are broken, crushed, or trampled by vehicles traveling or parking off road surfaces, or their habitat is physically impacted, such as disturbing or compacting the soil. Vehicles traveling on or parking off the route surface can result in death, altered growth, or reduced seed set through physically breaking, crushing, or uprooting plants (Wilshire, Shipley, and Nakata 1978, Cole and Bayfield 1993). Root exposure and/or direct root damage may occur due to vehicle passes over vegetation, particularly in loose soils, or in wet soils susceptible to rutting; these impacts can affect plant vigor and survival success.

Direct effects are dependent upon the intensity and timing of disturbance. Effects are also dependent upon the number of plants at a specific location and the proportion of the occurrence impacted. Repeated damage of this type weakens the compensatory capabilities of rare plants, which can lead to degradation of habitat and eventually to the replacement of native plants species with non-native species more adapted to frequent disturbances, such as invasive weeds.

Indirect Effects

Indirect effects are caused by the action and are later in time, or further removed in distance, but are still reasonably foreseeable. Indirect impacts to rare plants can occur from soil erosion or compaction, dust fugitives, or from the potential displacement of rare and native species with non-native or invasive species. Indirect impacts to soil from repeated off-road vehicle use can lead to the degradation of habitat for rare plants and other native plant communities. Soil compaction, erosion, and modification of soil properties can affect the distribution, abundance, growth rate, reproduction, and size of plants (Ouren *et al.* 2007). Wilshire and Nakata (1976) report that initial use by OHVs results in a loss of cohesion and lateral displacement of soils, while repeated use leads to compaction. The effects of soil erosion on plants can include undercutting of root systems as routes are enlarged by erosion; creation of new erosion channels in areas not used by vehicles; wind erosion of adjacent destabilized areas; burial of plants by debris eroded from areas of use; and reduction of the biological capability of the soil by physical modification and stripping of fertile layers (Wilshire *et al.*1978).

Soil compaction and the subsequent decrease in infiltration and distribution of water through the soil profile can lead to decreased moisture available for plant growth (Snyder *et al.* 1976). Compaction caused from repeated off-highway vehicle use, can result in reduced seed germination (Williams 1967 in Davidson and Fox 1974), seedling survival, soil water infiltration (Wilshire, Shipley, and Nakata 1978), plant and root growth (Phillips and Kirkham in Davidson and Fox 1974). Meadows are particularly susceptible to compaction due to the fact that most

meadows remain wet into August, with many staying wet year-round. In rare plant habitat, soils subjected to vehicular traffic that become compacted and eroded due to wheel ruts may become unsuitable for seedling development and the sustainability or expansion of that rare plant population could be affected.

Compaction by vehicles also contributes to roadside invasions of exotic plant species by reducing native plant vigor and creating areas of competition-free space that are open to invasion (Ouren *et al.* 2007, Munger *et al.* 2003, Trombulak & Frissell 2000, Wilshire *et al.* 1978a). Trombulak & Frissell (2000) report the spread of exotics by vehicles through habitat alteration, stress on native species, and creation or maintenance of movement corridors. Repeated damage to rare plant species a can lead to the degradation of habitat and eventually to the replacement of native plant species, with species more adapted to frequent disturbance, such as invasive weeds. Off-highway vehicles have been shown to accelerate plant invasions (von der Lippe and Kowarik 2007) by reducing native plant vigor and cover (Brooks and Lair 1995), creating a competition-free habitat open to invasion (Frenkel 1970), and acting as a vector for seed dispersal. For a more detailed discussion of the effects of roads and vehicles on weed invasion, and the effects of weeds on native vegetation, refer to the effects section for invasive plant species.

Dust from motor vehicle use has also been shown to decrease native plant cover and vigor by reducing rates of photosynthesis, respiration, transpiration (Spellerberg and Morrison 1998 in Ouren *et al.* 2007), and water-use efficiency. Dust can block photosynthesis, respiration, and transpiration, and may even be sufficient in some cases to alter community structure (Trombulak & Frissell 2000).

Cumulative Effects

A cumulative effect can result from the incremental impact of the action when added to the effects of past, present, and reasonably foreseeable future actions. Past activities are considered part of the existing conditions and are discussed within the Affected Environment section above. This is because the existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed to those effects.

The Forest boundary outside of the South Warner Wilderness Area, and excluding private in holdings within the proclaimed Forest boundary, was chosen as the cumulative effects analysis area for all rare species within this analysis. Ongoing or future actions on private lands within the Forest boundary may also have cumulative impacts on these species, but since survey requirements and mitigations for rare plant species are not known, the type and extent of the potential impacts to rare plant species on private lands cannot be quantified.

The existing condition of rare plants on the Modoc National Forest is the result of multiple past disturbances on multiple scales across the landscape, including volcanic activity, erosion, and fire, as well as human-caused disturbances, which have created a diversity of plant habitats on both spatial and temporal scales. Knowledge of rare plants, their locations on the Forest, and their habitat needs have increased over the years, but remains incomplete. Botanical surveys for Modoc National Forest projects are conducted with a primary focus on known potential habitat for TES and WL plant species. They do not cover entire project areas due to lack of available staff for intensive surveying. Also, many species of concern are very small in stature and are easily overlooked during surveys. Therefore, it is possible that isolated populations are overlooked during surveys. It is probable that documented occurrences of TES and WL plant species are a very incomplete representation of occurrences actually present on the Forest. Scientific understanding of rare plant ecological needs has increased with time, but for most rare

plant species little is known about specific ecological requirements and responses to different types of disturbances. Overall, there is no way to determine what impact past activities have or have not had on each species and their potential habitat, due to a lack of historic knowledge and detailed habitat requirements for these species.

Present and future activities that are associated with the proposed route system could impact rare species growing along or in the vicinity of a designated trail. These activities may include routine maintenance, such as clearing brush, posting signs, cleaning, or clearing of debris, or increased levels of dispersed camping or recreation along and near routes. Future projects in timber harvest and vegetation treatments, range management, fuel treatments, dam construction and maintenance, recreation, reforestation, railroad rights-of-way vegetation management, road decommissioning, and special uses may also contribute impacts to rare plant species. 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 mitigations or route closure. The effects of other types of future projects (*e.g.*, vegetation management) would likely be minimal or similar to those described in this analysis if existing management guidelines (such as field surveys, protection of known rare species locations, and noxious weed mitigations) remain in place.

Effects of Alternatives on Rare Plant Species

The following sections provide a discussion of the direct, indirect and cumulative effects of each Alternative to and rare plant species and their habitats. Only those rare plant species with the potential to be affected directly or indirectly by the proposed project (those within 100 feet of a proposed route) are discussed in detail in this document. The remainder of the discussion is focused on the general effects to rare species and habitats from motor vehicle use.

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. Cross-country travel by merely one vehicle has the potential to crush or grind up rare plants. Kellomaki and Saastmoinen (1975, in Yorks *et al.* 1997) noted that the initial use of a trail creates the greatest deterioration; even as few as 1 to 20 passes have been shown to reduce plant cover by stunting plants (Adams *et al.* 1982 in Ouren *et al.* 2007). Vehicles traveling through mud easily alter surface hydrology, potentially blocking water from Sensitive plant habitat, or conversely, potentially flooding it.

Under this alternative, it is impossible to quantify when and where rare plant species and habitats would be impacted by motor vehicles; therefore the analysis below uses the 490.5 miles of unauthorized routes as a representation of current motor vehicle use on the Forest. 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.

Direct and Indirect Effects

Of the 676 mapped occurrences within the project area, there are 23 Sensitive, and 40 Special Interest plant occurrences currently documented within 100 feet of the 490.53 miles of unauthorized routes on the Modoc National Forest. In addition, there are currently five occurrences of *Orcuttia tenuis*, found within 100 feet of unauthorized routes within the analysis area. This represents approximately nine percent of the rare plant occurrences on the Forest.

With the implementation of the No Action Alternative, cross county travel would continue on the Forest, which would continue the threat of impacts to known and potential rare plant habitat

across the Forest. As a result, this alternative has the greatest negative effect on all habitats and their associated species.

Under this alternative, there would be no seasonal closures of NFTS roads. Seasonal closures could potentially provide a minimal reduction in impacts to adjacent rare plant occurrences. Under this alternative, there would continue to be no mixed use allowed on NFTS Level 3 roads, which may provide a minimal reduction in noxious weed risk for adjacent rare plant occurrences. However, potential negative and positive effects from no seasonal closures and no mixed use on NFTS roads are miniscule relative to the direct and indirect effects resulting from continued cross-country motor vehicle use.

Barren Habitats

Barren habitats have not been heavily impacted by off road travel on the Modoc National Forest. There are no unauthorized routes currently present within the Barren habitat, so there are no known impacts to rare plants within this habitat from off-road vehicle use. It is possible that rare plant occurrences growing in barren habitats could be impacted in the future with continued cross-country travel under the No Action Alternative. However, there is no evidence of negative impacts to rare plant species in barren habitats at this time.

Fen and Wet Meadow Habitats

With the implementation of the No Action Alternative, cross county travel would continue on the Forest, which would continue the threat of impacts to fen and wet meadow habitats and their associated rare plant species. Fens and wet meadows can also be degraded by long-term OHV use, directly or indirectly, by de-watering, rutting, changing the drainage patterns to these systems or by moving sediments into these areas. Species within open wet habitats are the most susceptible to continued long-term impacts from use of these areas. Fens are particularly susceptible to impacts from OHV use within them as motor vehicle use has the potential to disrupt key hydrological processes essential to maintaining the integrity of the fen system. With continued use, there is the potential to remove or kill vegetation, which can de-water the fen, and oxidize the peat.

Currently, there are three fen and meadow species, with a total of four occurrences that are found within 100 feet of existing unauthorized routes across the Forest (Table 3-37). Both true fen and perennially wet meadow sites are susceptible to impacts from cross-country travel.

Table 3-37. The number of Fen and Meadow Species Occurrences Known Within 100 Feet of Unauthorized Routes, by Alternative

Species	Alternative				
	1	2	3	4	5
Botrychium lunaria	1	0	0	0	0
Botrychium pinnatum	1	0	0	0	0
Sphagnum spp.	2	0	0	0	0
Total number of rare plant occurrences	**4**	**0**	**0**	**0**	**0**

Roads within these habitats can be detrimental to the functionality of the hydrologic process, due to the fact that wet meadows and fens remain wet year-round. Routes that pass through or along edges of fens and wet meadows cause long-term adverse impacts to rare plant habitat and individuals, which can include impacts such as a loss of vegetation, changes in hydrology, accelerated erosion, and soil compaction. Soil compaction can influence drainage patterns as well

as cause ruts in these well-defined soils. In either case, water infiltration into fens and wet meadow soils is slowed or drainage patterns altered. These effects can permanently convert rare fen and wet meadow habitats into dry meadows. In addition, these habitats can be highly susceptible to invasion from noxious weed species that thrive in wet conditions such as Canada thistle (*Cirsium arvense*).

Currently there are 13.71 miles of unauthorized routes located within 100 feet of fen and wet meadows habitats on the Modoc National Forest. There are currently 10.45 acres located within 100 feet of existing unauthorized roads that have the potential to be directly or indirectly impacted by the No Action Alternative (Table 3-38).

Table 3-38. Approximate Number Of Miles and Acres of Habitat of Unauthorized (Alt. 1) or Proposed (Alts.2-5) Routes Within 100 Feet of Fens and Wet Meadows Habitat[1]

Measure	Alternative				
	1	2	3	4	5
Miles of Proposed Routes	0	0.09	0	0.09	0.09
Miles of Unauthorized Routes	13.71	0	0	0	0
Total Miles	13.71	0.09	0	0.09	0.09
Acres of Potential Habitat [2]	10.45	0.10	0	0.10	0.10

[1] Analysis includes mapped fens (Holland) combined with CalVeg types HJ and HM.

[2] Calculated within 100 feet of existing unauthorized routes and proposed routes, within fen and wet meadow habitats.

Forested Habitats

Currently, there are five species living principally within Forest habitats, with a total of 20 occurrences that are found within 100 feet of existing unauthorized routes across the Forest (Table 3-39), making this one of the habitats most vulnerable to cross-country motor vehicle travel. This habitat encompasses a variety of Forest types. Some areas have dense timber stands and are not amenable to cross-country vehicle travel, while other areas are in relatively open yellow pine stands where cross-country travel has a greater risk of damaging rare plant potential habitats. Meadow openings within Forests are important habitats for *Carex halliana* and *Calochortus longebarbatus* var. *longebarbatus*.

Table 3-39. The Number of Forest Species Occurrences Known Within 100 Feet of Unauthorized (Alt. 1) or Proposed (Alts. 2-5) Routes, by Alternative

Species	Alternative				
	1	2	3	4	5
Carex halliana	5	1	0	1	1
Calochortus longebarbatus var. longebarbatus	12	4	0	2	4
Cypripedium montanum	1	0	0	0	0
Dimeresia howellii	1	1	0	0	1
Eriogonum umbellatum var. glaberrimum	1	1	0	1	1

Species	Alternative				
	1	2	3	4	5
Total number of Rare plant occurrences	**20**	**7**	**0**	**4**	**7**

Currently there are 64.53 miles of unauthorized routes located within Forest habitat on the Modoc National Forest. There are currently 1,709 acres of Forest rare plant habitat located within 100 feet of existing unauthorized roads that have the potential to be directly or indirectly impacted by the No Action Alternative (Table 3-40).

Table 3-40. Approximate Number of Miles and Acres of Habitat of Proposed Routes and Unauthorized Routes Within Forest Habitat Type[1], and Acres of Potential Habitat Within 100 Feet of Routes

Measure	Alternative				
	1	2	3	4	5
Miles of Proposed Routes within Potential Habitat	0	55.62	0	42.47	55.62
Miles of Unauthorized Routes within Potential Habitat	64.48	0	0	0	0
Total Miles	**64.48**	**55.62**	**0**	**42.47**	**55.62**
Acres of Potential Habitat [2]	**1,709.10**	**1,472.25**	**0**	**1,126.22**	**1,472.25**

[1] Calveg types used in analysis include EP, JJ, MF, WF.

[2] Calculated within 100 feet of existing unauthorized routes, within Forested habitats.

Riparian Habitats

The Riparian habitat has the greatest number of rare plant species and occurrences potentially affected by cross-country travel in the No Action Alternative. Like the Fen and Wet Meadow habitats, Riparian areas occurring along both streams and lake shores can also be permanent impacted by cross-country travel. Species can be impacted by long-term use in their habitats. Currently there are eight species, with a total of 26 occurrences, found within 100 feet of unauthorized roads across the Forest (Table 3-41).

Table 3-41. The Number of Riparian Species Occurrences Known Within 100 feet of Unauthorized (Alt. 1) and Proposed (Alts. 2-5) Routes, by Alternative

Species	Alternative				
	1	2	3	4	5
Botrychium lunaria	1	0	0	0	0
Botrychium pinnatum	1	0	0	0	0
Buxbaumia viridis	4	0	0	0	0
Gratiola heterosepala	9	4	0	3	4
Pogogyne floribunda	8	3	0	3	3
Potentilla newberryi	1	0	0	0	0

Species	Alternative				
	1	2	3	4	5
Ribes hudsonianum var. *petiolare*	1	0	0	0	0
Salix bebbiana	1	0	0	0	0
Total number of Rare plant occurrences	**26**	**7**	**0**	**6**	**7**

Currently there are 12.29 miles of unauthorized routes located within 100 feet of Riparian habitats on the Modoc National Forest. There are 312.74 acres of Riparian habitats located within 100 feet of existing unauthorized roads that have the potential to be directly or indirectly impacted by the No Action Alternative (Table 3-42).

Table 3-42. Approximate Number of Miles and Acres of Potential Habitat of Proposed Routes and Unauthorized Routes Within 100 Feet of Streams and Lake Shores

Measure	Alternative				
	1	2	3	4	5
Miles of Proposed Routes	0	4.85	0	3.68	4.85
Miles of Unauthorized Routes	12.29	0	0	0	0
Total Miles	**12.29**	**4.85**	**0**	**3.68**	**4.85**
Acres of Potential Habitat[1]	**686.74**	**262.56**	**0**	**208.87**	**262.56**

[1] Calculated within 100 feet of existing unauthorized routes, within riparian habitats

Sage Steppe Habitats

Although the sage steppe habitat type is one of the most common and extensive habitat types on the Forest, there currently is only one known rare plant species occurring within 100 feet of unauthorized routes (Table 3-43). This habitat is particularly vulnerable to invasion by weedy annual grasses, particularly cheatgrass and Medusahead, which have the potential to severely alter ecological functions of the sage steppe. This is also a relatively open habitat type, which is vulnerable to cross-country motor vehicle travel.

Table 3-43. The Number of Sage Steppe Species Occurrences Known Within 100 Feet of Unauthorized (Alt. 1) and Proposed (Alts. 2-5) Routes by Alternative

Species	Alternative				
	1	2	3	4	5
Cordylanthus capitatus	2	0	0	0	0
Total number of Rare plant occurrences	**3**	**1**	**0**	**1**	**1**

Currently there are 22.14 miles of unauthorized routes located within sage steppe habitat on the Modoc National Forest. There are currently 574.99 acres located within 100 feet of existing

unauthorized roads that has the potential to be directly or indirectly impacted by the No Action Alternative (Table 3-44).

Table 3-44. Approximate Miles and Acres Adjacent to Habitat of Potential Habitat of Proposed Routes and Unauthorized Routes Within Sage Steppe Habitat Type

Measure	Alternative				
	1	2	3	4	5
Miles of Proposed Routes within Potential Habitat	0	11.24	0	6.75	11.24
Miles of Unauthorized Routes within Potential Habitat	22.14	0	0	0	0
Total Miles	**22.14**	**11.24**	**0**	**6.75**	**11.24**
Acres of Potential Habitat [1]	**574.99**	**292.27**	**0**	**178.27**	**292.27**

[1] Calculated within 100 feet of existing unauthorized routes, within sage steppe habitats

Vernal Pools and Swales Habitat

The Vernal Pools and Swales habitat supports the greatest number of TES species on the Forest, including the single Federally-listed Endangered plant species, *Tuctoria greenei*, and the single Federally-listed Threatened plant species on the Forest, *Orcuttia tenuis*. At the same time, this is one of the most vulnerable habitat types to disturbance.

With the implementation of the No Action Alternative, cross county travel would continue on the Forest, which would continue the threat of impacts to vernal pool and swales habitats and their associated rare plant species. Vernal pools and swales can also be degraded by long term OHV use, directly or indirectly, by rutting, changing the drainage patterns to these systems, or moving sediments into these areas. Species within open, wet habitats are the most susceptible to continued long-term impacts from use of these areas. Vernal pools and swales are particularly susceptible to impacts from OHV use within them, as motor vehicle use has the potential to remove or kill vegetation, which consists largely of ephemeral annual species. Damage to plants prior to seed set can interfere with reproductive capability of plants and, over time, deplete the soil seed bank.

Currently, there are five Vernal Pool and Swale species, including one Federally listed Endangered and one Federally listed Threatened species, with a total of 22 occurrences that are found within 100 feet of existing unauthorized routes across the Forest (Table 3-45).

Table 3-45. The Number of Vernal Pool and Swale Species Occurrences Known Within 100 Feet of Unauthorized (Alt. 1) or Proposed (Alts. 2-5) Routes, by Alternative

Species	Alternative				
	1	2	3	4	5
Orcuttia tenuis (Federally Threatened)	6	2	0	0	2
Gratiola heterosepala	9	3	0	0	3
Pogogyne floribunda	8	3	0	0	3
Potentilla newberryi	1	0	0	0	0
Total number of rare plant	**24**	**8**	**0**	**0**	**8**

Species	Alternative				
	1	2	3	4	5
occurrences					

Currently there are 21.81 miles of unauthorized routes located within 100 feet of Vernal Pools and Swales habitat on the Modoc National Forest. There are currently 454.31 acres located within 100 feet of existing unauthorized roads that have the potential to be directly or indirectly impacted by the No Action Alternative (Table 3-46).

Table 3-46. Approximate Miles of Proposed Routes and Unauthorized Routes Within 100 Feet of Vernal Pools and Swales

Measure	Alternative				
	1	2	3	4	5
Miles of Proposed Routes within Potential Habitat	0	6.89	0	3.99	6.89
Miles of Unauthorized Routes within Potential Habitat	21.81	0	0	0	0
Total Miles	**21.81**	**6.89**	**0**	**3.99**	**6.89**
Acres of Potential Habitat[1]	**454.31**	**75.75**	**0**	**50.74**	**75.75**

[1] Calculated within 100 feet of existing unauthorized routes, within vernal pools and swales habitat

Orcuttia tenuis

Because *Orcuttia tenuis* is a Federally listed Threatened species, it is analyzed here separately from other vernal pool rare plant species. There are seven known occurrences of *Orcuttia tenuis* located in vernal pools within 300 feet of unauthorized routes, inside the analysis area (Table 3-47). The 300 feet analysis buffer is being used for this species analysis to facilitate compliance with the Endangered Species Act.

Table 3-47. The Number of Federally Listed, Threatened *Orcuttia Tenuis* Occurrences Located in Vernal Pools Within 300 Feet of Unauthorised/Proposed Routes

Species	Alternative				
	1	2	3	4	5
Total number *of Orcuttia tenuis* occurrences	7	6	0	0	6

Off-highway vehicle use on unauthorized roads is currently impacting vernal pool plants directly by driving on plants and rutting vernal pool habitats, or indirectly by impacting the sites with sediments and potentially changing the hydrology of the pool. There are currently 1152.57 acres of vernal pool habitat located within 300 feet of 30.78 miles of unauthorized routes across the Modoc National Forest (Table 3-48).

Table 3-48. Approximate Miles And Acres Of Habitat of Proposed Routes and Unauthorized Routes Within 300 Feet Of Vernal Pools

Measure	Alternative				
	1	2	3	4	5
Miles of Proposed Routes	0	12.04	0	6.78	12.04
Miles of Unauthorized Routes	30.78	0	0	0	0
Total Miles	**30.78**	**12.04**	**0**	**6.78**	**12.04**
Acres of Potential Habitat [1]	**1152.57**	**273.60**	**0**	**168.50**	**273.60**

[1] Calculated within 300 feet of existing unauthorized routes, within vernal pool habitats

Cumulative Effects

The implementation of Alternative 1 would not improve conditions for rare plant species or their habitats. Cross-country vehicle travel would continue, and the proliferation of routes would increase within the project area. Unmanaged motor vehicle use on the Modoc National Forest has the potential for negative direct and indirect effects to all of the rare species known to occur within the project area (Table 3-48).

Under this alternative, motor vehicles traveling on and off unauthorized route would continue to trample, kill, and uproot rare species. Indirect effects to rare species and their associated habitats described in the general effects section could apply to all occurrences and species found within the project analysis area. However, the potential impacts would most likely occur to those species within 100 feet of existing unauthorized routes. Habitats which are open and accessible, such as the Fens and Wet Meadows and the Riparian habitats, are most susceptible.

One of the largest potential impacts from cross-country motorized use 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, recreational activities (such as camping, hiking, horseback riding, and hunting), and ongoing land management activities such as road maintenance and range management. Under this alternative, all but the most inaccessible habitats are at risk of noxious weed invasion and spread from cross-country motor vehicle travel, due to the potential for all roads within the project area to spread weeds.

Ongoing and foreseeable future actions, such as grazing and range management, dam construction and maintenance, timber harvest, fuels management, wildfires and prescription burns, and woodcutting activities, have also created temporary roads and skid trails that often contribute to cross-country travel and the creation of unauthorized routes. Under this alternative, these negative impacts would continue to occur. For a complete list of ongoing and foreseeable future actions for the Modoc National Forest, refer to the Modoc National Forest Travel Management Draft Environmental Impact Statement (DEIS), appendix H.

Negative direct and indirect impacts to rare plants and their habitats from Forest management activities are minimized by conducting botany surveys prior to project implementation, with flagging and avoidance of all rare plant occurrences. Compliance with the Modoc National Forest weed management strategies (USDA Forest Service 2005) during all management activities minimizes the risk for introduction and spread of noxious weeds.

Action Alternatives

Detailed discussions of potential effects on rare plant species for the action Alternatives are found below (Table 3-49). When data are available, acres of affected habitat and species are provided. Many of our Sensitive and Watch List plant species on the Forest, however, were not mapped accurately, and the exact acres for these occurrences are estimates based on the original discovery documentation. Also, many of these occurrences have not been re-visited since their initial discovery, some as long as 20 years ago, and the current status of these populations is unknown. Analysis is based on available records. No field surveys were conducted specifically along proposed routes.

Impacts to rare plants from the Action Alternatives would be similar to those from those discussed within the No Action Alternative above; however, with the prohibition of cross-country travel, and the closure of many of the unauthorized routes within the Proposed Action Alternative, impacts to rare plant species would be far fewer. Over the short-term there would be little difference between any of the Alternatives, as it takes time for roads to heal. However, over the long term (20 years) unauthorized roads not designated would begin to re-vegetate, and could potentially become re-colonized by rare species. As a result, any negative impacts would be decreased with time.

Table 3-49. Rare Plant Species Located Within 100 Feet of Unauthorized Routes (Alt. 1) or Proposed Routes (Alts. 2, 4, 5)

Species (Habitat)	Status	Occurrence or Suboccurence	Route Number	Alternatives				
				1	2	3	4	5
Botrychium lunaria (R)	Sensitive	1	BA436	X				
Botrychium pinnatum (R)	Sensitive	1	BA419	X				
*Buxbaumia viridis (*R*)*	Sensitive	1	BA473 BA474	X	X		X	X
*Buxbaumia viridis (*R*)*	Sensitive	4	BA406 BA407	X	X		X	X
*Buxbaumia viridis (*R*)*	Sensitive	6	BA419	X				
*Buxbaumia viridis (*R*)*	Sensitive	7	BA472	X	X		X	X
Calochortus longebarbatus var. *longebarbatus* (FE, F*)*	Sensitive	10	ML414	X				
Calochortus longebarbatus var. *longebarbatus* (FE, F)	Sensitive	11	ML444	X				
Calochortus longebarbatus var. *longebarbatus* (FE, F)	Sensitive	12 / A, B, C	ML444	X				
Calochortus longebarbatus var. *longebarbatus* (FE, F)	Sensitive	20	TR310	X	X		X	X
Calochortus longebarbatus var. *longebarbatus* (FE, F)	Sensitive	70 / A	ML2099 ML2100	X				
Calochortus longebarbatus var. *longebarbatus* (FE, F*)*	Sensitive	77	JW2135	X	X		X	X
Calochortus longebarbatus var. *longebarbatus* (FE, F)	Sensitive	78 / A	BA143	X	X			X

Species (Habitat)	Status	Occurrence or Suboccurence	Route Number	Alternatives				
				1	2	3	4	5
Calochortus longebarbatus var. *longebarbatus* (FE, F)	Sensitive	79	ML459	X				
Calochortus longebarbatus var. *longebarbatus* (FE, F)	Sensitive	82	ML432	X	X			X
Calochortus longebarbatus var. *longebarbatus* (F)	Sensitive	85 / A	BA2300	X				
Calochortus longebarbatus var. *longebarbatus* (FE, F)	Sensitive	86	ML422	X				
Calochortus longebarbatus var. *longebarbatus* (FE, F)	Sensitive	89	ML414	X				
Carex halliana (F)	Watch List	4	BA2212	X				
Carex halliana (F)	Watch List	5	BA2211	X				
Carex halliana (F)	Watch List	7	BA2204 BA2050	X	X		X	X
Carex halliana (F)	Watch List	9	BA2190 BA2191	X				
Carex halliana (F)	Watch List	10	BA2192	X				
Cordylanthus capitatus (SS)	Watch List	4	BA436	X				
Cordylanthus capitatus (SS)	Watch List	6	SS741 SS748	X				
Cypripedium montanum (F)	Sensitive	11	ML2089	X				
Dimeresia howellii (F)	Watch List	2	BA497	X	X			X
Eriogonum umbellatum var. glaberrimum (F)	Sensitive	6	SS551	X	X		X	X
Gratiola heterosepala (R, VP)	Watch List	1	SS72	X				
Gratiola heterosepala (R, VP)	Watch List	2	SS73	X				
Gratiola heterosepala (R, VP)	Watch List	4	SS54 SS55	X				
Gratiola heterosepala (R, VP)	Watch List	6	ML476	X				
Gratiola heterosepala (R, VP)	Watch List	9	BA173	X	X			X
Gratiola heterosepala (R, VP)	Watch List	13	ML584	X	X		X	X
Gratiola heterosepala (R, VP)	Watch List	16	BA55	X	X		X	X
Gratiola heterosepala (R, VP)	Watch List	17	ML290	X				
Gratiola heterosepala (R, VP)	Watch List	18	BA2217	X	X		X	X
Iliamna bakeri (SS)	Watch List	7 / A, E, O, P	ML327 ML328 ML329 ML330	X	X		X	X

Species (Habitat)	Status	Occurrence or Suboccurence	Route Number	Alternatives				
				1	2	3	4	5
			ML336 ML343 ML344 ML404 ML405 ML406 ML1300 ML1304 ML1305 ML1306 ML1307 ML1308 ML1310 ML2018 PK6 PK8 PK9 PK10 PK11 PK13 PK14 PK15					
Iliamna bakeri (SS)	Watch List	35	SS238	X	X		X	X
Iliamna bakeri (SS)	Watch List	44	PA39	X	X		X	X
Orcuttia tenuis (VP)	Threatened	1	ML450 ML451	X				
Orcuttia tenuis (VP)	Threatened	4	ML440	X				
Orcuttia tenuis (VP)	Threatened	11	ML461	X	X			X
Orcuttia tenuis (VP)	Threatened	12a 12b	ML488 ML474	X X	X			X
Orcuttia tenuis (VP)	Threatened	13	SS330	X				
Orcuttia tenuis (VP)	Threatened	17	ML460	X				
Pogogyne floribunda (R, VP)	Watch List	1	SS72	X				
Pogogyne floribunda (R, VP)	Watch List	3	SS73	X				
Pogogyne floribunda (R, VP)	Watch List	4	BA71	X	X		X	X
Pogogyne floribunda (R, VP)	Watch List	6	ML122	X				
Pogogyne floribunda (R, VP)	Watch List	9	BA49	X				
Pogogyne floribunda (R, VP)	Watch List	10	ML299	X	X		X	X

Species (Habitat)	Status	Occurrence or Suboccurence	Route Number	Alternatives				
				1	2	3	4	5
Pogogyne floribunda (R, VP)	Watch List	29	SS312	X	X		X	X
Pogogyne floribunda (R, VP	Watch List	34	ML450, ML45	X				
Potentilla newberryi (R)	Watch List	4 / A, B	ML277 ML280	X				
Ribes hudsonianum var. *petiolare* (R)	Watch List	1	SS943 SS945 SS947	X				
Rorippa columbiae (R)	Sensitive	1	ML268	X				
Rorippa columbiae (R)	Sensitive	2	ML280	X				
Rorippa columbiae (R)	Sensitive	3	ML277	X				
*Salix bebbiana (*R)	Watch List	1	SS943 SS945 SS947	X				
Sphagnum spp. (FE)	Watch List	1	BA418	X				
Sphagnum spp. (FE)	Watch List	2	BA417	X				

Alternative 2 – Proposed Action

Direct and indirect Effects: Prohibition of Cross-Country Motor vehicle Travel and the Addition of Unauthorized Roads to the NFTS

Sensitive and Special Interest Plant Species and Associated Habitats

Alternative 2 prohibits cross-country travel, and adds approximately 336 miles of roads to the NFTS. This alternative has the second-highest level of impact to rare plant species and their associated habitats, equivalent to that of Alternative 5, and lower in impact only to Alternative 1.

Table 3-50. Summary of Indicator Measures for the Analysis of Effects to Rare Plant Species for the Prohibition of Cross-Country Travel and the Addition of Routes Under Alternative 2

Measure	Total*
Miles of proposed routes within 100 feet of rare plant sites, or within or adjacent to suitable rare plant habitat.	125.80 miles
The number of acres of potential habitat for rare plants within 100 feet of routes.	2,840.43 acres
Total number of plant occurrences within 100 feet of proposed routes.	21

There are currently eight known species of rare plants documented within 100 feet of routes proposed for addition under Alternative 2, found within the Riparian, Fen and Wet Meadows, Forest, Sage Steppe, and Vernal Pool habitats. These species will be discussed below. If species are found in more than one habitat, they will be discussed in the habitat that is perceived to have the highest potential (most open) for impacts from off-road vehicles.

Riparian Habitat

Currently there is one rare plant species, *Buxbaumia viridis*, within Riparian habitat, found along routes proposed for addition that may be directly or indirectly impacted with the implementation of Alternative 2. In addition, there are currently 4.85 miles of routes, with a total of approximately 122.56 acres, within Riparian habitats that have the potential to be impacted by the implementation of this alternative.

Buxbaumia viridis (Bug-on-a-stick)

There are currently three occurrences of *Buxbaumia viridis* within 100 feet of unauthorized routes proposed for addition within Alternative 2. All three occurrences are in the Warner Mountains.

Table 3-51. Potential Impacts to *Buxbaumia viridis* from Alternative 2

Occurrence or Suboccurrence	Route	Individuals with Potential for Impact	Total Size of Occurrence (Individuals)	Percent of Occurrence Affected
1	BA473 BA474	12 plants	12 plants	100
4	BA406 BA407	2 plants	2 plants	100
7	BA472	9 plants	9 plants	100

This is a minute moss species found only on decaying logs within and adjacent to streams, and populations have been documented with numbers of individuals rather than acreages. It occurs only on decaying logs within or adjacent to streams.

Occurrence #1: This occurrence was discovered in 2004, and is located near routes BA473 and BA 474, at the head of Mill Creek.

Occurrence #4: This occurrence had two individuals when it was discovered in 2005, and is located near routes BA406 and BA407, at the headwaters of Goose Creek.

Occurrence #7: This occurrence had nine individuals when it was discovered in 2007, and is located near route BA472, also at the head of Mill Creek.

Alternative 2 has the potential to both directly and indirectly affect Occurrences #4 and #7, and to indirectly affect Occurrence #1. Potential impacts include removal or damaging of riparian logs which provided required habitat. Because of low population sizes and stringent habitat requirements, damage to or loss of a single log could potentially eliminate an entire occurrence. This unique habitat of rotting logs in streams makes *Buxbaumia viridis* unlikely to suffer direct impacts from being driven over. However, hydrologic alterations diverting water away from habitat logs, or drying up the springs and streams that keep habitat logs moist, are potential indirect impacts.

Fens and Wet Meadows Habitat

Currently there are no known rare plant species within the Fens and Wet Meadows habitat found within 100 feet of proposed route additions under Alternative 2. However, there are currently 13.71 miles of routes, with a total of approximately 10.45 acres, within Fens and Wet Meadows habitats that have the potential to be impacted by the implementation of this Alternative.

Vernal Pool Habitat

Currently there are two rare plant species, *Gratiola heterosepala* and *Pogogyne floribunda*, that are within Vernal Pool habitat, found along routes proposed for addition, and potentially directly or indirectly impacted with the implementation of Alternative 2. In addition, there are currently 21.81 miles of routes, with a total of approximately 454.31 acres, within Vernal Pool habitats that have the potential to be impacted by the implementation of this alternative.

Gratiola heterosepala (Boggs lake hedge-hyssop)

This is a Watch List species known from 17 occurrences on the Forest. This member of the snapdragon family inhabits vernal pools and similar wet clay habitats. There are currently four occurrences of *Gratiola heterosepala* within 100 feet of unauthorized routes proposed for addition within Alternative 2 (Table 3-52). Occurrence #9 had an estimated population of 10,000,000 plants when it was discovered in 1993, and is located in the Mowitz buttes area, near Williams Reservoir. Occurrence #13 had an estimated 300 plants when it was discovered in 1994, and is located in the Devil's Garden District near Lower Cummings Reservoir. Occurrence #16 had approximately 100 plants when it was discovered in 1997, and is located near a small unnamed vernal pool in the vicinity of Quaking Aspen Spring. Occurrence #18 had 2 plants when it was discovered in 1997, and is located in the Medicine Lake Highlands east of Alcohol Crater.

Gratiola heterosepala habitat ranges from moist to submerged during the months when vehicles can access the Forest. This makes the habitat subject to hydrologic alteration. Also, the dry upland surroundings of Devil's Garden vernal pools can be very dusty beginning in early summer, so motor vehicle use in the vicinity may spread dust over adjacent plants. However, this is a relatively widespread species across the Forest, and addition of the proposed routes would not impact the viability of this species, particularly combined with the prohibition of cross-country travel, which is the much greater threat to vernal pool species.

Table 3-52. Potential Impacts to *Gratiola heterosepala* from Alternative 2

Occurrence or Suboccurrence	Route	Acres with potential for impact	Total size of Occurrence (Acres)	Percent of Occurrence affected
9	BA173	0.18	357	<1%
13	ML584	0.06	51.4	1%
16	BA55	0.38	0.5	76%
18	BA2217	1.63	1.6	102%[1]

[1] This percentage exceeds 100%, probably due to rounding error of reported total site acreage.

Pogogyne floribunda (Profuse-flowered pogogyne)

This Watch List species is known from 42 occurrences across the Forest. A member of the mint family, it grows in vernal pools and similarly vernally wet areas. There are currently three occurrences of *Pogogyne floribunda* within 100 feet of unauthorized routes proposed for addition within Alternative 2. Occurrence #4 had approximately 75 plants when it was discovered in 1988, and is located east of Lone Pine Lake. Occurrence #10 had approximately 2000 plants when it was last visited in 1998, and is located adjacent to the OTHB Radar Installation. Occurrence #29 had approximately 50 plants when it was discovered in 2001, and is located in the Mowitz Buttes area about 1 ½ miles northeast of Knobcone Butte. This species appears to tolerate moderate disturbance well. With the number and size of occurrences on the Forest, addition of the proposed routes would not impact the viability of this species.

Table 3-53. Potential Impacts to *Pogogyne floribunda* from Alternative 2

Occurrence or Suboccurrence	Route	Acres with potential for impact	Total size of Occurrence (Acres)	Percent of Occurrence affected
4c	BA71	0.47	1.6	29%
10	ML299	0.12	8.2	2%
29	SS312	0.80	24	3%

Forest Habitat

Currently there are four rare plant species, *Eriogonum umbellatum* var. *glaberrimum*, *Calochortus longebarbatus* var. *longebarbatus*, *Carex halliana*, and *Dimeresia howellii*, which are within the Forest habitat, found along routes proposed for addition (Table 14), and potentially directly or indirectly impacted with the implementation of Alternative 2. In addition, there are currently 64.48 miles of routes, with a total of approximately 1,709.10 acres, within Forest habitats that have the potential to be impacted by the implementation of this alternative.

Calochortus longebarbatus* var. *longebarbatus (Long-haired star tulip)

There are currently four occurrences of *Calochortus longebarbatus* var. *longebarbatus* within 100 feet of unauthorized routes proposed for addition within Alternative 2 (Table 3-54).

Table 3-54. Potential Impacts to *Calochortus longebarbatus* var. *longebarbatus* from Alternative 2

Occurrence or Suboccurrence	Route	Acres with potential for impact	Total size of Occurrence (Acres)	Percent of Occurrence affected
20	TR310	0.61	1.3	47%
77	JW2135	4.3	186	2%
78A	BA143	0.16	31	1%
82	ML432	0.24	3.3	7%

Occurrence #20: This occurrence is located near route TR310, 0.5 mile west of Mud Springs.

Occurrence #77: This is a large occurrence which surrounds the proposed route, JW2135, west of Ambrose Station. It also surrounds Vernal Pool #301.

Occurrence #78A: This occurrence is located near route BA143, southeast of Hog Lake.

Occurrence #82: This small occurrence is located near route ML432, west of Duncan Lake and County Road 10.

This species occurs in meadows openings within Forests. Alternative 2 has the potential to impact three occurrences of *Calochortus longebarbatus* var. *longebarbatus* both directly and indirectly, and to impact a fourth occurrence indirectly. Potential impacts include trampling of plants and associated compaction and erosion of the meadow habitats, as well as the potential introduction of noxious weeds into these sites. Since this is a meadow species, its habitat can be very susceptible to degradation due to repeated and continued use, especially during the spring months when these areas are wet. Occurrences #20 is the most vulnerable due to its relatively small size and percentage of the population potentially impacted. For the other three occurrences, due to the

large sizes of the occurrences, any impacts would be confined to only a portion, so the viability of these occurrences would be maintained. This species is known from 138 occurrences across the Forest (USDA Forest Service 2008). Due to the size and number of occurrences, and stability of the species on the Forest, addition of the proposed routes would not impact the viability of *Calochortus longebarbatus* var. *longebarbatus* within the project area or throughout the Forest.

Eriogonum umbellatum* var. *glaberrimum (Green buckwheat)

This sensitive species is known from six occurrences on the Forest. There is currently one known occurrence of *Eriogonum umbellatum* var. *glaberrimum* within 100 feet of unauthorized routes proposed for addition within Alternative 2 (Table 3-55). This occurrence is located at the north end of the Warner Mountains, near County Road 2. It had 20 plants when it was last monitored in 2003.

Table 3-55. Potential impacts to *Eriogonum umbellatum* var. *glaberrimum* from Alternative 2.

Occurrence or Suboccurrence	Route	Acres with potential for impact	Total size of Occurrence (Acres)	Percent of Occurrence affected
6	SS551	0.09	1	9%

Carex halliana (Hall's sedge)

This Watch List species is known from 11 occurrences across the Forest. There is currently one occurrence of *Carex halliana* within 100 feet of unauthorized routes proposed for addition within Alternative 2 (Table 3-56). This occurrence is located west of the Glass Mountain Geologic Area, and had approximately 4,000 plants when it was discovered in 1997.

Table 3-56. Potential impacts to *Carex halliana* from Alternative 2

Occurrence or Suboccurrence	Route	Acres with Potential for Impact	Total size of Occurrence (Acres)	Percent of Occurrence Affected
7	BA2204 BA2050	0.71	29.2	2%

Dimeresia howellii (Doublet)

This Watch List species is known from 11 occurrences on the Forest. It is a diminutive member of the sunflower family, inhabiting gravelly, dry volcanic soils. Because of its small size, growing to about the size of a quarter, driving over the plant can readily crush and grind it into the volcanic gravel where it grows. There is currently one occurrence of *Dimeresia howellii* within 100 feet of unauthorized routes proposed for addition within Alternative 2 (Table 3-57). This occurrence is located in steep volcanic scree, west of Cedarville, in a site not readily accessible to OHVs. It had approximately 100 plants when it was discovered in 1987.

Table 3-57. Potential Impacts to *Dimeresia howellii* from Alternative 2

Occurrence or Suboccurrence	Route	Acres with Potential for Impact	Total size of Occurrence (Acres)	Percent of Occurrence Affected
2	BA497	0.0003	0.6	<1%

Sage Steppe Habitat

Currently there is one rare plant species, *Iliamna bakeri*, which is within the sage steppe habitat, found along routes proposed for addition, and potentially directly or indirectly impacted with the implementation of Alternative 2 (Table 3-58). In addition, there are currently 22.14 miles of routes, with a total of approximately 574.99 acres, within sage steppe habitats that have the potential to be impacted by the implementation of this Alternative.

Iliamna bakeri (Baker's Globe-Mallow)

This Watch List species is known from 61 occurrences across the Forest. There are currently three occurrences of *Iliamna bakeri* within 100 feet of unauthorized routes proposed for addition within Alternative 2 (Table 3-58). One of these occurrences includes 5 sub-populations potentially impacted by proposed route additions. Occurrence #7 consists of a collection of 17 sub-populations with a total estimated population of 1,000,000 plants. Sub-populations were discovered between 1999 and 2003. This occurrence is located in the Damon/Long wildfire site, south of Tionesta, where 23,398 acres burned in August 1996. Occurrence #35 had approximately 3600 plants when it was discovered in 2002. It is located near route SS238, within the 2001 Bell wildfire, 20 miles NNW of Canby. Occurrence #44 had approximately 150 plants when it was discovered in 2002, and 42 plants when it was revisited in 2003. It is located on the east side of Timber Mountain, an area which burned in the 1992 Timber wildfire. *Iliamna bakeri* is a species which thrives in recently burned sites, and not only tolerates but thrives with disturbance. Addition of the proposed routes would not affect the viability of this species within any of the known occurrences or across its range.

Table 3-58. Potential Impacts to *Iliamna bakeri* from Alternative 2

Occurrence or Suboccurrence	Route	Acres with Potential for Impact	Total Size of Occurrence (Acres)	Percent of Occurrence Affected
7, 7O, 7P	ML327	219.74	23,571.4	<1%
	ML328			
	ML329			
	ML330			
	ML336			
	ML343			
	ML344			
	ML404			
	ML405			
	ML406			
	ML1300			
	ML1304			
	ML1305			
	ML1306			
	ML1307			
	ML1308			
	ML1310			
	ML2018			
	PK6			

Occurrence or Suboccurrence	Route	Acres with Potential for Impact	Total Size of Occurrence (Acres)	Percent of Occurrence Affected
	PK8 PK9 PK10 PK11 PK13 PK14 PK15			
35	SS238	7.24	53.1	14%
44	PA39	1.52	137.8	1%

Federally listed Plant Species

Orcuttia tenuis

There is one known occurrence of *Orcuttia tenuis* located within 100 feet of proposed route additions, located in the Devil's Garden Ranger District (Table 3-59).

Table 3-59. Potential impacts to *Orcuttia tenuis* from Alternative 2

Occurrence or Suboccurrence	Route	Acres with potential for impact	Total size of Occurrence (Acres)	Percent of Occurrence potentially affected
11	ML461	0.4	0.6	67%

Occurrence #11: This population is located in vernal pool #217 near route ML461. Population size was estimated at approximately 5,000 plants in 2008. Although the proposed route addition, ML461, is located within 100 feet of this occurrence, it is not likely to affect the occurrence. Forest Road 40N06 separates ML461 from the vernal pool where Occurrence #11 is located, and the proposed route runs south from Road 40N06 and away from the vernal pool.

There are four known *Orcuttia tenuis* occurrences located in vernal pools that are within 300 feet of proposed route additions, all within the Devil's Garden Ranger District.

Occurrence #4: This population is located in the eastern half of Hackamore Reservoir, with an estimated population of 2,000,000 plants in 2003. The proposed routes within 300 feet of the pool are ML372, ML374, and ML375, all located at the western end of the reservoir more than 2,000 from the mapped *Orcuttia tenuis* occurrence. No impact to *Orcuttia tenuis* is expected from adding the proposed routes, because the routes access Hackamore Reservoir dam, do not impact the vernal pool, and are more than 0.5 mile from the known population.

Occurrence #12: This occurrence is located in Duncan Reservoir near route ML488. Population size was estimated at approximately 10,000 plants in 2008. Addition of route ML488 is not like to impact the *Orcuttia tenuis* occurrence here, because it is more than 1,500 feet from the closest *Orcuttia tenuis* population. It is an existing route that does not affect the vernal pool habitat.

Occurrence #14: This occurrence has two sub-populations, located in Williams Reservoir. Population A is located along the southwestern shoreline, with an estimated population of 18,500,000 plants. Population B is located on the eastern shoreline, and has an estimated

population of 75,000 plants. Both sub-populations were discovered in 2008. No effect is expected from adding the proposed route, BA173, because this established road accesses the lake shoreline more than 1,000 feet from either *Orcuttia tenuis* sub-population, and does not impact the occurrence or its habitat.

Occurrence #15: This occurrence is located along the northeastern shorelines of Vernal Pool #264, in the central pool south and east of Henski Reservoir. This occurrence was found in 2008, and the population size was estimated at 500,000 in the main population on the eastern shoreline of this middle pool, and approximately 50 plants in the southern edge of this pool. No impacts to *Orcuttia tenuis* are expected from adding proposed routes BA2289 and BA2290, because these routes access the dam area and are more than 0.5 mile from the populations.

All of the known occurrences of *Orcuttia tenuis* have persisted since the user-created non-system routes became established. Most are located more than 1000 feet from proposed routes, in large vernal pools expanded by artificial earth-fill dams. There will be no effect on the *Orcuttia tenuis* due to addition of the routes which are more than 1000 feet from occurrences. All of these proposed routes currently exist and will not result in any new ground disturbance or disturbance to the vernal pool hydrology or habitats for *Orcuttia tenuis*.

The occurrence with proposed routes closer than 1,000 feet will not be impacted by adding proposed routes, since the closest route leads away from the pool habitat with an established NFTS road between it and the pool habitat.

Changes to the Existing NFTS

Sensitive and Watch List Plant Species and Associated Habitats

In addition to the prohibition of cross-country travel, and addition of unauthorized routes, Alternative 2 also proposes to enact seasonal closures on 312 miles of NFTS roads, and to allow mixed use on an additional 138 miles of NFTS roads. Seasonal closures occurring during the months when roads are wet and muddy may potentially slightly reduce impacts to rare plant occurrences within 100 feet of the affected roads, as a result of reduced ground damage along and adjacent to muddy roadways. There are currently 30 known rare plant occurrences within 100 feet of NFTS roads scheduled for seasonal closures under Alternative 2 (Table 3-60).

Table 3-60. Rare Plant Species Located Within 100 Feet of NFTS Roads Proposed for Seasonal Closures, for all Alternatives

Species (Guild)	Status	Occurrence or Suboccurence	Road Number	Alternatives				
				1	2	3	4	5
Carex halliana (F)	Watch List	1	43N47 43N48 43N56		X		X	X
Carex halliana (F)	Watch List	2	43N47A		X		X	X
Carex halliana (F)	Watch List	9	43N47		X		X	X
Carex halliana (F)	Watch List	10	43N47B		X		X	X
Carex halliana (F)	Watch List	11	43N47A		X		X	X
Cordylanthus capitatus (SS)	Watch List	6	46N06A				X	
Gratiola heterosepala (VP, R))	Watch List	1	47N10 46N05C		X		X	X

Species (Guild)	Status	Occurrence or Suboccurence	Road Number	Alternatives				
				1	2	3	4	5
			46N05 46T05CA					
Gratiola heterosepala (VP, R)	Watch List	2	46N05		X		X	X
Gratiola heterosepala (VP, R))	Watch List	4	46B02B 46B02JB 46B02J		X		X	X
Hulsea nana (B)	Watch List	1	44N53		X		X	X
Iliamna bakeri (SS,B)	Watch List	4	46N02		X		X	X
Iliamna bakeri (SS,B)	Watch List	5	46N02 46N02E		X		X	X
Iliamna bakeri (SS,B)	Watch List	6	42N31				X	
Iliamna bakeri (SS,B)	Watch List	20	39N01				X	
Iliamna bakeri (SS,B)	Watch List	28	39N01				X	
Iliamna bakeri (SS,B)	Watch List	32	42N43		X		X	X
Meesia triquetra (FE)	Sensitive	4	46N06		X		X	X
Phacelia sericea var. *ciliosa* (SS, B)	Watch List	1	42N43		X		X	X
Phlox hoodii ssp. *muscoides* (B, SS)	Watch List	1	42N43		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	1	47N10 46N05C 46N05 46T05CA		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	2	46N05		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	3	46N05		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	13	46N05		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	24	46N02 46B02J		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	25	45N06		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	26	46A02Y 46N02A 46N02		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	27	46N02		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	28	46N02		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	32	45N28		X		X	X
Pogogyne floribunda (VP, R)	Sensitive	33	45N28		X		X	X

Vernal pool and fen habitats are both vulnerable to changes in hydrology, which can be impacted by roads. Although effects of seasonal closures on NFTS roads would likely be minimal, these are the two rare plant habitat types most likely to experience potential positive effects from seasonal closures during winter and early spring months. Therefore the number of vernal pools and fens located within 100 feet of proposed NFTS seasonal road closures was considered (Table 3-61).

Table 3-61. Vernal Pools and Fens Within 100 Feet of NFTS Roads Proposed for Seasonal Closures, for all Alternatives

Habitat Type	Alternative				
	1	2	3	4	5
Number of Vernal Pools within 100 feet of roads	0	35	0	35	35
Number of Roads within 100 feet of vernal pools	0	29	0	29	29
Miles of Roads within 100 feet vernal pools	0	8.16	0	8.16	8.16
Number of fens within 100 feet of roads	0	0	0	2	0
Number of roads within 100 feet of fens	0	0	0	3	0
Miles of Roads within 100 feet of fens	0	0	0	0.33	0

Allowing mixed use on NFTS roads would probably have no direct effects on rare plant occurrences. However, it could have negative indirect effects resulting from increased risk of noxious weed propagule spread and introduction, since OHVs might be more likely to have traveled through weed infested sites than passenger vehicles prior to entering the Forest. This potential for increase weed risk may be partially mitigated by routine maintenance along Level 3 roads, which includes noxious weed treatment. Overall, this potential increased risk would be minute relative to impacts from cross-country travel or travel on Level 2 roads which do not receive annual maintenance. There are currently three known rare plant occurrences within 100 feet of NFTS Level 3 roads proposed for mixed use under Alternative 2 (Table 3-62).

Table 3-62. Rare Plant Species Located Within 100 Feet of Level 3 NFTS Roads Proposed for Mixed Use, for all Alternatives

Species (Guild)	Status	Occurrence or Suboccurrence	Road Number	Alternatives				
				1	2	3	4	5
Astragalus anxius (B)	Sensitive	1	38N04					X
Astragalus pulsiferae var. *coronensis* (SS, JW, F)	Sensitive	1A	38N04					X
Calochortus longebarbatus var. *longebaratus* (F)	Sensitive	5	42N56					X
Calochortus longebarbatus var. *longebaratus* (F)	Sensitive	19	40N13 41N11					X
Calochortus longebarbatus var. *longebaratus* (F)	Sensitive	21	41N11					X
Calochortus longebarbatus var. *longebaratus* (F)	Sensitive	23	39N17					X
Calochortus longebarbatus var. *longebaratus* (F)	Sensitive	24	41N11					X

Species (Guild)	Status	Occurrence or Suboccurrence	Road Number	Alternatives				
				1	2	3	4	5
Calochortus longebarbatus var. *longebaratus* (F)	Sensitive	33	41N11					X
Calochortus longebarbatus var. *longebaratus* (F)	Sensitive	36	41N11					X
Calochortus longebarbatus var. *longebaratus* (F)	Sensitive	37	41N11					X
Calochortus longebarbatus var. *longebaratus* (F)	Sensitive	68	41N44					X
Carex halliana (F)	Watch List	1	43N48					X
Carex halliana (F)	Watch List	4	43N21					X
Carex halliana (F)	Watch List	9	43N47B					X
Carex halliana (F)	Watch List	10	43N47B					X
Cordylanthus capitatus (SS)	Watch List	6	46N06A		X			X
Cypripedium montanum (F)	Sensitive	1	40N12					X
Cypripedium montanum (F)	Sensitive	3	41N11 40N37					X
Cypripedium montanum (F)	Sensitive	7	40N05					X
Cypripedium montanum (F)	Sensitive	9	40N05					X
Cypripedium montanum (F)	Sensitive	10	40N05A					X
Cypripedium montanum (F)	Sensitive	11	41N44					X
Cypripedium montanum (F)	Sensitive	12	40N05					X
Cypripedium montanum (F)	Sensitive	13	40N05					X
Cypripedium montanum (F)	Sensitive	20	40N11					X
Cypripedium montanum (F)	Sensitive	30	40N11					X
Gratiola heterosepala (VP, R))	Watch List	12	46N10					X
Gratiola heterosepala (VP, R))	Watch List	14	46N10					X
Iliamna bakeri (SS, B)	Watch List	6	42N31					X
Iliamna bakeri (SS,B)	Watch List	7	44N77					X
Iliamna bakeri (SS,B)	Watch List	7	42N56		X			X
Iliamna bakeri (SS,B)	Watch List	20	39N01					X
Iliamna bakeri (SS,B)	Watch List	28	39N01					X
Iliamna bakeri (SS,B)	Watch List	33	46N10					X
Iliamna bakeri (SS,B)	Watch List	35	46N10					X
Ivesia paniculata (B, SS, F, JW)	Sensitive	1	37N11					X
Ivesia paniculata (B, SS, F, JW)	Sensitive	2	38N04					X
Ivesia paniculata (B, SS, F, JW)	Sensitive	3	38N04					X

Species (Guild)	Status	Occurrence or Suboccurrence	Road Number	Alternatives				
				1	2	3	4	5
Ivesia paniculata (B, SS, F, JW)	Sensitive	4	38N04 37N11					X
Ivesia paniculata (B, SS, F, JW)	Sensitive	9	38N46					X
Ivesia paniculata (B, SS, F, JW)	Sensitive	15	37N11					X
Ivesia paniculata (B, SS, F, JW)	Sensitive	19	38N04					X
Meesia triquetra (FE)	Sensitive	4	46N06		X			X
Mertensia longiflora	Watch List	2	40N37					X
Pogogyne floribunda (VP, R)	Watch List	20	45N09					X
Pogogyne floribunda (VP, R)	Watch List	29	44N11					X
Potentilla newberryi (VP,R)	Watch List	4	47N06					X

Because of available moisture, fen and vernal pool habitats adjacent to NFTS roads could also be potentially more vulnerable to weed infestations than other rare plant habitats. They are also important for many rare plant species on the Modoc National Forest. Therefore, the number of vernal pools and fens located with 100 feet of NFTS Level 3 roads proposed for mixed use was considered (Table 3-63). As for known rare plant occurrences, allowing mixed use would likely have only a minimal indirect effect of slightly increased risk of noxious weed introduction.

Table 3-63. Vernal Pools and Fens Within 100 Feet of NFTS Roads Proposed For Mixed Use for all Alternatives

Habitat Type	Alternative				
	1	2	3	4	5
Number of vernal pools within 100 feet of roads	0	2	0	0	11
Number of roads within 100 feet of vernal pools	0	2	0	0	8
Miles of roads within 100 feet vernal pools	0	0.08	0	0	0.79
Number of fens within 100 feet of roads	0	2	0	0	2
Number of roads within 100 feet of fens	0	4	0	0	4
Miles of roads within 100 feet of fens	0	0.38	0	0	0.38

Federally Listed Plant Species

The same potential factors apply to the Federally listed species, *Orcuttia tenuis*, as are described above for Sensitive and Special Interest plant species. However, there are no known occurrences of *Orcuttia tenuis* located within 100 feet of any NFTS roads proposed for either seasonal closures or mixed use under Alternative 2. Therefore, there would be no direct or indirect effects from seasonal closures or mixed use classification of Level 3 NFTS roads under Alternative 2.

Cumulative Effects

Implementation of Alternative 2 would improve conditions for rare plant species and their habitats by prohibiting cross-country motor vehicle travel and limiting the number of currently existing unauthorized routes to be added to the NFTS. It would discontinue the proliferation of

unauthorized routes across the project area, and compared with Alternative 1, the probability of negative direct effects on rare plants is drastically reduced. Over the long term (20+ years) this would have a positive indirect effect on rare plant species by reducing the cumulative negative effect from motor vehicle traffic. Designation of routes would have a small cumulative effect on rare plants, because these routes are already present and in use by motor vehicles across the Forest. Placing these routes on the MVUM as part of the route designation process could potentially increase the amount of motor vehicle use on these routes, which would in turn increase the potential for negative direct and indirect effects on rare plants. However, overall recreational use on the Modoc Forest is relatively light, in comparison with other Region 5 Forests, and increases on newly designated routes are expected to be small.

Under Alternative 2, the highest risk of weed introduction and spread by motor vehicles would be reduced to NFTS roads, including the proposed route additions. Locating and treating these weeds would be more efficient, and occurrences along roads (as opposed to those in the Forest interior) might be easier to locate and treat before becoming large infestations threatening rare plant habitats. The prohibition of travel on unauthorized roads, along with maps guiding the public, would insure that road-like disturbances due to timber harvesting or fire-line construction would not become de facto new roads, allowing those trails and temporary roads to recover rare plant habit qualities over time (Lovich and Bainbridge 1999). The Sage Steppe Restoration Projects may benefit rare plant species which grow in this habitat type; these benefits would be augmented by implementing Alternative 2 compared with Alternative 1, since any benefits would not be counteracted by the possibility of cross-country damage to the plants or their habitats.

As described under Alternative 1 Cumulative Effects, ongoing Forest management activities may contribute to impacts on rare plant species, but are protected by standard botany surveying, flagging and avoidance of occurrences, and weed prevention measures. For a complete list of ongoing and foreseeable future actions for the Modoc National Forest, see appendix H. Alternative 2 is expected to have a low contributory effect on the cumulative effects from Forest management activities.

Alternative 3

Direct and Indirect Effects: Prohibition of cross-country motor vehicle travel and the addition of unauthorized roads to the NFTS

Sensitive and Watch List Plant Species and Associated Habitats

Alternative 3 prohibits cross-country travel, and does not add any new roads to the NFTS. Under this alternative, the Boles Road would remain open to motor vehicles, and the Pumice Road would remain open to OHV use.

Alternative 3 would have the fewest direct and indirect effects on rare plants. The banning of cross-country motor vehicle use would have the same effects for Alternative 3 as for Alternative 2, and these effects are described in greater detail in the Alternative 2 effects discussion. In summary, banning cross-country motor vehicle use would prevent direct and indirect negative effects to rare plant occurrences caused by trampling, dust, erosion, and invasive noxious weeds. Because no routes would be added to the NFTS, all of the rare plant occurrences currently within 100 feet of unauthorized routes would be protected from future motor vehicle disturbance. This alternative would provide the greatest benefit to rare plants and their habitats.

Federally Listed Plant Species

Alternative 3 would have no negative effect on the Federally-listed Threatened species, *Orcuttia tenuis*. Because no new routes would be added to the NFTS, and because cross-country motor

vehicle traffic would be prohibited, Alternative 3 could have an indirect positive effect on this species by removing motor vehicle use from areas adjacent to vernal pool habitats.

Changes to the Existing NFTS

Sensitive and Watch List Plant Species and Associated Habitats

Under Alternative 3, there would be no proposed changes to the existing NFTS; there would be no direct or indirect effects on Sensitive and Special Interest plant species or on their associated habitats.

Federally Listed Plant Species

Because there are no proposed changes to the existing NFTS, there would be no direct or indirect effects on the Federally listed Threatened species, *Orcuttia tenuis*.

Cumulative Effects

For a complete list of ongoing and foreseeable future actions for the Modoc National Forest, refer to the Modoc National Forest Travel Management DEIS, Chapter 3, appendix H). There would be no negative direct or indirect effects to rare plant species under Alternative 3, so there would be no cumulative negative effects under this alternative. The prohibition of cross-country motor vehicle use could potentially have an indirect positive effect on rare plant species. However, the prohibition of cross-country travel does not eliminate the presence of unauthorized routes currently on the ground. Therefore, any benefits would be minor in the short term and would occur only over the long term (20 or more years) as routes heal over naturally.

Alternative 4

Direct and Indirect Effects: Prohibition of cross-country motor vehicle travel and the addition of unauthorized roads to the NFTS

Sensitive and Watch List Plant Species and Associated Habitats:

Under Alternative 4, a total of 286 miles of unauthorized roads would be added to the NFTS, 53 miles fewer than would be added under Alternatives 2 and 5. Of these roads, 57.79 miles would be within 100 feet of 16 rare plant sites, and would be within 100 feet of 1452.29 acres of potential rare plant habitat (Table 3-64). Alternative 4 has the second-lowest impact of the five alternatives the rare plant species. There are currently seven rare plant species with known occurrences located within 100 feet of proposed routes under this alternative: *Buxbaumia viridis*, *Calochortus longebarbatus* var. *longebarbatus*, *Carex halliana*, *Eriogonum umbellatum* var. *glaberrimum*, *Gratiola heterosepala*, *Iliamna bakeri*, and *Pogogyne floribunda* (Table 3-43).

Alternative 4 prohibits cross-country travel, and adds approximately 286 miles of roads to the NFTS. This alternative has the second lowest level of impact to rare plant species and their associated habitats, higher in impact only to Alternative 3.

Table 3-64. Alternative 4—Summary of Indicator Measures for the Analysis of Effects to Rare Plant Species for the Prohibition of Cross-Country Travel and the Addition of Routes

Measure	Total
Miles of unauthorized routes within 100 feet of rare plant sites, or within or adjacent to suitable rare plant habitat	57.79 miles
Number of acres of potential habitat for rare plants within 100 feet of routes	1452.29 acres

Measure	Total
Total number of plant occurrences (NFTS) within 100 feet of unauthorized routes.	16

There are currently seven known species of rare plants documented within 100 feet of routes proposed for addition under Alternative 4, found within the Riparian, Fen and Wet Meadows, Forest, Sage Steppe, and Vernal Pool habitats (Table 3-43). These species are the same as for Alternatives 2 and 5, with the exception that there are no occurrences of *Dimeresia howellii* within 100 feet of any Alternative 4 proposed routes. Species will be discussed by habitats below. As for Alternative 2, if species are found in more than one habitat, they will be discussed in the habitat that is perceived to have the highest potential (most open) for impacts from off-road vehicles. Because there is considerable overlap and similarity in effects for Alternative 2 and Alternative 4, the discussion will focus on differences between these two alternatives.

Riparian Habitat

Currently there is one rare plant species, *Buxbaumia viridis*, within Riparian habitat, found along routes proposed for addition that may be directly or indirectly impacted with the implementation of Alternative 4. In addition, there are currently 3.68 miles of routes, with a total of approximately 96.87 acres, within Riparian habitats that have the potential to be impacted by the implementation of this alternative.

Buxbaumia viridis (Bug-on-a-stick)

There are currently three occurrences of *Buxbaumia viridis* within 100 feet of unauthorized routes proposed for addition within Alternative 4, which are identical to those affected under Alternative 2 (Table 3-44). Refer to the Alternative 2 discussion for full details.

Fens and Wet Meadows Habitat

Currently there are no rare plant species within Fens and Wet Meadows found along routes proposed for addition with the implementation of Alternative 4. There are currently 0.9 miles of routes, with a total of approximately 0.18 acres, within Fens and Wet Meadows habitats that have the potential to be impacted by the implementation of this alternative.

Vernal Pool Habitat

Currently there are two rare plant species, *Gratiola heterosepala* and *Pogogyne floribunda*, that are within Vernal Pool habitat, found along routes proposed for addition, and potentially directly or indirectly impacted with the implementation of Alternative 4. In addition, there are currently 3.99 miles of routes, with a total of approximately 50.74 acres, within Vernal Pool habitats that have the potential to be impacted by the implementation of this Alternative.

Gratiola heterosepala (Boggs Lake hedge-hyssop)

There are currently three occurrences of *Gratiola heterosepala* within 100 feet of unauthorized routes proposed for addition within Alternative 4 (Table 3-65). This is one less occurrence than those affected under Alternative 2.

Table 3-65. Potential Impacts to *Gratiola heterosepala* from Alternative 4

Occurrence or Suboccurrence	Route	Acres with potential for impact	Total size of Occurrence (Acres)	Percent of Occurrence affected
13	ML584	0.06	51.4	1%

Occurrence or Suboccurrence	Route	Acres with potential for impact	Total size of Occurrence (Acres)	Percent of Occurrence affected
16	BA55	0.38	0.5	76%
18	BA2217	1.6	1.6	100%

Pogogyne floribunda (Profuse-flowered pogogyne)

There are currently three occurrences of *Pogogyne floribunda* within 100 feet of unauthorized routes proposed for addition within Alternative 4. These are identical to those affected under Alternative 2. Refer to Alternative 2 for a complete discussion of these occurrences.

Forest Habitat

Currently there are three rare plant species, *Calochortus longebarbatus* var. *longebarbatus, Eriogonum umbellatum* var. *glaberrimum* and *Carex halliana*, which are within Forest habitat, found along routes proposed for addition, and potentially directly or indirectly impacted with the implementation of Alternative 4. This is one less species than is impacted within Forest habitat under Alternative 2. There are only two occurrences of *Calochortus longebarbatus* var. *longebarbatus* located within 100 feet of proposed routes under this alternative, compared to three occurrences under Alternative 2 (Table 3-66). For details of these rare plant occurrences, refer to the Alternative 2 discussion.

Table 3-66. Potential Impacts to *Calochortus longebarbatus* var. *longebarbatus* from Alternative 4

Occurrence or Suboccurrence	Route	Acres with Potential for Impact	Total Size of Occurrence (Acres)	Percent of Occurrence Affected
20	TR310	0.61	1.3	47%
77	JW2135	4.3	186	2%

In addition, there are currently 42.47 miles of routes, with a total of approximately 1,126.23 acres, within Forest habitats that have the potential to be impacted by the implementation of this Alternative.

Eriogonum umbellatum* var. *glaberrimum (Green buckwheat)

There is currently one occurrence of *Eriogonum umbellatum* var. *glaberrimum* within 100 feet of unauthorized routes proposed for addition within Alternative 4 (Table 3-49). Refer to Alternative 2 for a complete discussion of this occurrence.

Carex halliana (Hall's sedge)

There is currently one occurrence of *Carex halliana* within 100 feet of unauthorized routes proposed for addition within Alternative 4 (Table 3-50). This is the same occurrence potentially affected under Alternative 2, and a complete discussion of this species can be found under Alternative 2.

Sage Steppe Habitat

Currently there is one rare plant species, *Iliamna bakeri*, which is within the Sage Steppe habitat, found along routes proposed for addition, and potentially directly or indirectly impacted with the implementation of Alternative 4 (Table 3-43). In addition, there are currently 6.75 miles of routes,

with a total of approximately 178.27 acres, within Sage Steppe habitats that have the potential to be impacted by the implementation of this alternative.

Iliamna bakeri (Baker's globe-mallow)

There are currently three occurrences of *Iliamna bakeri* within 100 feet of unauthorized routes proposed for addition within Alternative 4. One of these occurrences includes 5 sub-populations potentially impacted by proposed route additions. These occurrences are identical to those under Alternative 2; refer to Alternative 2 for a detailed discussion of effects.

Federally Listed Plant Species

Orcuttia tenuis

There are no known occurrences of *Orcuttia tenuis* within 100 feet of any proposed routes under Alternative 4. There are no known vernal pools containing *Orcuttia tenuis* within 300 feet of any proposed routes under this alternative. Therefore, there would be no effect to *Orcuttia tenuis* under this alternative.

Changes to the Existing NFTS

Sensitive and Special-Interest Plant species and associated Habitats

Under Alternative 4, there would be seasonal closures on the same 312 miles of existing NFTS roads as under Alternative 2, plus an additional 112 miles of NFTS roads in the Warner Mountains. A total of 424 miles of NFTS roads would have seasonal closures under Alternative 4. Relative to Alternative 2, this alternative would provide a slight increase in seasonal protections from road closures for four known rare plant occurrences, one occurrence of *Cordylanthus capitatus* and three occurrences of *Iliamna bakeri*. It would also provide the minimal increase in protection from seasonal road closures for two fens in the Warner Mountains.

Under Alternative 4, no Level 3 NFTS roads would be opened to mixed use. Therefore, there would be no effect from mixed use of NFTS roads on rare plants under this alternative. The Boles Road would be closed to motor vehicles and the Pumice Road would be closed to OHVs, the same as in Alternative 2 and Alternative 5.

Federally Listed Plant Species

There are no known occurrences of *Orcuttia tenuis* located within 100 feet of any NFTS road proposed for seasonal closures under Alternative 4. Therefore, there would be no impact on Federally-listed plant species.

Cumulative Effects

The implementation of Alternative 4 would be very similar to implementation of Alternative 2, so the discussion here will focus on the differences in cumulative effects between Alternative 2 and Alternative 4. For a more detailed discussion of the identical cumulative effects, refer to the Cumulative Effects discussion for Alternative 2. Alternative 4 would add 53 fewer miles of roads to the NFTS than Alternative 2, which would reduce both direct and indirect effects to rare plants. Specifically, Alternative 4 would have direct and indirect effects on 16 known rare plant occurrences, while Alternative 2 would have direct and indirect effects on 22 known plant occurrences. Alternative 4 would also have lesser potential direct and indirect effects on the Federally-listed Threatened species, *Orcuttia tenuis*, since it would not add any routes occurring within 100 feet of any known *Orcuttia tenuis* occurrence and would add only 26 routes located within 100 feet of vernal pools, as opposed to Alternative 2 which would add routes occurring within 100 ft of one known *Orcuttia tenuis* occurrence, and 41 routes passing within 100 feet of vernal pools. Because several routes near rare plant occurrences and important rare plant habitats

would be excluded from the NFTS under Alternative 4, this alternative would have fewer negative direct and indirect effects on rare plants and their habitats.

As described under Alternative 1 Cumulative Effects, ongoing Forest management activities may contribute to impacts on rare plant species, but are protected by standard botany surveying, flagging and avoidance of occurrences, and weed-prevention measures. For a complete list of ongoing and foreseeable future actions for the Modoc National Forest, refer to the Modoc National Forest Travel Management DEIS, Chapter 3, appendix H. Alternative 4 is expected to have a low contributory effect on the cumulative effects from Forest management activities.

Alternative 5

Direct and Indirect Effects: Prohibition of cross-country motor vehicle travel and the addition of unauthorized roads to the NFTS

Sensitive and Watch List Plant Species and Associated Habitats

Under Alternative 5, the routes proposed for addition to the NFTS are identical to those proposed under Alternative 2, as well as the closure of Boles Road to all motor vehicles and the closure of Pumice Road to OHVs. The direct and indirect effects of prohibition of cross-country motor vehicle travel and the addition of unauthorized roads to the NFTS on Sensitive and Watch List plant species and associated habitats under Alternative 5 would be identical to those effects under Alternative 2, and are described under Alternative 2 above.

Federally Listed Plant Species

The direct and indirect effects of prohibition of cross-country motor vehicle travel and the addition of unauthorized roads to the NFTS on *Orcuttia tenuis* and its associated Vernal Pool habitat under Alternative 5 would be identical to those effects under Alternative 2, and are described under Alternative 2 above.

Changes to the Existing NFTS

Sensitive and Special Interest Plant Species and Associated Habitats

In addition to the prohibition of cross-country travel, and addition of unauthorized routes, Alternative 5 also proposes to enact seasonal closures on 312 miles of NFTS roads, and to allow mixed use on 531 miles of Level 3 NFTS roads. The proposed seasonal closures are for the same roads as in Alternative 2, but the seasons of closure are for only two seasons of use as opposed to four seasons of use under Alternative 2. The difference in effects of the differences in closure dates would be minimal, since both closure schedules would close roads during the muddy season. Therefore, the effects of seasonal closures on rare plants under Alternative 5 would be similar to those under Alternative 2.

Alternative 5 would allow mixed use on the same 138 miles of NFTS Level 3 roads as in Alternative 2, plus an additional 392 miles of Level 3 roads. As with Alternative 2, allowing mixed use on NFTS roads might potentially increase the risk of noxious weed propagule introduction, since OHVs might be more likely to have traveled through weed-infested sites than passenger vehicles prior to entering the Forest. However, as described under Alternative 2, this risk is partially mitigated by routine road maintenance along Level 3 roads, which includes weed treatment. The comparatively small indirect effect of increased weed risk could potentially affect a total of five Sensitive plant species and six Watch List species located within 100 feet of roads, with a combined total of 47 rare plant occurrences. The Sensitive species are *Astragalus anxius*, *Astragalus pulsiferae* var. *coronensis*, *Calochortus longebarbatus* var. *longebarbatus*, *Cypripedium montanum*, and *Ivesia paniculata*. The Watch List species are *Carex halliana*, *Gratiola heterosepala*, *Iliamna bakeri*, *Mertensia longiflora*, *Pogogyne floribunda*, and *Potentilla newberryi*. In addition, there are 11 vernal pools located within 100 feet of proposed mixed use

roads which could also receive potential indirect effects from increased weed introduction risk. There are also two fens located within 100 feet of proposed mixed use roads, the same as in Alternative 2. Alternative 5 would overall have the greatest negative effect from changes in the NFTS of the four action alternatives. However, this effect would still be small relative to the effects from continued cross-country travel under Alternative 1.

Federally Listed Plant Species

There are no known occurrences of *Orcuttia tenuis* located within 100 feet of any NFTS roads proposed for seasonal closures or mixed use under Alternative 5, so there would be no effects from these actions on Federally listed plant species.

Cumulative Effects

The implementation of Alternative 5 would have similar direct and indirect effects as implementation of Alternative 2, except for minimally greater potential indirect effects from allowing mixed use on all NFTS Level 3 roads. Therefore, cumulative effects would also be similar for both of these alternatives. For a complete discussion of cumulative effects, refer to the Alternative 2 Cumulative Effects section. The only difference under Alternative 5 would be a slightly greater risk of negatively impacting rare plants and vernal pool habitats with noxious weed introductions due to addition of OHV traffic on NFTS Level 3 roads.

Summary of Determinations

Alternative 2

With the restriction of cross-country travel and the addition of 336 miles of new system roads, the Modoc National Forest Travel Management Project implementation of Alternative 2 will have no effect on the following species: *Astragalus anxius*, *Astragalus lemmonii*, *Astragalus pulsiferae* var. *coronensis*, *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium lunaria*, *Botrychium minganense*, *Botrychium montanum*, *Botrychium pinnatum*, *Bruchia bolanderi*, *Cypripedium montanum*, *Eriogonum prociduum*, *Galium glabrescens* ssp. *modocense*, *Galium serpenticum* ssp. *warnerense*, *Ivesia paniculata*, *Lupinus latifolius* var. *barbatus*, *Meesia triquetra*, *Meesia uliginosa*, *Mimulus evanescens*, *Phacelia inundata*, and *Rorippa columbiae*. The implementation of Alternative 2 may have effects on *Buxbaumia viridis*, *Calochortus longebarbatus* var. *longebarbatus*, and *Eriogonum umbellatum* var. *glaberrimum*, but will not lead toward a trend to Federal listing (rationale may be found in the effects discussions above). Implementation of Alternative 2 will have no effect on any occurrence of the Federally-listed Threatened species, *Orcuttia tenuis*.

Alternative 3

With the restriction of cross-country travel, the Modoc National Forest Travel Management Project implementation of Alternative 3 would have no effect on the following species: *Astragalus anxius*, *Astragalus lemmonii*, *Astragalus pulsiferae* var. *coronensis*, *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium lunaria*, *Botrychium minganense*, *Botrychium montanum*, *Botrychium pinnatum*, *Bruchia bolanderi*, *Buxbaumia viridis*, *Calochortus longebarbatus* var. *longebarbatus*, *Cypripedium montanum*, *Eriogonum prociduum*, *Eriogonum umbellatum* var. *glaberrimum*, *Galium glabrescens* ssp. *modocense*, *Galium serpenticum* ssp. *warnerense*, *Ivesia paniculata*, *Lupinus latifolius* var. *barbatus*, *Meesia triquetra*, *Meesia uliginosa*, *Mimulus evanescens*, *Phacelia inundata*, and *Rorippa columbiae*. Implementation of Alternative 3 would not affect the Federally listed Threatened species, *Orcuttia tenuis*.

Alternative 4

With the restriction of cross-country travel and the addition of 286 miles of new system roads, the Modoc National Forest Travel Management Project implementation of Alternative 4 would have no effect on the following species: *Astragalus anxius*, *Astragalus lemmonii*, *Astragalus pulsiferae* var. *coronensis*, *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium lunaria*, *Botrychium minganense*, *Botrychium montanum*, *Botrychium pinnatum*, *Bruchia bolanderi*, *Cypripedium montanum*, *Eriogonum prociduum*, *Galium glabrescens* ssp. *modocense*, *Galium serpenticum* ssp. *warnerense*, *Ivesia paniculata*, *Lupinus latifolius* var. *barbatus*, *Meesia triquetra*, *Meesia uliginosa*, *Mimulus evanescens*, *Phacelia inundata*, and *Rorippa columbiae*. The implementation of Alternative 4 may have effects on *Buxbaumia viridis*, *Calochortus longebarbatus* var. *longebarbatus*, and *Eriogonum umbellatum* var. *glaberrimum*, but would not lead toward a trend to listing (rationale may be found in the effects discussions above). Implementation of Alternative 4 would not affect the Federally listed Threatened species, *Orcuttia tenuis*.

Alternative 5

With the restriction of cross-country travel and the addition of 336 miles of new system roads, the Modoc National Forest Travel Management Project implementation of Alternative 5 will have no effect on the following species: *Astragalus anxius*, *Astragalus lemmonii*, *Astragalus pulsiferae* var. *coronensis*, *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium lunaria*, *Botrychium minganense*, *Botrychium montanum*, *Botrychium pinnatum*, *Bruchia bolanderi*, *Cypripedium montanum*, *Eriogonum prociduum*, *Galium glabrescens* ssp. *modocense*, *Galium serpenticum* ssp. *warnerense*, *Ivesia paniculata*, *Lupinus latifolius* var. *barbatus*, *Meesia triquetra*, *Meesia uliginosa*, *Mimulus evanescens*, *Phacelia inundata*, and *Rorippa columbiae*. The implementation of Alternative 5 may have effects on *Buxbaumia viridis*, *Calochortus longebarbatus* var. *longebarbatus*, and *Eriogonum umbellatum* var. *glaberrimum*, but will not lead toward a trend to listing (rationale may be found in the effects discussions above). Implementation of Alternative 5 would not affect the Federally listed Threatened species, *Orcuttia tenuis*.

Summary of Effects Analysis Across all Alternatives

Alternative 1, which allows continued cross-country motor vehicle use, would affect the greatest number of rare plant species and occurrences, as well as the greatest amount of rare plant habitats including fens and vernal pools, and would have the greatest risk of noxious weed spread.

Of the action alternatives, Alternative 3 would provide the greatest protection for rare plants and their habitats, since it would ban cross-country travel and continued travel on unauthorized routes. Alternative 4 would be the second-most favorable alternative for rare plants. While it is similar in effect to Alternatives 2 and 5, it would provide greater protection to vernal pool species, and would affect fewer known rare plant occurrences. Alternatives 2 would have marginally lower impacts to rare plants than Alternative 5, and Alternative 5 would offer the lowest protections for rare plants. However, because all of the action alternatives ban cross-country motor vehicle use, they all provide a significant level of protection for rare plant species and their habitats across the Forest.

Table 3-67. Effects Summary for Rare Plants, Habitats, and Noxious Weeds

Measure		Alt 1[2]	Alt 2[3]	Alt 3[3]	Alt 4[3]	Alt 5[3]
Number of plant occurrences[1] within 30 feet (direct and indirect effect)	Occurrence	48	16	0	12	16
Number of additional plant occurrences and routes between 30 and 100 feet (indirect effect)	Occurrence	14	6	0	4	6
Total number of plant occurrences (NFTS) within 100 feet of routes		62	22	0	16	22
Percent of known occurrences (NFTS) within 100 feet of routes		13.2%	4.7%	0%	3.4%	4.7%
Number of vernal pools within 30 feet of routes		48 (206.65 acres)	29 (25.07 acres)	0 (0 acres)	18 (18.84 acres)	29 (25.07 acres)
Number of vernal pools within 100 feet of routes		59 (454.31 acres)	41 (75.75 acres)	0 (0 acres)	26 (50.74 acres)	41 (75.75 acres)
Number of vernal pools within 300 feet of routes		81 (1152.57)	59 (273.60)	0 (0 acres)	40 (168.5 acres)	59 (273.60)
Number of fens within 30 feet of routes		1 (4.49 acres)	0 (0 acres)	0 (0 acres)	0 (0 acres)	0 (0 acres)
Number of fens within 100 feet of routes		3 (10.45 acres)	1 (0.09 acre)	0 (0 acres)	1 (0.09 acre)	1 (0.09 acre)
Miles of weed infested roads (weeds within 100 feet of routes)		28.78	16.09	0	14.19	16.09
Acres of weed infestations within 100 feet of routes		79.71	71.86	0	71.61	71.86

[1] Occurrences affected by more than one route were counted only once. Occurrences counted within 0 to 50 feet of a route were not counted again within 50 to100 feet of route.

[2] Impacts related to continued use of unauthorized routes

[3] [i]impacts related to changes to the NFS system including additions of roads to the NFS, changes to season of use, and changes in vehicle class.

Table 3-68. Summary ranking of Botanical Resources indicators for all Alternatives

Indicators – Botanical Resources	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 sensitive plant sites, or within or adjacent to suitable sensitive plant habitat	1	4	4	4	4
Miles of routes open for public motor vehicle use within or adjacent to sensitive plant sites	1	2	4	3	2
Miles of roads with seasonal closures within 100 feet of sensitive plant sites, vernal pools, and fens	1	3	1	4	3
Miles of roads open for mixed used within 100 feet of sensitive plant sites, vernal pools, and fens.	4	2	4	4	1
Average for Botanical Resources	1.5	2.5	3.7	3.5	2.3

[1] A score of 4 indicates the alternative has the least impact for botanical resources related to the indicator; a score of 1 indicates the alternative has the most impact for botanical resources related to the indicator.

Compliance with the Modoc LRMP and Other Direction

No Action—Alternative 1

Alternative 1 does not accomplish with the SNFPA's goal to maintain and restore springs, seeps, vernal pools, fens, bogs, and marshes, because it allows cross-country motor vehicle use throughout the Forest, including within these special aquatic habitats. Alternative 1 does not comply with section 2670 of the Forest Service Manual (FSM) that requires the Forest Service to develop and implement management practices to ensure that rare plants do not become threatened or endangered, and to ensure their continued viability on National Forests, because it allows indiscriminant use of motor vehicles through rare plant populations and habitats. Alternative 1 does not comply with the directives of Executive Order 13112—Invasive Species 64 FR 6183 (February 8, 1999), because it allows a known high-risk vector of noxious weeds (OHVs) to operate off established roads throughout the Forest.

Action Alternatives—Alternatives 2, 3, 4, and 5

By prohibiting cross-country motor vehicle traffic, and not adding routes which would negatively impact any Threatened or Sensitive species, Alternatives 3 and 4 comply with the MDF LRMP, the SNFPA, the Invasive Species Directive, and the Endangered Species Act, as well as the Forest Service Manual and Handbook. Alternative 3 would provide the greatest protections for rare plant species, while Alternative 4 would provide compliant but reduced protection. Alternatives 2 and 5 would provide the lowest levels of protection.

Noxious Weeds

Introduction

Because vehicle travel is a major factor and vector in the introduction and spread of noxious weeds, this project may affect the distribution and abundance of these species across the Modoc National Forest. Additionally, the Chief of the Forest Service has determined that invasive species are one of four significant threats to Forests and rangelands. Because the presence of these invaders affects many other resources such as soil, wildlife habitat, and sensitive plants, it is important to analyze and understand the effects of the project on noxious weed populations.

This section describes the affected environment for invasive plant species (weeds). It will describe the area potentially affected by the alternatives and existing resource conditions within that area. Measurement indicators are used to describe the existing conditions for the Forest, and to quantify and describe the extent to which the proposed action and alternatives meet project objectives and address resource concerns. Each alternative is then evaluated and compared using these measurement indicators.

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

Direction relevant to the proposed action that is relevant to the management and prevention of noxious weeds includes the following:

The Forest Service Manual (FSM) 2081.03 requires that a weed risk assessment be conducted when any ground disturbing activity is proposed. A weed risk assessment determines 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 that all feasible and prudent measures to minimize risk of harm will be taken 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.

Modoc National Forest Land and Resource Management Plan (MDF LRMP): The 1991 Modoc LRMP Standards and Guidelines direct the Forest to control noxious weeds and perform annual monitoring of noxious weed population levels.

Effects Analysis Methodology

Noxious Weed Species Considered

The eighteen noxious weed species being considered in this analysis are invasive, non-native plants that possess one or more of the characteristics of an invasive weed and are undesirable on Modoc National Forest lands (Table 3-62). Based on Executive Order 13112, issued in 1999, a

species is considered invasive if it (a) is non-native to the ecosystem under consideration, and (b) its introduction causes or is likely to cause economic or environmental harm or harm to human health (USDA Forest Service 2004). This analysis includes invasive plant species from the California Department of Food and Agriculture list of noxious weeds (CDFA 2008) and the Cal-IPC California Invasive Plant Inventory (Cal-IPC 2008). All weed species identified on the Forest are of concern with regard to their potential to spread and threaten native ecosystems. The Forest, however, has prioritized weed infestations for tracking based upon the aggressiveness of the weed species, the degree of regional concern, and feasibility of control. While some species listed in statewide inventories are not identified as a high priority for control efforts and are not specifically addressed in this analysis (i.e., cheatgrass, bull thistle, Russian thistle, Medusahead), it remains a priority to prevent the further spread of these species via management activities. However, control of all known infestations of these lower-priority species is not currently feasible and they are likely to persist throughout the life of this project.

A weed occurrence refers to a relatively discreet group of individuals, separated from the next nearest group of the same species by at least ¼ mile. Many of the weed occurrences are immediately adjacent to existing travel routes, due to the disturbed habitat available along the road edges, and the vehicles acting as vectors for weed seeds or other propagules.

Geographic Area Evaluated

Direct and indirect effects to noxious weeds under each alternative will be analyzed within the geographic extents described below. Cumulative effects will be analyzed within the administrative boundaries of the Modoc National Forest, exclusive of the South Warner Wilderness Area.

Alternative 1 (No Action)

For the No Action alternative, which allows cross-country travel, the direct and indirect effects will be analyzed within the administrative boundaries of the Modoc National Forest, excluding the South Warner Wilderness Area, a total of 1,609,466 acres. The existing condition discussion below will focus on this analysis area, with some broader background information provided for context. Alternative 2 (Proposed Action), 3 (Cross-Country Travel Prohibition), 4 (Resource Impact Reduction), and 5 (Expanded Recreational Mixed Use)

The geographic extent evaluated for direct and indirect effects will include lands within the administrative boundaries of the Modoc National Forest, excluding the South Warner Wilderness Area, but with particular emphasis on those areas of the Forest within 100 feet of proposed routes. This buffer encompasses the distance that vehicles are allowed to drive off roads for parking and camping. In general, weed infestations located near proposed routes will have a high risk of spread to areas along the route and to other parts of the Forest.

Assumptions

1. That new infestations will continue to occur with continued motorized use of routes.
2. That existing weed infestations will likely spread, and that the rate of spread will be increased by vehicular activity. Infestations located along routes where vehicles drive will spread further along the route. Motor vehicles will bring weed seeds and propagative parts from home areas and other areas where they traveled.
3. That routine road maintenance includes an obligation to identify and treat new noxious weed occurrences, thereby reducing the risk of noxious weed establishment. Maintenance level 3 roads receive more frequent maintenance, and would therefore have a greater reduction in weed risk from road maintenance. Maintenance level 2 roads receive less frequent road

maintenance, and would experience less of a weed risk reduction from maintenance than would level 3 roads.

4. For completing the risk assessments, the following categories of risk are assigned to determine risk level of noxious weed introduction or spread:

High risk: (1) presence of known weed populations along a route, (2) known A-rated weed populations within 100 feet of a route, or (3) a lack of inventory or survey of a route.

Medium risk: known B- or C-rated weed populations within 100 feet of a route.

Low risk: route and vicinity surveyed and noxious weed populations not found

Noxious Weeds Effects Analysis Methodology by Action

Measurement indicators have been developed for each action to quantify the direct and indirect effects of this project upon noxious weed species. For all actions, a short-term time frame is defined as one year, a long-term time frame is defined as twenty years, and the spatial boundary is defined as the Modoc National Forest, excluding the South Warner Wilderness Area and privately owned in-holdings within the proclaimed Forest boundary. These measurement indicators reflect research that identifies roads as a significant vector for weed establishment and spread.

Action: Direct and indirect effects of the prohibition of cross-country motor vehicle travel

1. Number of unauthorized routes within or adjacent to noxious weed sites
2. Acres of noxious weed sites within 100 feet of unauthorized routes
3. Total number of weed sites within 100 feet of unauthorized routes
4. Number of unauthorized routes assigned “high risk” of noxious weed introduction or spread, defined as follows:

High risk: (1) presence of known weed populations along route, (2) known A-rated weed populations within 100 feet of route, or (3) a lack of inventory or survey of route

Medium risk: known B- or C-rated weed populations within 100 feet of route

Low risk: route and vicinity surveyed and noxious weed populations not found

Action: Direct and indirect effects of adding facilities (presently unauthorized roads, trails, or areas) to the NFTS

1. Miles of routes added to the NFTS within or adjacent to noxious weed sites
2. Acres of noxious weed sites within 100 feet of proposed routes
3. Total number of weed sites within 100 feet of unauthorized routes
4. Number of unauthorized routes assigned “high risk” of noxious weed introduction or spread, defined as follows:

High risk: (1.) presence of known weed populations along route, (2.) known A-rated weed populations within 100 feet of route, or (3.) a lack of inventory or survey of route

Medium risk: known B- or C-rated weed populations within 100 feet of route

Low risk: route and vicinity surveyed and noxious weed populations not found

Action: Direct and indirect effects of identifying vehicle class and season of use on the NFTS

1. Miles of NFTS roads proposed for mixed use within or adjacent to noxious weed sites

2. Acres of noxious weed sites within 100 feet of NFTS road proposed for mixed use
3. Total number of weed sites within 100 feet of NFTS roads proposed for mixed use
4. Total miles of NFTS roads proposed for mixed use
5. Miles of NFTS roads proposed for mixed use within or adjacent to noxious weed sites
6. Acres of noxious weed sites within 100 feet of NFTS road proposed for mixed use
7. Total number of weed sites within 100 feet of NFTS roads proposed for mixed use
8. Total miles of NFTS roads proposed for mixed use

Action: Cumulative Effects

Total miles of proposed routes available for public use

Data Sources

Data used for this analysis comes from the Modoc National Forest noxious weed inventory, which is a spatial database compiled from data collected through 2004, as well as the Modoc National Forest field noxious weed record sheets. There have been no systematic noxious weed surveys on the Forest since 2004. No route-specific surveys for noxious weeds were conducted.

Affected Environment and Environmental Consequences

Affected Environment

On National Forest System lands as of 1999, an estimated 6-7 million acres were infested with weeds, and potentially increasing at a rate of 8 to12 percent per year (USDA Forest Service 1999). Similar trends have been observed on the Modoc National Forest, as the number of locations and extent of existing populations of species such as dyer's woad, Dalmatian toadflax, Scotch thistle, knapweeds, Medusahead, and others have increased on the Forest over the past several years. There are currently 539 mapped weed occurrences on the Forest, with a total of 7,941.19 mapped infested acres (Table 3-69). The actual total infested area of the Forest is considerably higher, since widespread infestations of Medusahead, cheatgrass, bull thistle, and Russian thistle have not been documented at all, and other species such as dyer's woad are not fully documented.

Table 3-69. Modoc National Forest Noxious Weed Inventory within Affected Environment

Species	Common Name	CDFA rating	Cal-IPC rating	Number of Occurrences	Gross Acres
Cardaria chalapensis	Lens-podded whitetop	B	moderate	4	8.96
Cardaria draba	Heart-podded hoarycress	B	moderate	1	0.4
Cardaria pubescens	Hairy whitetop	B	limited	2	0.17
Carduus acanthoides	Plumeless thistle	A	limited	1	0.1
Carduus nutans	Musk thistle	A	moderate	12	6.87
Centaurea diffusa	Diffuse knapweed	A	moderate	12	10.65
Centaurea stoebe	Spotted knapweed	A	high	13	5.14

Species	Common Name	CDFA rating	Cal-IPC rating	Number of Occurrences	Gross Acres
ssp. *micranthos*					
Centaurea solstitialis	Yellow starthistle	C	high	10	2.3
Centaurea virgata ssp. squarrosa	Squarrose knapweed	A	moderate	5	0.18
Cirsium arvense	Canada thistle	B	moderate	34	11.93
Crupina vulgaris	Common crupina	A	limited	1	745.19
Hypericum perforatum	Klamathweed	C	moderate	8	8.79
Isatis tinctoria	Dyer's woad	B	moderate	62	6069.94
Lepidium latifolium	Tall whitetop	B	high	1	0.1
Linaria dalmatica ssp. *dalmatica*	Dalmatian toadflax	A	moderate	12	974.73
Onopordum acanthium	Scotch thistle	A	high	333	86.46
Salvia aethiopis	Mediterranean sage	B	limited	27	11.61
Total				**539**	**7941.19**

Environmental Consequences

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 motor vehicle impacts along unauthorized routes at this point in time. Designation of a route is expected to increase and concentrate motor vehicle use; this has the potential to increase the risk of noxious weed introduction and spread. Routes, infestations, and mitigations or control measures will need to be re-evaluated on a continual basis to assess and address the risk from noxious weeds.

General Types of Impacts: Direct and Indirect Effects

Direct effects to weed plants would include the crushing of plants by vehicle traffic. Of greater concern are the indirect effects of roads on noxious weed populations, which include reasonably foreseeable effects that are further removed in time or distance. These indirect effects are captured by research identifying roads as (1) disturbances providing suitable habitat for weeds, and (2) vectors for weed spread (Christen and Matlack 2008, Gelbard and Belnap 2003, Gelbard and Harrison 2003). Many studies have established a correlation between habitat disturbance and weed invasion (Sax 2002, Sher *et al.* 2002). While some disturbances such as fire or flooding can be considered natural phenomena, anthropogenic (human-caused) alterations to habitat such as road construction may also create suitable habitat for weeds (Byers 2002). Belcher and Wilson (1989) found that 95 percent of leafy spurge infestations on a mixed-grass prairie were associated with disturbance from vehicle tracks, road construction, or fireguards. Noxious weeds may colonize disturbed sites such as roads because physical barriers that might otherwise keep them in check, such as unsuitable light, moisture or soil conditions, are removed (Parendes and Jones 2000). In addition, soil compaction caused by vehicle traffic may in some habitats favor

colonization by fast-growing weed species over slower-growing native perennials (Prose *et al.* 1987).

Roads function as vectors for weed spread as well. With human activities such as roads facilitating plant dispersal, noxious weeds may spread further and faster than average seed dispersal distances suggest (Von der Lippe and Kowarik 2007, Mack and Lonsdale 2001, Frenkel 1970). A study of roadside floras found that seeds of the species found along roadsides are also found in mud on the vehicles that travel them (Schmidt 1989). Seeds and propagules may be translocated in this way from home areas or from existing weed populations on the Forest. A study conducted in Glacier National Park found that weed species richness was higher at roadsides and decreased with increased distance from roads, suggesting that weeds were invading from those roads outward into surrounding vegetation (Tyser and Worley 1992). A study of California foothill grassland communities found that increased distance from roads was associated with decreased exotic forb species richness and increased native grass species richness, and emphasized the importance of roadless areas as *refugia* for native species (Gelbard and Harrison 2003). It follows that restricting motorized use to designated roads would decrease the potential for the introduction of weed seeds and propagules, and would eliminate disturbance to soils from motor vehicle use.

Alternative 1 (No Action)

Direct and 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 facilitate the expansion of existing populations. Under this alternative, it is impossible to quantify when and where noxious weeds would be encountered, spread, or introduced by motor vehicles; therefore, the 491 miles of unauthorized routes are used as a proxy for current motor vehicle use on the Forest (aside from National Forest Transportation System (NFTS) roads). Of the 1660 unauthorized routes mapped on the Modoc National Forest, 24 have weed populations documented within 100 feet of the route. There are a total of 21 noxious weed occurrences documented within 100 feet of unauthorized routes (Table 3-70), and a total of 28.78 miles of unauthorized routes within 100 feet of a known weed occurrence.

Table 3-70. High-Priority Noxious Weed Populations Documented Within 100 Feet of an Existing Unauthorized Route

Species	CDFA Rating	# Occurrences	Gross Acres
Cardaria chalepensis	B	1	0.44
Carduus nutans	A	1	0.19
Centaurea diffusa	A	1	0.66
Centaurea stoebe ssp. *micranthos*	A	1	1.00
Cirsium arvense	B	5	0.28
Isatis tinctoria	B	4	59.97
Linaria dalmatica ssp. *dalmatica*	A	2	8.52
Onopordum acanthium	A	5	2.02
Salvia aethiopis	B	1	0.01

Species	CDFA Rating	# Occurrences	Gross Acres
Total		**21**	**73.1**

This alternative has the highest number of unauthorized routes considered at "high risk" for weed introduction and spread. Table 3-71 (below) summarizes the number of unauthorized routes considered at high risk of weed establishment and spread under Alternative 1, which would allow continued motorized travel on these routes.

Table 3-71. Risk Ratings for Unauthorized Routes

Indicator (number of unauthorized routes)	Low Risk	Medium Risk	High Risk
Known weed occurrences present			11
A-Listed weed w/in 100 ft. of route			7
No inventory or survey			1635
B- or C-listed weed w/in 100 ft. of route		7	
Surveyed ≥ 2001; no weeds found	0		
Total	**0**	**7**	**1635**

Under this alternative, motor vehicles traveling on and off unauthorized routes would continue to create areas of disturbance that are vulnerable to weed invasion, and carry weed seeds and other propagules to new locations (Banks *et al.* 2004, Ouren *et al.* 2007, Von der Lippe and Kowarik 2007). 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 motor vehicle travel.

OHVs interact directly and indirectly with noxious weeds primarily in these two general ways: (1) OHVs introduce weed propagules to new areas (Trombulak and Frissell 2000), and (2) OHVs alter the landscape by causing disturbance in various forms; for example, by altering local hydrology, compacting soil, raising dust, crushing plants not adapted to disturbance and promoting those which are, and suppressing native vegetation (Brooks and Lair 2005, Gelbard and Harrison 2005, Ouren *et al.* 2007). In this way, OHVs are capable of both introducing exotic weeds and simultaneously providing them with habitat (*cf.* Christen and Matlack 2008).

Cumulative Effects

Many Forest activities such as livestock grazing, timber harvesting, recreational use, fuels treatments and fire suppression, road and railroad maintenance, and special uses also have the capabilities of introducing noxious weeds and providing them with disturbed habitats upon which they may gain footholds. For a complete list of present and reasonably foreseeable Forest activities, see appendix H. Mitigations for these management activities would consist of adherence to the Modoc National Forest Integrated Weed Management Strategy (2005). Specific actions under this strategy include pre-project weed surveys, flagging and avoidance of noxious weed occurrences, washing of vehicles and equipment prior to entering the Forest, use of weed-free materials, minimizing of ground disturbance, and restoration of disturbed sites with native materials. Implementation of the Integrated Weed Management Strategy (USDA Forest Service 2005) minimizes the risk of noxious weed introduction and spread associated with future foreseeable actions.

The additional effects of the No Action alternative for noxious weeds would be a net increase of disturbed habitat due to OHV use, the probability that habitat disturbed due to other Forest

activities would remain disturbed for longer periods of time as OHV users drive in such areas, the augmented ability of weed propagules to travel quickly and distantly into and across the Forest, and the increased likelihood that whatever weeds do travel into or across the Forest would find amenable disturbed habitat into which they may be introduced. In sum, Alternative 1 compounds the negative effects of other Forest projects upon soils and native plant communities; intensifies, prolongs, and augments their creation of noxious weed habitat; and provides more opportunities for noxious weeds to be introduced and take advantage of these disturbed habitats. Under this alternative a total of 1,635 high risk unauthorized routes would continue to be used by OHVs, in addition to seven medium-risk routes. This would be combined with the 3,866 already established NFTS roads for a total of 5,508 roads open to motor vehicle use under Alternative 1, combined with the high risk of continuing proliferation of new user created routes across the Forest.

Action Alternatives

The following sections discuss the direct, indirect, and cumulative effects of each action alternative (Alternatives 2, 3, 4, and 5) on noxious weeds. Effects analysis focuses on cross-country motor vehicle use and addition of routes to the NFTS. Alternatives 2, 4, and 5 also include seasonal closures of some current NFTS roads, and re-classification of some existing roads for mixed use. It is possible that seasonal closures could slightly reduce the risk of noxious weed spread, and that allowing mixed use on established roads could minimally increase the risk of noxious weed spread.

Effects analysis for proposed route additions focuses on presence of known weed occurrences. Table 3-72 shows known noxious weed populations within 100 feet of proposed routes. More detailed discussion of each population will be found under each alternative.

Alternative 2 (The Proposed Action)

Direct and Indirect Effects: Prohibition of Cross-Country Motor Vehicle Travel and Addition of Proposed Routes

Alternative 2 would prohibit cross-country travel off NFTS roads, add 339 miles of existing unauthorized routes to the NFTS, add seasonal use restrictions to approximately 313 miles of existing NFTS roads, allow non-street legal vehicle access on an additional 138 miles of existing NFTS roads, and close Forest Roads 46B29HB, 44N08, and 44N01. This alternative carries a much lower risk of noxious weed introduction and spread than does Alternative 1. The prohibition of cross-country motorized travel would minimize the risk of weed establishment and spread along unauthorized routes not proposed for designation. Under Alternative 2, there are 15 routes that have weed populations documented within 100 feet of the route. There are a total of 15 noxious weed occurrences documented within 100 feet of unauthorized routes (Table 3-72), and a total of 16.09 miles of routes within 100 feet of a known weed occurrence (Table 3-72).

Table 3-72. Noxious Weed Species and Occurrences Within 100 Feet of an Alternative 2 Proposed Route

Species	CDFA Rating	Occurrence Number	Number of Occurrences	Proposed Route(s)	Number of Routes	Route intersects occurrence	Gross Acres
Centaurea diffusa	A	4		ML327		yes	0.66
Centaurea stoebe ssp. *micranthos*	A	8		ML181A		yes	1.00

Species	CDFA Rating	Occurrence Number	Number of Occurrences	Proposed Route(s)	Number of Routes	Route intersects occurrence	Gross Acres
Cirsium arvense	B	2		BA431		no	0.01
Cirsium arvense	B	4		BA200		no	0.01
Cirsium arvense	B	10		SS421		no	0.01
Cirsium arvense	B	11		SS421		no	0.01
Cirsium arvense	B	17		BA203		no	0.15
Cirsium arvense	B	18		BA203		no	0.10
Isatis tinctoria	B	8		ML328		no	0.04
Isatis tinctoria	B	9		ML328		no	0.11
Isatis tinctoria	B	13		ML327 ML328 ML336 ML404 ML405 ML406		yes	59.81
Linaria dalmatica ssp. *dalmatica*	A	3		BA368		yes	9.54
Onopordum acanthium	A	58		ML373		yes	0.40
Onopordum acanthium	A	64		ML3		no	0.01
Onopordum acanthium	A	65		ML3		no	0.01
Total			**15**		**15**		**71.87**

Alternative 2 has a much lower risk of weed infestation and spread than Alternative 1. Under this alternative 1,166 unauthorized routes considered at "high risk" for weed introduction and spread would be added to the NFTS, as well as 4 routes with "medium risk". Table 3-73 summarizes the number of unauthorized routes considered at high risk of weed establishment and spread under Alternative 2, which would permit continued motorized travel on these routes.

Table 3-73. Alternatives 2 and 5—Risk Ratings for Proposed Routes

Indicator (Number of Unauthorized Routes)	Low Risk	Medium Risk	High Risk
Known weed occurrences present			9

Indicator (Number of Unauthorized Routes)	Low Risk	Medium Risk	High Risk
A-Listed weed w/in 100 ft. of route			1
No inventory or survey			1156
B- or C-listed weed w/in 100 ft. of route		4	
Surveyed ≥ 2001; no weeds found	0		
Total	**0**	**4**	**1166**

The addition of 339 miles of unauthorized routes to the NFTS road system would allow continued motor vehicle traffic within 100 feet of 15 documented occurrences of noxious weeds. Most of these occurrences have not been treated, and can be expected to have increased in size since they were initially documented. Of those that have been treated, most were treated only once, and without follow-up treatments are likely still present and growing. Several occurrences have incomplete documentation of population size, and their current status is unknown. Details on these individual occurrences are described below.

Diffuse Knapweed (*Centaurea diffusa*)

There is one occurrence of diffuse knapweed (#4) which had approximately 50 plants in 2003. There is one occurrence of spotted knapweed (#8) which had more than 100 plants when it was treated by hand-grubbing in 2000. It was chemically treated in 2001 and 2002. Both of these knapweed species are deeply tap-rooted biennial to short-lived perennial species, which reproduce from their abundant seeds.

Canada Thistle (*Cirsium arvense*)

There are five occurrences of Canada thistle, a rhizomatous perennial which reproduces primarily from its roots, but which can also reproduce from seed. Occurrence #2 was documented in 2001 with over 1000 plants. This site has not been treated. Occurrence #4 was documented in 2002 with approximately 20 plants, and has not been treated. Occurrences #10, #17, and #18 have not been treated.

Dyer's Woad (*Isatis tinctoria*)

There are three occurrences of dyer's woad (#8, #9, and #13), a deeply tap-rooted biennial species which reproduces from its copious seeds. None has been treated.

Dalmatian Toadflax (*Linaria dalmatica*)

There is one occurrence of Dalmatian toadflax, a rhizomatous perennial which reproduces via its prolific seeds, its rhizomes, and by root fragmentation. Occurrence #3 has incomplete records, with no original sighting record or population record. It was chemically treated in 1999, 2000, 2001, and 2002.

Scotch Thistle (*Onopordum acanthium*)

There are three occurrences of Scotch thistle, a deeply tap-rooted biennial to short-lived perennial that reproduces from abundant and long-lived seeds. Occurrence #64 was chemically treated in 1998 . Occurrences #65 and #58 have not been treated.

The presence of noxious weed occurrences in proximity to proposed route additions would continue the currently present risk of vehicles spreading these weed species across the Forest. However, this risk is reduced by the prohibition of cross-country travel. Additional road closures of the Forest Road 46B29HB and the Level 2 Pumice Road would provide a small further reduction in the risk of weed spread. Seasonal closures of 312 miles of existing NFTS roads might also reduce weed spread risk by reducing the overall amount of travel on these roads, although these effects would probably be minimal. The proposed seasonal closures occur

primarily during the winter months, with some overlap into fall and spring. OHV use of these routes is often limited by snow conditions during winter months, regardless of an official closure. However, closures during spring months when routes are muddy could reduce weed risk, since sites are more vulnerable to disturbance and weed establishment when they are wet and muddy. Reclassification of existing NFTS roads to allow mixed vehicle use is not expected to have any effect on noxious weed risk, since there is no available evidence indicating that type of vehicle affects the risk of weed introduction or spread on established roads. The greatest reduction in weed risk in Alternative 2, relative to Alternative 1, would come from the prohibition of cross-country motor vehicle travel.

Direct and Indirect Effects – Mixed Use and Seasonal Closures on NFTS Roads

Motor vehicle use on established roads provides a vector for noxious weed spread within and adjacent to roads during all seasons and regardless of vehicle class. However, off-road vehicle tires may potentially carry more soil-bearing weed seed from one site to another than standard passenger vehicle tires, particularly during wet conditions. Since off-road vehicles are designed and intended for use off-road, these vehicles have a higher probability of having been driven through noxious weeds prior to entering Modoc National Forest than standard passenger vehicles, and therefore have a higher risk of transporting noxious weed propagules to the Forest. They also have a greater risk for entering known weed occurrences within the 30 foot buffer adjacent to NFTS roads, allowed for in the proposed Motor Vehicle Use Map (MVUM), than do passenger cars, due to their greater capacity to go off-road. There are currently 11 known occurrences of noxious weeds located within 100 feet of seven Level 3 NFTS roads proposed for mixed use classification under Alternative 2 (Table 3-74). Under this alternative, classification of these roads for mixed use would increase the risk of spreading weed propagules from these 11 known occurrences. It would also increase the risk of noxious weed introduction from off-Forest areas on all 138 miles of NFTS Level 3 roads proposed for mixed use.

Table 3-74. Alternative 2—Noxious Weed Species and Occurrences Within 100 Feet of a Proposed NFTS Level 3, Mixed-Use Road

Species	CDFA Rating	Occurrence Number	Number of Occurrences	Proposed Mixed Use Road(s)	Miles within 100 ft. of Weeds	Number of Roads	Route intersects occurrence	Gross Acres
Centaurea diffusa	A	1		45N35	0.05		no	0.01
Cirsium arvense	B	2		45N04	0.03		no	0.01
Cirsium arvense	B	5		46N30	0.07		yes	0.23
Isatis tinctoria	B	9		43N18	0.05		no	0.01
Linaria dalmatica ssp. *dalmatica*	A	3		46N30 46N63	0.72		yes yes	14.37
Linaria dalmatica ssp. *dalmatica*	A	4		46N06	0.05		no	0.02

Species	CDFA Rating	Occurrence Number	Number of Occurrences	Proposed Mixed Use Road(s)	Miles within 100 ft. of Weeds	Number of Roads	Route intersects occurrence	Gross Acres
Onopordum acanthium	A	15		46N06	0.07		yes	0.31
Onopordum acanthium	A	18		46N30	0.04		yes	0.23
Onopordum acanthium	A	51		45N35	0.06		yes	0.16
Onopordum acanthium	A	54		43N36	0.04		no	0.01
Centaurea solstitialis	C	3		43N36	0.05		yes	0.08
Total			**11**		**1.23**	**7**		**15.44**

Under Alternative 2, a total of 313 miles of existing NFTS roads would be subject to seasonal closures during the winter and early spring months, when roads are most likely to be wet and muddy. During these months, roads can be more vulnerable to rutting and damage from motor vehicle use. Seasonal closures would reduce the total annual motor vehicle use, particularly during months when ground disturbance is more likely to create conditions ideal for noxious weed establishment. There is currently one known noxious weed occurrence within 100 feet of an NFTS road which would be closed from December 1 through April 30 under this alternative (Table 3-75). Alternative 2 would slightly reduce the risk of spreading this weed occurrence, while also slightly reducing the risk of weed introduction on 313 miles of existing NFTS roads.

Table 3-75. Alternative 2—Noxious Weed Species and Occurrences Within 100 feet of an NFTS Road with Proposed Seasonal Closures

Species	CDFA Rating	Occurrence #	# of Occurrences	Proposed Mixed Use Road(s)	Miles within 100 ft. of Weeds	# of Roads	Route intersects occurrence	Gross Acres
Onopordum acanthium	A	34		46B02J	0.05		yes	0.02
Total			1		0.05	1		0.02

Cumulative Effects

The cumulative effects from Forest management and use activities are the same for the Alternative 2 as for Alternative 1. For a complete discussion refer to the Alternative 1 cumulative effects section. For a complete list of present and reasonably foreseeable Forest management activities, refer to appendix H.

By limiting the number of existing routes to be added to the NFTS, travel through seven of these occurrences would be prohibited. More importantly, travel off of designated System roads would be prohibited, which would greatly reduce the risk of noxious weed introduction and spread across the Forest. In combination with the effects of other Forest uses, the Proposed Action would greatly reduce the risk of weed spread from any new infestations that might occur with timber

harvest, grazing, prescribed burning, or wildfire activities, as well as other Forest management and use activities impacting lands away from System roads. Future ground disturbing projects would also be less susceptible to the introduction of new weed propagules or to continued disturbance due to OHV use. Restriction of OHV travel cross-country would eliminate OHV disturbance off of system roads; whereas OHV disturbance favors such undesirable species as invasive exotic annual grasses, the lack of it would favor native perennial grasses and forbs and generally later-seral (late-stage ecological succession) native vegetation, which is better able to resist weed invasion (Gelbard and Harrison 2005). Under Alternative 2 a total of 16.09 miles of routes infested with known noxious weed occurrences would be added to the NFTS. These 15 known occurrences have a total area of 71.87 acres (Table 3-72). Under this alternative, a total of 5,033 roads would be open for motor vehicle use (Table 3-72).

Alternative 3

Direct and Indirect Effects: Prohibition of Cross-Country Motor Vehicle Travel and Addition of Proposed Routes

Alternative 3 prohibits cross-country travel off NFTS roads, adds no unauthorized routes to the Forest road system, and does not change seasonal use restrictions or non-street legal vehicle use restrictions on access on existing Forest System roads. Under Alternative 3, potential spread by motor vehicles from existing noxious weed occurrences within 100 feet of existing unauthorized routes (Table 4) would be eliminated. Under this alternative, motor vehicle traffic would be restricted from traveling off designated routes, which would greatly reduce the potential for creating noxious weed habitat through ground disturbance. It would also greatly reduce the potential for spread of noxious weeds from existing populations. Since no new routes would be added to the NFTS, there would be no effect from adding facilities.

Direct and Indirect Effects: Mixed Use and Seasonal Closures on NFTS Roads

No level 3 roads would be open to mixed use, so there would be no change in weed risk from mixed use relative to Alternative 1, and a lower risk from mixed use than under Alternative 2. There would be no seasonal road closures under this alternative, so the weed risk related to seasonal closures would be the same as for Alternative 1, and slightly higher than under Alternative 2. Forest Roads 46B29HB, 44N08, and 44N01 would remain open to OHVs, but there are no known noxious weed occurrences along these roads.

Cumulative Effects

The cumulative effects from Forest management and use are the same for Alternative 3 as for the No Action and Proposed Action Alternatives, and a complete discussion can be found in the Alternative 1 cumulative effects section. The additional effect from Alternative 3 from the prohibition of cross-country travel would be the same as for Alternative 2, described above. The difference in cumulative effects for Alternative 3 is that no non-system routes would be added to the Forest road system. This would eliminate vehicle travel through the 21 known noxious weed occurrences located along non-system routes. There are no known noxious weed occurrences along Forest Roads 46B29HB, 44N08, or 44N01. This alternative would therefore have the lowest risk of noxious weed introduction and spread. Under this alternative, no routes with known weed occurrences would be added to the NFTS, and the total number of roads open for motor vehicle use would be 3,866 (Table 3-72).

Alternative 4

Direct and Indirect Effects: Prohibition of Cross-Country Motor Vehicle Travel and Addition of Proposed Routes

Alternative 4 would prohibit cross-country travel off NFTS roads. It would also add 286 miles of unauthorized routes to the NFTS road system, with seasonal closures. It would also place seasonal closures on the same 312 miles of existing NFTS system roads as in Alternative 2, with additional seasonal closures on 112 miles of NFTS roads in the Warner Mountains, for a total of 424 miles of roads with seasonal closures. It would not allow mixed vehicle use on any existing Level 3 NFTS roads. Forest Roads 46B29HB, 44N08, and 44N01 would be closed to OHV use.

Table 3-76. Alternative 4—Risk Ratings for Proposed Routes

Indicator (number of unauthorized routes)	Low Risk	Medium Risk	High Risk
Known weed occurrences present			9
A-Listed weed w/in 100 ft. of route			1
No inventory or survey			1012
B- or C-listed weed w/in 100 ft. of route		3	
Surveyed ≥ 2001; no weeds found	0		
Total	**0**	**3**	**1022**

This alternative would add the same routes passing within 100 feet of the same noxious weed occurrences as would Alternative 2 (Table 3-65), with the exception of BA203 which passes within 100 feet of two Canada thistle infestations. Direct and indirect effects in Alternative 4 would therefore be similar, but slightly lower than those of the Alternative 2. Fewer unauthorized routes would be added when compared with Alternative 2 (286 miles vs. 339 miles, or about 84 percent of the Alternative 2 roads). This would result in a reduced risk of weed introduction and spread into these areas (Table 3-69).

Direct and Indirect Effects: Mixed Use and Seasonal Closures on NFTS Roads

No Level 3 roads would be opened to mixed use in Alternative 4, as opposed to 138 miles of Level 3 roads opened to mixed use under Alternative 2. This would result in a lower risk of noxious weed introduction and spread from mixed use of Level 3 roads than under Alternative 2, and an equal weed risk from mixed use on existing NFTS roads as for Alternative 1. Under Alternative 4, a total 1.34 miles from 12 NFTS roads in and near 15.70 acres of known weed occurrences would be closed seasonally (Table 3-70). Because this would reduce the total annual vehicle traffic through and adjacent to these weed occurrences, it would lower the overall weed risk under this alternative.

Table 3-77. Alternative 4—Noxious Weed Species and Occurrences Within 100 feet of an NFTS Road with Proposed Seasonal Closures

Species	CDFA Rating	Occurrence Number	# of Occurrences	Proposed Mixed Use Road(s)	Miles within 100 ft. of Weeds	Number of Roads	Route intersects occurrence	Gross Acres
Cardaria pubescens	B	2		42N31	0.06		no	0.10
Centaurea diffusa	A	1		45N35	0.05		no	0.01
Cirsium arvense	B	1		42N79	0.05		yes	0.01
Cirsium	B	2		45N04	0.03		no	0.01

Species	CDFA Rating	Occurrence Number	# of Occurrences	Proposed Mixed Use Road(s)	Miles within 100 ft. of Weeds	Number of Roads	Route intersects occurrence	Gross Acres
arvense								
Cirsium arvense	B	5		46N30	0.06		yes	0.23
Cirsium arvense	A	10		42N31	0.06		no	0.19
Linaria dalmatica	A	3		46N30 46N63	0.24 0.49		yes yes	5.29 9.08
Linaria dalmatica	A	4		46N06	0.05		no	0.02
Onopordum acanthium	A	15		46N06	0.10		yes	0.49
Onopordum acanthium	A	18		46N30	0.07		yes	0.23
Onopordum acanthium	A	25		42N31	0.03		no	0.01
Onopordum acanthium	A	34		46B02J	0.05		yes	0.02
Total			**12**		**1.34**	**8**		**15.70**

Cumulative Effects

The cumulative effects from Forest management and use activities, and from neighboring lands, are the same for Alternative 4 as for Alternatives 1 and 2. For a complete discussion, see the Alternative 1 cumulative effects section. The additional effects from Alternative 4 would be similar to the effects of Alternative 2. The only difference would be a slightly reduced risk of introduction and spread of noxious weeds due to the reduced number of proposed routes to be added to the Forest road system and the increase in the number of seasonal closures. Under this alternative, a total of 14.19 miles of routes known to be infested with noxious weeds would be added to the NFTS. The total of 13 known weed occurrences within 100 feet of these proposed routes have a total area of 71.62 acres (Table 3-79). Under this alternative, a total of 4,888 roads would be open for motor vehicle use (Table 3-79).

Alternative 5

Direct and Indirect Effects: Prohibition of Cross-Country Motor Vehicle Travel and Addition of Proposed Routes

Alternative 5 is very similar to the Proposed Action. It would add 339 miles of unauthorized routes, with seasonal closures on 312 miles of roads during two seasons rather than four seasons. It would also allow mixed use on 4,291 miles of NFTS roads, 392 miles more than in Alternative 2. The direct, indirect, and cumulative effects of Alternative 5 on noxious weeds are predicted to be slightly higher than those of Alternative 2, due to the slight reduction in length of seasonal closures and the increased number of mixed-use level 3 NFTS roads.

This alternative would add the same routes passing within 100 feet of the same noxious weed occurrences as would Alternative 2 (Table 3-65). Direct and indirect effects from the prohibition of cross-country travel and addition of proposed routes in Alternative 5 would therefore be

similar to those of Alternative 2. As with all of the action alternatives, the prohibition of cross-country travel would provide a reduction in weed risk relative to Alternative 1.

Direct and Indirect Effects: Mixed Use and Seasonal Closures on NFTS Roads

The proposed mileage of NFTS roads with seasonal closures would be identical to that of Alternative 2, although the seasons of closure would be reduced. This difference would potentially create a minimal increase in weed risk relative to Alternative 2. Alternative 5 would allow mixed use on an additional 531 miles of existing NFTS roads, as opposed to 138 miles under Alternative 2. These mixed use roads pass near or through a total 53.48 acres of known noxious weed occurrences along 5.74 miles of roads (Table 3-78). Overall, the direct and indirect effects and weed risk of mixed use and seasonal closures on NFTS roads under Alternative 5 would be slightly greater relative to Alternative 2.

Table 3-78. Alternative 5—Noxious Weed Species and Occurrences Within 100 feet of a Proposed NFTS Level 3, Mixed-use Road

Species	CDFA Rating	Occurrence Number	Number of Occurrences	Proposed Mixed Use Road(s)	Miles within 100 ft. of Weeds	# of Roads	Route intersects occurrence	Gross Acres
Cardaria pubescens	B	2		42N31	0.06		no	0.10
Carduus nutans	A	1		40N27	0.05		no	0.01
Carduus nutans	A	3		41N44	0.07		no	0.32
Carduus nutans	A	BV4		40N27	0.05		no	0.02
Carduus nutans	A	DH4		45N09	0.09		yes	0.88
Carduus nutans	A	5		44N11	0.06		yes	0.19
Carduus nutans	A	11		40N27	0.05		yes	0.02
Centaurea diffusa	A	1		45N35	0.05		no	0.01
Centaurea diffusa	A	4		41N11	0.12		yes	1.57
Centaurea solstitialis	C	3		43N36	0.05		yes	0.08
Cirsium arvense	B	1		42N79	0.05		yes	0.01
Cirsium arvense	B	2		45N04	0.03		no	0.01
Cirsium arvense	B	5		46N30	0.07		yes	0.23
Cirsium	B	10		42N31	0.07		no	0.19

Species	CDFA Rating	Occurrence Number	Number of Occurrences	Proposed Mixed Use Road(s)	Miles within 100 ft. of Weeds	# of Roads	Route intersects occurrence	Gross Acres
arvense								
Crupina vulgaris	A	1		40N22 40N33	0.17 1.08		yes yes	2.36 19.20
Hypericum perforatum	C	1		38N54	0.02		no	<0.01
Hypericum perforatum	C	2		41N11	0.05		yes	0.01
Hypericum perforatum	C	3		40N33	0.04		no	0.02
Isatis tinctoria	B	4		40N22	0.01		yes	0.05
Isatis tinctoria	B	5		48N70	0.05		no	0.01
Isatis tinctoria	B	BV6		40N22	0.01		no	0.04
Isatis tinctoria	B	DH6		48N70	0.05		no	0.01
Isatis tinctoria	B	7		48N70	0.10		yes	0.28
Isatis tinctoria	B	9		43N18	0.05		no	0.01
Isatis tinctoria	B	11		40N41	0.05		no	0.01
Isatis tinctoria	B	18		44N02	0.05		no	0.01
Isatis tinctoria	B	19		40N22	0.02		yes	0.05
Linaria dalmatica ssp. *dalmatica*	A	1		42N03	0.05		no	0.05
Linaria dalmatica ssp. *dalmatica*	A	2		42N68	0.19		yes	3.50
Linaria dalmatica ssp. *dalmatica*	A	BV3		42N68	0.04		no	0.11
Linaria dalmatica ssp. *dalmatica*	A	WM3		46N30 46N63	0.24 0.49		yes yes	5.29 9.08
Linaria	A	BV4		42N68	0.04		no	0.06

Species	CDFA Rating	Occurrence Number	Number of Occurrences	Proposed Mixed Use Road(s)	Miles within 100 ft. of Weeds	# of Roads	Route intersects occurrence	Gross Acres
dalmatica ssp. *dalmatica*								
Linaria dalmatica ssp. *dalmatica*	A	WM4		46N06	0.05		no	0.02
Onopordum acanthium	A	15		46N06	0.49		yes	0.10
Onopordum acanthium	A	18		46N30	0.07		yes	0.23
Onopordum acanthium	A	23		38N54	0.05		no	0.01
Onopordum acanthium	A	24		38N54	0.02		no	0.02
Onopordum acanthium	A	WM25		42N31	0.03		no	0.01
Onopordum acanthium	A	BV25		38N54	0.04		no	0.01
Onopordum acanthium	A	40		44N77	0.06		yes	0.21
Onopordum acanthium	A	51		45N35	0.06		yes	0.16
Onopordum acanthium	A	54		43N36	0.04		no	0.01
Onopordum acanthium	A	56		38N54	0.05		no	0.01
Onopordum acanthium	A	102		38N54	0.05		no	0.02
Onopordum acanthium	A	117		39N50	<0.01		no	<0.01
Onopordum acanthium	A	146		40N33	0.04		yes	0.02
Onopordum acanthium	A	151		39N50	0.05		yes	0.03
Onopordum acanthium	A	153		39N50	0.06		yes	0.09
Onopordum acanthium	A	170		41N47	0.06		yes	0.09
Onopordum acanthium	A	198		42N68	0.05		no	0.04
Onopordum acanthium	A	219		38N47	0.01		no	<0.01

Species	CDFA Rating	Occurrence Number	Number of Occurrences	Proposed Mixed Use Road(s)	Miles within 100 ft. of Weeds	# of Roads	Route intersects occurrence	Gross Acres
Onopordum acanthium	A	296		39N50	0.04		no	0.01
Onopordum acanthium	A	298		38N54	0.05		no	0.02
Salvia aethiopis	B	1		41N11	0.10		yes	0.61
Salvia aethiopis	B	6		40N37	0.04		no	0.01
Salvia aethiopis	B	18		41N44	0.03		yes	0.18
Salvia aethiopis	B	19		41N44	0.87		yes	7.57
Salvia aethiopis	B	20		41N44	0.05		yes	0.01
Total			**26**		**5.74**	**8**		**53.48**

Cumulative Effects

The cumulative effects from Forest management and use activities, and from neighboring lands, are the same for Alternative 5 as for Alternatives 1 through 4. For a complete discussion, see the Alternative 1 cumulative effects section. The additional effects from Alternative 5 would be similar to the effects of Alternative 2. The only difference would be a slightly increased risk of introduction and spread of noxious weeds due to the reduction in seasonal closures on the Forest road system and the increased number of NFTS level 3 roads open to mixed use. Under this alternative, a total of 16.09 miles of routes known to be infested with noxious weeds would be added to the NFTS. The total of 15 known weed occurrences within 100 feet of these proposed routes have a total area of 71.87 acres (Table 3-79). Under this alternative, a total of 5,033 roads would be open for motor vehicle use (Table 3-79).

Table 3-79. Summary of Effects Measures for all Alternatives

Effects Measure	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of Infested Routes[1]	28.78	16.09	0	14.19	16.09
Number of Weed Infestations[1]	21	15	0	13	15
Acres of Weed Infestations[1]	73.1	71.87	0	71.62	71.87
Number of Routes & Roads with Seasonal Closures	0	213	0	270	213
Acres of Weed Infestations-Seasonal Closures[2]	0	0.02	0	15.70	0.02
Miles of Infested Routes-Seasonal Closures[2]	0	0.05	0	1.34	0.05

Effects Measure	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Number of Closure Dates	0	4	0	5	2
Miles of Roads Open to Mixed Use	3,764	3,899	3,764	3,761	4,292
Acres of Weed Infestations-Mixed Use[3]	0	15.44	0	0	53.48
Miles of Infested Routes-Mixed Use[3]	0	1.23	0	0	5.74
Total Number of Roads Open to Motorized Use	5,508	5,033	3,866	4,888	5,033

[1] Calculated from known noxious weed infestations within 100 feet of proposed routes.
[2] Calculated from known noxious weed infestations within 100 feet of NFTS roads with seasonal closures.
[3] Calculated from known noxious weed infestations within 100 feet of Level 3 NFTS roads proposed for mixed use.

Summary of Effects Analysis Across all Alternatives

In summary, the lowest weed risk alternative is Alternative 3 (Table 3-80), which prohibits cross-country motor vehicle travel and adds no unauthorized routes to the Forest road system. The highest weed risk alternative is Alternative 1, which allows continued cross-country travel throughout the Forest, except in the South Warner Wilderness Area. Alternatives 2, 4, and 5 vary only slightly in their weed risks, since the greatest contributing factor in the risk analysis is cross-country travel, which is prohibited under all of these alternatives.

Table 3-80. Risk Analysis for all Alternatives

Indicator – Noxious Weeds	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Risk of weed spread	1	3	5	4	2

In the table above, a score of 5 indicates that the alternative poses the least risk for noxious weed spread. A score of 1 indicates that the alternative poses the greatest risk for noxious weed spread.

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 inconsistent with Forest Service Manual direction (FSM 2081.03) which requires the identification of noxious weed control measures when there is a moderate to high risk of introducing or spreading noxious weeds. For the reasons discussed above in the effects analysis of Alternative 1 upon noxious weeds, a moderate to high risk exists, due to the unmanaged disturbance and increased potential for new weed introductions as a result of continued cross-country travel.

All action alternatives are consistent with the Modoc NF Land and Resource Management Plan. A noxious weed risk assessment has been completed for each alternative (FSM 2081.03 and SNFPA 2004), the public has been informed of the risk and effects from motor vehicle travel and noxious weeds (SNFPA 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).

Terrestrial Wildlife

Introduction

Management of terrestrial 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 are 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 to the degree consistent with multiple-use objectives established in each Forest Land and Resource Management Plan (LRMP). Management decisions related to motorized travel can affect terrestrial species by increasing human-caused mortality, changing 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 use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to motorized travel on NFS lands must consider effects to wildlife and their habitat.

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

Direction relevant to the proposed action as it affects terrestrial biota includes the following:

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) species, 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 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 species to ensure management activities are not likely to jeopardize the continued existence of a TE species, 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.

Forest Service Manual and Handbooks

Forest Service Sensitive (FSS) species are species identified by the Regional Forester for which population viability is a concern (Forest Service Manual 2670). 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:

- Wetland and Meadow Habitat (Management Standard & Guideline 70): See Water Resources section.
- California Spotted Owl and Northern Goshawk: Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites (Management Standard & Guideline 82).
- Fisher and Marten: Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites (Management Standard & Guidelines 87 and 89).
- Riparian Habitat (Management Standard & Guideline 92): See Water Resources section.
- Bog and Fen Habitat (SNFPA ROD page 65, 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 Northwest Forest Plan (NWFP)

The NWFP includes specific requirements for Survey and Manage species and areas such as aquatic conservation areas.

The Modoc National Forest Land and Resource Management Plan (MDF LRMP)

The MDF LRMP includes specific requirements for wildlife species (p. 4-27 to 4-28 – 3).

- C. Within designated golden eagle, Swainson's hawk, osprey, and prairie falcon habitat manage all currently active nest territories as directed in the following:

    - Golden Eagle – Such activities as OHV use and maintenance or construction of facilities, trails, and roads would be restricted within 1/4 – to ½ mile of the nest during the reproductive period, February to August, because they may be detrimental to nesting and fledging.

    - Swainson's Hawk – Prohibit disturbing management activities with (sic) 1/4 – mile of nest sites from March 1 through July 31. Disturbance from management activities include firewoodcutting; range habitat improvements; and construction or maintenance of facilities, trails or roads.

    - Osprey – Disturbance from human activities, including foot traffic and OHV use within 1/8- to ½ mile of the nest, may be detrimental to nesting and fledging during the reproductive period, March to August. Disturbing activities would be restricted.

    - Prairie Falcon - Disturbance from human activities, including foot traffic and OHV use within 1/8- to ½ mile of the nest, may be detrimental to nesting and fledging during the reproductive period, March 1 to August 1. Disturbing activities would be restricted.

K. Within mule deer habitat:

On deer winter ranges where OHV use is demonstrated to adversely affect deer, institute OHV closures from December 1 to March 31.

- The following guidelines are part of the Raptor Management Prescription – 9 of the MDF LRMP:
    - p. 4-85 - Off-highway vehicle use has seasonal restrictions.
    - p. 4-85 – 1. Within bald eagle nesting and wintering habitat:
        - b. New roads would not be constructed in winter roosts. Existing roads in winter roosts would be closed during the wintering period. New roads would not be constructed within primary zones of active nest territories. Construction within secondary zones would be determined on a case-by-case basis.
        - c. Seasonal or permanent road closures may be necessary to limit human disturbance during the reproductive or wintering period, depending on the area.
    - p. 4-86 – 2. Within goshawk habitat:
        - b. New roads should not be constructed within nest stands.
        - c. Roads may be maintained, constructed and reconstructed within ¼ mile of nest stands from August through February.
    - p. 4-88 – Recreation. Refer to OHV map for seasonal closure areas.
    - p. 4-88 - Recreation. 1. Within bald eagle nesting and wintering habitat:

      Motorized vehicles would be permitted September through December in nesting territories and April through October in wintering areas. Other times of the year these areas may be administratively closed.
    - p. 4-89 – 2. Within and near goshawk habitat:
        - Disturbance from recreational facilities may limit reproductive success. New or expanding facilities should be at least ½ mile from nest stands.
        - Within ¼ mile of nest stands, motorized vehicles would be permitted August through February. Other times of year these areas may be administratively closed.

Species-specific standards and guidelines are identified below under species effects analysis.

Effects Analysis Methodology

This is a site-specific project, for which there are two levels of analysis. First, there is site-specific analysis of the individual routes proposed for addition. This detailed analysis is by route and will be included in an appendix (or the project record). The Forest has documented that each discipline has assessed each individual route (currently unauthorized roads, trails, areas) proposed for addition to the National Forest Transportation System (NFTS) at a level sufficient to support their effects analysis and identify any necessary site-specific mitigations.

Second, there is the analysis of each alternative as a whole, which is informed by the site-specific route analysis noted above and other information. The discussion of the direct, indirect, and cumulative effects of each alternative is in a summary form. For ease of understanding, the effects of the alternatives are described separately for three discreet actions, and then combined to provide the total direct and indirect effects of each alternative (see below). The combination of these discreet actions is then added to the past, present, and reasonably foreseeable actions in the cumulative effects analysis. The three discreet actions common to all action alternatives are (1) The prohibition of cross-country motorized vehicle travel; (2) The addition of facilities

(unauthorized routes, trails, or areas) to the National Forest Transportation System (NFTS), including identifying seasons of use and vehicle class; and (3) Changes to the existing NFTS .

Impacts Relevant to Terrestrial Biota

Vehicle use on and off established routes has affected or has the potential to affect terrestrial species, including threatened, endangered, and sensitive species, by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat.

Assumptions specific to the terrestrial biota analysis

See the chapter 3 Introduction for a list of common assumptions.

The focus of this analysis is on suitable habitat; suitable habitat is assumed occupied unless it has been surveyed to a standard that determines absence. Suitable habitat was defined using the California Wildlife Habitat Relationships (CWHR) system (see below for more information on the methodology used). Because the CWHR suitability may reflect slightly different definitions of suitability than more specific models of species habitat, the reader is cautioned that directly comparing acres of "suitable" habitat between this document and its CWHR-based definitions and other analysis documents that use other systems for defining suitability of habitat is inappropriate and may be misleading.

All vehicle types result in the same amount of disturbance effect to wildlife.

Location of a trail or route is equal to disturbance effects from that trail or route (i.e., it is assumed all trails provide the same level of disturbance), unless local data or knowledge indicate otherwise.

Habitat is already impacted in the short term. In the long term, habitat would remain the same on added trails or routes, but would increase to at least some degree on non-added trails with ban of cross-country travel and subsequent passive restoration. Routes not added to the NFTS under Alternatives 2 through 5 would slowly re-vegetate and regain the conditions that exist on adjacent lands. The low levels of public non-motorized use, permitted use, or administrative use would be insufficient to overcome the natural in-growth of vegetation and accumulation of organic material into the unauthorized routes.

For this analysis, all land managed by the Modoc National Forest was considered in the analysis of effects to habitat. Indexes and habitat analysis are specifically limited to habitat occurring on National Forest System lands. Habitat analysis is based on current vegetation data (USFS 2007) that was collected and processed in 2003. Earlier data sets are available that cover a more extensive area outside of the proclaimed National Forest boundary, but these data sets are older (based in early 1990s imagery), and not as well assigned to vegetation groups matching the California Wildlife Relationships System vegetation groups. Occupancy and occurrence of species on adjacent lands is included in the qualitative, population, or cumulative effects portions of the analysis.

Data Sources

- The California Wildlife Habitat Relationships program (CWHR version 8.0; Calif. Dept. of Fish and Game, 2002) was used to define suitability for the species analyzed by this document. Habitat conditions were considered as "suitable" if a particular size and stage class provided a combined rating of at least 0.75 for the three components of cover, feeding, and reproduction. This means any given stage had to provide at least one high rating and two medium ratings. This level was picked to select habitats that the biologist felt were key to persistence while excluding marginal or peripheral habitats.

- GIS layers with the following information: route, habitats, and "designated" or important wildlife areas (e.g., PACs; bald eagle nests; deer herd critical areas) as stored in Forest and district files.
- District and Forest information files and personal knowledge.

Terrestrial Biota Indicators

Each indicator was calculated using the sources of information above, using GIS queries.

Acres open to motorized use and miles of unauthorized routes within terrestrial biota habitat.

Miles of motorized routes at Forest-wide scale and within the habitat for each species group.

Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area.

The proportion of a species (or species group's) habitat that is affected by motorized routes.

Terrestrial Biota Methodology by Action

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

Short-term time frame: 1 year.

Long-term time frame: 20 years.

Spatial boundary: Forest.

Indicator(s): Acres open to motorized use and miles of unauthorized routes within terrestrial biota habitat.

Methodology: GIS analysis of existing unauthorized routes in relation to habitat.

Rationale: Studies have documented that motorized travel can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA Forest Service 2000).

Direct and Indirect Effects of Adding Facilities to the NFTS (presently unauthorized routes, trails, and areas), Including Identifying Seasons of use and Vehicle Class

Short-term time frame: 1 year.

Long-term time frame: 20 years.

Spatial boundary: Forest.

Indicator(s): (1) Miles of motorized routes; (2) Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area; (3) The proportion of a species (or species group's) habitat that is affected by motorized routes

Methodology: GIS analysis of added routes in relation to habitat and important or sensitive terrestrial biota areas.

Rationale: Literature indicates that placement of routes in relation to habitat can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA Forest Service 2000).

Changes to the Existing NFTS

Short-term time frame: 1 year.

Long-term time frame: 20 years.

Spatial boundary: Forest.

Indicator(s): (1) Miles of motorized routes; (2) Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area; (3) The proportion of a species (or species group's) habitat that is affected by motorized routes

Methodology: GIS analysis of added routes in relation to habitat and important/sensitive terrestrial biota areas.

Rationale: Literature indicates that placement of routes in relation to habitat can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA Forest Service 2000).

Cumulative Effects

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

Long-term time frame: 20 years.

Spatial boundary: Forest

Indicator(s): (1) Miles of motorized routes; (2) Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area; (3) The proportion of a species (or species group's) habitat that is affected by motorized routes.

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

Rationale: Literature indicates that placement of routes in relation to habitat can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA Forest Service 2000).

Affected Environment and Environmental Consequences

Affected Environment – General Wildlife

The Modoc National Forest provides habitat for over 350 species of birds, mammals, amphibians, and reptiles (USFS 1991). One terrestrial wildlife species is currently listed as Endangered or Threatened under the ESA and 15 species listed as Forest Service Sensitive (Table 3-81). These species and their habitats on the Modoc National Forest are described in detail in the Modoc National Forest Motorized Travel Management EIS Biological Evaluation and the Biological Assessment (BE and BA), which can be found in the project record and is summarized in the next section. In addition, there are eight terrestrial Management Indicator Species (MIS) on the Modoc National Forest (Table 3-82).

Table 3-81. Threatened, Endangered, and Sensitive Terrestrial Species of the Modoc National Forest.

Threatened or Endangered species	
Birds	
Northern Spotted Owl	*Strix occidentalis caurina*
Forest Service sensitive species	
Birds	
Bald eagle	*Haliaeetus leucocephalus*
Northern goshawk	*Accipter gentilis*
Swainson's hawk	*Buteo swainsoni*
Greater sage-grouse	*Centrocercus urophasianus*
Willow flycatcher	*Empidonax traillii*
Greater sandhill crane	*Grus canadensis tabida*
Peregrine falcon	*Falco peregrinus*
Great gray owl	*Strix nebulosa*
California spotted owl	*Strix occidentalis occidentalis*
Mammals	
Pallid bat	*Antrozous pallidus*
Townsend's big-eared bat	*Corynorhinus townsendii*
California wolverine	*Gulo gulo luteus*
Marten	*Martes americana*
Sierra Nevada red fox	*Vulpes vulpes necator*

Table 3-82. Terrestrial Management Indicator Species (MIS) of the Modoc National Forest.

Management Indicator Species	
Birds	
Greater sage-grouse	*Centrocercus urophasianus*
Sooty grouse	*Dendragapus obscurus*
Hairy woodpecker	*Picoides villosus*
Yellow warbler	*Dendroica petechia*
Mountain quail	*Oreotyx pictus*
Black-backed woodpecker	*Picoides arcticus*
Mammals	
Marten	*Martes americana*
Northern flying squirrel	*Glaucomys volans*

Some of these species are currently being affected by cross-country motorized use of the Modoc National Forest. Literature describing the effects of motorized routes and trails upon wildlife have often grouped or categorized species in various ways to describe effects (Knight and Gutzwiller, eds. 1995, Gaines et al. 2003, Wisdom et al. 2000). Gaines et al. (2003) categorized species into six groups based upon a combination of their biology and interactions with route- and motorized trail-associated factors. For this analysis the following groups are used: (1) late-successional Forest, (2) wide-ranging carnivores, (3) ungulates, (4) riparian, (5) cavity dependent, (6) oak-woodland and oak-conifer associated species, (7) wetland, and (8) sage steppe. Threatened, Endangered, and Forest Service Sensitive species (TES) and MIS with habitat likely to be affected by motorized route or trail use, fall into these categories as shown in Table 3-83 (below).

Table 3-83. Wildlife group and focal species represented within groups

Wildlife group	Focal Species
Late-successional Forest	Northern spotted owl#, California spotted owl*, northern goshawk*, great gray owl*, American marten*+, sooty grouse+, northern flying squirrel+
Wide-ranging carnivores	Black bear, wolverine, Sierra Nevada red fox*
Ungulates	Mule deer, e k, bighorn sheep
Riparian	Bald eagle*, willow flycatcher*, yellow warbler+, osprey
Cavity-dependent	Pallid bat*, hairy woodpecker+, black-backed woodpecker+, pileated woodpecker, red-naped and red-breasted sapsuckers
Oak-woodland and oak-conifer	Western gray squirrel, wild turkey, mountain quail+
Wetland	Sandhill crane*, Canada goose, mallard
Sage Steppe	Pronghorn, Swainson's hawk*, greater sage-grouse*+, golden eagle

= Listed as "Proposed", "Threatened", or "Endangered" under the Endangered Species Act.

* = Listed as a "Sensitive" species in the Forest Service Pacific Southwest Region.

+ = Listed as a Management Indicator Species for the Modoc National Forest

Cumulative Effects Setting

The impacts to habitat are summarized in the table below. Of primary importance to wildlife is the amount of ongoing vegetation manipulation that is occurring and is reasonably foreseeable. Additional vegetation manipulation is occurring on private lands adjacent to the lands managed by the Modoc National Forest. Extensive tree thinning, as well as stand regeneration, are occurring on adjacent and nearby private lands. Additional adjacent lands are affected each year by extensive livestock grazing and, in some cases, conversion to intensive agriculture. Analysis of cumulative effects considers these impacts that are likely to occur on private lands as well as the foreseeable actions on public lands. Table 3-84 below details the reasonably foreseeable public land actions that may occur on or adjacent to the Modoc National Forest.

Table 3-84. Summary of Reasonably Foreseeable Vegetation Altering Actions on Public Land In and Adjacent to the Modoc National Forest

Type of Vegetation Change	Estimated average impact	Land Manager
Prescribed fire	4,000 acres/year	Modoc NF
Mechanical fuels treatment	6,000 acres/year	Modoc NF
Timber harvest	2,500 acres for sawlogs/year	Modoc NF

Type of Vegetation Change	Estimated average impact	Land Manager
	3,000 acres for wood fiber/year	Modoc NF
Sage-steppe restoration	15,000 acres first decade 19,000 acres second decade	Modoc NF & BLM Modoc NF & BLM
Grazing	122,500 AUMs/year[1] 54,800 AUMs/year	Modoc NF BLM (USDI 2008)
Power transmission corridor maintenance	3,000 acres/decade	Modoc NF
Road construction	0.95 mi/year (based on last 10 yrs.)	Modoc NF
Road decommissioning	7.68 miles/year (based on last 10 yrs.)	Modoc NF

[1]AUM—animal unit per month

Because private landowners do not typically publish their long-term management plans, actions on private land are more difficult to analyze. Varying amounts of timber harvest and grazing do occur annually on lands adjacent to National Forest System lands managed by the Modoc National Forest. The quantity in any given year is variable and driven by market conditions and events such as fire and insect outbreaks.

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one can not reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events; which may contribute to cumulative effects just as much as human actions. 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.” Also see CFR 220.4 (f). For these reasons, the analysis of past actions in this section is based on current environmental conditions.

Terrestrial Biota Affected Environment and Environmental Consequences

See the effects methodology section above regarding how the environmental consequences analysis was conducted.

Late-Successional, Forest-Associated Species: Affected Environment

Focal species within the group: northern spotted owl, California spotted owl, northern goshawk, great gray owl, marten, sooty grouse, and northern flying squirrel.

This species group is associated with mature to old Forests that contain characteristics of late-successional stages. These characteristics include large trees for a given growing site, relatively high canopy closure, elevated amounts of decadence in the form of snags (standing, dead trees), down logs, in-tree decay and deformity. Table 3-85 displays the CWHR vegetation type, size and stage classes that provide a cumulative habitat suitability value of at least 0.75 in the CWHR program. For this analysis, habitat conditions are considered as "suitable" if a particular size and stage class provides a combined rating of at least 0.75 for the three components of cover, feeding, and reproduction. This means any given stage had to provide at least one high rating and two medium ratings. This level was picked to select habitats that the biologist felt were key to persistence, while excluding marginal or peripheral habitats. Because special habitat elements that a species may require (e.g, large tree cavities) are not accounted for directly within the CWHR type it was felt that constraining the model to having at least one component in the high category would compensate for overestimation that appeared to occur if only moderate level suitability was included for all three stages. Conversely, requiring at least two high suitability ratings constrained habitat for some species to levels below known occurrence.

Table 3-85. For the late-Successional Group, the California Wildlife Habitat Relationship Stages and the Acres of Potential Habitat Occurring on the Modoc National Forest

Species	Habitat (CWHR) Suitability >0.75	Acres of habitat on the Modoc National Forest*
Northern goshawk	EPN: 4D, 5M, 5D JPN: 4M, 4D, 5M, 5D LPN: 4M, 4D, 5P, 5M, 5D MHW: 4M, 4D, 5M, 5D, 6 MRI: 4M, 4D, 5M, 5D, 6 PPN: 4M, 4D, 5M, 5D RFR: 5M, 5D SMC: 4M, 4D, 5P, 5M, 5D SCN: 4M, 4D, 5P, 5M, 5D WFR: 4M, 4D, 5M, 5D, 6	204,700
Northern spotted owl	MHW, 5M, 5D, 6 MRI: 5D, 6 PPN: 5M, 5D RFR: 5M, 5D SMC: 5M, 5D, 6 WFR: 5M, 5D, 6	9,210
California spotted owl	MHW, 5M, 5D, 6 MRI: 5D, 6 PPN: 5M, 5D RFR: 5M, 5D SMC: 5M, 5D, 6 WFR: 5M, 5D, 6	10,350
Great gray owl	LPN: 4M, 4D, 5M, 5D	74,820

Species	Habitat (CWHR) Suitability >0.75	Acres of habitat on the Modoc National Forest*
	RFR: 4M, 4D, 5M, 5D SMC: 4M, 4D, 5M, 5D, 6 WFR: 4M, 4D, 5M, 5D, 6	
Marten	LPN: 4M, 4D, 5M, 5D MRI: 5M, 5D, 6 RFR: 4M, 4D, 5M, 5D SCN: 4M, 4D, 5M, 5D	31,520
Sooty grouse	EPN: 4 (ALL), 5 (ALL) JPN: 4 (ALL), 5 (ALL) LPN: 4 (ALL), 5 (ALL) RFR: 4S, 4P, 5S, 5P SMC: 4 (ALL), 5 (ALL), 6 WFR: 4 (ALL), 5 (ALL), 6	439,280
Northern flying squirrel	ASP: 4D, 5P, 5M, 5D, 6 JPN: 5M, 5D LPN: 5M, 5D MHW: 5D, 6 MRI: 4D, 5M, 5D, 6 PPN: 5D RFR: 5M, 5D SMC:4D, 5M, 5D, 6 SCN: 5M, 5D WFR: 4D, 5M, 5D, 6	73,740

*acres are rounded to the nearest 10

These habitats provide conditions that support several species of public concern. The northern goshawk is well distributed across the Forest where aggregations of large trees with moderate to dense canopy cover provide suitable nesting and foraging conditions. Goshawks are managed through the provision of 200-acre protected activity centers around known territorial locations. Currently 190 polygons covering 25,280 acres are managed as goshawk protected activity centers (gPACs).

The spotted owl (both the northern subspecies and the California subspecies) is found within mountain top habitat islands on the west side of the Forest. There are at least three locations of known northern spotted owl occurrence and one location of California spotted owl occurrence. The northern spotted owl subspecies is listed as “Threatened” by the US Fish and Wildlife Service. The northern spotted owl is managed in accordance with the direction found within the Northwest Forest Plan (NWFP, USDA 1992 as amended). The California spotted owl is a Forest Service “Sensitive” species and is managed under the guidelines found within the Sierra Nevada Forest Plan Amendment ((USFS 2004) and the Modoc National Forest Land and Resource Management plan (USFS 1991). The single known California spotted owl site is managed with a 300-acre protected activity center (soPAC) as the focus for habitat protection. An additional 700 acres are managed as a Home Range Core Area (HRCA). This location has also been used by barred owls, and has produced hybrid spotted/barred owl young. This one location is separated from the bulk of the California spotted owl population in the northern Sierras by large expanses of unsuitable habitat (sparse pine stands, juniper Forest, open sage flats). The current status of California spotted owls on the Modoc can only be considered that of an outlier location that probably functions as a genetic sink for any individual found in the location.

American marten are also known to use late-successional conditions, particularly in the Medicine Lake Highlands on the northwest edge of the Forest. Marten within the Medicine Lake area are protected by the provisions in the NWFP that provide for retaining canopy cover and the provision of decadence in the form of large down logs and snags. Outside of the NWFP area marten are rare, but when located, den sites are protected.

Other species utilizing late-successional habitats include the sooty grouse, the northern flying squirrel and the great gray owl. The sooty grouse uses fir trees with dense foliage for roosts (Zeiner1990). The northern flying squirrel uses cavities in large snags and trees for nesting and cover (Zeiner 1990). Both of these species have no specific management guidelines but do benefit from other guidelines relating to snag retention and guidelines that provide general vegetative diversity. Great gray owls have occasionally been observed within the Forest. There have been intermittent surveys for great gray owls but no breeding has been detected and there are no confirmed observations of pairs of great gray owls within or adjacent to the MDF.

Late-Successional, Forest-Associated Species: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of Continuation of Cross-Country Motorized Vehicle Travel

Although occasional direct mortality may occur from collisions with off-road vehicles, this appears to be an exceedingly rare event for species in this group, and has not been reported to occur within the Forest. It is possible this could occur under this alternative; however, given existing use and mobility of the species within this group, such occurrences would remain rare and inconsequential to species population dynamics. At the long-term analysis point, assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

A larger impact, both in the short term, and the long term, would be disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to focal species within this group. Table 3-86 displays the number of acres of habitat potentially available for cross-country travel under this alternative for each of the focal species within this group. Table 3-86 also displays the miles of route available for use that occurs within habitat on the National Forest. The California WHR sizes and stages that were considered as “suitable” are listed for each species in Table 3-85, above.

Table 3-86. Alternative 1: the Potential Late-Successional Habitat that Could be Impacted by Cross-Country, off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Northern goshawk	179,380	87.6%
Northern spotted owl	8,440	91.6%
California spotted owl	10,350	100.0%
Great gray owl	74,820	100.0%
Sooty grouse	418,500	95.3%
American marten	31,520	100.0%
Northern flying squirrel	63,140	85.6%

*Rounded to nearest 10 acres.

Included in cross-country travel are the effects from continuation of use on unauthorized routes. The linear effects of travel routes can include disturbance, displacement, microclimate changes, and increased mortality from hunting and trapping (Gaines et al. 2003). Disturbance can lead to physiological responses such as increased stress hormones (Wasser et al. 1997 as reported in Gaines et al. 2003). Table 3-87 displays the miles of routes available for use within habitats modeled to be used by the focal species in this group.

Table 3-87. Alternative 1: Miles of Routes Within Potential Habitat for the Late-Successional Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Northern goshawk	46.9	713.1
Northern spotted owl	0.7	27.4
California spotted owl	0.8	23.5
Great gray owl	38.5	255.7
Sooty grouse	136.0	1,886.4
American marten	16.5	120.5
Northern flying squirrel	25.9	212.2

Northern goshawks actively defend nest sites during portions of the breeding season. Cross-country travel could lead to disturbance that disrupts pair-bonding, causes exposure of eggs or young to inclement weather, and increases adult energy expenditures.

Goshawk habitat was examined in a manner similar to that used by Gaines et al. (2003) in order to assess the relative impact levels of routes on late-successional habitats; goshawk habitat was used as a proxy for the other late-successional species because goshawks are well distributed across the Forested area of the Modoc NF. Goshawk habitat consists of a structure (closed canopy, mature Forest, with adequate decadence) that incorporates most of the needs of the other late-successional species, making goshawk habitat a reasonable modeling tool. Goshawk habitat was examined at the level of 6th-order watersheds (sixth order hydrological unit of classification or HUCs). The relative amount of goshawk habitat within a HUC ranges from 72 percent of the National Forest within a HUC, to no goshawk habitat within a HUC. The mean proportion of goshawk habitat to National Forest in HUCs that contain goshawk habitat is 18 percent.

The habitat influence index is calculated by buffering the available routes (both unauthorized and NFTS) by 50 meters on both sides. The sum of this route buffer is then divided by the total amount of goshawk habitat within the 6th order watershed to determine the proportion of late-successional habitats that could be influenced by available routes. A ranking was assigned that follows the rankings developed by Gaines et al. (2003). The level of influence is as follows:

- Less than 30 percent within habitat influence buffer is a low level of human influence
- Thirty to 50 percent within the habitat influence buffer is a moderate level of human influence
- More than 70 percent within the habitat influence buffer is a high level of human influence

The acres and habitat influence index and rank for each HUC are displayed in appendix M. Only five of the HUCs had a moderate ranking. All other HUCs with habitat were ranked as low. The five HUCs with moderate rankings each had less than 100 acres of goshawk habitat within the

watershed. This would indicate a low level of impact from edge effects, snag and downed log reduction, and habitat loss and fragmentation resulting from route-associated factors (Gaines et al. 2003). Table 3-88 below summarizes this information for this and the other alternatives.

A second index to evaluate the effects of displacement, avoidance, and disturbance is the security habitat index (Gaines et al. 2003). For this analysis, routes (both unauthorized and NFTS) are buffered by 200 meters. The area outside this buffer is referred to as security habitat. Thus, total habitat minus habitat within the buffer area equals security habitat. The security habitat is divided by the total habitat within the HUC to determine the proportion that is in security habitat and that may provide refugia for the species. A ranking was assigned that follows the rankings developed by Gaines et al. (2003). The level of influence of human activities on habitat ranking is as follows:

- Less than 50 percent security habitat is a high level of human influence
- Fifty to 70 percent security habitat is a moderate level of human influence
- More than 70 percent security habitat is a low level of human influence

The security index and rank for each HUC are displayed in appendix L. In this alternative, 18 of the HUCs had a low ranking, 30 were ranked moderate and 53 were ranked high. When constrained to HUCs with at least 200 acres of goshawk habitat, 8 had a low rank, 23 moderate and 37 high. A low ranking indicates a low level of impact from edge effects, snag and downed log reduction, habitat loss and fragmentation resulting from route-associated factors. A “High” ranking occurs where there is limited interior area that remains unaffected by route-associated factors (Gaines et al. 2003).

When combined with the results of the habitat influence analysis, the security habitat analysis describes late-successional habitat on the Modoc National Forest as being generally influenced by the presence of routes, but not highly impacted by the actions that occur closest to routes (e.g., edge effects, snag and down log removal, habitat loss and fragmentation).

Another way to measure the impact of routes on goshawks is the miles of routes (both unauthorized and NFTS) within goshawk protected activity centers (gPACs). Under Alternative 1 there would be approximately 143 miles of routes within gPACs, of which approximately 10 miles is unauthorized routes. The unauthorized route mileage can be converted to equivalent-acres by assuming each mile of route is approximately 1.8 acres based on a 15-foot wide impact. These unauthorized routes within PACs are equivalent to approximately 18 acres or 0.7% of the total acres within PACs.

Most of the effects revealed by the habitat influence analysis and the security habitat analysis are from the existing approved transportation system. Unauthorized routes constitute 491 miles while the transportation system extends across approximately 4,580 miles.

Spotted owls could be disturbed during the nesting season by cross-country travel. Disturbance could lead to reduced time on the nest, thereby threatening eggs, or young, with exposure. Disturbance from off-road travel would typically occur in daylight when owls are in the resting portion of the diurnal cycle. Off-road disturbance impacts are limited by the heavily timbered areas where spotted owls nest. In general, these impacts are possible but not likely. The minor possibility of off-road disturbance impacts would have no measurable impact on long-term population parameters; therefore, the effect on northern spotted owls of continued cross-country travel is negligible and discountable. California spotted owls would have even less impact from vehicle use because of limited California spotted owl occurrence on the Forest and the dense nature of occupied stands. There are no signs of recent cross-country vehicle use by the public within the HRCA or California spotted owl PAC. Impacts to spotted owls from on-route

disturbance emanating from unauthorized routes appear to be so minor as to be discountable. The mean segment length for an unauthorized route within spotted owl habitat is 0.14 miles. These short spurs would receive little use during the breeding season when disturbance causes the most impact. The unauthorized routes within habitat equate to approximately 0.01% of the modeled northern spotted owl habitat. The unauthorized routes within California spotted owl habitat is about 0.01% of the modeled California spotted owl habitat. The potential impact to either subspecies of spotted owl is so small as to be discountable.

Great gray owls, if they occur, would be impacted by similar effects as northern and California spotted owls of disturbance to nesting birds. However, it does not appear that great gray owls regularly nest on the Modoc National Forest; therefore, impacts are minor to non-existent.

The marten could be affected by loss of dens, increased disturbance of individual martens, and by indirect impacts to prey. Vehicles have the potential to collapse den sites, resulting in the potential loss of adults or young. Vehicles can also increase disturbance, resulting in additional energy expenditures. Indirectly, vehicles can affect the squirrel populations that marten primarily feed on. Squirrel populations may be impacted by increased disturbance resulting in lowered energy reserves available for the production of young. If cross-country travel occurs to the extent that soil compaction was to occur, food resources for squirrels, particularly truffles, could be diminished. Reduced production of young and reduced production of food would reduce the size of squirrel populations available for marten to prey upon. The impacts to martens are limited by the limited amount of current cross-country use. Unauthorized routes within modeled marten habitat would equal approximately 30 acres. This is approximately 0.1% of the habitat on the Modoc National Forest. For marten the continuation of use of existing routes is unlikely to contribute to direct mortality or generate sufficient disturbance to affect marten population parameters such as fecundity or mortality rates.

The impacts to squirrels in general also apply to northern flying squirrels. Flying squirrels would probably not be affected by disturbance due to the diurnal nature of the disturbance and the nocturnal nature of flying squirrels. Because flying squirrels are arboreal nesters, they are unlikely to be disturbed or suffer from direct mortality from cross-country travel. However, flying squirrels heavily use truffles that occur in the Forest soil (Smith 2007). Changes to soils could affect truffle production and, if sufficiently widespread, result in reduced numbers of northern flying squirrels. Currently, soil changes due to cross-country recreational travel appear to be insufficient to impact truffle production at the level that flying squirrels would be impacted. Approximately 25.9 miles of unauthorized route would be available for use in this alternative. This would be equivalent to approximately 47 acres or 0.06% of the modeled northern flying squirrel habitat on the Modoc NF. Flying squirrels have probably already adjusted to this existing use by establishing dens and nests away from the unauthorized (and NFTS) routes. It appears unlikely that the continued use of the unauthorized routes would have a discernable effect on northern flying squirrels. Thus these effects are so minor as to be imperceptible.

The sooty grouse is susceptible to direct mortality of chicks from cross-country travel. Sooty grouse nest adjacent to or under old logs. Trampling of logs has the potential to destroy nests. Close passage of vehicles may result in flushing of incubating females, potentially resulting in nest loss. This impact should be considered a possibility, but not a known impact. Sooty grouse would not be directly affected by the continuation of use. The short nature of the unauthorized routes does not appear to provide sufficient use as to constitute a measurable effect. Additionally, when transformed into an acre equivalent the unauthorized routes within sooty grouse habitat would affect an area equivalent to 0.06% of the sooty grouse habitat on the Forest.

Effects of Adding Facilities (presently unauthorized roads, trails and/or areas) to the NFTS

This alternative would not add any facilities to the NFTS.

Effects of Changes in Existing Season and Class of Use

This alternative would not change any current season or class of use.

Cumulative Effects

The effects of this alternative would aggregate with the effects outlined above in table 3-85, above. Those effects include 2,500 acres of sawlog removal and 3,000 acres of wood for fiber on National Forest. There is also ongoing timber harvest and Forest regeneration on private lands within and adjacent to the proclaimed boundary of the Forest, as well as stochastic (random) events such as wildfires and catastrophic insect outbreaks. Removal of trees has the potential to impact species in this group. Generally, this group of species is affected negatively by actions that reduce the average tree size, or that reduce canopy closure. Long-term trends have generally been negative for this species group, as can be seen by the inclusion of the northern spotted owl, a species that is Federally listed as “Threatened” and includes Forest Service “Sensitive” species, such as northern goshawk, California spotted owl, great gray owl, and marten, for which viability has been a concern.

This alternative would continue cross-country travel, including continued public use of the unauthorized routes; therefore, the impacts to species in this group from vehicular travel would continue and aggregate with effects from vegetation management occurring elsewhere. Because the impacts from cross-country travel are estimated to be low, the continuation of cross-country travel under this alternative would add minimally to negative impacts from vegetation management activities. The continuation of public travel on the unauthorized routes would also continue to provide impacts. However, the size of the impact is small. The impact of the unauthorized routes can also be estimated by converting the miles of unauthorized route into equivalent acres by assuming each mile of route is approximately 1.8 acres based on a 15-foot wide impact. This means that the 47 miles of unauthorized route in northern goshawk habitat is equivalent to approximately 85 acres or less than two percent of the area impacted annually by timber harvest for sawlogs or fiber. For northern spotted owls, this equates to about one acre of unauthorized route, or 0.02 percent of the annual timber treatment. For sooty grouse, this equates to about 246 acres of unauthorized route, or less than five percent of the annual timber treatment. Furthermore, the unauthorized routes do not constitute a change to habitats but an existing condition whose vegetation-change impact has already occurred, and whose current conditions would continue into the future. Thus, the unauthorized routes have less impact than an acre of new vegetation manipulation. Therefore, the impacts from the unauthorized routes and the cross-country travel are so minor, when aggregated with other impacts occurring on the landscape, that they are imperceptible and discountable.

Alternative 2 (Proposed Action)

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group from cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling or indirect impacts to prey or food resources from cross-country vehicle travel.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add a total of 339 miles of unauthorized routes to the NFTS. Table 3-88 displays the route mileage of both the existing system roads and the proposed unauthorized additions within habitats used by the focal species. The addition of 339 miles of unauthorized routes would affect the late-successional focal species.

Table 3-88. Alternative 2: Miles of Routes Within Potential Habitat for the Late-Successional Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Northern goshawk	35.1	701.1
Northern spotted owl	0.7	27.4
California spotted owl	0	22.7
Great gray owl	9.0	226.2
American marten	8.4	112.4
Sooty grouse	115.8	1,866.3
Northern flying squirrel	6.6	192.9

This alternative would reduce the route mileage within northern goshawk habitat by 2 percent (approximately 12 miles) compared to Alternative 1. This Alternative would contain 7 percent more routes than Alternative 3, which adds no unauthorized routes to the NFTS, and about 2 percent more routes than Alternative 4. The NFTS mileage would be the same for all alternatives, and the unauthorized routes added to the system would be the same for both this alternative and Alternative 5. These small percentage differences between alternatives are essentially undetectable against the background fluctuations of weather and stochastic events such as fires. Alternative 2 would have approximately 139 miles of routes within the gPACs, of which about five miles are routes added to the NFTS. This compares to total miles within gPACs of 143, 134, and 137 for Alternatives 1, 3, and 4 respectively. The difference of plus or minus five miles or 3 percent difference is also essentially undetectable.

The habitat influence index and rank for each HUC are displayed in appendix M. Only five of the HUCs had a moderate ranking. All other HUCs with habitat were ranked as low. The five HUCs with moderate rankings each had less than 200 acres of goshawk habitat within the watershed. That all of the HUCs with more than 200 acres of habitat have low ranking would indicate a low level of impact from edge effects, snag and downed log reduction, habitat loss and fragmentation resulting from route-associated factors (Gaines et al. 2003). There is no difference between this alternative and Alternatives 3, 4, and 5 in the number of HUCs with a habitat influence ranking of low. Alternative 1 has one HUC with a rating of moderate with all other HUCs at a low ranking (among HUCs with at least 200 acres of habitat) which is one more watershed than Alternative2.

When constrained to HUCs with at least 200 acres of goshawk habitat, 14 had a low security rank, 19 moderate and 35 high. A low ranking indicates a low level of impact from edge effects, snag and downed log reduction and habitat loss and fragmentation resulting from route-associated factors. By contrast, a high ranking occurs where there is limited interior extent that remains unaffected by route-associated factors (Gaines et al. 2003). This compares with Alternative 1, which had only eight HUCs with a low ranking, 23 with a moderate ranking and 37 with a high human influence ranking (among HUCs with at least 200 acres of habitat). Alternative 3, which does not add any unauthorized routes to the NFTS, swings one additional HUC from the moderate to low category resulting in 15 low, 18 moderate and 35 high ranked HUCs with greater than 200 acres of goshawk habitat. This seems to validate the process whereby each individual route segment was evaluated by line officers and the interdisciplinary team for impacts. Even with adding 69 percent of the unauthorized routes in this alternative, almost all of the effect

attained by not adding any unauthorized routes in Alternative 3, was achieved in Alternative 2. Alternative 4, which differs in miles of route in habitat by approximately five miles, has the same distribution of rankings as this alternative (Alternative 2). Alternative 5 would have the same ratings as this alternative because there is no difference in the physical route system between the alternatives.

When combined with the results of the habitat influence analysis, the security habitat analysis describes late-successional habitat on the Modoc National Forest as being generally influenced by the presence of routes, but not highly impacted by the actions that occur closest to routes (e.g., edge effects, snag and down log removal, habitat loss and fragmentation).

Most of the effects revealed by the habitat influence analysis and the security habitat analysis are from the existing approved transportation system. Routes that potentially could have been added to the NFTS constitute 491 miles, while the existing transportation system extends across approximately 4,580 miles.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of routes. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair bonding and nest initiation may have less disturbance. However, this is also the period when routes are often blocked by snowdrifts and unavailable for wheeled travel. Therefore, the impact is expected to be variable by year and minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to provide the same magnitude of impact for this analysis. By allowing an additional 138 miles of mixed use, there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of this alternative would aggregate with the effects outlined above in table 3-84. Those effects include 2,500 acres of sawlog removal and 3,000 acres of wood for fiber on National Forest. There is also ongoing timber harvest and Forest regeneration on private lands within and adjacent to the proclaimed boundary of the Forest as well as stochastic events such as wildfires and catastrophic insect outbreaks. Removal of trees has the potential to impact species in this group. Generally, this group of species is affected negatively by actions that reduce the average tree size, or that reduce canopy closure.

This alternative would add approximately 339 miles of routes to the NFTS, and would discontinue cross-country travel which includes continued use of unauthorized routes. Some impacts to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere because of the additional 339 miles of unauthorized routes added to the NFTS. However, the impact would be small. The added routes can be converted to equivalent-acres by assuming each mile of route is approximately 1.8 acres based on a 15-foot wide impact. This means that the 35 miles of unauthorized routes added to the NFTS in northern goshawk habitat in this alternative is equivalent to approximately 64 acres, or about one percent of the area impacted annually by timber harvest for sawlogs or fiber. For northern spotted owls, the area affected by adding routes to the NFTS equates to about one acre, or 0.02 percent of the annual timber treatment across the Forest. For sooty grouse, the added routes within habitat equate to about 211 acres, or less than four percent of the annual timber treatment. These route additions are offset at the 20-year, long-term point by the amount of routes not added to the NFTS

that would have begun to move towards habitat for late-successional species. For northern goshawks, this means an equivalent of approximately 22 acres. For northern spotted owls, there would be no habitat added because all of the current existing unauthorized routes would be added to the system. For sooty grouse, an equivalent of 36 acres would begin moving toward late-successional conditions. All of these acres would have many decades of growth and recovery before they fully became suitable for the species in this group. Therefore, in this alternative the impacts from the route system are somewhat reduced compared to the impacts of Alternative 1, and countered additionally by the cessation of impacts from cross-country travel. Overall, impacts from this alternative appear to be so minor, that when aggregated with other impacts occurring on the landscape, they are imperceptible and discountable.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling or indirect impacts to prey or food resources.

The linear effects of routes would still occur on the 4,580 miles of NFTS roads open for use. Table 3-89 displays the amount of route mileage within habitats used by the focal species. The habitat influence index and rank for each HUC are displayed in appendix M. The five HUCs with moderate rankings each had less than 200 acres of goshawk habitat within the watershed. This would indicate a low level of impact from edge effects, snag and downed log reduction and habitat loss, and fragmentation resulting from route-associated factors (Gaines et al. 2003).

The security index and rank for each HUC are displayed in appendix L. When constrained to HUCs with at least 200 acres of goshawk habitat, 15 had a low rank, 18 moderate and 35 high. A low ranking indicates a low level of impact from edge effects, snag and downed log reduction and habitat loss and fragmentation resulting from route-associated factors. By contrast, a high ranking occurs where there is limited interior extent that remains unaffected by route-associated factors (Gaines et al. 2003).

When combined with the results of the habitat influence analysis, the security habitat analysis describes late-successional habitat on the Modoc National Forest under Alternative 3 as being generally influenced by the presence of routes, but not highly impacted by the actions that occur closest to routes (e.g., edge effects, snag and down log removal, habitat loss and fragmentation). All of the effects revealed by the habitat influence analysis and the security habitat analysis in this alternative are from the existing NFTS.

Table 3-89. Alternative 3: Miles of Routes Within Potential Habitat for the Late-Successional Group

Species	Miles Of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat On NF
Northern spotted owl	0	27.4
California spotted owl	0	22.7
Northern goshawk	0	701.1

Species	Miles Of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat On NF
Great gray owl	0	226.2
American marten	0	112.4
Sooty grouse	0	1,866.3
Northern flying squirrel	0	192.9

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of use

Changes to existing season of use would not occur under this alternative.

There would be no change of vehicle class in this alternative.

Cumulative Effects

The effects of this alternative would aggregate with the effects outlined above in **Error! Reference source not found.**3-83. This alternative would prohibit cross-country travel including the continued use of approximately 491 miles of unauthorized routes. The impacts to species in this group from cross-country travel and from unauthorized routes would cease, and may partially counter some of the effects from vegetation management occurring elsewhere. However, the size of the impact is small. The unauthorized routes that would not be added to the NFTS can be converted to equivalent-acres. For the 47 miles of unauthorized routes in northern goshawk habitat in this alternative, the equivalent area would be approximately 86 acres, or less than 2 percent of the area impacted annually by timber harvest for sawlogs or fiber, or 0.04 percent of the goshawk habitat on the Modoc National Forest. For northern spotted owls, the area affected by unauthorized routes equates to about 1 acre of roadway or 0.02 percent of the annual timber treatment, or 0.01% of the habitat. For sooty grouse, the unauthorized routes equate to about 246 acres or less than 4 percent of the annual Forest timber treatment, or about 0.06% of the Forest's sooty grouse habitat. The unauthorized routes' impact would begin to decrease at the 20-year long-term point as the routes begin to develop vegetation and downed woody debris and move towards habitat for late-successional species. For northern goshawks, this means an equivalent of approximately 86 acres. For northern spotted owls, there would be approximately 1 acre of additional habitat. For sooty grouse, an equivalent of 246 acres would begin moving toward late-successional conditions. All of these acres would have many decades of growth and recovery before they fully became suitable for the species in this group. Therefore, in this alternative, the impacts from cross-country use are reduced versus the impacts of Alternative 1, and reduced by the slow recovery toward suitability of the unauthorized routes. However, the low rate and intensity of impacts from cross-country travel do not appear to be sufficient to counter other impacts that are occurring from vegetation management and stochastic events such as insect outbreaks and stand-replacing fires. Overall, when aggregated with other impacts to the late-successional group, impacts from this alternative appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially

where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling, or indirect impacts to prey or food resources.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 286 miles of routes to the NFTS. Table 3-90 (below) displays the route mileage within habitats used by the focal species.

Table 3-90. Alternative 4: Miles of Routes within Potential Habitat for the Late-Successional Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Northern goshawk	30.0	696.1
Northern spotted owl	0.7	27.4
California spotted owl	0	22.7
Great gray owl	8.2	225.4
American marten	7.2	111.1
Sooty grouse	95.2	1845.7
Northern flying squirrel	5.5	191.8

This alternative would contain five percent more route mileage than Alternative 3, and about one percent less route mileage than Alternatives 2 and 5 within goshawk habitat. These small percentage differences between alternatives are essentially undetectable against the background fluctuations of weather and stochastic events such as fires. Alternative 4 would have approximately 137 miles of routes within the gPACs of which about three miles are routes proposed for addition to the NFTS. This compares to total miles within gPACs of 143, 139, and 134 for Alternatives 1, 2, and 3 respectively. Alternative 5 has the same route configuration as Alternative 2, and therefore the same mileage and acreage numbers. The difference of plus or minus five miles, or three percent difference, is undetectable in impact.

The habitat influence index and rank for each HUC are displayed in appendix M. Only five of the HUCs had a moderate habitat influence ranking. All other HUCs with habitat were ranked as low. The five HUCs with moderate rankings each had less than 200 acres of goshawk habitat within the watershed. That all of the HUCs with more than 200 acres of habitat have low habitat influence ranking would indicate a low level of impact from edge effects, snag and downed log reduction and habitat loss and fragmentation resulting from route-associated factors (Gaines et al. 2003). There is no difference between this alternative and Alternatives 2, 3, and 5 in the number of HUCs with a habitat influence ranking of low. Alternative 1 has one HUC with a rating of moderate, with all other HUCs at a low ranking (among HUCs with at least 200 acres of habitat).

The security index rank for each HUC is displayed in appendix L. When constrained to HUCs with at least 200 acres of goshawk habitat, 15 had a low security index rank, 18, moderate and 35 high. A low ranking indicates a low level of impact from edge effects, snag and downed log reduction and habitat loss and fragmentation resulting from route-associated factors. By contrast, a high ranking occurs where there is limited interior extent that remains unaffected by route-associated factors (Gaines et al. 2003). This compares with Alternative 1, which had only eight HUCs with a low ranking, 23 with a moderate ranking, and 37 with a high human influence ranking. Alternative 3, which does not add any unauthorized routes to the NFTS, has the same number of HUCs in the low category as alternative 4 resulting in 15 low, 18 moderate and 35 high ranked HUCs with greater than 200 acres of goshawk habitat. In this alternative, by not adding 43 percent of the unauthorized routes, the same general security index was achieved as in

the alternative that does not add any unauthorized routes (Alternative 3). Alternative 5 would have the same ratings as Alternative 2 because there is no difference in the physical route system between those two alternatives.

When combined with the results of the habitat influence analysis, the security habitat analysis describes late-successional habitat on the Modoc National Forest as being generally influenced by the presence of routes, but not highly impacted by the actions that occur closest to routes (e.g., edge effects, snag and down log removal, habitat loss and fragmentation). Most of the effects revealed by the habitat influence analysis and the security habitat analysis are from the existing NFTS. Unauthorized routes to be added to the NFTS in this alternative total 286 miles (or 6 percent) of the approximately 4,580 miles of NFTS roads.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route in this alternative. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair-bonding and nest initiation may have less disturbance. However, this is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, the seasonal closure impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. There would be no change in vehicle class proposed in this alternative. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 4 on the late-successional group would aggregate with the effects outlined above in table 3-84. This alternative would discontinue cross-country travel which includes approximately 213 miles of unauthorized routes. Some impacts to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere because of the additional 286 miles of unauthorized routes added to the NFTS. However, the size of the impact is small. The added routes in northern goshawk habitat for this alternative, when converted to equivalent-acres, convert to approximately 55 acres or about 1 percent of the area impacted annually by timber harvest for sawlogs or fiber. For northern spotted owls, the area affected by adding routes to the system equates to about one acre, or 0.02 percent of the annual Forest timber treatment. For sooty grouse, the added routes equate to about 173 acres or less than 3 percent of the annual Forest timber treatment. These NFTS additions are offset at the 20-year long-term point by the prohibition of cross-country travel and the unauthorized routes that have begun to move towards habitat for late-successional species. For northern goshawks, this means an equivalent of approximately 31 acres would be moving towards suitability. For northern spotted owls, there would be no additional habitat because all of the current unauthorized routes within northern spotted owl habitat would be added to the system. For sooty grouse, an equivalent of 74 acres would be moving toward late-successional conditions. All of these acres, and those for the other late-successional species, would have many decades of growth and recovery before they became fully suitable for the species in this group. Therefore, in this alternative, the impacts from cross-country use are reduced versus the impacts of Alternative 1, and further reduced by the slow recovery toward suitability of the 213 miles of unauthorized routes. Overall, impacts from this alternative appear to be so minor that when aggregated with other impacts occurring on the landscape, that they are imperceptible and discountable.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling, or indirect impacts to prey or food resources.

Effects of Adding Unauthorized Routes to the NFTS

This alternative is the same as Alternative 2 in that it would add the same 339 miles of unauthorized routes to the NFTS. The effects of these changes to the NFTS are the same as those listed above for Alternative 2. The miles of unauthorized routes added to the system in this alternative are displayed in Table 3-91 below for each of the focal species.

Table 3-91. Alternative 5: Miles of Routes within Potential Habitat for the Late-Successional Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Northern goshawk	35.1	701.1
Northern spotted owl	0.7	27.4
California spotted owl	0	22.7
Great gray owl	9.0	226.2
American marten	8.4	112.4
Sooty grouse	115.8	1,866.3
Northern flying squirrel	6.6	192.9

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair bonding and nest initiation may have fewer disturbances. However, this is also the period when routes are often blocked by snowdrifts and unavailable for wheeled travel. Therefore, the impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to provide the same magnitude of impact for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel, but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to late-successional species as compared to Alternative 2. This alternative has the same imperceptible and discountable cumulative effects as Alternative 2.

Comparison of Effects on Late-Successional Species, by Alternative

This section provides tabular comparisons of the five alternatives. Tables 3-85 through 3-87 display the impacts to the northern goshawk, the species selected as best representing all of the focal species within the late-successional species group.* UA = unauthorized route miles that could continue to receive motorized use under continued cross-country travel (Alt 1), or (for all other Alternatives) that would be added to the NFTS
UA+NFTS = total miles of combined UA routes and NFTS routes

Table 3-95 displays a comparison of other habitat change metrics for other focal species in the late-successional species group. In general Alternative 1 shows the most impacts to the focal species and their habitats and Alternative 3 the least.

Table 3-92 displays a comparison of Habitat Influence Rank ratings, by alternative. A Habitat Influence Rank rating of “low” indicates less than 30 percent of a HUC is within a influence buffer. A rating of “high” indicates that more than 70 percent of the HUC is within a influence buffer.

Table 3-92. Habitat Influence Rank Ratings, by Alternative

Number of HUCs with each Habitat Influence Rank Rating, Where each HUC Contains some Suitable Habitat					
Ranking	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Low	95	96	96	96	96
Moderate	6	5	5	5	5
High	0	0	0	0	0
Number of HUCS with each Habitat Influence Rank Rating, Where each HUC Contains at Least 200 Acres of Suitable Goshawk Habitat					
Ranking	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Al t5**
Low	67	68	68	68	68
Moderate	1	0	0	0	0
High	0	0	0	0	0

* UA = unauthorized route miles that could continue to receive motorized use under continued cross-country travel (Alt 1), or (for all other Alternatives) that would be added to the NFTS
UA+NFTS = total miles of combined UA routes and NFTS routes

Table 3-95 displays a comparison of other habitat change metrics for other focal species in the late-successional species group. In general Alternative 1 shows the most impacts to the focal species and their habitats and Alternative 3 the least.

Table 3-93 displays a comparison of security index rank ratings by alternative. A Security Index Rank rating of “low” would indicate more than 70% of a HUC is in an area outside of a 200-meter disturbance zone. A rating of “high” would indicate less than 50 percent of a HUC is in an area outside of a 200-meter disturbance zone.

Table 3-93. Security Index Rank Ratings, by Alternative

Number of HUCs with each Security Index Rank Rating, where each HUC contains some suitable habitat					
Ranking	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Low	18	26	27	27	26
Moderate	30	26	26	26	26
High	53	49	48	48	49

Number of HUCs with each Security Index Rank Rating, where each HUC contains some suitable habitat					
Number of HUCS with each Security Index Rank Rating, where each HUC contains at least 200 Acres of suitable goshawk habitat					
Ranking	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Low	8	14	15	15	14
Moderate	23	19	18	18	19
High	37	35	35	35	35

* UA = unauthorized route miles that could continue to receive motorized use under continued cross-country travel (Alt 1), or (for all other Alternatives) that would be added to the NFTS
UA+NFTS = total miles of combined UA routes and NFTS routes

Table 3-95 displays a comparison of other habitat change metrics for other focal species in the late-successional species group. In general Alternative 1 shows the most impacts to the focal species and their habitats and Alternative 3 the least.

Table 3-94 displays a comparison of other habitat change metrics for goshawks. In general Alternative 1 shows the most impacts to goshawks and their habitats and Alternative 3 the least.

Table 3-94. Comparison of Other Goshawk Habitat Change Metrics Between Alternatives

Metric	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
% of HUCs with a low habitat influence index	94% (all) 99% (w 200ac)	96% (all) 100% (w 200ac)	95% (all) 100% (w 200ac)	95% (all) 100% (w 200ac)	96% (all) 100% (w 200ac)
% of HUCs with a low security index rating	18%(all) 12% (w >200ac habitat)	26%(all) 21% (w >200ac)	27%(all) 22% (w >200ac)	27%(all) 22% (w >200ac)	26%(all) 21% (w >200ac)
Area available for cross-country travel	179,380 ac	0 ac	0 ac	0 ac	0 ac
Miles of routes in habitat	UA* : 47.0 miles UA + NFTS: 713	UA: 35.1 UA + NFTS: 701 2%< A-1	UA: 0 UA + NFTS: 666 7%< A-1 5%< A-2	UA: 30.0 UA + NFTS: 696 2%< A-1 0.7%<A-2 5%> A-3	UA: 35.1 UA + NFTS: 701 2%< A-1
Miles of routes in PACs	UA: 9.8 UA + NFTS: 143	UA: 4.9 UA + NFTS: 139	UA: 0 UA + NFTS: 134	UA: 3.0 UA + NFTS: 137	UA: 4.9 UA + NFTS: 139
Equivalent acres of UA routes in habitat (% of MDF Habitat)	UA: 85.5 (.04%) UA + NFTS: 1,298 (0.6%)	UA: 63.9 (.03%) UA + NFTS: 1,276 (0.6%)	UA: 0 (0%) UA + NFTS: 1,212 (0.6%)	UA: 54.6 (.03%) UA + NFTS: 1,267 (0.6%)	UA: 63.9 (.03%) UA + NFTS: 1,276 (0.6%)
Equivalent acres of UA routes in PAC (% of MDF PAC acres)	UA: 17.8 (.07%) UA + NFTS: 260 (2.8%)	UA: 8.9 (.04%) UA + NFTS: 253.0 (1.0%)	UA: 0 (0%) UA + NFTS: 243.9 (1.0%)	UA: 5.5 (.02%) UA + NFTS: 249.3 (1.0%)	UA: 8.9 (.04%) UA + NFTS: 253.0 (1.0%)

* UA = unauthorized route miles that could continue to receive motorized use under continued cross-country travel (Alt 1), or (for all other Alternatives) that would be added to the NFTS
UA+NFTS = total miles of combined UA routes and NFTS routes

Table 3-95 displays a comparison of other habitat change metrics for other focal species in the late-successional species group. In general Alternative 1 shows the most impacts to the focal species and their habitats and Alternative 3 the least.

Table 3-95. Comparison of Selected Habitat Change Metrics by Alternative for Other Late-Successional Focal Species

Species	Metric	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Northern spotted owl (Modeled habitat on the MDF: 9,210 ac)	NF habitat available for cross-country travel	8,441.6 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	0.7 UA UA+NFTS: 27.4	0.7 UA UA+NFTS: 27.4 0%< A-1	0 UA UA+NFTS: 26.7 2%< A-1 2%< A-2	0.7 UA UA+NFTS: 27.4 0%< A-1 0%< A-2 2%> A-3	0.7 UA UA+NFTS: 27.4 0%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	1.3 acres (0.01%)	1.3 acres (0.01%)	0 acres (0%)	1.3 acres (0.01%)	1.3 acres (0.01%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	49.9 acres (0.5%)	49.9 acres (0.5%)	48.6 acres (0.5%)	49.9 acres (0.5%)	49.9 acres (0.5%)
California spotted owl (Modeled habitat on the MDF: 10,350 ac)	MDF habitat available for cross-country travel	10,346 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 0.8 UA+NFTS: 24	UA: 0 UA+NFTS: 23 3%<A-1	UA: 0 UA+NFTS: 23 3%< A-1 0%< A-2	UA: 0 UA+NFTS: 23 3%< A-1 0%< A-2 0%< A-3	UA: 0 UA+NFTS: 23 3%<A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	1.5 ac (0.01%)	0 ac (0%)	0 ac (0%)	0 ac (0%)	0 ac (0%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	43.7 ac (0.4%)	41.9 ac (0.4%)	41.9 ac (0.4%)	41.9 ac (0.4%)	41.9 ac (0.4%)
	Miles of route in PAC and equivalent acres	UA: 0 UA+NFTS: 2.2 UA+NFTS: 4 ac	UA: 0 UA+NFTS: 2.2 UA+NFTS: 4 ac	UA: 0 UA+NFTS: 2.2 UA+NFTS: 4 ac	UA: 0 UA+NFTS: 2.2 UA+NFTS: 4 ac	UA: 0 UA+NFTS: 2.2 UA+NFTS: 4 ac
Great gray owl (Modeled habitat on the MDF: 74,820 ac)	NF habitat available for cross-country travel	74,820 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 39.5 UA+NFTS: 256	UA: 9.0 UA+NFTS: 226 12%< A-1	UA: 0 UA+NFTS: 217 15%<A-1 4%< A-2	UA 8.2 UA+NFTS: 225 12%< A-1 0.3%<A-2	UA: 9.0 UA+NFTS: 226 12%< A-1

Species	Metric	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
					4%> A-3	
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	71.9 ac (0.1%)	16.4 ac (0.02%)	0 ac (0%)	14.9 ac (0.02%)	16.4 ac (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	465.9 ac (0.6%)	411.3 ac (0.5%)	394.9 ac (0.5%)	409.5 ac (0.5%)	411.3 ac (0.5%)
Marten (Modeled habitat on the MDF: 31,520 ac)	MDF habitat available for cross-country travel	31,520 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 16.5 UA+NFTS: 120	UA: 8.4 UA+NFTS: 112 7%< A-1	UA: 0 UA+NFTS: 104 14%< A-1 7%< A-2	UA: 7.3 UA+NFTS: 111 8%< A-1 1%< A-2 7%> A-3	UA: 8.4 UA+NFTS: 112 7%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	30.0 ac (0.1%)	15.3 ac (0.05%)	0 ac (0%)	13.3 ac (0.04%)	15.3 ac (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	218.4 ac (0.7%)	203.8 ac (0.6%)	189.3 ac (0.6%)	207.0 ac (0.6%)	203.8 ac (0.6%)
Sooty grouse (Modeled habitat on the MDF: 439,280 ac)	NF habitat available for cross-country travel	418,500 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 136.0 UA+NFTS: 1,886	UA: 116.0 UA+NFTS: 1,866 1%< A-1	UA: 0 UA+NFTS: 1,750 7%< A-1 6%< A-2	UA: 95.9 UA+NFTS: 1,845 2%< A-1 1%< A-2 5%> A-3	UA: 116.0 UA+NFTS: 1,866 1%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	247.5 ac (0.06%)	211.1 ac (0.05%)	0 ac (0%)	174.5 ac (0.04%)	211.1 ac (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	3,432 ac (0.8%)	3,396 ac (0.8%)	3,185 ac (0.7%)	3,358 ac (0.8%)	3,396 ac (0.8%)
Northern flying squirrel (Modeled habitat on the MDF: 73,740 ac)	NF habitat available for cross-country travel	63,138 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 25.9 UA+NFTS: 212	UA: 6.6 UA+NFTS: 193	UA: 0 UA+NFTS: 186	UA: 5.5 UA+NFTS: 192	UA: 6.6 UA+NFTS: 193

Species	Metric	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
			9%< A-1	12%< A-1 3%< A-2	10%< A-1 0.06%<A-2 3%>A-3	9%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	47.1 ac (0.06%)	12.0 ac (0.02%)	0 ac (0%)	10.0 ac (0.01%)	12.0 ac (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	385.8 ac (0.5%)	351.3 ac (0.5%)	338.5% (0.5%)	349.4 ac (0.5%)	351.3 ac (0.5%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Threatened and Endangered Species Determinations

Northern Spotted Owl
In accordance with the Endangered Species Act of 1973, as amended, a Biological Evaluation and Assessment for this species was prepared for the Modoc National Forest Motorized Travel Management Project and is hereby incorporated by reference. The analysis concludes minor impacts from the limited cross-country travel and the approximately 0.01 percent of modeled habitat from the addition of routs to the NFTS. Therefore, the Biological Evaluation and Assessment made a determination that the Modoc Travel Management Project would have no effects on northern spotted owls.

Sensitive Species Determinations

California Spotted Owl
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

The Modoc Travel Management Project Alternative 1 may affect individual California spotted owls as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2-5 would have no impacts as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS within California spotted owl habitat. Alternatives 2-5 would therefore have no effects on California spotted owls or their habitats. Thus, it was the biologist's determination that the Modoc Travel Management Project Alternatives 2-5 would not affect California spotted owls or their habitat.

Northern Goshawk
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

The Modoc Travel Management Project Alternative 1 may affect individual northern goshawks as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2, 4, and 5 would prohibit cross-country motorized vehicle travel but would add mileage (30-35 miles within habitat) to the NFTS. Because Alternatives 2, 4, and 5 add mileage to the NFTS there may be some disturbance effects to individual goshawks but the quantity is small and discountable. Alternative 3 would have no

impacts as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS within northern goshawk habitat. Alternative 3 would therefore have no effects on northern goshawks or their habitats. Thus was the biologist's determination that the Modoc Travel Management Project Alternatives 1, 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 northern goshawk. It was also the biologist's determination that Alternative 3 would not affect northern goshawks or their habitat.

Great Gray Owl
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

It does not appear that cross-country travel would directly affect great gray owls. Due to the lack of confirmed nesting, and the very low level of primary OHV use, it appears unlikely that great gray owls would be nesting at a time and place affected by cross-country travel. Disturbance would appear to be unlikely due to the low densities of great gray owls. Considering the low density of great gray owls, the limited opportunities for disturbance and low quantity of habitat impacts from unauthorized routes (38.5 miles in Alternative 1; or 70 equivalent acres; or .09% of modeled habitat) it appears that there would be no effects to great gray owl populations sufficient to contribute to a trend toward listing or impact viability of the species. Alternatives 2, 3, 4, and 5 would have less effect due to the prohibition of cross-country motorized travel and the fewer or no routes added to the NFTS. In essence, the potential for effects to great gray owls is so low and discountable that it is essentially the same as no effect for any of the alternatives in this project. Given the lack of direct and indirect effects, there are no effects to aggregate with other trends affecting, and impacts occurring to great gray owls and their habitats. Therefore there would be no cumulative effects on great gray owls or their habitat. Thus the it was the wildlife biologist's determination that the Modoc Travel Management project would not affect great gray owls or their habitat.

Marten
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

The Modoc Travel Management Project Alternative 1 may affect individual marten as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2-5 would have limited impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and less than 15 acres of additional routes would be added to the NFTS within marten habitat. These 15 acres represent approximately 0.05 percent of the modeled habitat for marten on the Modoc National Forest. Alternatives 2, 3, 4 and 5 would therefore have extremely limited effects on marten that are imperceptible and discountable and no effects on their habitats. Thus it was the biologist's determination that the Modoc Travel Management Project Alternative 1 may affect individuals but is not likely to result in a trend toward Federal listing and that Alternatives 2, 3, 4 and 5 would not affect marten or their habitat.

Wide-Ranging Carnivores: Affected Environment

Focal Species Within the Group: Black Bear

This species group is not associated with any one type of habitat, but is associated with a wide variety of conditions. These species include the Forest Service "Sensitive" species wolverine and Sierra Nevada red fox. The wolverine appears to have been absent from northern California for an

extended time (Aubrey et al. 2007, Schwartz et al. 2007). Recently, a wolverine was observed on the Tahoe National Forest. Preliminary genetic information gathered at the observation area seems to indicate a single individual genetically similar to individuals in Idaho (USFS 2008b). The Sierra Nevada red fox is also a rare species with a disjunct limited distribution (Perrine 2005, Zielinski et al. 2005). There are no known observations from the Modoc National Forest in the last 20 years. Currently, the closest known population is located in the vicinity of Lassen Volcanic National Park, approximately 25 miles southwest of the closest portion of the Modoc NF. Because of their scarcity and the paucity of reliable observational data, both wolverine and red fox are presumed absent and are not suitable for this analysis. Wolverine and Sierra Nevada red fox are not considered further.

Marten have been observed on the Forest and also can be considered a wide-ranging carnivore. However, their habitat requirements align more closely with the species in the late-successional group; therefore, marten are discussed in the Late-Successional species group.

Other wide-ranging carnivores that do occur within the Forest are black bears, mountain lions, and bobcats. All three of these species use a variety of habitat types (Zeiner 1990). Black bears are omnivorous (Zeiner 1990); mountain lions are primarily carnivorous and focus their diet on deer (Zeiner 1990); bobcats are also carnivorous but generally take smaller prey than deer, such as rabbits and rodents. Bobcats may consume fruits and grass (Zeiner 1990). There are no specific guidelines for managing black bears, mountain lions, or bobcats on the Modoc National Forest. Black bears were selected as the focal species for this group because they are present on the Forest, and their omnivorous diet does not tie their population fluctuations closely to another species of vertebrate.

Table 3-96 displays the CWHR vegetation type, size and stage classes that provide a cumulative habitat suitability value of at least 0.75 in the CWHR program. The reader should see the late-successional species section for information on the use of the CWHR suitability to determine suitable habitat. The acres of modeled habitat on the Modoc National Forest for the focal species in this group are also displayed.

Table 3-96. For the Wide-Ranging Carnivore Group, California Wildlife Habitat Relationship Stages Considered Suitable, and the Acres of Potential Habitat Occurring on the Modoc National Forest

Species	Habitat (CWHR) Suitability >0.75	Acres of habitat on National Forest
Black bear	ASP: 4S, 5S, 5M EPN: 4S, 5S, 5M JPN: 4S, 5S, 5M LPN: 4S, 5S, 5M MHW: 4S, 5S, 5M, 6 MRI: 4S, 4P, 5S, 5P, 5M, 6 PPN: 4S, 5S, 5M RFR: 4M SMC: 4S, 5S, 5M, 6 SCN: 4M WFR: 4S, 5S, 5M, 6	60,840

*Rounded to nearest 10 acres.

Wide-Ranging Carnivores Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of Continuation of Cross-Country Motorized Vehicle Travel

Table 3-97 displays the acres of habitat potentially available for use under this alternative for the focal species (black bear) within this group. Table 3-98 also displays the route miles available for use within habitat on the Modoc National Forest. The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-96, above. Although occasional direct mortality may occur from off-road collisions with vehicles, this appears to be an exceedingly rare event and has not been reported to occur within the Forest. It is possible that such an occurrence could occur under this alternative; however, given existing use and mobility of the species, such occurrences would remain rare and inconsequential to species population dynamics. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

A larger impact, both in the short term, and the long term, would be the disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to the focal species within this group. Cross-country travel could impact black bear food sources such as berries and invertebrates by changing soil conditions and trampling of plants, down logs or insect nests. These impacts are infrequent because of the low quantity of cross-country travel on the Forest.

Table 3-97. Alternative 1: The Potential Habitat for the Wide-Ranging Carnivore Group that Could be Impacted by Cross-Country, off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Black Bear	53,550	88.0%

*Rounded to nearest 10 acres.

Under this alternative, cross-country travel, which includes motorized use on 491 miles of unauthorized routes, would continue. Table 3-98 displays the unauthorized route mileage within habitats used by the focal species in this group. This alternative contains approximately 25 miles of existing unauthorized routes within modeled black bear habitat. This is approximately 11 percent more miles available for use than in the alternative with the lowest route mileage (Alternative 3). Although black bears will habituate to human presence (as every visitor to Yosemite knows), bears appear to be generally wary and susceptible to disturbance on the Modoc National Forest. This may be because human contact is infrequent in the local area, and possibly due to hunting pressure. Disturbance to black bear activities could occur along routes causing increased energy expenditures, lowered fat reserves, and ultimately lower reproduction. However, the amount of disturbance is limited because of the low volume of traffic that occurs on the unauthorized routes.

Table 3-98 Alternative 1: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles of Unauthorized Route within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat On NF
Black bear	24.7	253.8

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any particular route. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the wide-ranging carnivore group would aggregate with the effects outlined above in table 3-84. Those effects include 2,500 acres of sawlog removal, 3,000 acres of wood removal for fiber, 6,000 acres of mechanical treatment of vegetation, and 4,000 acres of prescribed fire annually on the Modoc National Forest. This is about 15,500 acres per year of vegetation treatments of varying intensity. There is also ongoing timber harvest and Forest regeneration on private lands within and adjacent to the proclaimed boundary of the Forest, as well as stochastic events such as wildfires and catastrophic insect outbreaks. Vegetation management and prescribed fire has the potential to impact species in this group by removing important habitat elements such as downed logs, snags, hollow trees and mature shrubs that are used for cover, or that are important to the life histories of the prey of wide-ranging carnivores. Generally, this group of species is affected negatively by extensive mechanical and prescribed fire treatments that reduce these important habitat elements; although some elements, such as snags and down logs, can be increased by the application of prescribed fire.

This alternative would continue cross-country travel which includes use of unauthorized routes. Therefore the impacts to species in this group, discussed above, would continue and aggregate with effects from vegetation management occurring elsewhere. Because the impacts from cross-country travel are estimated to be low, the continuation of cross-country travel under this alternative would add only minor impacts to negative impacts from vegetation management activities. The continuation of motorized use on unauthorized routes would also continue to provide negative impacts. However, the impact of the unauthorized routes would be small. The unauthorized route mileage can be converted to equivalent-acres by assuming each mile of route is approximately 1.8 acres based on a 15-foot wide impact. This means that the 25 miles of unauthorized route in black bear habitat, in this alternative, is equivalent to approximately 45 acres, or about 0.3 percent, of the area impacted annually by various mechanical and prescribed fire vegetation treatments or about 0.07 percent of the modeled black bear habitat. Furthermore, the unauthorized routes do not constitute a change to habitats, but rather are an existing condition whose vegetation change impact has already occurred and whose conditions would continue into the future. Thus, an acre of unauthorized route has less impact than an acre of new vegetation manipulation. Overall, vehicle-related impacts from this alternative appear to aggregate with other impacts occurring on the landscape. However, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 1 are imperceptible and discountable, and would not change existing trends to species habitat or distribution.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.The potential impacts discussed under Alternative 1 from cross-country travel would not occur. Black bears would not be affected by disturbance, collision or indirect impacts to prey or food resources due to off-road vehicle use.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of route to the NFTS. Table 3-99 (below) displays the route mileage in this alternative within habitats used by the focal species for this group. Alternative 2 would have approximately four percent fewer miles of route available for public use as compared to Alternative 1 and 6 percent more route mileage added to the NFTS than Alternative 3. There are approximately 16 miles of unauthorized routes in this alternative that would slowly regain characteristics of suitable habitat for black bears. Down logs would accumulate, shrub species would re-occupy the sites, and eventually the sites would become suitable for bear foraging. The 16 route miles equates to approximately 27 acres of potential habitat. This is less than 0.05 percent of the modeled black bear habitat. The scope of impact is so small as to be undetectable.

Table 3-99. Alternative 2: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Black bear	15.7	244.8

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, they would have little impact especially since bears are hibernating during much of this period. This is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, no impacts are expected to black bears from changes in existing season of use. Other wide-ranging carnivores may benefit from reduced vehicle travel through reduced snow compaction and reduced disturbance. Snow compaction may allow the movement of some species such as mountain lions and coyotes into areas otherwise inaccessible to these species during periods when snow is deep.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

As in Alternative 1, the effects of Alternative 2 on the wide-ranging carnivore group would aggregate with the effects outlined above in table 3-84 Alternative 2 would discontinue cross-country travel and add approximately 339 miles of route to the NFTS. Impacts to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere because of the additional 339 miles of unauthorized route added to the NFTS. However, the impact of additional routes added to the NFTS would be small. The additional NFTS road mileage, when converted to equivalent-acres, would be equivalent to approximately

29 acres or about 0.2 percent of the area potentially impacted annually by vegetation management and prescribed fire or approximately 0.05% of the modeled habitat. These NFTS additions are partially offset at the 20-year, long-term point by the amount of unauthorized routes in this alternative that have begun to move towards habitat for wide-ranging carnivore species. For black bears, this means an equivalent of approximately nine acres (or an additional 0.01% of the existing modeled habitat) would be moving towards suitability. These acres, 20 years after implementation, would have some attributes of suitable habitat including maturing shrubs and accumulating down logs. Therefore, in this alternative, the impacts of road system use are somewhat reduced compared to the impacts of Alternative 1, and countered additionally by the cessation of impacts from cross-country travel. However, these impacts are still small compared to the impacts of ongoing vegetation treatments on the Forest and adjacent lands. Overall, impacts from this alternative appear to be so minor that when aggregated with other impacts occurring on the landscape, they would be imperceptible and discountable.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel, including continued use of approximately 491 miles of unauthorized routes. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling or indirect impacts to prey or food resources.

Table 3-100. Alternative 3: The Potential Habitat for the Wide-Ranging Carnivore Group that Could be Impacted by Cross-Country, off-Road Travel

Species	Acres of Habitat*
Black Bear	10,220

This alternative would not add any unauthorized routes to the NFTS. However the linear effects of roads would still occur on the 4,580 miles of NFTS. Table 3-101 (below) displays the route mileage within habitats used by the focal species in this group.

Table 3-101. Alternative 3: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Black bear	0	229.1

Alternative 3 would have approximately 11 percent less route mileage as compared to Alternative 1, and six percent less route mileage than Alternatives 2, 4, and 5. Disturbance would not occur along unauthorized routes as cross-country travel would not occur. The approximately 24 miles of unauthorized routes that are within habitat and where motorized use would no longer occur under this alternative, would slowly regain characteristics of suitable habitat for black bears. Down logs would accumulate, shrub species would re-occupy the sites and eventually the sites would become suitable for bear foraging. This impact is limited in scope because of the limited amount of unauthorized routes within black bear habitat. The 24 miles equates to approximately 45 acres

of potential habitat. This is less than 0.08 percent of the modeled black bear habitat. The scope of impact would be so small as to be undetectable in impact.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

Cumulative Effects

The effects of Alternative 3 on the wide-ranging carnivore group would aggregate with the effects outlined above in table 3-84 and discussed in Alternative 1. Alternative 3 would discontinue cross-country travel, which would include approximately 491 miles of unauthorized routes that would no longer be available for motorized use. The impacts to species in this group from the prohibition of cross-country travel may partially counter some of the effects from vegetation management occurring elsewhere. However, the scope and intensity of the impact from ending cross-country travel would be small. For example, the 25 miles of unauthorized route in black bear habitat in this alternative is equivalent to approximately 45 acres, or less than 0.3 percent of the area impacted annually on the Modoc NF by vegetation management and prescribed fire. The positive effects from prohibiting cross-country travel would begin to show at the 20-year, long-term point as unauthorized routes begin to move towards habitat for wide-ranging carnivores. For black bears, this means an equivalent of approximately 45 acres would be moving toward suitability. However, the low rate and intensity of impacts from reduced route use and the cessation of cross-country travel do not appear to be sufficient to counter other impacts that are occurring from vegetation management and stochastic events such as insect outbreaks and stand-replacing fires. Overall, when aggregated with other impacts to the wide-ranging carnivore group, impacts from this alternative appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling or indirect impacts to prey or food resources from vehicle travel off the NFTS.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-102 displays the added routes within habitats used by the focal species in this group. Alternative 4 would have approximately four percent fewer miles of routes as compared to Alternative 1 and one percent fewer unauthorized route additions within habitat than Alternatives 2 and 5. Disturbance would not occur along the 10.5 miles of unauthorized routes included in the prohibition of cross-country travel. The approximately 10.5 miles of unauthorized routes under this alternative would slowly regain characteristics of suitable habitat for black bears. Down logs would accumulate, shrub species would re-occupy the sites, and eventually the sites would become suitable for bear foraging. This impact is limited in scope because of the limited amount

of unauthorized routes in black bear habitat not added to the NFTS. The 10.5 miles of routes equates to approximately 19 acres of potential habitat. This is less than 0.04 percent of the modeled black bear habitat. Disturbance could still occur on the 14 miles of unauthorized route that would be added to the NFTS. The routes added to the NFTS would equate to approximately 26 acres. This additional disturbance area is so small in comparison to existing habitat as to be insignificant. When combined with the sporadic and limited nature of disturbance, the scope of impact is so small as to be undetectable in impact.

Table 3-102. Alternative 4: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Black bear	14.2	243.3

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of road. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, they would have little impact, especially since bears are hibernating during much of this time period. This is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, no impacts are expected to black bears from changes in existing season of use. Other wide-ranging carnivores may benefit from reduced vehicle travel through reduced snow compaction and reduced disturbance.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. There would be no vehicle class changes proposed in this alternative. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 4 on the wide-ranging carnivore group would aggregate with the effects outlined above in **Error! Reference source not found.**table 3-84. This alternative would discontinue cross-country travel and add 286 miles of unauthorized routes to the NFTS. Impacts from the added routes to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere. However, the impact of additional routes added to the NFTS would be small. For example, the 14 miles of unauthorized route in black bear habitat, added to the NFTS in this alternative, is equivalent to approximately 26 acres, or about 0.2 percent of the area impacted annually by vegetation management and prescribed fire or about 0.04 percent of the modeled black bear habitat. These NFTS additions are partially offset at the 20-year, long-term point by the prohibition of cross-country travel that includes unauthorized routes that would begin to move towards habitat for wide-ranging carnivore species. For black bears, this means an equivalent of approximately 16 acres would be moving towards suitability. These acres, 20 years after implementation, would have some attributes of suitable habitat including maturing shrubs and accumulating down logs. Therefore, in this alternative the impacts of road system use are countered by the cessation of impacts from cross-country travel and somewhat reduced by versus the impacts of Alternative 1. However, these impacts are still small compared to the impacts of ongoing vegetation treatments on the Forest and adjacent lands. Overall, impacts from this alternative appear to be so minor that when aggregated with other impacts occurring on the landscape, they are imperceptible and discountable.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-103 displays the route mileage to be added for use within habitats used by the focal species in this group. The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-96, above. This alternative has the same physical impact to habitat as Alternative 2 because there is no difference in the routes system available for use.

Table 3-103. Alternative 5: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles of Routes Added to the NFTS within Habitat On NF	Combined Miles of NFTS and Added Routes within Habitat On NF
Black bear	15.7	244.8

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, they would have little impact, especially since bears are hibernating during much of this time period. This is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, no impacts are expected to black bears from changes in existing season of use. Other wide-ranging carnivores may benefit from reduced vehicle travel through reduced snow compaction and reduced disturbance. Therefore, the impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use, there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to wide-ranging carnivores as compared to Alternative 2. This alternative has the same cumulative effects as Alternative 2, which are imperceptible and discountable.

Comparison of Effects on Wide-Ranging Carnivores, by Alternative

This section provides tabular comparisons of the five alternatives. Table 3-104 displays a comparison of habitat-change metrics for the focal species in the wide-ranging carnivore group.

In general, Alternative 1 shows the most impacts to wide-ranging carnivores and Alternative 3 the least.

Table 3-104. Comparison of Selected Effects, by Alternative

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Black Bear (Modeled habitat on the MDF: 60,840 ac)	NF habitat available for cross-country travel	53,550 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA*: 24.7 mi UA+NFTS: 254	UA: 15.7 UA+NFTS: 245 4%< A-1	UA: 0 UA+NFTS: 229 10%< A-1 6%< A-2	UA: 14.2 UA+NFTS: 243 4%< A-1 0.6%<A-2 6%> A-3	UA: 15.7 UA+NFTS: 245
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	45.0 ac (0.07%)	28.6 ac (0.05%)	0 ac (0%)	25.8 ac (0.04%)	28.6 ac (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	462.3 ac (0.8%)	445.9 ac (0.7%)	416.8 ac (0.7%)	442.3 ac (0.7%)	445.9 ac (0.7%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Ungulate Group: Affected Environment

Focal Species Within the Group: Elk, Mule Deer

This species group is not associated with any one type of habitat, but is associated with a wide variety of rangeland and brush-field habitats. Ungulate species that occur on the Modoc are pronghorn, wild horses, deer, elk, and bighorn sheep. Pronghorn are considered with the sage-steppe species group. The bighorn sheep appears to be absent from the Modoc National Forest. Individuals are occasionally observed in the Warner Mountains, but these individuals are thought to have dispersed from the Hays Canyon Range or other locations along the California-Nevada border (Flores, 2008). Disease transmission and epizootics (an outbreak of disease affecting many animals of one kind at the same time) appear to be the primary factors affecting bighorn distribution in the Warner Mountains (Flores, 2008). Wild horses occur on the Modoc, particularly on the Devil's Garden and Doublehead Ranger Districts. Wild horses are managed in the Modoc LRMP as livestock, with a goal to maintain a Forest population between 275 and 335 individuals (MDF LRMP, 1991. pg. 4-19).

Elk are a relatively recent arrival on the Modoc National Forest (Yamagiwa 2008). Elk distribution on the Forest is somewhat limited to the western portion of the Forest and the northern portion of the Warner Mountains (Yamagiwa 2008). Elk diets vary greatly geographically (Zeiner et al., 1991) but often contain a large herbaceous component. Elk are considered a focal species for the ungulate group.

Deer are widely distributed on the Forest. Formerly the deer herds were much larger (USFS 1991). The estimated population in 1952 was 100,000 individuals in northeastern California. By 2004, the population estimate had dropped to 16,000 individuals (Modoc MIS report 2007). Mule deer are also considered a focal species for this group.

This species group is associated with vegetation types that contain characteristics of early successional stages. These characteristics include no or smaller trees and shrubs for a given growing site, relatively low canopy closure, and limited amounts of decadence in the form of decay or deformity. Sites have more forbs and young shrubs than older or more Forested vegetation types. Table 3-105 displays the CWHR vegetation type, size and stage classes that provide a cumulative habitat suitability value of at least 0.75 in the CWHR program. For this analysis, habitat conditions are considered as "suitable" if a particular size and stage class provides a combined rating of at least 0.75 for the three components of cover, feeding, and reproduction. The high mobility of the species in this group means a much wider array of habitats may actually contain these species at any given time as they transit across or through less important or less desirable habitats. The habitats modeled here thus represent key habitats required for healthy herds. This section therefore refers to the modeled habitats as "key" habitats.

A zone of route influence was calculated to address edge effects, habitat impacts and other human impacts associated with routes. Routes were buffered a distance that varied with each maintenance level of route, to model the impacts of different amounts of route use. Route buffer distances were obtained from Gaines et al. (2003) and cross-walked to maintenance level in lieu of data pertaining to actual vehicle use for each road segment. The buffer amount used for each maintenance level is as follows:

Maintenance Levels 1 and 0	300 meters
Maintenance Level 2	900 meters
Maintenance Level 3	1000 meters
Maintenance Levels 4 and 5	1,300 meters

The area within the zone of influence was subtracted from the quantity of key habitat available within the 6th order watershed (HUC) to determine the amount of habitat outside of the influence of the road system. The proportion of habitat outside the zone of influence to the amount of habitat in the watershed resulted in a habitat disturbance index. A ranking was assigned that follows the rankings developed by Gaines et al. (2003). The level of influence for each ranking is as follows:

- Less than 50 percent of ungulate key habitat outside the zone of influence is rated a high level of human influence
- Fifty to 70 percent of ungulate key habitat outside the zone of influence is rated a moderate level of human influence
- More than 70 percent of ungulate key habitat outside the zone of influence is rated a low level of human influence

Calculation of the habitat influence rankings resulted in the same rankings between each of the alternatives. All five alternatives had the same number (five) of watersheds that were rated moderate and the same number of watersheds (116) that were rated high. One of the watersheds was rated as low human influence for ungulates.

Table 3-105. For the Ungulate Group, California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
E k	BBR: 2P, 2M, 3P, 4S, 4P	153,550

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
	FEW: 1 (ALL), 2 (ALL) MHW: 1, 2S, 2P, 2M, 3S, 3P, 4S, 4P SGB: 2P, 2M, 3P, 4S, 4P SMC: 1, 2S, 2P, 2M, 3S, 3P, 4S, 4P WTM: 1 (ALL), 2 (ALL) WFR: 1, 2 (ALL), 3S, 3P, 4S, 4P	
Mule deer	ASP: 2S, SP, 3P, 3S, 4M CPC: 2S, 2P, 3S, 3P, 3M, 4P EPN: 2S, 2P, 3P, 3M JPN: 2S, 2P, 3S, 3P, 3M JUN: 2P, 3P, 4P, 5P LPN: 2S, 2P, 3S, 3P, 3M MCP: 2P, 2M, 2D, 3P, 3M MHW: 2S, 2P, 3S, 3P, 3M, 4M MRI: 2S, 2P, 3S, 3P, 3M, 4M PPN: 2S, 2P, 3S, 3P, 3M RFR: 2S, 2P, 3S, 3P, 3M, SMC: 2S, 2P, 3S, 3P, 3M, 4M SCN: 2S, SP, 3S, 3P, 3M WFR: 2S, 2P, 3S, 3P, 3M, 4M	227,440

Ungulate Group: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

The California WHR sizes and stages that were considered as “suitable” are listed for each species in Table 3-105, above. Direct mortality may occur from collisions with vehicles; however, collisions with vehicles operating off road appears to be an exceedingly rare event and has not been reported to occur within the Forest. It is possible that such an occurrence could occur under this alternative; however, given existing use and mobility of the species in this group, such occurrences would remain rare and inconsequential to species population dynamics. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

A larger impact, both in the short-term, and the long-term, would be the disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to the species within this group. Table 3-106 displays the number of acres of habitat potentially available for use under this alternative for the focal species (elk, mule deer) within this group. Cross-country travel has the potential to trample or masticate browse plants and to impact soil conditions, leading to other changes in vegetation that may reduce hiding cover for juveniles or adults. This impact appears to be very limited because of the low rate of cross-country travel.

Table 3-106. Alternative 1: Potential Key Habitat for the Ungulate Group That Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of Key Habitat*	Percent of all habitat on MDF open to cross-country travel
Elk	153,550	100.0%
Mule Deer	227,440	100.0%

*Acres rounded to the nearest 10.

Cross-country travel includes the continuation of use on unauthorized routes. Table 3-107 displays the route mileage within habitats used by the focal species in this group. In this alternative, cross-country travel would continue along with use of the existing roads on the NFTS. This alternative would have the most impact on the ungulate group from disturbance associated with vehicles using routes. Deer and elk would have 10 percent and 8 percent more mileage in key habitat than the alternative with no added unauthorized routes (Alternative 3). As with the other alternatives 98.6 percent of the suitable acres (on a watershed basis) are rated as having a "High" level of habitat influenced by the effects of routes. In studies reported by Gaines et al. (2003), elk moved an average distance of 800 meters and deer moved 400 meters when displaced by human activity (Gaines et al. 2003). These types of movements can be an impact on reproductive success as seen in the reduced reproductive success reported when disturbance occurred in elk caving areas (Phillips and Alldredge 2000 as reported in Gaines et al. 2003). The high level of habitat influence in almost all of the watersheds indicates that impacts to reproductive success from the existing route system (NFTS and all unauthorized routes) may be occurring. Hypothetically, this may be contributing to the long-term decline in deer numbers.

Table 3-107. Alternative 1: Miles of Routes Within Potential key Habitat for the Ungulate Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes Within Habitat on NF
Elk	40	471
Mule Deer	78	805

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any particular route. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the ungulate group would aggregate with the effects outlined above in table 3-84. Those effects include 4,000 acres of prescribed fire, 6,000 acres of mechanical fuel treatments, approximately 1,500 acres of treatments to improve sage-steppe, and 122,500 AUMs of grazing annually on the Modoc National Forest. This is about 11,500 acres per year of vegetation treatments, of varying intensity, potentially affecting ungulate forage and cover. There is also ongoing juniper removal and grazing on private lands within and adjacent to the proclaimed boundary of the Forest as well as stochastic events such as wildfires and catastrophic insect outbreaks. Vegetation treatments and grazing have the potential to impact species in this group by removing forage, impeding the growth of forage, or altering vegetative structure that provides cover. Past trends for this group have generally been negative for deer and somewhat positive for elk.

This alternative would continue cross-country travel which would include continued use of unauthorized routes; therefore, impacts to species in this group from cross-country travel would continue and aggregate with effects from vegetation management occurring elsewhere. Because

the impacts from cross-country travel are estimated to be low, the continuation of cross-country travel under this alternative would add only small negative impacts to the impacts from vegetation management activities. The impact of unauthorized routes available to public use is small. For example, the 38 miles of unauthorized routes in elk habitat, available to public use in this alternative, is equivalent to approximately 69 acres or about 0.6 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments or about 0.05 percent of the modeled elk habitat. The 78 miles of unauthorized routes in mule deer habitat, available to public use in this alternative, is equivalent to approximately 142 acres or about 1.2 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments or about 0.06 percent of the modeled deer habitat. Furthermore, the unauthorized routes do not constitute a change to habitats, but an existing condition whose vegetation change impact has already occurred and whose conditions would continue into the future. Thus, the unauthorized routes have less impact than an acre of new vegetation manipulation. Overall, impacts from this alternative appear to aggregate with other impacts occurring on the landscape; however, compared to the scope and intensity of the other impacts occurring on the landscape. The impacts from Alternative 1 of continuing public cross-country travel are very small. The use of 78 miles o unauthorized route within habitat would impact less than 0.06% of the mule deer habitat and less than 0.05% of the elk habitat on the Modoc National Forest. All of the alternatives would have the same number of HUCs with a rating of “high” indicating that the inclusion of all or none of the unauthorized routes would change the general level of disturbance. These impacts appear to be insufficient to change existing trends to species population size, habitat or distribution.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long term (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, indirect impacts to food resources, or impacts to cover.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of route to the NFTS. Table 3-108 displays the route mileage within habitats used by the focal species in this group.

This alternative would not add approximately 11 miles of currently unauthorized routes within elk habitat that would continue to receive motorized use under continued cross-country travel in Alternative 1. This alternative would add 27 miles (about six percent) more routes to the NFTS than Alternative 3, and add about 1 percent more routes (or two miles) than Alternative 4 would to the NFTS. The route system would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for elk due to route-induced disturbance than Alternatives 3 and 4.

Table 3-108. Alternative 2: Miles of Routes within Potential key Habitat for the Ungulate Group

Species	Miles Of Routes Added To The Nfts Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Elk	27 miles	460 miles

Species	Miles Of Routes Added To The Nfts Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Mule Deer	57 miles	784 miles

The amount of routes added to the NFTS within mule deer habitat is less by three percent (approximately 21 miles) than the unauthorized routes that would continue to receie motorized use under continued cross-country travel in Alternative 1. This alternative would contain 10 percent more added routes (57 miles) than Alternative 3, and about one percent more added route mileage than Alternative 4. The route system would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for mule deer due to route-induced disturbance than Alternatives 3 and 4. Alternative 2 would result in less disturbance than Alternative 1 and the same amount as Alternative 5.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of road. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, disturbance would be reduced during the period of high-energy use for temperature regulation and fetal growth. However, this is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, the impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on the ungulate group. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel, but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 2 on the ungulate group would aggregate with the effects outlined above in Table 3-84. This alternative would prohibit cross-country travel which includes approximately 152 miles of unauthorized routes in this species habitat. Some impacts to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere because of the additional 339 miles of unauthorized route added to the NFTS. However, the impact of additional routes added to the NFTS is small. The roadways can be converted to equivalent-acres by assuming each mile of route is approximately 1.8 acres based on a 15-foot wide impact. This means that the 27 miles of unauthorized route in elk habitat, added to the NFTS in this alternative, is equivalent to approximately 49 acres, or about 0.4 percent of the area impacted annually by vegetation management and prescribed fire or about 0.03 percent of the modeled elk habitat. For mule deer, the 57 miles of unauthorized route, added to the NFTS in this alternative, is equivalent to approximately 104 acres, or about 0.9 percent of the area impacted annually by these treatments or about 0.05% of the modeled mule deer habitat. These NFTS additions are offset at the 20-year, long-term point by the prohibition of cross-country travel which includes unauthorized routes that have begun to move towards habitat for wide-ranging carnivore species. For elk, this means an equivalent of approximately 20 acres are moving towards suitability; for mule deer approximately 38 acres are moving towards suitability. These acres, 20 years after implementation, would have many attributes of suitable habitat, including maturing shrubs and accumulating cover. Therefore, in this alternative the impacts of road system use are somewhat reduced versus the impacts of Alternative 1, and reduced additionally by the cessation of impacts from cross-country travel.

As with the other alternatives, 98.6 percent of the suitable acres (on a watershed basis) are rated as having a “High” level of habitat influenced by the effects of routes. The high level of habitat

influence in almost all of the watersheds indicates that impacts to reproductive success from the existing route system may be occurring. The impacts of the small percentage differences between this alternative and the other alternatives may be essentially undetectable against the background fluctuations of variable traffic quantities, weather and stochastic events such as fires.

The impacts of adding routes to the NFTS are small compared to the impacts of ongoing vegetation treatments on the Forest and adjacent lands and the potential impacts of the existing NFTS system. Overall, impacts from this alternative appear to be so minor that when aggregated with other conditions and impacts occurring on the landscape, that they would be imperceptible and discountable.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling or indirect impacts to cover or food resources.

This alternative would not add any unauthorized routes to the NFTS. However the linear effects of roads would still occur on the 4,580 miles of NFTS roads open for use. Table 3-109 displays the amount of route mileage within habitats used by the focal species in this group.

Table 3-109. Alternative 3: Miles of Routes Within Potential Habitat for the Ungulate Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of Nfts and Added Routes within Habitat on NF
Elk	0 miles	433 miles
Mule Deer	0 miles	727 miles

This alternative would have the least amount of route mileage within elk habitat at approximately 433 miles. This would be a reduction of eight percent (approximately 38 miles) compared to the total routes available for public travel in Alternative 1. This alternative would add about six percent fewer routes in key habitat than Alternatives 2, 4 and 5. Alternative 3 would thus cause the least energy expenditure for elk due to route-induced disturbance of any of the alternatives. The amount of disturbance difference between Alternative 3 and the other alternatives would appear to be less than the variability in traffic on the road system (see the recreation discussion).

This alternative would have the least route mileage within mule deer habitat at approximately 727 miles. This is a reduction of 8 percent (approximately 38 miles) compared to the total in Alternative 1. This alternative would contain about 6 percent less mileage than Alternatives 2, 4 and 5. Alternative 2 would thus cause the least energy expenditure for elk due to route-induced disturbance of any of the alternatives. However, the variability in traffic on the road system, as well as background fluctuations in weather and stochastic events, renders these differences undetectable in population response.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

This alternative would not have seasonal closures and therefore would have no changes in season of use. There would be no effects to ungulates from this action under this alternative. This alternative would have no change to vehicle use class.

Cumulative Effects

The effects of Alternative 3 on the ungulate group would aggregate with the effects from other activities and factors outlined above in table 3-84. This alternative would prohibit cross-country travel which includes approximately 491 miles of unauthorized routes. The impacts to species in this group from the cross-country travel would cease and may partially counter some of the negative effects from vegetation management occurring elsewhere. However, the scope and intensity of the impact from ending cross-country travel is small. For example, by prohibiting cross-country travel, the 38 miles of unauthorized route in elk habitat, and the 78 miles in deer habitat, in this alternative are equivalent to approximately 69 acres for elk and 142 acres for mule deer of habitat moving toward suitability. These amounts are less than 0.6 percent and 1.2 percent, respectively, of the area impacted annually by vegetation management and prescribed fire. They are approximately 0.05% of the modeled elk habitat and 0.06% of the modeled deer habitat. The positive effects from not continuing cross-country travel, including use on the unauthorized routes, would begin to show at the 20-year long-term point as the unauthorized routes would be moving towards habitat for ungulates. For elk, this means an equivalent of approximately 69 acres would be moving toward suitability and 142 acres for mule deer would be improving. This would be approximately 0.05 percent of the modeled elk habitat and 0.06 percent of the modeled deer habitat. As with the other alternatives, 98.6 percent of the suitable acres (on a watershed basis) are rated as having a “High” level of habitat influenced by the effects of routes. The high level of habitat influence in almost all of the watersheds indicates that impacts to reproductive success from the existing route system may be occurring.

The limited scope and low intensity of the reduced impacts from cessation of unauthorized route use and the cessation of cross-country travel do not appear to be sufficient to counter other impacts that are occurring from vegetation management and stochastic events such as disease outbreaks and stand-replacing fires. Overall, when aggregated with other conditions and impacts to the ungulate group, impacts from this alternative appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The ungulate group would not be affected by disturbance, trampling or indirect impacts to prey or food resources.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-110 displays the amount of route mileage within habitats used by the focal species in this group.

Table 3-110. Alternative 4: Miles of Routes within Potential Habitat for the Ungulate Group

Species	Miles of Routes Added to the NFTS Within Habitat on NF	Combined Miles of NFTS and Added Routes Within Habitat on NF
Elk	26 miles	458 miles
Mule Deer	49 miles	775 miles

This alternative would reduce the amount of routes added to the NFTS within elk habitat by three percent (approximately 13 miles) compared to the total in Alternative 1. This Alternative would add two miles fewer routes than Alternatives 2 and 5, or less than one percent. Alternative 4 would have about 25 miles (about 6 percent) more routes added to the NFTS than Alternative 3. Alternative 4 would thus cause slightly higher energy expenditure for elk due to route-induced disturbance than Alternative 3, but less than Alternatives 1, 2 and 5.

The amount of routes added to the NFTS within mule deer habitat would decline by 4 percent (approximately 30 miles) in Alternative 4 as compared to the total in Alternative 1. This alternative would add 7 percent more route mileage (48 miles) to the NFTS than Alternative 3, and would add about 1 percent less route mileage to the NFTS than Alternatives 2 and 5. Alternative 4 would thus cause slightly higher energy expenditure for mule deer due to route-induced disturbance than Alternative 3 but less than Alternatives 1, 2 and 5.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, disturbance would be reduced during the period of high-energy use for temperature regulation and fetal growth. The impact of seasonal closures is expected to be minor to undetectable as considerable wintering occurs off the Modoc National Forest.

Changes to class of use are not expected to have any detectable impact on wildlife. Whether an auto, truck, or OHV is the source of disturbance, it is assumed to that the amount of disturbance is same for this analysis. There would be no change to vehicle class in this alternative. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 4 on the ungulate group would aggregate with the effects outlined above in **Error! Reference source not found.**3-103. This alternative would prohibit cross-country travel which would include the use of approximately 213 miles of unauthorized routes. Impacts to species in this group from the 286 miles of routes added to the NFTS would continue, and aggregate with effects from vegetation management occurring elsewhere. However, the impact of additional routes added to the NFTS is small. For example, the 25 miles of unauthorized route in elk habitat, added to the NFTS in this alternative, is equivalent to approximately 45 acres, or about 0.4 percent of the area impacted annually by vegetation management and prescribed fire or approximately 0.03% of modeled habitat. For mule deer, the 48 miles of unauthorized route, added to the NFTS in this alternative, is equivalent to approximately 87 acres, or about 0.7 percent of the area impacted annually by these treatments or about 0.04 percent of the modeled deer habitat. These NFTS additions are offset at the 20-year long-term point by the prohibition of cross-country travel, which includes the use of unauthorized routes that would have begun to move towards habitat for ungulate species. For elk, this means an equivalent of approximately 24 acres would be moving towards suitability; for mule deer approximately 55 acres would be moving towards suitability. Therefore, in this alternative, the impacts are somewhat reduced by the cessation of impacts from cross-country travel. However, these impacts are still small compared to the impacts of ongoing vegetation treatments on the

Forest and adjacent lands. As with the other alternatives, 98.6 percent of the suitable acres (on a watershed basis) are rated as having a "High" level of habitat influenced by the effects of routes. The high level of habitat influence in almost all of the watersheds indicates that impacts to reproductive success from the existing route system may be occurring.

Overall, impacts from this alternative appear to be so minor that when aggregated with other impacts occurring on the landscape, they are imperceptible and discountable.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-111 displays the amount of route mileage within habitats used by the focal species in this group. This alternative has the same physical impact to habitat as Alternative 2, as there is no difference in the routes mileage or arrangement. Thus, the effects of adding unauthorized routes to the NFTS are the same in Alternative 5 as in Alternative 2.

Table 3-111. Alternative 5: Miles of Routes within Potential Habitat for the Ungulate Group

Species	Miles of Routes Added to the NFTS Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Elk	27 miles	460 miles
Mule Deer	57 miles	784 miles

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of road. Effects would be the same as those for Alternative 2.

By allowing an additional 530 miles of mixed use there may be some additional vehicle travel on the NFTS, but there are no indications that the amount of use would be greater than the existing variation in total use. Whether an auto, truck, or OHV is the source of disturbance, it is assumed to that the amount of disturbance is same for this analysis. Thus, although more NFTS roads may be open for OHV use under this alternative, the total miles of road open for vehicle use is the same as Alternative 2. Changing the mix of use is not expected to have any additional impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to ungulate species as compared to Alternative 2. This alternative has the same cumulative effects as Alternative 2, which are imperceptible and discountable.

Comparison of effects on Ungulates by Alternative

This section provides tabular comparisons of the five alternatives. Table 3-112 displays a comparison of habitat change metrics for the focal species for the ungulate group. In general, Alternative 1 shows the most impacts to ungulate species and Alternative 3 the least.

Table 3-112. Comparison of Selected Effects, by Alternative

Species	Measure	Alt 1	Alt 2	Alt 3	Alt4	Alt5
E k (Modeled habitat on the MDF: 152,550)	NF habitat available for cross-country travel	150,100ac	0 acres	0 ac	0 ac	0 ac
	Miles of route in habitat	UA*: 38 mi UA+NFTS: 471	UA: 27 UA+NFTS: 460 2%< A-1	UA: 0 UA+NFTS: 433 8%< A-1 6%< A-2	UA: 25 UA+NFTS: 458 3%< A-1 0.4%<A-2 6%> A-3	UA: 27 UA+NFTS: 460
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	69.2 ac (0.05%)	49.1 ac (0.03%)	0 ac (0%)	45.5 ac (0.03%)	49.1 ac (0.03)%
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	857.2 ac	837.2 ac	788.1 ac	833.6 ac	49.1 ac
Mule Deer (Modeled habitat on the MDF: 227,440)	NF habitat available for cross-country travel	218,940	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 78 UA+NFTS: 805	UA: 57 UA+NFTS: 784 3%< A-1	UA: 0 UA+NFTS: 727 10%< A-1 7%< A-2	UA: 48 UA+NFTS: 775 4%< A-1 1%<A-2 7%> A-3	UA: 57 UA+NFTS: 784
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	142.0 ac (0.06%)	103.7 ac (0.05%)	0 ac (0%)	87.4 ac (0.04%)	103.7 ac (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	1,465 ac (0.6%)	1,427 ac (0.6%)	1,323 ac (0.6%)	1,411 ac (0.6%)	1,427 ac (0.6%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Riparian Group: Affected Environment

Focal Species Within the Group: Bald Eagle, Willow Flycatcher, Yellow Warbler, Osprey

This species group is associated with habitats along rivers, streams and wetlands. Species that represent this group include the Forest Service “Sensitive” species bald eagle and willow flycatcher. Other species include the yellow warbler and golden eagle. Currently riparian habitats

are managed according to the standards contained within the Modoc LRMP as amended by the SNFPA and NWFP. Within the SNFPA ROD, Standard 69 states, "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."

The NWFP includes specific guidelines for an aquatic conservation strategy. Standard RM-2 particularly applies to this project: "Adjust dispersed and developed recreation practices that retard or prevent attainment of Aquatic conservation Strategy objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective, eliminate the practice or occupancy."

These specific guidelines and standards, along with others concerning new development and maintenance of existing routes, provide protection for riparian habitats.

Bald eagles are dependent on riparian and river systems to provide foraging locations for fish and waterfowl (Zeiner 1990). They primarily use large trees for nest locations that are close to the shore of lakes or streams. Jenkins (1992) found that bald eagles on the middle Pit River used trees that averaged 44.2 inches in diameter and averaged 1,391 feet from the water's edge. Known bald eagle nests on the Modoc National Forest average 435 meters from the closest stream course. This compares closely with nests within the middle Pit River drainage (Big Lake to Pit 5 Reservoir), where all nests had a view of the closest permanent water body and averaged 424 meters from fish-bearing water (Jenkins 1992, table 3 pg 59). In order to evaluate effects to bald eagles the riparian habitat conservation areas and the pond and lake GIS layers were buffered by 450 meters to provide an estimate of the area on the Forest available to potentially support bald eagles. This area estimate is considered the maximum potential habitat. The amount of area that actually could provide nesting is unknown because the small inclusions of large trees required for nest sites are not mapped. The maximum potential habitat indicates those areas where eagles may occur, given suitable foraging and sufficient size trees for nesting.

The maximum potential habitat was then used to calculate a bald eagle nesting habitat disturbance index. Routes were buffered by 450 meters to determine the route zone of influence. The habitat disturbance index was calculated by dividing the area within the route zone of influence by the amount of maximum potential bald eagle habitat within the 6th-order watershed to determine the proportion of bald eagle habitat that could be influenced by routes available for public use. A ranking was assigned that follows the rankings developed by Gaines et al. (2003) using the following class breaks:

- Less than 30 percent of maximum potential habitat within route zone of influence ranks as a "Low" level of human influence
- Thirty to 50 percent of maximum potential habitat within the route zone of influence is a moderate level of human influence
- More than 50 percent of maximum potential habitat within the route zone of influence is a high level of human influence

The quantity of routes within the maximum potential habitat was determined for each alternative, as well as the amount of maximum potential habitat available for cross-country motor vehicle travel. Because the maximum potential habitat is substantially larger than the known nesting and roosting habitat, the analysis also calculated the quantity of routes and the area open to cross-country travel within 0.25 miles of known roosts or nests for each alternative.

Willow flycatchers breed in riparian thickets during the summer months (Bombay et al. 2003) and spend the remainder of the year in Mexico and Central America. They breed in shrubby riparian vegetation that has at least some surface water or saturated soil within the territory during early breeding in June (Bombay et al. 2003). Observations are primarily limited to the Warner Mountains (USFS 2007). Because willow flycatchers are very habitat specific, only known locations were analyzed. The area within 0.25 miles of known willow flycatcher activity centers is approximately 1,760 acres. Other areas may provide long-term potential habitat, but are not analyzed for impacts from changes proposed by this project because of concerns related to actions outside of this project. See the cumulative effects section for more discussion. The effects of disturbance may be problematic; in at least one study (Altman et al. 2003) moderate or high human activity did not appear to be a factor in nest success. This may indicate that disturbance from human presence is not an important factor for this species. Other impacts from brood parasitism and livestock may be more important.

The yellow warbler is found in habitats of wet, deciduous thickets (Lowther et al. 1999). There are roughly 86,585 acres of potential habitat for yellow warblers on the Modoc NF when modeled to the CWHR 0.75 suitability index level used in this analysis. Yellow warbler populations have increased in other areas where livestock grazing in riparian areas has been curtailed and in locations where cowbirds have been reduced (Lowther et al. 1999).

A 60-meter habitat influence buffer was created to address edge effects, snag loss, down log impacts and other human impacts associated with routes. A riparian influence index was then calculated where the proportion of riparian habitat conservation area (RHCA) within the habitat influence buffer to the amount of RHCA in the 6th order watershed (HUC) was determined. A ranking was assigned that follows the rankings developed by Gaines et al. (2003). The level of influence is as follows:

- Less than 30 percent of total RHCA within the habitat influence buffer is a low level of human influence
- Thirty to 50 percent within the habitat influence buffer is a moderate level of human influence
- More than 70 percent within the habitat influence buffer is a high level of human influence

Ospreys are dependent on live fish for food (Poole et al. 2002). Because of this requirement, osprey distribution on the Doublehead Ranger District is limited (USFS 2007). Osprey habitat on the Modoc National Forest is approximately 2,980 acres within 0.25 miles of known sites. Ospreys habituate easily to nearby human activity, although individuals nesting away from disturbance may be sensitive to human presence (Poole et al. 2002). Adults nesting near highways are vulnerable to collisions with vehicles. Because osprey are dependent on large trees or structures that provide suitable substrates for nest construction, their habitat is not mappable. In order to analyze effects to osprey, the impacts to existing known sites is analyzed and used as a relative measure of impact between alternatives.

Table 3-113. For the Riparian Group, California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
Bald eagle	SPECIAL ELEMENTS (see discussion)	979,490 acres maximum potential 7,320 acres within 0.25 miles of existing activity centers
Willow flycatcher	SPECIAL ELEMENTS (see discussion)	1,760 within 0.25 miles of existing activity

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
		centers
Yellow warbler	MRI: 2P, 2M, 2D, 3 (ALL), 4S, 4P, 4M PPN: 2P, 2M, 3P, 3M, 4P, 4M SMC: 2P, 2M, 3P, 3M, 4P, 4M WFR: 2P, 2M, 2D, 3(ALL), 4S, 4P, 4M	86,585 acres
Osprey	SPECIAL ELEMENTS (see discussion)	2,980 acres within 0.25 miles of existing activity centers

Riparian Group: Environmental Consequences

Alternative 1

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-96 above. Although occasional direct mortality to adults may occur from collisions with vehicles on highways, this is not known to have occurred from slower moving vehicles off road. If off-road vehicle collisions with the focal species in this group do occur, such occurrence appears to be an exceedingly rare event and has not been reported within the Forest. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality of adults would still be unlikely.

Indirect impacts, both in the short-term, and the long-term, would result from disturbance that may cause individuals to move or alter behavior. This alternative would provide potential disturbance to the focal species within this group. Table 3-114 displays the acres of habitat potentially open for use under this alternative for the focal species within this group. Table 3-114 also displays the route mileage that occurs within habitat on the National Forest.

Table 3-114. Alternative 1: Potential Habitat for the Riparian Group that Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Bald eagle	7,320 w/in 0.25 mi existing 979,490 in maximum potential habitat	100.0% 100.0%
Willow flycatcher	1,710	97.1%
Yellow warbler	79,155	91.4%
Osprey	2,980	100.0%

*Acres rounded to the nearest 10.

Bald eagles appear to be more sensitive to foot travel than vehicle travel (Gaines et al. 2003). Anecdotal evidence from long-time observers of bald eagles in northeastern California seems to indicate a link between early nesting season vehicle access to nest stands and lowered nesting success (B. Turner personal observation, J. Rechtin personal observation; also see Watson 2004 related to foot access). Access by vehicles under incubating birds or winter roosting birds is presumed to be detrimental. Vehicle use under nest and roost trees probably results in lowered reproductive success. Potentially 7,320 acres within 0.25 miles of existing sites could be negatively affected by this alternative.

Direct impacts to willow flycatchers could include disturbance or loss of eggs or young due to jostling of willows. Similar impacts have been documented for livestock (USFS 2001a Vol.3, Chap. 3, part 4.4.2.3). A direct impact to willow flycatchers from cross-country vehicle travel is

possible but somewhat speculative. Indirect impacts could result from vehicle-induced changes to soil water levels affecting willow growth and invertebrate assemblages. For more information on impacts of cross-country travel on soil moisture and surface water flow, see the section on effects to hydrology and soils elsewhere in this document. There are no known occurrences of habitat loss due to off-highway vehicle use on the Modoc National Forest.

Yellow warblers could be impacted by loss of eggs or young from the jostling of plants on which nests are built. Vehicle impacts that reduce riparian hardwoods such as willows would reduce quantities of available habitat for yellow warblers. Impacts on yellow warblers from cross-country vehicle travel are possible but somewhat speculative. There are no known occurrences of yellow warbler habitat loss due to off-highway vehicle use on the Modoc National Forest.

Osprey may also be affected by cross-country travel by disturbance of nesting birds. Although ospreys appear to habituate readily to vehicle traffic, sudden appearance of vehicles in unusual places (e.g., off a well-traveled road) has caused osprey to flush off the nest (B. Turner personal observation).

Prohibition of cross-country travel includes the continuation of use on unauthorized routes. Table 3-115 displays the route mileage that would be available for use by the public within habitats used by the focal species in this group. This alternative would have approximately 21 miles of roads within a quarter mile of existing bald eagle nests and roosts. Of these 21 miles, only 0.7 miles are unauthorized routes. Under the four action alternatives, cross-country travel would be prohibited which includes these 0.7 miles. Alternative 1 would thus have 0.7 miles, or 3 percent, more route mileage within 0.25 miles of active bald eagle areas than the other alternatives.

Within the maximum potential habitat, there would be roughly 2,850 miles of routes, of which, approximately 234 miles would be unauthorized routes. This is approximately eight percent more route mileage within the maximum potential habitat than occurs in the alternative with the least route mileage (Alternative 3). This small percentage difference is also reflected in the riparian habitat influence index ratings. Alternative 1 has three more watersheds (98 out of 123) with “High” ratings than Alternative 3, which has the least number of “High”-ranked watersheds. “High” ratings indicate that human influence is high within the area potentially used by bald eagles. For bald eagles this alternative would therefore provide a slight additional amount of disturbance emanating from routes than the other alternatives. Because of fluctuations in snow accumulation and when spring snowmelt occurs, access to eagle nest and roost areas is highly variable. This variability affects when in the nesting cycle disturbance may occur near eagles. When disturbance occurs in the breeding cycle, is important, as eagles show more sensitivity to disturbance during incubation and early stages of brooding than later in the nesting cycle (Watson 2004). Given that the high variability in weather probably causes a large variability in disturbance timing, a four- to eight-percent difference in route availability appears to be an undetectable amount of impact.

Table 3-115. Alternative 1: Miles of Routes within Potential Habitat for the Riparian Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Bald eagle	0.7 mi within 0.25 miles of existing use 233.8 mi. within the maximum potential habitat	21 miles of route (total) within 0.25 miles existing use 2,851 mi within max. potential
Willow flycatcher	0.9	10.9 miles of route (total)
Yellow warbler	24.7	398.9 miles of route (total)

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Osprey	0.8	11.3 miles of route (total)

Willow flycatcher habitat would contain approximately 11 miles of unauthorized routes within 0.25 miles of known occurrence locations under this alternative. Approximately 9 percent more routes would occur in this alternative than would in Alternative 3, which does not add any routes to the NFTS. In at least one study (Altman et al. 2003), moderate or high human activity did not appear to be a factor in nest success. This may indicate that disturbance from human presence is not an important factor for this species. Routes may have an indirect impact of altering hydrology and thus impacting the amount of riparian shrub habitat available for nesting. This alternative would have the most impact from routes, although those impacts are expected to be limited compared to the impacts from other land management activities, especially grazing (see the cumulative effects section below).

Yellow warbler habitat would be affected similarly to willow flycatcher habitat. Approximately six percent of the total route mileage within potential habitat in this alternative would consist of unauthorized routes. This alternative would have the most unauthorized and NFTS route mileage within potential habitat at approximately 399 total miles as compared to the 374 total miles in Alternative 3, the alternative that does not add any unauthorized routes to the system. This alternative is very similar in the quantity of routes within habitat that would exist under Alternatives 2, 4, and 5. Alternative 1 would not prohibit cross-country travel which includes unauthorized routes that equal approximately two to three percent more route mileage than Alternatives 2, 4, and 5. Differences in disturbance on yellow warblers between alternatives would not likely be detectable given the relatively small changes in route mileage between alternatives. The indirect effect of altered hydrology and impacts to aquatic invertebrates are potentially much larger impacts. Because this alternative continues cross-country travel which includes the use of unauthorized routes, it would have a greater impact on potential habitat than the other alternatives. For the potential changes to stream hydrology from this alternative, see the hydrology and soils section of this chapter.

Alternative 1 would have approximately 7 percent more routes (11.3 miles) within 0.25 miles of a known osprey nest than Alternative 3, the alternative that does not add any unauthorized routes to the system. Ospreys readily habituate to human road use (Poole et al. 2002). It appears that the small differences in routes between the alternatives are unlikely to have a detectable effect on osprey population dynamics. Osprey are seasonal migrants and subject to impacts from changes in fish populations, weather during the nesting season, and changes to nest site availability. Impacts from small perturbations in the amount of disturbance do not appear to be meaningful.

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any routes. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the riparian group would aggregate with the effects outlined above in table 3-115. Those most important to the riparian group of the effects are the 122,500 AUMs of grazing annually on the Modoc National Forest, plus additional grazing actions on adjacent public and private lands. This grazing may be potentially affecting riparian species forage and cover. Forest standards provide protections to riparian areas and reduce impacts due to other management actions such as timber harvest, prescribed fire, and mechanical fuel treatments (USFS 1991). However, some riparian systems on the Forest are still recovering from impacts

that occurred prior to the implementation of the Modoc LRMP in 1991. For additional discussion on changes to riparian systems, see the hydrology and aquatic biology sections of this chapter.

There is also ongoing residential development, timber harvest, and juniper removal on private lands within and adjacent to the proclaimed boundary of the Forest, as well as stochastic events such as wildfires and catastrophic insect outbreaks. These actions are not subject to the Forest's standards, but in the case of timber harvest on private land, may be required to follow state timber harvest regulations that provide for protection of riparian resources. Vegetation treatments and grazing have the potential to impact species in this group by removing cover, impeding the growth of cover, altering vegetative structure or altering the relative amounts of different riparian plants (USFS 2001a). Some potential habitat for riparian shrub species such as willow flycatcher and yellow warbler cannot achieve suitability due to past, current and foreseeable actions, particularly grazing within perennial wet meadows. Grazing can suppress establishment and growth of willows (USFS 2001a Vol.3, Chap. 3, part 4.4.2.3). Changes to vegetation may result in changes in insect assemblages which may affect forage quality and quantity for willow flycatchers and yellow warblers (USFS 2001a Vol.3, Chap. 3, part 4.4.2.3). Loss of shrubs may also impact osprey by affecting the availability of fish. Past trends for this group have generally been negative but have improved greatly for bald eagles, culminating in their removal from the Endangered Species List in 2007.

This alternative would continue cross-country travel which would include the use of unauthorized routes, therefore impacts to species in this group would continue and aggregate with effects from other activities that affect stream hydrology and riparian vegetation. This aggregation of effects appears to be insufficient to negatively impact bald eagles. Bald eagles continue to reproduce and roost on the Modoc National Forest. The Forest has no indication that trends are other than positive and reflective of the general trends that led to de-listing of this species.

Cross-country travel may lead to additional negative impacts to hydrology and vegetative growth in riparian areas that can impact willow flycatcher habitat. This may aggregate with ongoing impacts from grazing that limit or minimize new willow establishment in wet meadows and removed willows in the past. Cross-country travel that reduces shrub density may combine with other impacts such as grazing, recreation, landing construction for timber management, and residential development, to increase the distribution and density of brown-headed cowbirds resulting in increased nest parasitism of willow flycatchers and yellow warblers.

The impact of cross-country travel on osprey appears to be minimal because of osprey's ability to habituate to vehicle presence. Ospreys are long-distance migrants and are therefore exposed to a multitude of impacts related to changes in not only the breeding area, but in the wintering areas. Changes to food sources can have large impacts to osprey productivity. For example, the removal of a fish hatchery as a food source for osprey on the Lassen National Forest resulted in a large decrease in nesting osprey on the Hat Creek Ranger District (USFS, Hat Creek Ranger District, unpublished data). Examples such as this would indicate that the impacts of occasional increased flushing of the small osprey population on the Modoc are probably insignificant at the population trend level.

Continuation of cross-country travel which includes use on unauthorized routes would also continue to provide impacts. However, the impact of unauthorized routes appears to be small. For example, the 11 miles of routes in willow flycatcher habitat in this alternative, is equivalent to approximately 20 acres or about one percent of the willow flycatcher habitat modeled by this analysis. Furthermore, the roadways do not constitute a change to habitats but an existing condition whose vegetation change impact has already occurred and whose conditions would continue into the future. Thus, the routes have less impact than an acre of new vegetation removal. This small additional impact would aggregate with negative pressures to population

growth such as limited willow habitats and potentially increasing brood parasitism but the additional impact is negligible and would thus, not alter, or accelerate existing trends. Yellow warblers are also long distance migrants and would be impacted similarly to willow flycatchers from the unauthorized routes within this alternative.

In summary, this alternative would add negative impacts, primarily from cross-country travel, to the ongoing population trends for this species group. This additional impact is of a minimal nature and appears discountable and insignificant such that population and habitat trends would be unaffected.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The bald eagles and ospreys would not be affected by vehicle travel underneath nest or roost trees. Loss of young and loss of eggs due to jostling would not occur for willow flycatchers and yellow warblers. Changes to riparian vegetation cover would not occur from cross-country vehicle travel.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of routes to the NFTS. Table 3-116 displays the route mileage within habitats used by the focal species in this group. This alternative would have approximately 20 miles of route within a quarter mile of existing bald eagle nests and roosts. These 20 miles are all existing NFTS routes, as no routes within the quarter mile zone would be added to the NFTS under this alternative. Therefore, this alternative would have no effect on bald eagles from the use of added routes within 0.25 miles of a bald eagle use location.

Within the bald eagle maximum potential habitat, there would be roughly 2,750 miles of NFTS routes, of which, approximately 134 miles would be added routes. This is approximately five percent more added routes within the maximum potential habitat than occurs in the alternative with the least mileage of added routes (Alternative 3). This alternative would have approximately four percent fewer added routes within the maximum potential habitat than Alternative 1. This small percentage difference is also reflected in the habitat influence index ratings. Alternative 2 has one more watershed (96 out of 123) with “High” ratings than Alternative 3, which has the least number of “High”-ranked watersheds. Alternative 2 has two fewer watersheds with “High” ratings than Alternative 1. “High” ratings indicate that human influence is high within the area potentially used by bald eagles. For bald eagles, this alternative would therefore provide a slight amount of disturbance reduction compared to Alternative 1. Given that the high variability in weather probably causes a large variability in disturbance timing, a one- to five-percent difference in route availability appears to be undetectable in amount of impact.

Table 3-116. Alternative 2: Miles of Routes within Potential Habitat for the Riparian Group

Species	Miles of Routes Added to the NFTS Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Bald eagle	0 mi within 0.25 miles of existing eagle use 133.8 mi. within the maximum potential habitat	20 miles within 0.25 miles of existing eagle use 2,751 mi within max. potential

Species	Miles of Routes Added to the NFTS Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Willow flycatcher	0.1 miles	10.1 miles
Yellow warbler	15.1 miles	389 miles
Osprey	0.6 miles	11.1 miles

Willow flycatcher habitat would contain approximately 10 miles of routes within 0.25 miles of known occurrence locations under this alternative. Approximately two percent more routes would occur in this alternative than would in Alternative 3, which has the least amount of routes. This alternative would have approximately seven percent less route mileage than Alternative 1 where allowing cross-country travel includes the continued use of one mile of unauthorized routes within willow flycatcher habitat. Routes may have an indirect impact of altering hydrology and thus impacting the amount of riparian shrub habitat available for nesting. This alternative would have an intermediate impact to hydrology from routes, as compared to the other alternatives. The impacts from disturbance and changes to riparian habitats caused by altered stream flows are expected to be limited compared to the impacts from other land management activities, especially grazing (see the hydrology section elsewhere and the cumulative effects section below).

Yellow warbler habitat would be affected similarly to willow flycatcher habitat. Approximately four percent of the route mileage within potential habitat in this alternative would consist of added routes. This alternative would have an intermediate quantity of route mileage within potential habitat at approximately 389 total miles, as compared to the 374 total miles in Alternative 3, the alternative with the smallest mileage of routes. Alternative 1 would have approximately two percent more route mileage in potential yellow warbler habitat than would occur in Alternative 2. The quantity of route mileage in Alternative 2 is approximately one percent more than would occur in Alternative 4, and the same as Alternative 5. Differences in disturbance to yellow warblers between alternatives would not likely be detectable, given the relatively small changes in route mileage between alternatives. The indirect effect of altered hydrology and impacts to aquatic invertebrates are potentially much larger impacts. Because this alternative prohibits cross-country travel, it would have a smaller impact on potential habitat than Alternative 1, but would still have more impact than Alternative 3, which does not add any unauthorized routes to the NFTS. For more discussion of the potential changes to stream hydrology from this alternative see the hydrology and soils section of this chapter.

Alternative 2 would have approximately five percent more route mileage (11.3 miles) within 0.25 miles of a known osprey nest than Alternative 3, the alternative with the least route mileage. Alternative 2 would also have approximately two percent less route mileage than Alternative 1. It appears that the small differences in route mileage between the alternatives are unlikely to have a detectable effect on osprey population dynamics given osprey's tolerance to human activity. Osprey are seasonal migrants and subject to impacts from changes in fish populations, weather during the nesting season, and changes to nest site availability. Impacts from small perturbations in the amount of disturbance do not appear to be meaningful.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities of bald eagles such as pair-bonding, nest initiation, incubation and early brooding may have less disturbance resulting in more successful reproduction. The seasonal closures would also reduce disturbance at winter roosts, potentially providing bald eagles with additional energy reserves. Willow flycatchers, yellow warblers and osprey would be absent during the seasonal closures as they are seasonal migrants.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on this focal group.

Cumulative Effects

The effects of Alternative 2 on the riparian group would aggregate with the effects outlined above in table 3-84. Forest standards provide protections to riparian areas and reduce impacts due to management actions (USFS 1991). However, some riparian systems on the Forest are still recovering from impacts that occurred prior to the implementation of the Modoc LRMP in 1991. For additional discussion on changes to riparian systems, see the hydrology and aquatic biology sections of this chapter.

There is also ongoing residential development, timber harvest, juniper removal, and grazing on private lands within and adjacent to the proclaimed boundary of the Forest, as well as stochastic events such as wildfires and catastrophic insect outbreaks. Vegetation treatments and grazing have the potential to impact species in this group by removing cover, impeding the growth of cover, altering vegetative structure or altering the relative amounts of different riparian plants. Changes to vegetation may result in changes in insect assemblages, which may affect forage quality and quantity for willow flycatchers and yellow warblers. Past trends for this group have generally been negative but have improved greatly for bald eagles, culminating in their removal from the Endangered Species List in 2007.

This alternative would not continue cross-country travel; therefore, cross-country travel impacts to species in this group would cease and no longer aggregate with effects from other activities that affect stream hydrology and riparian vegetation. See the cumulative effects discussion for Alternative 1 above for more information on this aggregation of effects.

The addition of 339 miles of routes to the NFTS would also continue to provide impacts. However, the impact of adding the routes to the NFTS is small. For example, the 10.1 miles of added route and pre-existing NFTS route in willow flycatcher habitat in this alternative, is equivalent to approximately 18 acres. This small additional impact would aggregate with negative pressures to population growth such as limited willow habitats, impacts occurring during migration and on the wintering grounds, and potentially increasing brood parasitism. However, the additional impact from route additions under this alternative is negligible and would thus not alter or accelerate existing trends. Yellow warblers, willow flycatchers and osprey are also long-distance migrants. They would suffer little relative impact from the route added to the NFTS, within this alternative, compared to the ongoing impacts to habitat they use during other parts of their lifecycle.

In summary, this alternative would add fewer negative impacts to the ongoing population trends for this species group than Alternative 1. The primary reason for the lower amount of impact is the prohibition of cross-country travel and the reduced amount of routes available for public travel as compared to Alternative 1. The small amount of impact that this alternative would add to existing population and habitat trends is of a minimal nature and appears discountable and insignificant.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The bald eagles and ospreys would not be affected by vehicle travel underneath nest or roost trees. Loss of young and loss of eggs due to jostling would not occur for willow flycatchers and yellow warblers. Changes to riparian vegetation cover would not occur from cross-country vehicle travel.

This alternative would not add any unauthorized routes to the NFTS. However, the linear effects of routes would still occur on the 4,580 miles of NFTS available for use. Table 3-117 displays the route mileage within habitats used by the focal species in this group. This alternative would have approximately 20 miles of NFTS routes within a quarter mile of existing bald eagle nests and roosts. Of these 20 miles, none would be unauthorized routes. Therefore, this alternative would have no effect on bald eagles from the addition of unauthorized routes within 0.25 miles of a bald eagle use location.

Within the maximum potential habitat, there would be roughly 2,617 miles of routes, of which none would be added unauthorized routes. This is approximately eight percent less route mileage within the maximum potential habitat, than occurs in the alternative that does not prohibit cross-country travel which includes the use of unauthorized routes (Alternative 1). This percentage difference is also reflected in the habitat influence index ratings. Alternative 3 has three less watersheds (98 out of 123) with “High” ratings than Alternative 1, which has the largest number of “High”-ranked watersheds. Alternative 2 has one more watershed with a “High” rating than Alternative 3. “High” ratings indicate that human influence is high within the area potentially used by bald eagles. This alternative would also have four to five percent less route mileage within bald eagle maximum potential habitat than alternatives 2, 4, and 5. For bald eagles, this alternative would therefore provide some disturbance reduction compared to the other alternatives. Given that the high variability in weather probably causes a large variability in disturbance timing, a four- to eight-percent difference in route availability appears to be an undetectable amount of impact.

Table 3-117. Alternative 3: Miles of Routes within Potential Habitat for the Riparian Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat
Bald eagle	0 mi within 0.25 miles of existing eagle use 0 mi. within the maximum potential habitat	20 mi within 0.25 miles of existing eagle use 2,617 mi within max. potential
Willow flycatcher	0 miles	9.9 miles
Yellow warbler	0 miles	374 miles
Osprey	0 miles	10.5 miles

Willow flycatcher habitat would contain approximately 10 miles of routes within 0.25 miles of known occurrence locations under this alternative. Approximately nine percent less route mileage would occur in this alternative than would in Alternative 1, which has the largest amount of route mileage near existing willow flycatcher sites. This alternative would have approximately two percent less route mileage than Alternatives 2, 4, and 5. Routes may have an indirect impact of altering hydrology and thus impacting the amount of riparian shrub habitat available for nesting. This alternative would have the least impact to hydrology from routes. The impacts from disturbance and changes to riparian habitats caused by altered stream flows are expected to be

limited, compared to the impacts from other land management activities, especially grazing (see the hydrology section elsewhere and the cumulative effects section below).

Yellow warbler habitat would be affected similarly to willow flycatcher habitat. There would be no addition of unauthorized routes to the NFTS under this alternative. This alternative would have the lowest quantity of route mileage within potential habitat at approximately 374 total miles as compared to the 399 total miles in Alternative 1. Alternatives 2, 4, and 5 would have approximately three to four percent more routes in potential yellow warbler habitat. Differences in disturbance to yellow warblers between alternatives would not likely be detectable given the relatively small changes in route mileage between alternatives. The indirect effect of altered hydrology and impacts to aquatic invertebrates are potentially much larger impacts. Because this alternative does not add any unauthorized routes, it would have the least impact on potential habitat. For more discussion of the potential changes to stream hydrology from this alternative, see the hydrology and soils section of this chapter.

Alternative 3 would have approximately seven percent less route mileage (11.3 miles) within 0.25 miles of a known osprey nest than Alternative 1. Alternatives 2 and 5 would have approximately five percent more route mileage than this alternative. It appears that the small differences in route mileage between the alternatives are unlikely to have a detectable effect on osprey population dynamics, given osprey's tolerance to human activity. Osprey are seasonal migrants and subject to impacts from changes in fish populations, weather during the nesting season, and changes to nest site availability. Impacts from small perturbations in the amount of disturbance do not appear to be meaningful.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

There would be no changes to vehicle class in this alternative. Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

This alternative would not add any unauthorized routes to the NFTS and would discontinue cross-country travel. The impacts to species in this group from the cross-country travel which includes the use of unauthorized routes would cease, and may partially counter some of the effects from vegetation management and grazing occurring elsewhere. However, the scope and intensity of the impact from cross-country travel is small. For example, 25 miles of unauthorized routes that would no longer be used with the prohibition of cross-country travel would convert slowly back to yellow warbler habitat over time This is equivalent to approximately 46 acres or less than 0.02 percent of the modeled yellow warbler habitat. The positive effects from prohibiting cross-country travel begin to show immediately for species such as willow flycatchers and yellow warblers that may suffer direct mortality from nest damage or jostling. However, the vehicle-caused mortality appears to be very small in relation to the potential for mortality from grazing. Livestock are more numerous than vehicles, and spend more time in and adjacent to riparian shrubs (122,500 animal-unit months versus 897 primary-use and 22,755 secondary-use OHV visits (English et al. 2004)). At the 20-year, long-term point, some additional riparian habitat may have begun to accumulate from the prohibition of cross-country travel. However, the low rate and intensity of impacts from the cessation of cross-country travel do not appear to be sufficient to

counter other impacts that are occurring from grazing, vegetation management and stochastic events such as breeding season, inclement weather, and stand-replacing fires. Overall, when aggregated with other impacts to the riparian group, impacts from this alternative appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. In habitat where cross-country travel is prohibited, the bald eagles and ospreys would not be affected by vehicle travel underneath nest or roost trees. Potential loss of young and loss of eggs due to jostling would not occur for willow flycatchers and yellow warblers.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 286 miles of routes to the NFTS. Table displays the route mileage within habitats used by the focal species in this group. This alternative would have approximately 20 miles of route within a quarter mile of existing bald eagle nests and roosts. Of these 20 miles, none are unauthorized routes. Therefore, this alternative would have no effect on bald eagles from the use of unauthorized routes within a quarter mile of a bald eagle use location.

Within the bald eagle maximum potential habitat, there would be roughly 2,728 miles of routes, of which approximately 111 miles would be added routes. This is approximately four percent more route mileage within the maximum potential habitat than occurs in the alternative that prohibits cross-country travel and does not add any unauthorized routes to the NFTS (Alternative 3). This alternative would have approximately four percent less route mileage within the bald eagle maximum potential habitat than Alternative 1. This small percentage difference is also reflected in the habitat influence index ratings. Alternative 4 has one more watershed (96 out of 123) with “High” ratings than Alternative 3, which has the least number of “High”-ranked watersheds. Alternative 4 has two fewer watersheds with “High” ratings than Alternative 1. “High” ratings indicate that human influence is high within the area potentially used by bald eagles. For bald eagles, this alternative would therefore provide a slight amount of disturbance reduction compared to Alternative 1. Given that the high variability in spring weather probably causes a large variability in disturbance timing, a four percent difference in route mileage appears to be an undetectable amount of impact.

Table 3-118. Alternative 4: Miles of Routes within Potential Habitat for the Riparian Group

Species	Miles of Routes Added to the NFTS Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Bald eagle	0 mi with 0.25 miles of existing eagle use 111.3 mi. within the maximum potential habitat	20 mi with 0.25 miles of existing eagle use 2,728 mi within max. potential
Willow flycatcher	0.1 miles	10.1 miles
Yellow warbler	12.6 miles	387 miles
Osprey	0.6 miles	11.1 miles

Willow flycatcher habitat would contain approximately 11 miles of routes within 0.25 miles of known occurrence locations under this alternative. Approximately two percent more routes would occur in this alternative than in Alternative 3, which does not add any unauthorized routes to the NFTS. This alternative would have approximately seven percent less route mileage than Alternative 1. Routes may have an indirect impact of altering hydrology and thus impact the amount of riparian shrub habitat available for nesting. This alternative would have an intermediate impact to hydrology from routes. The impacts from disturbance and changes to riparian habitats caused by altered stream flows are expected to be limited, compared to the impacts from other land management activities, especially grazing (see the hydrology section elsewhere and the cumulative effects section below).

Yellow warbler habitat would be affected similarly to willow flycatcher habitat. Approximately three percent of the total route mileage within potential habitat in this alternative would consist of unauthorized routes added to the NFTS. This alternative would have an intermediate quantity of route mileage within potential yellow warbler habitat with approximately 387 total miles as compared to the 374 total miles in Alternative 3, the alternative where no unauthorized routes are added to the NFTS. Alternative 1 would have approximately three percent more routes in potential yellow warbler habitat than would occur in Alternative 4. The route mileage in Alternative 4 is approximately one percent more than would occur in Alternatives 2 and 5. Differences in disturbance to yellow warblers between alternatives would not likely be detectable, given the relatively small changes in route mileage between alternatives. The indirect effect of altered hydrology and impacts to aquatic invertebrates are potentially larger impacts. Because this alternative prohibits cross-country travel, it would have a smaller impact on potential habitat than Alternative 1. However, it would still have more impact than Alternative 3, which does not add any unauthorized routes to the NFTS. For more discussion of the potential changes to stream hydrology and aquatic invertebrates from this alternative, see the hydrology and aquatic biology sections of this chapter.

Alternative 4 would have approximately six percent more route mileage (11.3 miles) within a quarter mile of a known osprey nest than Alternative 3, the alternative with the lowest route mileage. Alternative 4 would also have approximately two percent less route mileage than Alternative 1. It appears that the small differences in route mileage between the alternatives are unlikely to have a detectable effect on osprey population dynamics given osprey's tolerance to human activity. Osprey are seasonal migrants and subject to impacts from changes in fish populations, weather during the nesting season, and changes to nest site availability. Impacts from small perturbations in the amount of disturbance do not appear to be meaningful.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities of bald eagles such as pair-bonding, nest initiation, incubation and early brooding may have less disturbance resulting in more successful reproduction. The seasonal closures would also reduce disturbance at winter roosts, potentially providing bald eagles with additional energy reserves. Willow flycatchers, yellow warblers and osprey would be absent during the seasonal closures as they are seasonal migrants.

Changes to class of use are not expected to have any detectable impact on the riparian group. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. This alternative would have no change in vehicle class. Changing the mix of use is not expected to have any impacts on the riparian group.

Cumulative Effects

The effects of Alternative 4 on the riparian group would aggregate with the effects outlined above in table 3-84. For additional discussion on changes to riparian systems, see the hydrology and aquatic biology sections of this chapter. Past trends for this group have generally been negative but have improved greatly for bald eagles, culminating in their removal from the Endangered Species List in 2007.

This alternative would not continue cross-country travel; therefore, impacts to species in this group from cross-country travel would cease and no longer aggregate with effects from other activities that affect stream hydrology and riparian vegetation. See the cumulative effects discussion for Alternative 1 above for more information on this aggregation of effects.

The addition of 286 miles of unauthorized routes to the NFTS would also continue to provide impacts. However, the impact of adding the unauthorized routes to the NFTS is small. For example, the 10.1 miles of route in willow flycatcher habitat, added to the NFTS in this alternative, is equivalent to approximately 18 acres. This small additional impact would aggregate with negative pressures to population growth such as limited willow habitats and potentially increasing brood parasitism, as well as grazing induced mortality and changes to riparian shrub vegetation. However, the additional impact from vehicle disturbance is negligible, and would thus not alter, or accelerate existing trends. Yellow warblers, osprey, and willow flycatchers, and juvenile bald eagles are also long-distance migrants. They would suffer little relative impact from the unauthorized routes added to the NFTS within this alternative, compared to the ongoing impacts to habitat they use during other parts of their lifecycle.

In summary, this alternative would add fewer negative impacts to the ongoing population trends for this species group than Alternative 1, 2 and 5, but more than Alternative 3. The primary reason for the lower amount of impact is the prohibition of cross-country travel and the reduced amount of route added to the NFTS. The small amount of impact that this alternative would add to existing population and habitat trends is of a minimal nature and appears discountable and insignificant.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. Table 3-119 displays the route mileage within habitats used by the focal species in this group for this alternative. This alternative has the same route configuration as Alternative 2. Because the route system is the same, the effects to riparian species are the same for this alternative (Alternative 5) and Alternative 2.

Table 3-119. Miles of Routes within Potential Habitat for the Riparian Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Bald eagle	0 mi within 0.25 miles of existing eagle use 133.8 mi. within the maximum potential habitat	20 mi within 0.25 miles of existing eagle use 2,751 mi within max. potential habitat
Willow flycatcher	0.1 miles	10.1 miles

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Yellow warbler	15.1 miles	389 miles
Osprey	0.6 miles	11.1 miles

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities of bald eagles such as pair-bonding, nest initiation, incubation and early brooding may have less disturbance, thereby resulting in more successful reproduction. The seasonal closures would also reduce disturbance at winter roosts potentially providing bald eagles with additional energy reserves. Willow flycatchers, yellow warblers and osprey would be absent during the seasonal closures as they are seasonal migrants.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel, but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on riparian wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to riparian species as compared to Alternative 2. This alternative has the same cumulative effects as Alternative 2, which are imperceptible and discountable.

Comparison of Effects on the Riparian Group, by Alternative

This section provides tabular comparisons of the five alternatives. The first two tables (Table 3-120, Table 3-121) display the relative impacts at the watershed level of the five alternatives.

Table 3-120. Riparian Habitat Influence Rank Ratings, by Alternative

Number of HUCs with each Habitat Influence Rank Rating, Where each HUC Contains some Riparian Reserve					
Ranking	Alt 1	Alt 2	Alt 3	Alt4	Alt5
Low	86	87	89	87	87
Moderate	27	27	25	27	27
High	4	3	3	3	3

Table 3-121. Bald Eagle Habitat Influence Rank Ratings, by Alternative

Number of HUCs with each Habitat Influence Rank Rating, Where each HUC Contains some Riparian Reserve					
Ranking	Alt 1	Alt 2	Alt 3	Alt4	Alt5
Low	9	9	10	9	9
Moderate	16	18	18	18	18
High	98	96	95	96	96

Table 3-122. Comparison of Selected Effects, by Alternative

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Bald eagle (Modeled habitat on the MDF: 7,320 within ¼ mi zone: 979,490 ac within max. potential habitat)	NF habitat available to cross-country travel (1/4-mi zone)	7,320 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat (1/4 -mi zone)	UA*: 0.7 UA+NFTS: 21	UA: 0 UA+NFTS: 20.3	UA: 0 UA+NFTS: 20.3	UA 0 UA+NFTS: 20.3	UA: 0 UA+NFTS: 20.3
	Equivalent acres of UA routes in habitat (% of ¼ mi zone Habitat)	1.3 ac (0.02%)	0 ac (0%)	0 ac (0%)	0 ac (0%)	0 ac (0%)
	Equivalent acres of UA +NFTS routes in habitat (% of ¼ mi zone Habitat)	38.2 ac (0.5%)	36.9 ac (0.5%)	36.9 ac (0.5%)	36.9 ac (0.5%)	36.9 ac (0.5%)
	Area of maximum potential habitat available to cross-country travel	979,490	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat (maximum potential habitat)	UA*: 233.8 UA+NFTS: 2,851	UA:133.8 UA+NFTS: 2,751 4%<A-1	UA: 0 UA+NFTS: 2,617 8%< A-1 5%< A-2	UA 111.3 UA+NFTS: 2,728 3%< A-1 1%< A-2 4%> A-3	UA: 133.8 UA+NFTS: 2,751 4%< A-1
	Equivalent acres of UA routes in habitat (% of maximum potential Habitat)	425.5 ac (0.04%)	243.5 ac (0.02%)	0 ac (0%)	202.5 ac (0.02%)	243.5 ac (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of maximum potential Habitat)	5,189 ac (0.5%)	5,007 ac (0.5%)	4,763 ac (0.5%)	4,965 ac (0.5%)	5,007 ac (0.5%)
Willow flycatcher (Modeled habitat on the MDF: 1,760)	NF habitat available for cross-country travel	1,713 acres	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 1.0 UA+NFTS: 10.9	UA: 0.2 UA+NFTS: 10.1 mi 7%< A-1	UA: 0 UA+NFTS: 9.9 9%< A-1 2%< A-2	UA: 0.2 UA+NFTS: 10.1 7%< A-1 0%<A-2 2%> A-3	UA: 0.2 UA+NFTS: 10.1 7%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	1.8 ac (0.1%)	0.4 ac (0.02%)	0 ac (0%)	0.4 ac (0.02%)	0.4 ac (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	19.8 ac (1.1%)	18.4 ac (1.0%)	18.0 ac (1.0%)	18.4 ac (1.0%)	18.4 ac (1.0%)

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Yellow warbler (Modeled habitat on the MDF: 86,585)	NF habitat available for cross-country travel	79,155	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	24.7 UA mi 398.9 mi	15.1 UA mi 389.3mi 2% < A-1	0 UA mi 374.2 mi 6% < A-1 4% < A-2	12.6 UA mi 386.8 mi 3% < A-1 1%< A-2 3%> A-3	15.1 UA mi 389.3mi 2% < A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)					
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)					
Osprey (Modeled habitat on the MDF: 2,980 acres)	NF habitat available for cross-country travel	2,980	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	0.8 UA mi 11.3 mi	0.6 UA mi 11.1 mi 3%< A-1	0 UA mi 10.5 mi 10%< A-1 7%< A-2	0.6 UA mi 11.1 mi 4%< A-1 1%<A-2 7%> A-3	0.6 UA mi 11.1 mi 3%< A-1

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Sensitive Species Determinations

Bald Eagle
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

The Modoc Travel Management Project Alternative 1 may affect individual bald eagles as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2, 3, 4 and 5 would have no impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS within 1/4 –mile of an existing bald eagle site. Alternatives 2, 3, 4 and 5 would therefore have no effects on bald eagles or their habitats. Thus it is the biologist's determination that the Modoc Travel Management Project Alternative 1 may affect individuals but is not likely to result in a trend toward Federal listing and that Alternatives 2, 3, 4, and 5 would not affect bald eagles or their habitat.

Willow Flycatcher
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

The Modoc Travel Management Project Alternative 1 may affect individual willow flycatchers as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2, 3 4, and 5 would have no impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and less than ¼ mile of additional routes would be added to the NFTS within willow flycatcher habitat. Alternatives 2, 3, 4 and 5 would therefore have no effects on willow flycatchers or their habitats. Thus it is the biologist's determination that the Modoc Travel Management Project Alternative 1 may affect individuals but is not likely to result in a trend toward Federal listing and that Alternatives 2, 3, 4 and 5 would not affect willow flycatchers or their habitat.

Cavity-Dependent Group: Affected Environment

Focal Species Within the Group: Hairy woodpecker, black-backed woodpecker, pileated woodpecker, red-naped sapsucker, red-breasted sapsucker

This species group is associated with cavities in trees. Species included in the group include the pallid bat, a Forest Service "Sensitive" species. Other species include woodpeckers such as the hairy woodpecker, black-backed woodpecker, pileated woodpecker, red-naped sapsucker and the red-breasted sapsucker. The Modoc LRMP, as amended by the NWFP and the SNFPA, provides for a variety of snag densities..

Table 3-123. Snag Retention Guidelines on the Modoc National Forest

Habitat	Density	Source of Guideline
Big Valley Sustained Yield Unit	1.5 snags >16" DBH/acre	Modoc LRMP 1991
Eastside pine types	At least 3.0 largest snags/acre	SNFPA
Westside mixed conifer and ponderosa pine types	At least 4.0 largest snags/acre	SNFPA
Red fir	At least 6.0 largest snags/acre	SNFPA
NWFP matrix	Sufficient snags to support 40% of potential cavity-nesting bird population levels	Northwest Forest Plan

The hairy woodpecker, found in all woodland and Forest types, uses snags and dead parts of trees to create cavities (USFS 1991b pg. 3-110). Zeiner et al. (1990) report that hairy woodpecker nest tree diameter ranges from 13 to 30 inches. Jackson et al. (2002) report cavity entrances are about 5 cm (2 inches) in diameter. This would indicate use of trees much smaller than the 13" minimum reported by Zeiner may not be physically possible due to structural weakness created in trees smaller than 10-13" DBH.

Black-backed woodpeckers are also found in a variety of Forested habitats. This species uses live and dead trees with an average size of 14-15" DBH (Dixon et al. 2000). The cavity is often excavated in a tree with heartrot or in the sapwood of a recently burned tree (Dixon et al. 2000).

Pileated woodpeckers are the largest woodpecker in the Modoc area and in most of North America (Bull and Jackson 1995). This species uses late-successional Forest or younger Forest with large remnant trees (Bull and Jackson 1995). Roost locations are in trees with existing hollow interiors created by decay. Nest trees in the Pacific Northwest are typically snags with large diameters (mean DBHs of 38, 33 and 27 inches reported in Bull and Jackson 1995). Pileated woodpeckers are reported to be "tolerant" of human activity near the nest, and to exhibit variable behavior near roosts where some individuals may be tolerant and other individuals may change roosts (Bull and Jackson 1995). The CWHR and vegetation modeling predicts an estimated

25,360 acres could potentially support this species in mixed conifer, white fir and red fir vegetation types on the Forest.

The red-naped and red-breasted sapsuckers are closely related species of woodpeckers found on the Modoc National Forest. The range of the two species overlaps on the Modoc NF and the two species hybridize (Walters et al. 2002). These aptly named birds are adapted for sipping sap from a variety of conifer and hardwood species (Walters et al. 2002). Red-breasted sapsuckers may place cavities higher in trees than red-naped sapsuckers (55 to 65 foot average for red-breasted sapsuckers, versus 9.5- to 58-foot averages for red-naped as reported in Walters et al. 2002). Cavity diameters are generally about 1.5 to 1.8 inches (Walters et al. 2002). The minimum size tree used by sapsuckers was reported as 6.6 inches (Walters et al. 2002). It appears that, at least the red-naped, is "little affected by vehicle traffic when nesting alongside roads" (Walters et al. 2002). Because red-naped sapsuckers are mostly limited to the Warner Mountains, the habitat modeling was restricted to the Warner Mountain Ranger District. Red-naped sapsuckers do occur on other portions of the Forest; however, the Warner Mountains provide the locations where red-naped sapsuckers are routinely observed on the Forest.

Cavity use places pallid bats in this species grouping. Pallid bats are thought to be widely distributed across the Forest. The SNFPA FEIS 2001 refers to pallid bats as "roosting habitat generalists" whose "foraging habitats requirements appear to be more restrictive" (Vol.3, Chap. 3, part 4.4 pg. 55 (USFS 2001a)). Some of the roosts used by pallid bats are oak cavities and hollow trees (USFS 2001a, Vol. 3. Chap. 3, part 4.4, pg. 55) Pallid bats also forage on ground-dwelling arthropods so open areas are important for feeding. The presence of cavities and open areas across much of the Forest provides the conditions that support the assumption of broad distribution. Suitable cavities for pallid bats may occur anywhere that there are sufficiently large trees to form cavities (assumed to be trees larger than 6" DBH). Pallid bats' preference for foraging in open areas makes determination of habitat difficult. Also, the broad nature of habitats used results in none of the CWHR habitat stages meeting the 0.75 suitability index used in this analysis. Because of the diverse nature and lack of sufficient suitability rating impacts to pallid bats will only be discussed in a qualitative way.

In order to examine relative impacts between alternatives, a disturbance index was calculated. Hairy woodpeckers were used to represent the other focal species in this group. Hairy woodpeckers have a relatively widespread population across the Forest and capture both medium- and large-tree Forest types. To determine the route zone of influence, routes were buffered by 60-meters. The habitat disturbance index was calculated by dividing the hairy woodpecker habitat within the route zone of influence by the amount of hairy woodpecker habitat within the 6th order watershed to determine the proportion of habitat that could be influenced by routes. A ranking was assigned that follows the rankings developed by Gaines et al. (2003) using the following class breaks:

- Less than 30 percent of maximum potential habitat within route zone of influence ranks as a "Low" level of human influence
- Thirty to 50 percent of maximum potential habitat within the route zone of influence is a moderate level of human influence
- Greater than 50 percent of maximum potential habitat within the route zone of influence is a high level of human influence.

Table 3-124. For the Cavity-dependent Group, California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
Hairy Woodpecker	ASP: 4S, 4P, 4M, 5S, 5P, 5M, 6 EPN: 4S, 4P, 4M, 5S, 5P, 5M JPN: 4S, 4P, 4M, 5S, 5P, 5M LPN: 4S, 4P, 4M, 5S, 5P, 5M MHW: 5S, 5P, 5M, 6 MRI: 4S, 4P, 4M, 5S, 5P, 5M, 6 PPN: 4S, 4P, 4M, 5S, 5P, 5M RFR: 5S, 5P SMC: 4S, 4P, 4M, 5S, 5P, 5M, 6 SCN: 5S, 5P, 5M WFR: 4S, 4P, 4M, 5S, 5P, 5M, 6	390,960 acres
Black-backed woodpecker	LPN: 4 (ALL), 5(ALL) RFR: 5D	25,600 acres
Pileated woodpecker	JPN: 5M, 5D MHW: 5M, 5D, 6 PPN: 5M, 5D SMC: 5M, 5D, 6 WFR: 5M, 5D, 6	25,360 acres
Red-naped sapsucker	ASP: 3S, 3P, 3M, 4S, 4P, 4M, 5S, 5P, 5M ESP: 5S, 5P, 5M MHW: 3S, 3P, 3M, 4S, 4P, 4M, 5S, 5P, 5M MRI: 3S, 3P, 3M, 4S, 4P, 4M, 5S, 5P, 5M WFR: 3S, 3P, 3M, 4S, 4P, 4M, 5S, 5P, 5M	19,530 acres
Red-breasted sapsucker	ASP: 4S, 4P, 4M, 5S, 5P, 5M, 6 EPN: 4S, 4P, 4M, 5S, 5P, 5M JPN: 4S, 4P, 5S, 5P, 5M JUN: 5S, 5P LPN: 4S 4P, 4M, 5S, 5P, 5M MHW: 4S 4P, 4M, 5S, 5P, 5M, 6 MRI: 4S 4P, 4M, 5S, 5P, 5M, 6 PPN: 4S 4P, 4M, 5S, 5P, 5M RFR: 4S, 4P, 4M SMC: 4S 4P, 4M, 5S, 5P, 5M, 6 WFR: 4S 4P, 4M, 5S, 5P, 5M	380,610 acres
Pallid bat	NO HABITATS >0.75 (see discussion)	

Cavity-Dependent Group: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

Table 3-125 displays the acres of habitat potentially available for use under this alternative for the focal species within this group. Cross-country travel includes the use of unauthorized routes. Table 3-126 displays the route mileage that occurs within habitats of the focal species on the Modoc National Forest. Although occasional direct mortality may occur from off-road collisions with vehicles, this appears to be an exceedingly rare event and has not been reported to occur within the Forest. It is possible that such an event could occur under this alternative, however given existing use and mobility of the species, such occurrences would remain rare and inconsequential to species population dynamics. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

A larger impact, both in the short term, and the long term, would be the disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to the focal species within this group. Disturbance could occur during feeding activities. Vehicles in proximity may cause birds to flush from feeding locations. Disturbance may also impact food deliveries to cavities, pair-bonding, and cavity construction. Breeding-related impacts may be somewhat limited, as early breeding activities may begin when snow impedes or prevents most cross-country travel.

Hairy woodpeckers and red-breasted sapsuckers, being widespread, are the most available to be impacted. At the same time, the large number of acres of habitat means the impacts that do occur are diluted. Pileated woodpeckers often forage near or on the ground (Bull and Jackson 1995) and thus may be particularly susceptible to having feeding disturbed. Impacts to red-naped sapsuckers may be reduced, compared to other cavity-dependent species, as the Warner Mountains with their steeper slopes may be less used for cross-country travel than other portions of the Forest.

Cross-country road travel may benefit pallid bats by increasing the amount of openings in the ground-level vegetation. This effect would probably be limited, as most areas suitable for cross-country travel probably have sufficient ground-level openings.

Table 3-125. Alternative 1: Potential Habitat for the Cavity-Dependent Group that Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Hairy woodpecker	376,820	96.4%
Black-backed woodpecker	21,250	83.0%
Pileated woodpecker	22,160	87.4%
Red-naped sapsucker	13,970	71.5%
Red-breasted sapsucker	285,910	75.1%

*Rounded to nearest 10 acres.

This alternative would continue to allow cross-country travel which would include the use of 491 miles of unauthorized routes. Table 3-126 displays the amount of route mileage within habitats used by the focal species in this group. Disturbance to cavity-dependent species' activities could occur along these routes. The largest impact would be the increased loss of recently dead trees to woodcutting and hazard reduction.

The habitat influence rating was "Moderate" for 11 of the watersheds, and "Low" for 100 watersheds. Of the hairy woodpecker habitat on the Modoc National Forest, 94 percent occurs in a watershed with a "Low" rating for human influence. This alternative has the most watersheds with moderate ratings and has the lowest percentage of habitat with a low rating. The

continuation of cross-country travel results in approximately five percent of the habitat being rated “moderate” rather than “low”.

As a group, all of the focal species would be most affected by this alternative, as opposed to the other alternatives, because cross-country travel, which includes the continued use of unauthorized routes, would continue under this alternative. The routes and vehicle traffic probably present little direct impact to any of the focal species in this group. Indirectly, more route mileage would equal more area that would be easily accessible for woodcutting. Woodcutting typically happens in proximity to a roadway resulting in fewer snags near the road. The habitat influence rating of “Low” indicates that this impact does not greatly affect the populations of these focal species. However, there would be about five percent fewer acres occurring within a “Low” ranked watershed under this alternative than under Alternative 3, which prohibits cross-country travel and does not add any unauthorized routes to the NFTS. Black-backed woodpeckers, pileated woodpeckers, and red-naped sapsuckers are probably less affected by continued cross-country travel, as these species tend to be more associated with special habitat elements. The special habitat elements of recently burned trees for black-backed woodpeckers, large trees and ants for pileated woodpeckers, and riparian hardwoods for red-naped sapsuckers are not evenly distributed across the Forest. Black-backed and pileated woodpecker habitat show the largest differential between alternatives in the miles of route within habitat metric. This alternative would continue cross-country travel which would include five percent more route mileage within pileated habitat and 14 percent more miles within black-backed habitat than would occur under Alternative 3. For the black-backed woodpecker, this alternative differs from Alternatives 2, 4, and 5 by about six to seven percent in the route mileage within habitat. The mileage differences (on a percentage basis) are less for the other focal species. The sapsuckers and the hairy woodpecker are affected by eight to ten percent more routes under this alternative than under the alternative where no unauthorized routes are added to the NFTS (Alternative 3). There is little difference (two to six percent) between this alternative and Alternatives 2, 4, and 5 in the change in route mileage within habitat for the sapsuckers and the hairy woodpecker.

Table 3-126. Alternative 1: Miles of Routes within Potential Habitat for the Cavity-Dependent Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Hairy woodpecker	147.5	1,749
Black-backed woodpecker	12.9	95
Pileated woodpecker	3.3	66
Red-naped sapsucker	5.9	59
Red-breasted sapsucker	123.8	1,363

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any particular route segment. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the cavity-dependent group would aggregate with the effects outlined above in table 3-84. Those effects include 4,000 acres of prescribed fire, 6,000 acres of mechanical fuel treatments, 1,500 acres of treatments to improve sage-steppe, and 5,500 acres of timber harvest on the Modoc National Forest. This is about 17,000 acres per year of vegetation treatments, of varying intensity, potentially affecting cavity-dependent species’ forage and cover. There is also ongoing timber harvest and juniper removal on private lands within and adjacent to

the proclaimed boundary of the Forest, as well as stochastic events such as wildfires and catastrophic insect outbreaks. Vegetation management and prescribed fire have the potential to impact species in this group by removing important habitat elements such as downed logs, snags, hollow trees and large trees. These elements are used for cover, cavity construction or are important to the life histories of the prey of cavity-dwellers. Prescribed fire and wildfire may also increase the numbers of dead trees, or increase the stress levels within trees, resulting in additional insect populations. Generally, this group of species is affected negatively by extensive mechanical treatments that reduce these important habitat elements and reduce the rate of accumulation of dead trees. Conversely, the species in this group tend to benefit from wildfires, prescribed fire, insect outbreaks and densely stocked timber stands. The benefits from these conditions are a result of higher quantities of snags and higher insect populations that provide improved foraging for these primarily insectivorous species.

This alternative would continue cross-country travel, which includes the public use of the 491 miles of unauthorized routes. Therefore, impacts to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere. Because the impacts from cross-country travel are estimated to be low, the continuation of cross-country travel under this alternative would add only a small amount of negative impacts to those impacts occurring from vegetation management activities. The continuation of public travel on the unauthorized routes would also continue to provide impacts. However, the impact of the unauthorized routes is small in relation to the extent of habitat for these species. For example, the 148 miles of unauthorized routes in hairy woodpecker habitat in this alternative is equivalent to approximately 270 acres, or about two percent, of the area impacted annually by various mechanical and prescribed fire vegetation treatments, or 0.04 percent of the modeled suitable hairy woodpecker habitat on the Modoc National Forest. The three miles of unauthorized routes in pileated woodpecker habitat in this alternative, is equivalent to approximately six acres, or 0.3 percent area impacted annually by various mechanical and prescribed-fire vegetation treatments, or about 0.02 percent of the habitat open to cross-country travel. Furthermore, the unauthorized routes do not constitute a change to habitats, but an existing condition whose vegetation-change impact has already occurred, and whose conditions would continue into the future. Thus, the unauthorized routes have less impact than an acre of new vegetation manipulation.

Alternative 1 has the highest level of negative effects of the alternatives, but these effects are limited in scope and intensity in comparison to other actions occurring on the landscape. Timber harvest and mechanical fuels treatments must meet minimum retention requirements for down logs and snags, thereby ameliorating the potential negative effects to cavity-dependent species from direct removal of snags. Reduced stand density from timber harvest and stand tending results in stronger trees, more resistant to insects. The lower rates of mortality in treated stands thus result in lower densities of snags and ultimately down logs. This effect can last 20 years or more until stand density increases sufficiently to cause tree stress and death. Snag density is encouraged through the retention of existing snags, but as snags fall, the reduced snag recruitment rate can result in areas being below target levels of snag density. This is detrimental to those cavity nesters depending on snags for forage and nesting substrates. Prescribed fire, wildfire, and insect attacks create additional snags and down logs. At the same time, stand-replacing wildfire, while providing a pulse of snags, can remove all living trees, leaving an area poorly suited for cavity nesters for decades. To the extent that snag-removing activities exceed snag-creating activities, there may be a long-term decline in habitat quality for cavity-dependent species. The small acreages of unauthorized routes in this alternative (e.g., 268 equivalent-acres in hairy woodpecker habitat) are insignificant compared to the quantity of treated landscape (5,500 acres per year on the Modoc National Forest, additional would occur on adjacent private lands) especially when considering the positive benefits from this project are essentially a one-time event and timber harvest is ongoing. In other words, the impact of 286 acres of unauthorized

route would be undetectable compared to the long-term period of 20 years and 110,000 acres of timber treatments. Thus, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 1 are imperceptible and discountable.They do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of unauthorized routes to the NFTS. The routes and vehicle traffic probably present little direct impact to any of the focal species in this group. Indirectly, more routes would equal more area easily accessible for woodcutting. Woodcutting typically happens in proximity to a roadway, resulting in fewer snags near the road. The habitat influence rating of “Low” indicates that this impact does not greatly affect the populations of these focal species. However, there would be about five percent fewer acres occurring within a “Low” ranked watershed under this alternative than under Alternative 3, which has the lowest route mileage. This alternative would have two percent more route miles within pileated woodpecker habitat, and eight percent more route miles within black-backed habitat than would occur under Alternative 3. For the black-backed woodpecker, this alternative differs from Alternative 4 by about 1 percent in the route mileage within habitat. The sapsuckers and the hairy woodpecker are affected by five to seven percent more route mileage under this alternative than under the alternative with the least mileage (Alternative 3). There is little difference (one percent) between this alternative and Alternatives 4 in the change in route mileage within habitat for the sapsuckers and the hairy woodpecker. The impacts of this alternative would be the same as Alternative 5 because they have the same routes. The routes in Alternative 2 would thus result in lower impacts to cavity-dependent species than would occur under Alternative 1, have essentially the same impacts as Alternatives 4 and 5, and slightly more impact than Alternative 3. These impacts would primarily be a slight lowering of available snags adjacent to routes and occasional disturbance of foraging due to passing vehicles. These impact differences are limited in scope and intensity.

Table 3-127 displays the route mileage within habitats used by the focal species for this group. The habitat influence rating was “Moderate” for 10 of the watersheds, and “Low” for 101 watersheds. In this alternative, 95 percent of the hairy woodpecker habitat on the Modoc National Forest occurs in a watershed with a “Low” rating for human influence.

Table 3-127. Alternative 2: Miles of Routes within Potential Habitat for the Cavity-Dependent Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Hairy woodpecker	114.5	1,716
Black-backed woodpecker	7.6	90
Pileated woodpecker	1.5	64

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Red-naped sapsucker	3.0	56
Red-breasted sapsucker	98.9	1,363

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles. These areas would have no disturbance from vehicles during the closure periods. Seasonal closures do not appear to be a factor for this species group.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance; whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel, but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 2 on the cavity-dependent group would aggregate with the effects outlined above in table 3-84 This alternative would not continue cross-country travel, which includes the use of unauthorized routes; therefore, impacts to species in this group from cross-country travel would cease and no longer aggregate with effects from other activities that affect cavity-dependent species or their habitat.

The addition of 339 miles of unauthorized routes to the NFTS would also continue to provide impacts. However, the impact of the added routes is small in relation to the extent of habitat for these species. For example, the 115 miles of added route in hairy woodpecker habitat, in this alternative, is equivalent to approximately 209, acres or about one percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. The 1.5 miles of added route in pileated woodpecker habitat, in this alternative, is equivalent to approximately three acres, or about 0.01 percent of the habitat on the National Forest, or 0.01 percent of the area impacted annually by various mechanical and prescribed-fire vegetation treatments.

Alternative 2 has a level of negative effects equal to Alternative 5, below those of Alternative 1, and above those of Alternatives 3 and 4. The primary reasons for the lower amount of impact compared to Alternative 1 is the prohibition of cross-country travel in Alternative 2. The effects of Alternative 2 are limited in scope and intensity in comparison to other actions occurring on the landscape. The small acreages of routes added to the NFTS in this alternative are insignificant compared to the quantity of treated landscape. Thus, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 2 are imperceptible and discountable. They do not appear to affect existing trends to species population size, habitat, or distribution. The small amount of impact that this alternative would add to existing population and habitat trends is of a minimal nature and appears discountable and insignificant.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed

under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance or indirect impacts to prey or food resources.

This alternative would not add any unauthorized routes to the NFTS. However, the linear effects of routes would still occur on the 4,580 miles of NFTS routes. Table 3-128 displays the route mileage within habitats used by the focal species in this group.

The habitat influence rating was "Moderate" for 8 of the watersheds, and "Low" for 103 watersheds. Of the hairy woodpecker habitat on the Modoc National Forest, 99 percent occurs in a watershed with a "Low" rating for human influence. This alternative would have the smallest quantity of route mileage of the alternatives. This alternative could potentially add approximately 268 acres of hairy woodpecker habitat if all the routes no longer used due to the prohibition of cross-country travel, re-vegetate into suitable Forested habitat. The quantities of potential habitat prohibiting cross-country travel would be even less for the other focal species in this group because they have route mileage within their suitable habitat. For example, pileated woodpeckers have only 3.3 miles of unauthorized route in their modeled habitat. This is approximately six acres. Even for hairy woodpecker, the amount of habitat added is small compared to the extent of the existing habitat. For hairy woodpecker the 268 acres from routes not added to the NFTS is only 0.07 percent of the total hairy woodpecker habitat on the National Forest. For pileated woodpeckers, the potential habitat gain is only 0.03 percent of modeled habitat. These extremely small percentages indicate that even no addition of unauthorized routes to the NFTS has no perceptible impact to the population of cavity-dependent species on the Forest.

Table 3-128. Alternative 3: Miles of Routes Within Potential Habitat for the Cavity-Dependent Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes Within Habitat on NF
Hairy woodpecker	114.5	1,716
Black-backed woodpecker	7.6	90
Pileated woodpecker	1.5	64
Red-naped sapsucker	3.0	56
Red-breasted sapsucker	98.9	1,363

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

This alternative would have no change in vehicle class of use.

Cumulative Effects

This alternative would discontinue cross-country travel, which would include use of approximately 491 miles of unauthorized routes to the NFTS. The impacts to species in this group from the cross-country travel would cease and may partially counter negative effects from vegetation management occurring elsewhere. However, the scope and intensity of the impact from ending cross-country travel is small (see the cumulative effects discussion above for Alternative 1). The positive effects from prohibiting cross-country travel would begin to show immediately for species such as pileated woodpeckers that forage on down logs. At the 20-year, long-term point, some additional cavity habitat would have begun to accumulate. However, the low rate and intensity of positive impacts from the cessation of cross-country travel do not appear to be sufficient to counter other impacts that are occurring from vegetation management

treatments. As noted above, there is a potential one-time gain of 268 acres of habitat for hairy woodpecker. This pales in comparison to the 5,500 acres per year of timber harvest that is reasonably foreseeable. Thus, at the end of 20 years the potential habitat gain of 268 acres from this alternative could possibly be countered by 110,000 acres of treatment. Additional harvest would occur on the adjacent private timberlands, also reducing live tree mortality and reducing potential hairy woodpecker habitat. During this 20-year period, some improvement in condition for hairy woodpeckers would occur as prescribed fire, wildfire, and insect outbreaks create new snags. However, these impacts also would dwarf the impact of the potential additional habitat from this alternative. Overall, when aggregated with other impacts to the cavity-dependent group, impacts from this alternative are imperceptible and discountable. They do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance or indirect impacts to prey or food resources.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-129 displays the amount of route mileage within habitats used by the focal species in this group.

The habitat influence rating was “Moderate” for 10 of the watersheds, and “Low” for 101 watersheds. Of the hairy woodpecker habitat on the Modoc National Forest, 95 percent occurs in a watershed with a “Low” rating for human influence. This alternative differs from Alternatives 2 and 5 by less than one percent in the quantity of unauthorized routes added to the NFTS in the habitat for the focal species. The difference in “footprint” between this alternative and alternatives 2 and 5 are, for all intents, essentially undetectable. Therefore, Alternative 4 would have the same effects to cavity-dependent species as Alternative 2.

Table 3-129. Alternative 4: Miles of Routes within Potential Habitat for the Cavity-Dependent Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Hairy woodpecker	114.5	1,716
Black-backed woodpecker	7.6	90
Pileated woodpecker	1.5	64
Red-naped sapsucker	3.0	56
Red-breasted sapsucker	98.9	1,363

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route. These areas would have no disturbance from vehicles during the closure periods. Hairy woodpeckers, black-backed woodpeckers and pileated woodpeckers may see some small reduction in disturbance from seasonal closures, but the extent of closures is small in comparison to the distribution of these

species. Because additional miles of seasonal closure occur on the Warner Mountains in this alternative, red-naped sapsuckers would have additional relief from disturbance as compared to the other alternatives that would not implement closures in the Warner Mountains. Conversely, red-breasted sapsuckers would not benefit from the additional closures.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. There would be no change to vehicle class of use in this alternative. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 4 on the cavity-dependent group would aggregate with the effects outlined above in table 3-84. This alternative would not continue cross-country travel; therefore, the disturbance impacts to species in this group would cease and no longer aggregate with effects from other activities that affect cavity-dependent species and their habitat. The continuation of public travel on 286 miles of unauthorized route added to the NFTS would also continue to provide impacts. However, the impact of the added routes is small in relation to the extent of habitat for these species. For example, the 94 miles of route added to the NFTS in hairy woodpecker habitat, in this alternative, is equivalent to approximately 171 acres or about one percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. The 1.4 miles of route added to the NFTS in pileated woodpecker habitat, in this alternative, is equivalent to approximately 2.5 acres, or about 0.01 percent of the habitat on the National Forest, or 0.01 percent area impacted annually by various mechanical and prescribed-fire vegetation treatments. These impacts are essentially the same as those that would occur under Alternatives 2 and 5.

The small acreages of route added to the NFTS in this alternative are insignificant compared to the quantity of treated landscape. Certainly, the quantity of potential improvement is insufficient to affect habitat trends or population dynamics. Thus, compared to the scope and intensity of the other impacts occurring on the landscape the impacts from Alternative 4 are imperceptible and discountable. They do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. Table 3-130 displays the route mileage proposed to be added to the NFTS within habitats used by the focal species in this group under Alternative 5. Because the route system is the same, the effects to cavity-dependent species are the same for this alternative (Alternative 5) and Alternative 2. Because the route footprint is less than one percent different with Alternative 4, Alternative 5 has essentially the same impacts as Alternative 4.

Table 3-130. Alternative 5: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Hairy woodpecker	114.5	1,716
Black-backed woodpecker	7.6	90
Pileated woodpecker	1.5	64
Red-naped sapsucker	3.0	56
Red-breasted sapsucker	98.9	1,363

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair-bonding and nest initiation may have less disturbance. However, this is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, the impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to cavity-dependent species as compared to Alternative 2. This alternative has the same imperceptible and discountable cumulative effects as Alternative 2.

Comparison of Effects on Cavity-Dependent Species, by Alternative

This section provides tabular comparisons of the five alternatives. Table 3-131 displays how the alternatives compare in number of watersheds with a low habitat influence index, and in proportion of habitat acres occurring within a watershed with a “Low” route influence index rating. Table 3-131 displays a comparison of habitat change metrics for the focal species in the cavity-dependent group. In general, Alternative 1 shows the most impacts to cavity-dependent species and Alternative 3 the least.

Table 3-131. Comparison of Habitat Disturbance Index Ratings Between Alternatives for the Cavity-Dependent Group

Metric	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
# of watersheds with a low habitat influence index	100	101	103	101	101
% of habitat acres whose watershed rating is "Low"	94%	95%	99%	95%	95%

Table 3-132. Comparison of Selected Effects, by Alternative

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Hairy Woodpecker (Modeled habitat on the MDF: 390,960)	NF habitat available for cross-country travel	376,825	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA*: 147.5 UA+NFTS: 1,749 mi	UA: 114.5 UA+NFTS: 1,716 mi 2%< A-1	UA: 0 UA+NFTS: 1,601mi 8%< A-1 7%< A-2	UA: 94.2 UA+NFTS: 1,695 mi 3%< A-1 1%<A-2 6%> A-3	UA: 114.5 UA+NFTS: 1,716 mi 2%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	268.4 (0.07%)	298.4 (0.05%)	0 (0%)	171.4 (0.04%)	298.4 (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	3,183 (0.8%)	3,123 (0.8%)	2,914 (0.7%)	3,085 (0.8%)	3,123 (0.8%)
Black-backed woodpecker (Modeled habitat on the MDF: 25,600)	NF habitat available for cross-country travel	21,252 acres	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat I	UA: 12.9 UA+NFTS: 95	UA: 7.6 UA+NFTS: 90 6%< A-1	UA: 0 UA+NFTS: 82 14%< A-1 8%< A-2	UA: 6.4 UA+NFTS: 89 7%< A-1 1%<A-2 8%> A-3	UA: 7.6 UA+NFTS: 90 6%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	23.5 (0.09%)	13.8 (0.05%)	0 (0%)	11.6 (0.05%)	13.8 (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	172.9 (0.7%)	163.8 (0.6%)	149.2 (0.6%)	162.0 (0.6%)	163.8 (0.6%)
Pileated woodpecker (Modeled habitat	NF habitat available for cross-country travel	22,165 acres	0 ac	0 ac	0 ac	0 ac

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
on the MDF: 25,360)	Miles of route in habitat	UA: 3.3 UA+NFTS: 66	UA: 1.5 UA+NFTS: 64 3%< A-1	UA: 0 UA+NFTS: 62 5%< A-1 2%< A-2	UA: 1.4 UA+NFTS: 64 3%< A-1 0%<A-2 2%> A-3	UA: 1.5 UA+NFTS: 64 3%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	6.0 (0.02%)	2.7 (0.01%)	0 (0%)	2.5 (0.01%)	2.7 (0.01%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	120.1 (0.5%)	116.5 (0.5%)	112.8 (0.4%)	116.5 (0.5%)	116.5 (0.5%)
Red-naped sapsucker (Modeled habitat on the MDF: 19,530)	NF habitat available for cross-country travel	13,967	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 5.9 UA+NFTS: 59	UA: 3.0 UA+NFTS: 56 5%< A-1	UA: 0 UA+NFTS: 53 10%< A-1 5%< A-2	UA: 2.5 UA+NFTS: 56 6%< A-1 1%<A-2 5%> A-3	UA: 3.0 UA+NFTS: 56 5%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	10.7 (0.05%)	5.5 (0.03%)	0 (0%)	4.6 (0.02%)	5.5 (0.03%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	107.4 (0.5%)	101.9 (0.5%)	96.5 (0.5%)	101.9 (0.5%)	101.9 (0.5%)
Red-breasted sapsucker (Modeled habitat on the MDF: 380,610)	NF habitat available for cross-country travel	285,907 acres	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 123.8 UA+NFTS: 1,363	UA: 98.9 UA+NFTS: 1,338 2%< A-1	UA: 0 UA+NFTS: 1,239 9%< A-1 7%< A-2	UA: 81.5 UA+NFTS: 1,320 3%< A-1 1%<A-2 7%> A-3	UA: 98.9 UA+NFTS: 1,338 2%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	225.3 (0.06%)	180.0 (0.05%)	0 (0%)	148.3 (0.04%)	180.0 (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	2,481 (0.7%)	2,435 (0.6%)	2,255 (0.6%)	2,402 (0.6%)	2,435 (0.6%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Oak Group: Affected Environment

Focal Species within the Group: Western Gray Squirrel, Mountain Quail

This species group is associated with habitats that contain oak trees and other hardwoods not associated with riparian zones. Typical species in this group are western gray squirrel, wild turkeys, and mountain quail. Western gray squirrels and mountain quail are the focal species for this group.

Western gray squirrels use the lower-elevation habitats of the Big Valley Ranger District, and are sporadically observed on the other Ranger Districts (USFS 2007). Western gray squirrel presence data for the Modoc is almost entirely from oak habitat (USFS 2007). Mountain quail are included in this group, although they are also strongly associated with shrub habitats other than oaks. However, much of the oak habitat on the Modoc National Forest is often associated with, or located near, dense shrub habitats such as mountain mahogany (*Cercocarpus* sp), *Ceanothus*, or *Prunus* species (B. Turner, 2008 personal observation). Mountain quail habitat is generally steeper, has more cover, more trees, and more woody debris than California quail habitat does (Gutierrez and Delehanty 1999). Mountain quail have been observed to hull and eat "acorns extensively in the fall" (Gutierrez and Delehanty 1999). Mountain quail also eat mushrooms in winter, and generally restrict their diet to plant material (Gutierrez and Delehanty 1999). Mountain quail are altitudinal migrants that move downslope in fall to avoid deep winter snows (Gutierrez and Delehanty 1999).

The Modoc LRMP contains standards and guidelines for managing oaks. The area of the Forest that is managed in accordance with the SNFPA (USFS 2004) provides for oak regeneration and oak retention during treatments. Management of the Big Valley Sustained Yield Unit provides for oak retention under the standards promulgated in the 1991 LRMP. These standards require maintaining at least 36 square feet of basal area per acre in deer intermediate and winter ranges, and 10 square feet of basal area per acre in other areas of oak occurrence.

In order to examine relative impacts between alternatives, a disturbance index was calculated. Western gray squirrels were used to represent the other species in this group. Western gray squirrels appear to be more associated with oak habitats than mountain quail based on the CWHR habitats that are important (see Table 3-133, below). To determine the route zone of influence, routes were buffered by 60 meters. The habitat disturbance index was calculated by dividing the western gray squirrel habitat within the route zone of influence by the amount of western gray squirrel habitat within the 6th order watershed to determine the proportion of habitat that could be influenced by routes. A ranking was assigned that follows the rankings developed by Gaines et al. (2003) using the following class breaks:

- Less than 30 percent of western gray squirrel habitat within a route zone of influence ranks as a "Low" level of human influence
- Thirty to 50 percent of habitat within the route zone of influence is a moderate level of human influence
- More than 50 percent of habitat within the route zone of influence is a high level of human influence

Table 3-133. For the Oak-associated Group: California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (Cwhr) Suitability >0.75	Acres of Habitat on National Forest
Western gray squirrel	ESP: 4D, 4M, 5D	141,780 acres

Species	Habitat (Cwhr) Suitability >0.75	Acres of Habitat on National Forest
	MHW: 3D, 4D, 5P, 5M, 5D, 6 PPN: 4D, 5S, 5P, 5M	
Mountain quail	ESP: 2(ALL), 3,(ALL), 4(ALL), 5(ALL) JPN: 2(ALL), 3,(ALL), 4(ALL), 5(ALL) MCP: 2S, 2P, 3S, 3P, 4S, 4P MHW: 1(ALL), 2(ALL), 3,(ALL), 4(ALL), 5(ALL), 6 MRI: 2(ALL), 3,(ALL), 4(ALL), 5(ALL), 6 PPN: 1(ALL), 2(ALL), 3,(ALL), 4(ALL), 5(ALL) SMC: 1(ALL), 2(ALL), 3,(ALL), 4(ALL), 5(ALL), 6 SCN: 2(ALL), 3,(ALL), 4(ALL), 5(ALL) WFR: 1(ALL), 2(ALL), 3,(ALL), 4(ALL), 5(ALL), 6	340,000 acres

Oak Group: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

The California WHR sizes and stages that were considered as “suitable” are listed for each species in Table 3-133, above. Table 3-134 displays the acres of habitat potentially available for use under this alternative for the focal species within this group. Table 3-135 displays the route mileage that occurs within habitat on the National Forest. Although occasional direct mortality may occur from collisions with vehicles on highways, this is not known to have occurred from slower-moving vehicles off road. If off-road vehicle collisions with the focal species in this group do occur, such occurrences appear to be rare events, and have not been reported within the Forest. Mountain quail nests could be destroyed by off-road vehicle use because of the ground-nesting behavior of this bird. Western gray squirrel young are generally arboreal, and away from direct impacts of vehicles. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events may occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

Indirect impacts to species in this group include impacts to soils that result in less food availability. In locations of heavy off-road use, soil conditions can become compacted. Compacted soils could potentially reduce acorn production, have lower truffle production, and provide fewer opportunities for caching of acorns. Because there are few locations that show extensive compaction from recreational off-road vehicle use, these indirect impacts are very limited on the Modoc NF. For more information on impacts to soils, see the soils and hydrology sections of this document.

A larger impact, both in the short term, and the long term, would be the disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to the focal species within this group

Table 3-134. Alternative 1: Potential Habitat for the Oak Group that Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Western gray squirrel	141,060	99.5%
Mountain quail	338,870	99.7%

*Acres rounded to the nearest 10.

Cross-country travel includes the use of unauthorized routes, and Table 3-135 displays the route mileage within habitats used by the focal species in this group.

Table 3-135. Alternative 1: Miles of Routes within Potential Habitat for the Oak-Associated Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Western gray squirrel	59.0 miles	658.4 miles
Mountain quail	146.8 miles	1,578.0 miles

This alternative would continue to allow the use of 491 miles of unauthorized routes. Disturbance to oak-associated species' activities could occur along these routes. The largest impact would be the continued disturbance along route edges. Vehicle travel may disrupt foraging activities, resulting in more energy expenditures. However, the habitat influence index that was calculated for western gray squirrels indicate that roadside disturbance is probably a minor impact. The habitat influence rating was "Moderate" for eight of the watersheds with gray squirrel habitat, and "Low" for 94 watersheds. There were no watersheds with western gray squirrel habitat that had a rating of "High". Of the western gray squirrel habitat on the Modoc National Forest, 94 percent occurs in a watershed with a "Low" rating for human influence. All of the alternatives have the same number of watersheds in each of the rating categories.

Although the watersheds all have the same rating between alternatives, there are differences in the amount of habitat that is within the disturbance zone that occurs within 60 meters of a route. Not surprisingly, given that cross-country travel, including continued use of unauthorized routes, would continue, Alternative 1 has the largest number of acres (30,607) that fall within the route disturbance zone. This equates to about eight percent more than the alternative with the fewest acres within the disturbance zone (Alternative 3).

As a group, all of the oak-associated species would be most affected by this alternative, as opposed to the other alternatives, because this alternative would have the most route mileage. The routes and vehicle traffic probably present little direct impact to any of the focal species in this group. Indirectly, more route mileage would equal less available habitat for foraging and reproduction. This is especially true in the long-term time period of 20 years, when the other alternatives would have converted routes into re-vegetated foraging habitat for these species.. This alternative would have nine percent more route mileage within gray squirrel and mountain quail habitat, than would occur under Alternative 3. For the gray squirrel, this alternative differs from Alternatives 2, 4, and 5 by about two to four percent in the route mileage within habitat. For the mountain quail, this alternative differs from Alternatives 2, 4, and 5 by about two to three percent in the route mileage within habitat.

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any route. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the oak-dependent group would aggregate with the effects outlined above in table 3-84. Vegetation management and prescribed fire have the potential to impact species in this group by removing small oaks. Vegetation management that may affect oaks includes 4,000 acres of prescribed fire, 6,000 acres of mechanical fuel treatments, 1,500 acres of treatments to improve sage-steppe, and 5,500 acres of timber harvest on the Modoc National Forest. This is about 17,000 acres per year of vegetation treatments, of varying intensity, potentially affecting oak-dependent species forage and cover. Much, if not most, of this activity would occur in areas without an oak component. There is also ongoing timber harvest on private lands where oaks may not be retained at any level. Other ongoing adjacent actions that may impact oaks include juniper removal and grazing on private lands within and adjacent to the proclaimed boundary of the Forest, as well as stochastic events such as wildfires and catastrophic insect and disease outbreaks. Prescribed fire and wildfire may increase acorn production. Some oak habitat is lost through time as conifers overtop the oaks, causing them to decline and eventually die. Generally, this group of species is affected negatively by extensive mechanical treatments that reduce the quantity of oaks and affected positively by treatments that remove conifers that are competing with oaks for sunlight and water. Competition from conifers is an endemic problem in most oak stands due to the long-term effects of fire suppression.

This alternative would continue cross-country travel which would include use of unauthorized routes to public use; therefore, the impacts described above to species in this group would continue and aggregate with effects from vegetation management occurring on the Forest and elsewhere. Because the impacts from cross-country travel are limited in intensity, the continuation of cross-country travel under this alternative would add minor negative impacts to impacts from vegetation management activities. Included in cross-country travel is the continuation of public travel on the unauthorized routes which would also continue to provide impacts. However, the impact of unauthorized routes is small in relation to the extent of habitat for these species. For example, the 59 miles of unauthorized route in western gray squirrel habitat, is equivalent to approximately 107 acres, or about 0.6 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. The 147 miles of unauthorized route in modeled mountain quail habitat, in this alternative, is equivalent to approximately 268 acres, or about 0.07 percent of the habitat open to cross-country travel, or 1.6 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments.

Alternative 1 has the highest level of negative effects of the alternatives, but these effects are limited in scope and intensity in comparison to other actions occurring on the landscape. Oak habitat is lost through time as conifers overtop the oaks. The mechanical treatments and timber harvest that remove competing conifers provide a partial counter to this trend toward loss of oaks due to conifer competition. Although timber harvest and mechanical fuels treatments must meet minimum retention requirements for oaks under the Forest LRMP, oak regeneration can be lost during these actions and during prescribed fire treatments. Grazing can also affect oak regeneration (Bartolome et al. 1987). The impacts of slow habitat loss due to conifer competition, suppressed regeneration due to grazing, and loss of small oaks during other vegetation treatments is occurring across the distribution of oak on the Modoc NF. Thus, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 1 are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The western gray squirrel and mountain quail would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation by cross-country travel would not occur.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of unauthorized routes to the NFTS. Table 3-136 displays the route mileage within habitats used by the focal species in this group.

Table 3-136. Alternative 2: Miles of Routes within Potential Habitat for the Oak-Associated Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Western gray squirrel	44.9 miles	644 miles
Mountain quail	118.2 miles	1,549 miles

The route mileage added to the NFTS within western gray squirrel habitat declines by two percent (approximately 14 miles) compared to Alternative 1. This Alternative would contain seven percent more route mileage added to the NFTS (45 miles) than Alternative 3, and about two percent more route mileage (10 miles) than Alternative 4. The added route mileage would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for gray squirrels due to route-induced disturbance than Alternatives 3 and 4. Alternative 2 would result in less disturbance than Alternative 1 and the same amount as Alternative 5. The habitat influence index that was calculated for western gray squirrels indicates that road-side disturbance is probably a minor impact. The habitat influence rating was “Moderate” for eight of the watersheds with gray squirrel habitat, and “Low” for 94 watersheds, the same as the other alternatives. There were no watersheds with western gray squirrel habitat that had a rating of “High”.

Although the watersheds all have the same rating between alternatives, there are differences in the amount of habitat that is within the disturbance zone that occurs within 60 meters of a route. Alternative 2 has the second largest number of acres (30,089) that fall within the route disturbance zone. This equates to about two percent less than the alternative with the most acres within the disturbance zone, Alternative 1.

The amount of route mileage within mountain quail habitat declines by two percent (approximately 28 miles) compared to Alternative 1. This Alternative would contain eight percent more route mileage added to the NFTS (118 miles) than Alternative 3, and about 1 percent more route mileage (22 miles) than Alternative 4. The routes would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for mountain quail due to route-induced disturbance than Alternatives 3 and 4. Alternative 2 would result in less disturbance than Alternative 1 and the same amount of disturbance as Alternative 5.

The impacts of the small percentage differences between this alternative and the other alternatives in the route mileage added to the NFTS within habitat for the focal species, may be essentially undetectable against the background fluctuations of variable traffic quantities, variable hunting pressure, weather, and stochastic events such as fires.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may have less disturbance.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 2 on the oak-dependent group would aggregate with the effects outlined above in table 3-84. (Also, see the discussion above for alternative 1 and its effects on oak-dependent species.) This alternative would not continue cross-country travel; therefore, impacts from cross-country travel to species in this group would cease and no longer aggregate with effects from other activities that affect oak-dependent species vegetation. The continuation of public travel on 339 miles of routes added to the NFTS would also continue to provide impacts. However, the impact of added routes is small in relation to the extent of habitat for these species. For example, the 45 miles of route added to the NFTS in western gray squirrel habitat in this alternative, is equivalent to approximately 82 acres, or about 0.5 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. This also equates to 0.06 percent of the modeled western gray squirrel habitat. The 118 miles of routes added to the NFTS in mountain quail habitat, in this alternative, is equivalent to approximately 215 acres, or about 0.06 percent, of the habitat on the Modoc National Forest, or 1.2 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. The small acreages of route added to the NFTS in this alternative are insignificant compared to the quantity of treated landscape. Certainly, the quantity of potential improvement in habitat that would occur by the passive restoration of unauthorized routes resulting from prohibition of cross-country travel is insufficient to affect habitat trends or population dynamics. Thus, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 2 are imperceptible and discountable. They do not appear to affect existing trends to species population size, habitat or distribution and are therefore insignificant.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

The western gray squirrel and mountain quail would not be affected by vehicle travel adjacent to nests or within foraging habitat that occurs as a result of cross-country vehicle travel. This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed

under Alternative 1 from cross-country travel would not occur. Changes to food resources caused by compaction or removal of vegetation would not occur.

This alternative would not add any routes to the NFTS. However, the linear effects of roads would still occur on the 4,580 miles of NFTS routes. Table 3-137 displays the route mileage within habitats used by the focal species in this group.

Table 3-137. Alternative 3: Miles of Routes within Potential Habitat for the Oak-Associated Group

Species	Miles of Unauthorized Routes Added to the NFTS within Habitat ON NF	Combined Miles of NFTS and Added Unauthorized Routes within Habitat on NF
Western gray squirrel	0 miles	599 miles
Mountain quail	0 miles	1,431 miles

The route mileage within western gray squirrel habitat declines by nine percent (approximately 59 miles) compared to Alternative 1. In Alternative 3, route mileage declines by seven percent (approximately 45 miles) compared to the total in Alternative 2 or Alternative 5. Alternative 3 has six percent (approximately 35 miles) fewer miles within habitat than Alternative 4. This alternative would thus have the lowest energy expenditure for gray squirrels due to road-induced disturbance. Even though this alternative would have less route mileage, all of the alternatives have the same number of watersheds in each of the rating categories, indicating similar levels of impact from route edge effects. Although the watersheds all have the same rating between alternatives, there are differences in the amount of habitat that is within the disturbance zone that occurs within 60 meters of a route. Not surprisingly, given it has the lowest route mileage, Alternative 3 has the fewest number of acres (28,129) that fall within the route disturbance zone. This equates to about eight percent fewer than the alternative with the most acres within the disturbance zone, Alternative 1.

The route mileage within mountain quail habitat declines by nine percent (approximately 147 miles) compared to Alternative 1. In Alternative 3, route mileage declines by eight percent (approximately 118 miles) compared to the total in Alternative 2 or Alternative 5. Alternative 3 has seven percent (approximately 35 miles) less route mileage within habitat than Alternative 4. Alternative 3 would thus have the lowest energy expenditure for mountain quail due to road-induced disturbance.

Although this alternative has the lowest route mileage within habitat, the percentage change of miles within habitat is less than 10 percent between all alternatives. The impacts of the small percentage differences may be essentially undetectable against the background fluctuations of variable traffic quantities, harvest, weather and stochastic events such as fires.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

Changes to class of use are not expected to have any detectable impact on wildlife.

Cumulative Effects

This alternative would discontinue cross-country travel which would include the use of approximately 491 miles of unauthorized routes. The impacts to species in this group from the cross-country travel would cease and may partially counter some of the effects from loss due to

conifer competition occurring elsewhere. However, the scope and intensity of the impact from ending cross-country travel is small (see the cumulative effects discussion above for Alternative 1). The positive effects from discontinuing cross-country travel which includes unauthorized routes, would begin to show immediately as new oaks begin to sprout and reclaim disturbed areas. At the 20-year, long-term point, some additional oak habitat would have begun to accumulate. However, the low rate and intensity of impacts from the cessation of cross-country travel do not appear to be sufficient to counter the rate of habitat loss due to conifer competition, stochastic events such as wildfire or catastrophic disease, or reduced recruitment of oaks due to grazing. Overall, when aggregated with other impacts to the cavity-dependent group, impacts from this alternative appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The western gray squirrel and mountain quail would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation would not occur.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-138 displays the route mileage that would be added to the NFTS within habitats used by the focal species in this group.

Table 3-138. Alternative 4: Miles of Route within Potential Habitat for the Oak-Associated Group

Species	Miles Of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Western gray squirrel	34.9 miles	634 miles
Mountain quail	96.1 miles	1,527 miles

The route mileage within western gray squirrel habitat declines by four percent (approximately 24 miles) compared to Alternative 1 and declines by two percent (approximately 10 miles), compared to the route mileage added to the NFTS in Alternatives 2 and 5. This Alternative would contain six percent more added mileage (35 miles) than Alternative 3. Alternative 4 would thus cause slightly higher energy expenditure for gray squirrels due to road-induced disturbance than Alternative 3. Alternative 4 would result in less disturbance than Alternatives 1, 2, and 5. The habitat influence index that was calculated for western gray squirrels indicate that roadside disturbance is probably a minor impact. The habitat influence rating was “Moderate” for eight of the watersheds with gray squirrel habitat, and “Low” for 94 watersheds, the same as the other alternatives. There were no watersheds with western gray squirrel habitat that had a rating of “High”.

Although the watersheds all have the same rating between alternatives, there are differences in the amount of habitat that is within the disturbance zone that occurs within 60 meters of a route. Alternative 4 has the second-fewest number of acres (29,630) that fall within the route

disturbance zone. This equates to about five percent more than the alternative with the least acres (Alternative 3), and about three percent less than the alternative with the most acres within the disturbance zone, Alternative 1.

The route mileage within mountain quail habitat declines by three percent (approximately 51 miles) compared to Alternative 1. This Alternative would contain seven percent more route mileage (96 miles) than Alternative 3, and about one percent less route mileage (22 miles) than Alternative 2 and Alternative 5. Alternative 4 would thus cause slightly higher energy expenditures for mountain quail due to route-induced disturbance than Alternative 3. Alternative 4 would result in less disturbance to mountain quail than Alternatives 1, 2 and 5.

The impacts of the small percentage differences between this alternative and the other alternatives in the amount of routes within habitat for the focal species, may be essentially undetectable against the background fluctuations of variable traffic quantities, variable hunting pressure, weather and stochastic events such as fires.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may have less disturbance.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. There would be no change in vehicle class of use in this alternative. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 4 on the oak-dependent group would aggregate with the effects outlined above in table 3-84. (Also, see the discussion above for Alternative 1 and its effects on oak-dependent species.). This alternative would not continue cross-country travel; therefore, those impacts to species in this group would cease and no longer aggregate with effects from other activities that affect oak-dependent species habitat. The addition of 286 miles of unauthorized routes to the NFTS would also continue to provide impacts. However, the impact of the added route use is small in relation to the extent of habitat for these species. For example, the 35 miles of unauthorized route that would be added to the NFTS in western gray squirrel habitat, in this alternative, is equivalent to approximately 64 acres or about 0.4 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. The 118 miles of unauthorized routes added to the NFTS in mountain quail habitat, in this alternative, is equivalent to approximately 215 acres, or about 0.06 percent of the habitat on the Modoc National Forest, or 1.2 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments.

The small acreages of unauthorized route added to the NFTS in this alternative are insignificant, compared to the quantity of treated landscape and the quantity of landscape affected by conifer-competition. The effects from the prohibition of cross-country travel in this alternative are also small when compared to the quantity of other actions affecting these species. Certainly, the quantity of potential improvement is insufficient to affect habitat trends or population dynamics. Thus, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 4 are imperceptible and discountable. They do not appear to affect existing trends to species population size, habitat or distribution and are therefore insignificant.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. Therefore, there would be no impacts from cross-country, motorized travel.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-13 displays the route mileage that would be added to the NFTS within habitats used by the focal species in this group. This alternative has the same route configuration as Alternative 2. Because the road system is the same, the effects to oak-associated species are the same for this alternative (Alternative 5) and Alternative 2.

Table 3-139. Miles of Routes within Potential Habitat for the Oak-Associated Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Western gray squirrel	44.9 miles	644 miles
Mountain quail	118.2 miles	1,549 miles

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of road and be identical to those that would occur with Alternative 2. These closure areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair-bonding and nest initiation may have less disturbance. The impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to oak-associated species as compared to Alternative 2. This alternative has the same cumulative effects as Alternative 2, which effects are imperceptible and discountable.

Comparison of Effects on Oak-Associated Species, by Alternative

This section provides tabular comparisons of the five alternatives. The first table (3-140) compares the number of watersheds with a “Low” disturbance index rating and compares the amount of total acres that lie within the habitat disturbance zone. Table 3-141 displays a comparison of habitat change metrics for the focal species in the oak-associated group. Alternative 1 shows the most impacts to oak-associated species, and Alternative 3 the least.

Table 3-140. Comparison of Habitat Disturbance Index Ratings Between Alternatives for the Oak-Associated Group

Metric	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
# of watersheds with a low habitat disturbance index	94	94	94	94	94
# of acres within the habitat disturbance zone”	30,607	30,089	28,189	29,630	30,089

Table 3-141. Comparison of Selected Effects, by Alternative on the Oak-Associated Group

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Western gray squirrel (Modeled habitat on the MDF: 141,780)	NF habitat available for cross-country travel	141,060 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA*: 59.0 UA+NFTS: 658.4	UA: 44.9 UA+NFTS: 644.3 2%< A-1	UA: 0 UA+NFTS: 599.4 9%< A-1 7%< A-2	UA: 34.9 UA+NFTS: 634.3 4%< A-1 2%<A-2 6%> A-3	UA: 44.9 UA+NFTS: 644.3 2%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	107.4 (0.08%)	81.7 (0.06%)	0 (0%)	63.5 (0.04%)	81.7 (0.06%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	1,198 (0.8%)	1,173 (0.8%)	1,091 (0.8%)	1,154 (0.8%)	1,173 (0.8%)
Mountain quail (Modeled habitat on the MDF: 340,000)	NF habitat available for cross-country travel	338,870 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 146.8 UA+NFTS: 1,578	UA: 118.2 UA+NFTS: 1,549 2%< A-1	UA: 0 UA+NFTS: 1,431 9%< A-1 8%< A-2	UA: 96.1 UA+NFTS: 1,527 3%< A-1 1%<A-2 7%> A-3	UA: 118.2 UA+NFTS: 1,549 2%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	267.2 (0.08%)	215.1 (0.06%)	0 (0%)	174.9 (0.05%)	215.1 (0.06%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	2,872 (0.8%)	2,819 (0.8%)	2,604 (0.8%)	2,779 (0.8%)	2,819 (0.8%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Wetland Group: Affected Environment

Focal Species within the Group: Sandhill Crane, Canada Goose, Mallard

This species group is associated with seasonal and permanent wetlands and areas with wet soils that support rushes and sedges. Focal species for this group include sandhill cranes, Canada goose, and mallards. Sandhill cranes that breed at many of the larger wetland areas on the Forest are part of the Central Valley Population of greater sandhill cranes (Grus canadensis tabida; Ivey and Herziger 2001). Sandhill cranes nest in flooded meadows and marshes with scattered stands of bulrush, cattails and burreed (Tacha et al. 1992). Established pairs tend to return to breeding sites (Tacha et al. 1992).

Canada geese nest on many of the islands in wetlands and lakes on the Modoc National Forest. Approximately 667 islands have been constructed for goose nesting on the Modoc National Forest (USFS 2007). Mallard use of habitat on the Modoc National Forest is similar to that used by Canada geese (USFS 2007). The CWHR habitat stages that are important (as measured by exceeding the 0.75 suitability index) are the same for both mallards and Canada geese. Because of the similarities of their habitat, mallards and Canada geese are analyzed together. Disturbance of mallards or Canada geese on the nest can result in nest desertion or attraction of avian and mammalian predators (Drilling et al. 2002). Wetlands on the Modoc NF are not only important for nesting, but as important mid-migration foraging areas (Miller et al. 2005).

An index to evaluate the effects of displacement, avoidance, and disturbance is the security habitat index (Gaines et al. 2003). For this analysis, routes are buffered by 250 meters, in order to establish a zone of route influence The mapped habitats that scored a CWHR suitability index of 0.75 for mallards and Canada geese (see Table 3-142 below) were buffered by 250 meters following the procedure established by Gaines et al. (2003) to establish the potential habitat. The amount of potential habitat in a watershed outside of the zone of route influence (the security habitat) is divided by the total amount of potential habitat to determine the level of human influence within the watershed. A ranking was assigned that follows the rankings developed by Gaines et al. (2003) and that reflects an approximation of a point where human influences affect wetland wildlife use of the wetland. The level of influence of human activities on habitat ranking is as follows:

- Less than 50 percent security habitat is a high level of human influence
- Fifty to 70 percent security habitat is a moderate level of human influence
- More than 70 percent security habitat is a low level of human influence

Table 3-142. For the Wetland-Associated Group, California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
Sandhill crane	FEW: 1M, 1D, 2M, 2D WTM: 1M, 1D, 2M, 2D	7,060 acres
Canada goose and Mallard duck	AGS: All sizes/stages FEW: All sizes/stages PGS: All sizes/stages WTM: All sizes/stages	82,000 acres

Wetland Group: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-142, above. Table 3-143 displays the number of acres of mapped habitat that meets the CWHR stages potentially available for use under this alternative. Table 3-144 displays the route mileage that occurs within habitat on the National Forest. Although occasional direct mortality may occur from collisions with vehicles on highways, this is not known to have occurred from slower moving vehicles off road. If off-road vehicle collisions with adults in this group do occur, such occurrence appears to be a rare event and has not been reported within the Forest. Sandhill crane, mallard and goose nests could be destroyed by off-road vehicle use because of the ground-nesting behavior of these birds. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

Indirect impacts to species in this group include impacts to vegetation that results in less cover suitable for nesting. In locations of heavy off-road use, vegetation can be impacted such that it becomes compacted or in extreme cases removed, thereby rendering a site unsuitable for nesting waterfowl and cranes. Sedimentation of wetlands from off-road vehicle use could also impact vegetation growth or invertebrate production in the wetlands. For more information on impacts to soils and water quality, see the soils and hydrology sections of this document.

Another impact would be the disturbance caused by off-road use of vehicles resulting in the movement of individuals or the alteration of their behavior. Disturbance-caused movement can expose eggs or chicks to potentially fatal weather conditions or predators. Disturbance can also alter feeding patterns or interrupt important mating rituals. These impacts to feeding and mating can have indirect impacts to the production of young through delaying the onset of laying, reducing clutch size or reducing the fitness of adults or chicks.

Table 3-143. Alternative 1: Potential Habitat for the Wetland Group that Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Sandhill crane	6,560 acres of mapped habitat	92.9%
Canada goose Mallard	78,150 acres of mapped habitat	95.3%

*Acres rounded to the nearest 10.

Continued cross-country travel includes effects from the continuation of use of unauthorized routes. Table 3-144 displays the route mileage within habitats used by the focal species in this group.

Table 3-144. Alternative 1: Miles of Routes within Potential Habitat for the Wetland Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Sandhill crane	2.25 miles	13 miles
Canada goose Mallard	35.0 miles	257 miles

This alternative would continue cross-country travel which would include the use of 491 miles of unauthorized routes. Disturbance to wetland species' activities could occur along these routes. The largest impact would be the continued disturbance along route edges. Vehicle travel may disrupt foraging activities, resulting in more energy expenditures. To evaluate the level of human influence, the security index for wetland habitat was calculated. In this alternative, the human influence rating would be "High" for 67 of the watersheds with wetland habitat, "Moderate" for 31 of the watersheds, and "Low" for 23 watersheds. These ratings reflect the increased route mileage under this alternative compared to the other alternatives. This alternative (Alternative 1) has six more watersheds with high rankings than the alternative with the fewest high rankings (Alternative 3), and four fewer "Low"-ranked watersheds than the two alternatives with the most "Low"-ranked watersheds (Alternatives 3 and 4).

As a group, all of the wetland species would be most affected by this alternative, as opposed to the other alternatives, because this alternative allows continued cross-country travel which includes unauthorized routes. Indirectly, more route mileage would equal less available habitat, as well as more disturbance to foraging and reproduction activities. This is especially true in the long-term time period of 20 years when the other alternatives would have unauthorized routes which, over time, would convert into re-vegetated foraging habitat or buffer from disturbance for these species. Because cross-country travel includes unauthorized roads, this alternative would have 17 percent more route miles within sandhill crane habitat, than would occur under Alternative 3, the alternative that does not add any unauthorized routes to the system and prohibits cross-country travel. For the sandhill crane, this alternative differs from Alternatives 2, 4, and 5 by about 11 to14 percent in the route mileage within habitat. The larger percentage differences between this alternative and the other alternatives in route mileage within sandhill crane habitat may be a factor of the relatively small area that is known to be sandhill crane habitat. This alternative would have 14 percent more route mileage within Canada goose and mallard habitat, than would occur under Alternative 3, the alternative that does not add any unauthorized routes to the system and prohibits cross-country travel. For the goose and mallard, this alternative differs from Alternatives 2, 4, and 5 by approximately seven to eight percent in the mileage of routes within habitat. The impacts of the small percentage differences between this

alternative and the other alternatives in the amount of routes within Canada goose and mallard habitat may be essentially undetectable against the background fluctuations of variable wetland water levels, variable harvest rates, weather and stochastic events such as fires and floods. However, Alternative 1 would have the most impact of all the alternatives on wetland species.

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any particular route segment. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the wetland-dependent group would aggregate with the effects outlined above in table 3-84. Those impacts most affecting wetland habitats are related to the 122,500 AUMs of grazing on the National Forest and similar impacts occurring on adjacent BLM and private lands. These impacts include mortality to wetland associated species from fence entanglement and hay cropping, removal of vegetation that results in the loss of nesting cover, loss of substrate for invertebrates, lowered water quality and increased turbidity. Vegetation management activities that affect water quality and quantity of runoff can also impact the habitat for this species group. For more information on cumulative effects to water quality and quantity, see the hydrology section of this chapter.

This alternative would continue cross-country travel which includes the use of unauthorized routes by the public; therefore, impacts to species in this group would continue and aggregate with effects from vegetation management and grazing. Because the impacts from cross-country travel are estimated to be of limited intensity, the continuation of cross-country travel under this alternative would add a small amount of negative impacts to the impacts from grazing and other activities. The continuation of use on the unauthorized routes, which is a part of cross-country travel, would also continue to provide impacts. However, the impact of this use is small in relation to the extent of habitat for these species. For example, the 35 miles of unauthorized route in Canada goose and mallard habitat, in this alternative, is equivalent to approximately 64 acres or about 0.08 percent of the buffered Canada goose and mallard habitat area. Under Alternative 1, approximately 2.25 miles of unauthorized route is an equivalent of approximately four acres or 0.06% of potential sandhill crane habitat.

Alternative 1 has the highest level of negative effects of the alternatives, but these effects are limited in scope and intensity in comparison to the other actions occurring on the landscape. Especially on private lands, residual vegetation after grazing may be insufficient to provide nesting cover. Trends for Canada goose and mallard populations are affected by conditions on the wintering grounds and other centers of nesting. Generally, Canada goose populations appear to be increasing in the West, while mallard populations appear to have declined (USFS 2007). Sandhill crane populations also appear to be increasing (USFS 2007). The small negative impacts of this alternative, aggregated with the other negative impacts occurring to wetland habitats, appear to be insufficient to counter the increasing numbers of sandhill cranes and Canada geese. These same impacts may be contributing to a portion of the decline in mallard numbers. However, mallard populations may be more heavily affected by factors impacting the primary breeding and wintering areas in the Great Plains, Palouse and Central Valley (Austin and Miller 1995). When compared to the scope and intensity of the other impacts occurring on the landscape, and to the overall trends for the focal species, the impacts from Alternative 1, including individual mortality, degraded water quality, and removal of emergent vegetation, are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The sandhill crane, mallard and Canada goose would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation would not occur.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of routes to the NFTS. Table 3-145 displays the routes within habitats used by the focal species in this group.

Table 3-145. Alternative 2: Miles of Routes within Potential Habitat for the Wetland Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Sandhill crane	0.76 miles	11.75 miles
Canada goose Mallard	17.45 miles	239 miles

The route mileage within sandhill crane habitat declines by 11 percent (approximately 1.5 miles) compared to Alternative 1. This Alternative would contain about 6 percent more added route mileage (0.8 miles) than Alternative 3, and about 3 percent more added route mileage (0.5 miles) than Alternative 4. The route system would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for sandhill cranes due to route-induced disturbance than Alternatives 3 and 4. Alternative 2 would result in less disturbance than Alternative 1 and the same amount as Alternative 5.

The route mileage within Canada goose and mallard habitat declines by 7 percent (approximately 17.5 miles) compared to Alternative 1. This Alternative would contain 7 percent more route mileage (17.5 miles) than Alternative 3, and about 1 percent more route mileage (3.5 miles) than Alternative 4. The route mileage would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for geese and mallards due to route-induced disturbance than Alternatives 3 and 4. Alternative 2 would result in less disturbance than Alternative 1 and the same amount as Alternative 5.

To evaluate the level of human influence, the security index for wetland habitat was calculated. In this alternative the human influence rating would be “High” for 66 of the watersheds with Canada goose/mallard habitat, “Moderate” for 31 of the watersheds, and “Low” for 24 watersheds. These ratings reflect the slightly higher amount of route mileage than contained in Alternatives 3 and 4. This alternative would have the same number of watersheds in each ranking category as Alternative 5. This alternative (Alternative 2) has five more watersheds with high rankings than the alternative with the fewest high rankings (Alternative 3), and three fewer low-ranked watersheds than the two alternatives with the most low-ranked watersheds (Alternatives 3 and 4). These changes in ratings places this alternative as intermediate in the effect of routes on wetland habitats compared to the other alternatives. However, the impacts of the small percentage differences between this alternative and the other alternatives in the route mileage within Canada goose and mallard habitat, may be essentially undetectable against the background fluctuations of

variable wetland water levels, variable harvest rates, weather and stochastic events such as fires and floods.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may have be disturbed less than under alternatives 1 and 3 that do not implement closures.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance; whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 2 on the wetland-dependent group would aggregate with the effects outlined above in table 3-84. This alternative would discontinue cross-country travel which would include approximately 152 miles of unauthorized routes that with discontinued use would eventually re-vegetate. The addition of 339 miles of unauthorized routes to the NFTS would continue to provide impacts. However, the impact of additional routes is small in relation to the extent of habitat for these species. For example, the 17 miles of unauthorized routes added to the NFTS in Canada goose and mallard habitat, in this alternative, is equivalent to approximately 31 acres or about 0.04 percent of the buffered Canada goose and mallard habitat area. Under Alternative 2, approximately 0.76 miles of unauthorized routes would be added to the NFTS in sandhill crane habitat. This would be less than two acres or about 0.02% of modeled sandhill crane habitat.

The small negative impacts of this alternative, aggregated with the other negative impacts occurring to wetland habitats, appear to be insufficient to counter the increasing numbers of sandhill cranes and Canada geese (see discussion under Alternative 1). These same impacts may be contributing to a portion of the decline in mallard numbers. However, mallard populations may be more heavily affected by factors impacting the primary breeding and wintering areas in the Great Plains, Palouse and Central Valley (Austin and Miller 1995, Miller and Duncan 1999). When compared to the scope and intensity of the other impacts occurring on the landscape, and to the overall trends for the focal species, the impacts from Alternative 2, including individual mortality, degraded water-quality, and removal of emergent vegetation, are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The wetland species would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation would not occur.

This alternative would not add any routes to the NFTS. However the linear effects of routes would still occur on the 4,580 miles of NFTS roads open for use. Table 3-146 displays the route mileage within habitats used by the focal species in this group.

Table 3-146. Alternative 3: Miles of Routes within Potential Habitat for the Wetland Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Sandhill crane	0 miles	11 miles
Canada goose Mallard	0 miles	222 miles

The route mileage within sandhill crane habitat declines by 17 percent (approximately 2.25 miles) compared to Alternative 1. In Alternative 3, route mileage in crane habitat declines by 6 percent (approximately 0.75 miles) compared to the total in Alternative 2 or Alternative 5. Alternative 3 has 4 percent (approximately 0.5 miles) fewer miles within habitat than Alternative 4. This alternative would thus have the lowest energy expenditure for sandhill cranes due to road-induced disturbance.

The route mileage within Canada goose and mallard habitat declines by 4 percent (approximately 35 miles) compared to Alternative 1. In this alternative (Alternative 3), route mileage declines by 7 percent (approximately 17 miles) compared to the total in Alternative 2 or Alternative 5. Alternative 3 has 6 percent (approximately 14 miles) fewer route miles within habitat than Alternative 4. Alternative 3 would thus have the lowest energy expenditure for Canada geese and mallards due to road-induced disturbance.

To evaluate the level of human influence, the security index for wetland habitat was calculated. In this alternative the human influence rating would be “High” for 61 of the watersheds with Canada goose/mallard habitat, “Moderate” for 33 of the watersheds, and “Low” for 27 watersheds. These ratings reflect the reduced route mileage under this alternative compared to the other alternatives. This alternative (Alternative 3) has six fewer watersheds with high rankings than the alternative with the most “High” rankings (Alternative 1), and four more low-ranked watersheds than the alternative with the least “Low” ranked watersheds (Alternatives 1). These changes in ratings places this alternative as the lowest in the effect of routes on wetland habitats compared to the other alternatives. The lowest impact from existing routes means the least amount of disturbance caused by vehicles operating on roadways. However, the impacts of the small percentage differences between this alternative and the other alternatives in the amount of routes within Canada goose and mallard habitat, may be essentially undetectable against the background fluctuations of variable wetland water levels, weather and stochastic events such as fires and floods. The larger percentage differences between this alternative and the other alternatives in amount of routes within sandhill crane habitat may indicate the potential for sandhill cranes to benefit from reduced routes adjacent to wetlands used by sandhill cranes.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

Changes to class of use are not expected to have any detectable impact on wildlife.

Cumulative Effects

This alternative would discontinue cross-country travel which would include continued use of 491 miles of unauthorized routes to the NFTS. The impacts to species in this group from the cross-country travel and from the unauthorized routes would cease and may partially counter some of the ongoing negative effects due to grazing. However, the scope and intensity of the impact from ending cross-country travel is small (see the cumulative effects discussion above for Alternative 1). The positive effects from prohibiting cross-country travel begin to show immediately as disturbance would be immediately reduced. At the 20-year, long-term point, some additional wetland habitat would have begun to accumulate from discontinuation of motorized use on unauthorized roads resulting from the prohibition of cross-country travel. However, the low rate and intensity of impacts from cessation of cross-country travel do not appear to be sufficient to counter the impacts from ongoing grazing or stochastic events such as wildfire or catastrophic disease. Overall, the reduced negative impacts from this alternative, when aggregated with the positive population trends for geese and cranes, seem to indicate that conditions may continue to improve for Canada geese and sandhill cranes. The aggregated negative effects may be a small contribution to mallard population declines, but the project area is small in comparison to mallard habitat in the Pacific flyway. Overall, cumulative effects appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The sandhill crane, Canada goose and mallard would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation would not occur.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-147 displays the route mileage within habitats used by the focal species in this group.

Table 3-147. Alternative 4: Miles of Routes within Potential Habitat for the Wetland Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Sandhill crane	0.45 miles	11.4 miles
Canada goose Mallard	14 miles	236 miles

The route mileage within sandhill crane habitat declines by 14 percent (approximately 1.8 miles) compared to Alternative 1 and declines by 3 percent (approximately 0.3 miles) compared to the added route mileage in Alternatives 2 and 5. This Alternative would contain 4 percent more added route mileage (0.5 miles) than Alternative 3. Alternative 4 would thus cause slightly higher energy expenditure for sandhill cranes due to route-induced disturbance than Alternative 3. Alternative 4 would result in less disturbance than Alternatives 1, 2, and 5.

The route mileage within mallard and Canada goose habitat declines by 8 percent (approximately 21 miles) compared to Alternative 1. This Alternative would contain 6 percent more added route mileage (14 miles) than Alternative 3, and about 1 percent less route mileage (3.5 miles) than Alternative 2 and Alternative 5. Alternative 4 would thus cause slightly higher energy expenditures for geese and mallards due to route-induced disturbance than Alternative 3. Alternative 4 would result in less disturbance than Alternatives 1, 2 and 5.

In this alternative the human influence rating would be "High" for 66 of the watersheds with Canada goose/mallard habitat, "Moderate" for 28 of the watersheds, and "Low" for 27 watersheds. These ratings reflect the reduced mileage of routes added to the NFTS under this alternative compared to most of the other alternatives. This alternative (Alternative 4) has one less watershed with a high ranking than the alternative with the most "High" rankings (Alternative 1), and the same number of "Low" ranked watersheds as the other alternative with the most low-ranked watersheds (Alternative 3). These ratings place this alternative as intermediate in the effect of routes on wetland habitats compared to the other alternatives. Although tying for the number of watersheds with a "Low" ranking, this alternative has more "High" rated watersheds than the alternative (3) that does not add any routes to the NFTS. This would appear to indicate an elevated level of negative impact from this alternative as compared to Alternative 3. The impacts of the percentage differences between this alternative and the other alternatives in the route mileage added within Canada goose and mallard habitat, may be essentially undetectable against the background fluctuations of variable wetland water levels, variable harvest rates, weather and stochastic events such as fires and floods. This alternative provides benefits of reduced disturbance to sandhill cranes as compared to Alternative 1. That Alternatives 2-5 have small differences in effect may reflect the screening that was performed by the line officer/interdisciplinary team and indicate that the screening would not add the most onerous route segments, at least for sandhill cranes, to the NFTS.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may be disturbed less than by Alternative 1 and Alternative 3 which do not have seasonal closures.

Changes to class of use are not expected to have any detectable impact on wildlife.

Cumulative Effects

The effects of Alternative 4 on the wetland-dependent group would aggregate with the effects outlined above in table 3-84. This alternative would discontinue cross-country travel which includes continued use on approximately 152 miles of unauthorized routes. The continuation of public travel on 339 miles of unauthorized routes would continue to provide impacts. However, the impact of the routes added to the NFTS is small in relation to the extent of habitat for these species. For example, the 14 miles of added route in Canada goose and mallard habitat, in this alternative, is equivalent to approximately 25 acres or about 0.03 percent of the buffered Canada goose and mallard habitat area. Under Alternative 4, approximately 0.5 miles of unauthorized routes would be added to the NFTS in sandhill crane habitat. This would be less than one acre of potential habitat.

The small negative impacts of this alternative, aggregated with the other negative impacts occurring to wetland habitats, appear to be insufficient to counter the increasing numbers of sandhill cranes and Canada geese (see discussion under Alternative 1). These same impacts may be contributing to a portion of the decline in mallard numbers. However, mallard populations may be more heavily affected by factors impacting the primary breeding and wintering areas in the

Great Plains, Palouse and Central Valley (Austin and Miller 1995, Miller and Duncan 1999). When compared to the scope and intensity of the other impacts occurring on the landscape, and to the overall trends for the focal species, the impacts from Alternative 4, including individual mortality, degraded water-quality, and removal of emergent vegetation, are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. Table 3-148 displays the route mileage proposed to be added to the NFTS within habitats used by the focal species in this group. This alternative has the same NFTS configuration as Alternative 2. Because the NFTS is the same, the effect to wetland species is the same for this alternative (Alternative 5) and Alternative 2.

Table 3-148. Miles of Route within Potential Habitat for the Wetland Group

Species	Miles Of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Sandhill crane	0.76 miles	11.75 miles
Canada goose Mallard	17.45 miles	239 miles

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of road and be identical to those that would occur with Alternative 2. These closure areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair-bonding and nest initiation may have less disturbance. The impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance; whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2 with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to wetland species as compared to Alternative 2. This alternative has the same cumulative effects as Alternative 2, which are effects that are imperceptible and discountable.

Comparison of Effects on Wetland Species, by Alternative

This section provides tabular comparisons of the five alternatives. The first table (Table 3-149) compares the number of watersheds with a “Low” disturbance index rating and compares the

amount of acres that lie within the habitat disturbance zone. Table 3-150 displays a comparison of habitat change metrics for the focal species in the wetland-associated group. Alternative 1 has the most impacts to wetland-associated species and Alternative 3 the least.

Cumulative Effects

Table 3-149. Comparison of Habitat Disturbance Index Ratings Between Alternatives for the Wetland Group

Metric	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
# of watersheds with each human influence rank	23 “Low” 31 “Moderate” 67 “High”	24 “Low” 31 “Moderate” 66 “High”	27 “Low” 33 “Moderate” 61 “High”	27 “Low” 28 “Moderate” 66 “High”	24 “Low” 31 “Moderate” 66 “High”

Table 3-150. Comparison of Selected Effects by Alternative on the Oak-Associated Group

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Sandhill crane (Modeled habitat on the MDF: 7,060)	NF habitat available for cross-country travel	6,560 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA*: 2.25 UA+NFTS: 13	UA: 0.76 UA+NFTS: 12 11%< A-1	UA: 0 UA+NFTS: 11 17%< A-1 6%< A-2	UA: 0.45 UA+NFTS: 11 14%< A-1 3%<A-2 4%> A-3	UA: 0.76 UA+NFTS: 12 11%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	4.1 (0.06%)	1.4 (0.02%)	0 (0%)	0.8 (0.01%)	1.4 (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	23.7 (0.3%)	21.8 (0.3%)	20.0 (0.3%)	20.0 (0.3%)	21.8 (0.3%)
Canada goose and Mallard (Modeled habitat on the MDF: 82,000)	NF habitat available for cross-country travel	78,150 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 35.0 UA+NFTS: 257	UA 17.5 UA+NFTS: 239 7%< A-1	UA: 0 UA+NFTS: 222 14%< A-1 7%< A-2	UA: 14.0 UA+NFTS: 236 8%< A-1 1%<A-2 6%> A-3	UA: 17.5 UA+NFTS: 239 7%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	63.7 (0.08%)	31.9 (0.04%)	0 (0%)	25.5 (0.03%)	31.9 (0.04%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	467,7 (0.6%)	435.0 (0.5%)	122.0 (0.1%)	429.5 (0.5%)	435.0 (0.5%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Sensitive Species Determinations

Greater Sandhill Crane
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

For the Modoc Travel Management Project Alternative 1, the biologist found that the alternative may affect individual sandhill cranes as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2, 4 and 5 would prohibit cross-country travel and reduce the potential disturbance and indirect effects from additional routes being added to the NFTS compared to the potential impacts of Alternative 1. This reduction appears to sufficiently reduce impacts to a level so low as to be undetectable and thus Alternatives 2, 4 and 5 would have no effect on sandhill cranes. Alternative 3 would have no impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS. Alternative 3 would therefore have no effects on sandhill cranes or their habitats. Thus it is my determination that the Modoc Travel Management Project Alternatives 2-5 would not affect sandhill cranes or their habitat.

Sage-Steppe Group: Affected Environment

Focal Species within the Group: Pronghorn, Greater Sage-Grouse, Swainson's Hawk, Golden Eagle

This species group is associated with the dynamic mosaic landscape of big and low sagebrush, grasslands, and juniper.

Pronghorn use extensive sagebrush areas with a low coverage of shrubs for food and predator escape (USFS 2008a). Pronghorns rely on the ability to visually detect predators at long distance and the pronghorn's speed to escape predators (Zeiner et al. 1990). This sensitivity to predators makes does in late pregnancy and does with young fawns highly reactive to any form of harassment (Lee et al. 1998). There is an estimated 62,550 acres of potential pronghorn habitat that meets the CWHR suitability index equal to or greater than 0.75 on the Modoc National Forest. A habitat disturbance index was calculated for pronghorn antelope based on a 1,500-meter buffer. However, only a limited number of watersheds (10) showed any difference between the two most divergent alternatives (1 and 3). The average difference of 53 acres in the raw acre calculation resulted in very small percentage differences between Alternative 1 and Alternative 3. Additionally, 96 percent of the modeled habitat, Forest-wide was contained in the 1500-meter disturbance buffer. Because of these results it is clear that pronghorn habitat is potentially subject to roadside disturbance and that the differences between alternatives is insufficient for the habitat disturbance index to be a useful measure of effect.

The Swainson's hawk is a long-distance migrant that breeds on the Modoc National Forest (Modoc National Forest records) and spends the non-breeding season in South America (England et al. 1997). Swainson's hawk reproduction appears to be restricted on the Modoc to the northwest corner of the Doublehead Ranger District, although there appears to be suitable habitat on at least small portions of the other three districts.

Nesting pairs may desert their nests after visits to nests by humans (England et al. 1997). Although apparently tolerant of regular, ongoing human activities, loud, irregular, unpredictable activities have caused nest abandonment (England et al. 1997). A study on the Hanford Site in

central Washington found that Swainson's hawks appeared to be sensitive to pedestrian and vehicle traffic (Poole et al. 1988). The authors of the study recommended a 2.2 kilometer (1.4 mile) buffer around nest trees to reduce disturbance to nesting Swainson's hawks and to protect against impacts to the prey base (Poole et al. 1988). The Modoc LRMP requires a 402.3 meter (0.25 mile) protective buffer around Swainson's hawk nests to prevent disturbance from management activities (USFS 1991). Analysis of this project's effects on Swainson's hawks is thus complicated by widely distributed, but apparently vacant habitat and widely varying potential effects zones. Thus, in order to cover the impacts that may potentially occur, without knowing the appropriate scale, this analysis looks at the effects to Swainson's hawks at three scales. The Forest-wide CWHR potentially suitable habitat is the largest scale and includes habitat on all four ranger districts. The mid-scale examines the potential impacts at the 2.2-kilometer range around the known, recently active nesting sites. The third and smallest scale examines the potential impacts within the 402.3 meter disturbance zone around the known active nests. The 2.2 kilometer and the 402.3 meter scales only examine the known sites on the Doublehead Ranger District.

Greater sage-grouse on the Modoc plateau have declined (USFS 2008a) as have sage-grouse populations in other areas of their contracting range (Schroeder et al. 1999). California Department of Fish and Game records indicate there were many active leks across much of the Devil's Garden and Doublehead Ranger Districts with scattered leks on or adjacent to the other two districts in the early part of the 20th century (USFS 2007). By the 1950s, the sage-grouse population had dropped dramatically and by 2004, only six birds remained on the only known remaining active lek on the Devil's Garden (USFS 2007). The encroachment of juniper into the sagebrush steppe has been a major factor in the decline of sage-grouse habitat on the Modoc National Forest (USFS 2007). This analysis looks at the potential sagebrush habitats across the historic range of sage-grouse on the Modoc National Forest including the remaining center of activity near the Clear Lake Hills on the Doublehead Ranger District. The entire historic range of habitat is analyzed to detect potential conflicts with areas of sage habitat that may be currently vacant but that may provide important future expansion habitats.

The area designated for active management of the Devil's Garden/Clear Lake population management unit ("active management area") is also analyzed for impacts. This is the area where a multi-agency group (including the Forest Service) is actively working to enhance the sage-grouse population through habitat manipulation and the release of translocated birds. The active management area is approximately 289,400 acres of which 212,710 acres are on the Modoc National Forest. This area of the Modoc National Forest was selected to analyze the effects of the alternatives considered in this document on sage-grouse in this important area of active population restoration.

The small-scale, local impacts near the currently active sage-grouse leks were considered as part of the analysis of each unauthorized route segment by the line officer/interdisciplinary team as part of the analysis to define the proposed action.

Golden eagles hunt primarily prey of open country such as hares, rabbits, ground squirrels, prairie dogs and will frequently use carrion (Kochert et al. 2002, USFS 2007). An estimated 5,500 acres are within 0.25 miles of nesting golden eagles on the Forest. Humans cause >70 percent of the recorded golden eagle deaths with collision being the largest cause (Kochert et al. 2002). Nearly 1,000 golden eagles were killed along highways near Rock Springs, WY in one winter (Kochert et al. 2002). Analysis of golden eagles examines the potential impacts within a 402.3 meter (0.25 mile) radius of the known nesting sites. This scale was picked due to the difficulty in defining golden eagle habitat. Golden eagles on the Modoc use a variety of vegetation types and substrates for nesting. Foraging can also occur in a variety of habitat types. Due to these factors, the existing

golden eagle locations were buffered by 0.25 mile and used to analyze the relative differences between alternatives.

Table 3-151. For The Sage-Steppe Group, California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
Pronghorn	AGS: All sizes/stages LSG: 1, 2S, 2P, 2M, 3S PAS: All sizes/stages SGB: 1, 2S, 2P, 2M	62,550 acres
Swainson's hawk	AGS: All sizes/stages JUN: 5S, 5P PAS: All sizes/stages	59,450 acres (potential habitat from model) 17,720 acres (within 2.2 kilometers of existing site) 1,450 acres (within 0.25 miles of existing sites)
Greater sage-grouse	BBR: 2(ALL), 3(ALL), 4(ALL) SGB: 2(ALL), 3(ALL), 4(ALL) WTM: 1S, 1P, 2D	128,940 acres (potential habitat from model)
Greater sage-grouse	National Forest System lands within the active management area	212,710 acres
Golden eagle	SPECIAL ELEMENTS	5,550 (within 0.25 miles of existing sites)

Sage-Steppe Group: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

The California WHR sizes and stages that were considered as "suitable" are listed for each species in , above. Table 3-152. displays the number of acres of mapped habitat that meets the CWHR stages potentially open for cross-country travel under this alternative. Table 3-153. displays the route mileage that occurs within habitat on the National Forest. Although occasional direct mortality may occur from collisions with vehicles on highways, this is not known to have occurred from slower moving vehicles off-road. Sage grouse nests could be destroyed by cross-country travel. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

Indirect impacts to species in this group from cross-country travel fall into two basic sets. One set is related to changes in vegetation due to cross-country travel. The other set of impacts is related to disturbance to animal behavior from cross-country vehicle travel.

Changes to vegetation that result from cross-country vehicle travel potentially include reduction in quantity of vegetation, changes to vegetative structure that affects cover, or changes in relative abundance of plant species. In locations of heavy off-road use, vegetation can be impacted such that it becomes compacted or in extreme cases, removed; thereby rendering a site unsuitable for ground-nesting birds such as sage-grouse to construct nests safe from predators. Cross-country travel may also alter the relative mix of plant species. An example may be a reduction in sage shrubs and an increase in annual grasses from repeated vehicle travel masticating the shrubs. Cross-country vehicle travel can also disrupt soil crusts reducing soil fertility resulting in less new

plant growth, and potentially increasing noxious plants (Kaltenecker and Wicklow-Howard 1994). For more information on cross-country travel effects to plants see the botany section elsewhere in this document.

The amount of impact from cross-country vehicle travel is unknown but presumed small due to the relatively low quantity of cross-country vehicle travel on the Modoc National Forest (see discussion on recreation and of-road vehicle use patterns elsewhere in the document). The intensity of this impact is unknown but appears to be limited especially when compared to other vegetation altering activities (see cumulative effects sections).

Disturbance can be an impact, caused by off-road use of vehicles that may result in direct and indirect effects by causing the movement of individuals or the alteration of their behavior. Disturbance-caused movement can expose eggs or young to potentially fatal weather conditions or predators. Disturbance can also alter feeding patterns or interrupt important mating rituals. These impacts to feeding and mating can have impacts to the production of young through delaying the onset of laying, reducing clutch size or reducing the fitness of adults or young with reduced fitness manifesting in lower rates of survival for offspring. The amount of this impact is unknown but presumed small due to the relatively low quantity of cross-country vehicle travel on the Modoc National Forest (see discussion on recreation and off-road vehicle use patterns elsewhere in the document).

Table 3-152. Alternative 1: Potential Habitat for the Sage-Steppe Group that Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of habitat*	Percent of all habitat (or area) on MDF open to cross-country travel
Pronghorn	62,530 acres (CWHR habitat model)	100%
Swainson's hawk	59,430 acres (CWHR habitat model)	100%
	17,720 acres (2.2 km buffer of known sites)	100%
	1,450 acres (402.3 m buffer of known sites)	100%
Greater sage-grouse	128,300 acres (CWHR habitat model)	100%
	212,710 acres (active management area)	100%
Golden eagle	4,980 acres (402.3 m buffer of known sites)	89.7%

*Acres rounded to the nearest 10.

Table 3-153. displays the route mileage within habitats used by the focal species in this group.

Table 3-153. Alternative 1: Miles of Route within Potential Habitat for the Sage-Steppe Group

Species	Miles of Unauthorized Routes Within Habitat on NF or within the active management area (sage-grouse)	Combined Miles of NFTS and Unauthorized Routes
Pronghorn	31.26 miles	208.5 miles
Swainson's hawk	29.4 miles (CWHR habitat model)	194.4 miles (CWHR habitat model)
	0.2 miles (2.2 km buffer of known sites)	40.2 miles (2.2 km buffer of known sites)
	0 miles (402.3 m buffer of known sites)	4.8 miles (402.3 m buffer of known sites)
Greater sage-grouse	34.3 miles (CWHR habitat model)	372 miles (CWHR habitat model)
	43.1 miles (active management area)	797 miles (active management area)

Species	Miles of Unauthorized Routes Within Habitat on NF or within the active management area (sage-grouse)	Combined Miles of NFTS and Unauthorized Routes
Golden eagle	1.5 miles	17.8 miles

This alternative would continue to allow the use of 491 miles of unauthorized routes as part of the continuation of cross-country travel. Disturbance to sage-steppe species' activities could occur along these routes. The largest impact would be the continued disturbance along route edges. Vehicle travel may disrupt foraging activities resulting in more energy expenditures. As a group, all of the sage-steppe species would be most affected by this alternative, as opposed to the other alternatives, because cross-country travel would continue that includes the use of the most route mileage available for public motorized vehicle travel.

Approximately 31.3 miles of unauthorized routes would be available for use within potential pronghorn habitat in this alternative. This is 15 percent more than route mileage that would be available for use under Alternative 3, which does not add any unauthorized routes to the NFTS. Alternatives 2, 4, and 5 would have approximately 7-8 percent fewer route miles than this alternative. Alternative 1 would allow cross-country travel which includes 209 miles of unauthorized routes within the CWHR modeled pronghorn habitat. This is approximately 15 percent (29 miles) more than would occur under Alternative 3, the alternative with no unauthorized route usage. The additional route mileage would result in this alternative having the greatest potential disturbance to pronghorn. However, this disturbance effect is tempered by the average length of the unauthorized route segments. Approximately 84 percent of all unauthorized route segments are less than 0.5 miles in length or much shorter than the 1500-meter (0.93 mile) distance used to approximate pronghorn reactions. Analysis indicates that 100 percent of the unauthorized routes would lie within the influence zone of the existing route system. Thus, even though this alternative would have more routes than the other alternatives, the additional miles do not result in additional disturbance to pronghorn.

Indirectly, more unauthorized route mileage would equal less available habitat. Assuming an average 15-foot route width, the 31.3 miles of unauthorized routes that occurs in pronghorn habitat represents about 57 acres. In the long-term time period of 20 years, when the other alternatives would have converted routes not added to the NFTS into re-vegetated foraging habitat, Alternative 1 would still have 57 acres of unauthorized routes within habitat and the acres would not be available as pronghorn habitat.

Alternative 1 would potentially have more disturbance to Swainson's hawks than Alternative 3 due to 29 more miles routes being available for use in Alternative 1. This is about 15 percent more route mileage than Alternative 3. Alternative 1 would also have approximately 7-9 percent more route mileage than Alternatives 2, 4, and 5. Although these percentages are relatively high for the effects in this project, they are somewhat speculative given the speculative nature of the CWHR modeled Swainson's hawk habitat. The known Swainson's hawk habitat at the 2.2-kilometer scale would only be impacted by 0.2 miles of unauthorized route that would be available to public use in Alternative 1, or added to the NFTS in Alternatives 2, 4, and 5. At the 402.3-meter scale, there are no unauthorized routes in any of the alternatives. It thus appears that there is a small, somewhat speculative, increase in disturbance to Swainson's hawk potential habitat away from the known nesting areas.

Alternative 1 would not prohibit cross-country travel and would include continued use on approximately 34 miles of unauthorized routes in potential sage-grouse habitat across the Forest. Alternative 1 would also continue public use on 43.1 miles of unauthorized routes within the active management area for sage-grouse. When combined with existing NFTS routes a total of 372 miles would be available for public use within the modeled habitat and 438 miles would be available within the active management area. This is 9 percent more route mileage in habitat than

under Alternative 3 and 10% more mileage in the active mileage area than would be available for public use in Alternative 3. Route mileage in habitat across the Forest, in Alternative 1 totals approximately 3 percent more than would occur in Alternatives 2, 4, and 5. Route mileage in the active management area would be 3-4 percent more than would occur in Alternatives 2, 4, and 5. Only one mile of unauthorized route is within ¼ mile of a historic lek site. This one mile aggregate would affect four historic lek sites, none of which appear to be currently active. In the long-term, this alternative would maintain current disturbance levels and would not have the potential recovery of habitat that would occur under the other alternatives.

Golden eagle activity centers would have approximately 17.8 miles of route continuing to be used by the public under this alternative. This is approximately 8 percent more route mileage than would occur under Alternative 3. Alternatives 2, 4, and 5 would have approximately 5-6 percent less route mileage (16.7 –17.0 miles) than this alternative. The primary impact to golden eagles is increased disturbance during the nesting season compared to the other alternatives. Although a potential positive indirect effect could be additional forage in the form of road-killed carrion, this effect would be limited or not occur given the low speeds on these generally short spurs (maximum length of unauthorized route segment in golden eagle habitat is 0.3 miles, the mean length is 0.14 miles) and during cross-country travel.

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any particular route segment. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the sage-steppe group would aggregate with the effects outlined above in table 3-84. Those effects include approximately 1,500 acres per year of treatments to improve sage-steppe, and 122,500 AUMs of grazing annually on the Modoc National Forest. There is also ongoing juniper removal and grazing on other public and private lands within and adjacent to the proclaimed boundary of the Forest as well as stochastic events such as wildfires and catastrophic insect outbreaks. However the dominant trends affecting this species group are a substantial trend of juniper encroachment and capture of sagebrush sites within and adjacent to the project area and a trend of increased extent of annual grasses such as cheatgrass and medusahead (US Forest Service and USDI Bureau of Land Management 2008).

Juniper and encroachment of annual grasses results in reduced forbs and perennial grasses which can reduce forage for the focal species pronghorn and sage-grouse and reduce the food for the prey of Swainson's hawks and golden eagles. Juniper encroachment may also make sage-grouse more susceptible to predation and reduce an area's suitability for pronghorn. Vegetation treatments and grazing have the potential to impact species in this group by removing grasses and forbs, impeding the growth of sagebrush, expediting the spread of annual grasses, or altering vegetative structure that provides cover. Past trends for this group have generally been negative for all species except golden eagles. Pronghorn populations in northeastern California appear to have dropped from near 100,000 in 1952 to approximately 25,000 by 1992 and have since appeared to stabilize (USFS 2007). Swainson's hawk populations in California appear to be slowly declining (USFS 2007). Sage grouse have sharply declined (see above also USFS and USDI Bureau of Land Management 2008).

This alternative would continue cross-country travel therefore impacts to species in this group would continue and aggregate with effects from vegetation management and the effects of juniper encroachment. Because the impacts from cross-country travel are estimated to be low, the continuation of cross-country travel under this alternative would add minor to imperceptible amounts to negative impacts from vegetation management activities. The impact of unauthorized

routes would be small. For example, the 31 miles of unauthorized route in pronghorn habitat, in this alternative, is equivalent to approximately 56 acres or about 0.09 percent of the potential pronghorn habitat. The 34 miles of unauthorized route in sage-grouse habitat (CWHR model), in this alternative, is equivalent to approximately 62 acres or about 0.05 percent of the area the model predicts may potentially provide sage-grouse habitat. Furthermore, the unauthorized routes do not constitute a change to habitats but an existing condition whose vegetation change impact has already occurred and whose conditions would continue into the future. Thus, the roadways have less impact than an acre of new vegetation manipulation. Overall, impacts from this alternative appear to be primarily related to disturbance and appear to aggregate with other impacts occurring on the landscape, particularly the trend of loss of habitat to juniper and annual grass encroachment. However, compared to the scope and intensity of habitat loss due to juniper and annual grass encroaching across the landscape, the impacts from Alternative 1 are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution for species in this group.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within the sage-steppe group by prohibiting cross-country travel, including continued use of approximately 213 miles of unauthorized routes, that are within the sage steppe habitat. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from continued cross-country travel would not occur.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of unauthorized routes to the NFTS. Table 3-154 displays the route mileage within habitats used by the focal species in this group.

Table 3-154. Alternative 2: Miles of Routes within Potential Habitat for the Sage-Steppe Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Pronghorn	16.8 miles	194 miles
Swainson's hawk	15.6 miles (CWHR habitat model) 0.2 miles (2.2 km buffer of known sites) 0 miles (402.3 m buffer of known sites)	181 miles (CWHR habitat model) 40.2 miles (2.2 km buffer of known sites) 4.8 miles (402.3 m buffer of known sites)
Greater sage-grouse	3.9 miles (CWHR habitat model) 31.3 miles (active management area)	361 miles (CWHR habitat model) 426.1 miles (active management area)
Golden eagle	0.6 miles	17 miles

Alternative 2 would have a total of 194 miles of unauthorized routes within the CWHR modeled habitat for pronghorn. Of this total, approximately 16.8 miles of unauthorized routes would be added to the NFTS within potential pronghorn habitat in this alternative. This is 9 percent more than the route mileage that would be available for use under Alternative 3, which adds no unauthorized routes to the NFTS. Alternative 1 would have approximately 7 percent more route mileage than this alternative. Alternative 4 would have approximately 2 percent fewer miles added to the NFTS than this alternative. This alternative would have the same route mileage, in

the same locations, as Alternative 5. The slightly lower amount of route miles added to the NFTS would result in this alternative having somewhat less potential disturbance to pronghorn than the Alternative 1 which has the most routes available to public use. However, this disturbance effect is tempered by the average length of the unauthorized route segments. Approximately 84 percent of all unauthorized route segments are less than 0.5 miles in length or much shorter than the 1500-meter (0.93 mile) distance used to approximate pronghorn reactions. Analysis indicates that 100 percent of the unauthorized routes would lie within the influence zone of the existing NFTS routes. Thus, even though this alternative would have more routes than some other alternatives, the additional miles do not result in additional disturbance.

Indirectly, more route mileage would equal less available habitat. Assuming an average 15-foot route width, the 17 miles of unauthorized routes that would be added to the NFTS that occur in pronghorn habitat represents about 31 acres. In the long-term period of 20 years, Alternative 2 would not be in the process of growing the 31 acres into available pronghorn habitat. This would be approximately 26 acres less than would be available to grow into habitat in Alternative 3, and approximately 5 acres less than the available amount for Alternative 4. Alternative 2 would have the same amount of long-term habitat returned as Alternative 5. However, these acres appear to be insignificant additions compared to the more than 62,000 acres of modeled potential pronghorn habitat.

Alternative 2 would potentially have more disturbance to Swainson's hawks than Alternative 3 due to 16 more miles of unauthorized routes being added to the NFTS in Alternative 2. This is about 9 percent more route mileage than Alternative 3. Alternative 2 would also have approximately 2 percent more route mileage than Alternative 4, and approximately 7 percent less than Alternative 1. These impacts are somewhat speculative given the speculative nature of the CWHR model of habitat for Swainson's hawks. The known Swainson's hawk habitat at the 2.2-kilometer scale would only be impacted by 0.2 miles of unauthorized route in Alternative 1, or 0.2 miles of unauthorized routes added to the NFTS in Alternatives 2, 4, and 5. At the 402.3-meter scale, there are no unauthorized routes that would be added to the NFTS in any of the alternatives. It thus appears that there is a small, somewhat speculative, increase in disturbance to Swainson's hawk habitat away from the known nesting areas.

Alternative 2 would add to the NFTS approximately 24 miles of unauthorized routes in potential sage-grouse habitat across the Forest. When combined with existing NFTS routes a total of 362 miles would be available for public use within habitat for sage-grouse. This is 7 percent more mileage than would be available under Alternative 3 which does not add any routes to the NFTS. There is no difference in miles of route within potential habitat between Alternative 2 and 5 because both Alternatives have the same route system. There is no effective difference between Alternative 2 and Alternative 4 as the two alternatives differ by less than 0.7 miles or less than 0.2 percent. Alternative 2 would add 31.3 miles to the existing NFTS routes for a total of 426 miles within the active management area. This is seven percent more mileage within the active management area than would occur in Alternative 3. Alternative 2 would have 5.8 miles more available routes than Alternative 4 within the active management area. Thus alternative 2 would have more available routes than Alternatives 3 and 4, the same as Alternative 5, and less than Alternative 1. The additional route mileage when converted to acre-equivalents would be 43.5 acres of routes added within habitat (0.03 percent of the total available) and 57 acres of routes added within the active management area (0.03 percent of the active management area). These percentages appear to be so small as to be insignificant. Only 0.7 miles of added route would be within ¼-mile of a historic lek with no routes added within the active management area.

In the long-term, this alternative would potentially add approximately 19 acres of habitat compared to 0 acres added for Alternative 1, 63 acres added in Alternative 3, 20 acres added in Alternative 4 and 19 acres added in Alternative 5. This would appear to be an insignificant

change given approximately 129,000 acres that potentially could provide habitat for sage-grouse according to the CWHR model.

Golden eagle activity centers would have approximately 17.0 miles of NFTS route within a quarter-mile under this alternative. This is approximately 4 percent more route mileage than would occur under Alternative 3 and approximately 2 percent more route mileage than would occur under Alternative 4. Alternative 1would have approximately 5 percent more total route miles (17.8 miles) than this alternative. The primary impacts to golden eagles from the route system is increased disturbance during the nesting season compared to the Alternatives 3 and 4 with their lower total route mileage and the decreased disturbance compared to Alternative 4. However, these impacts are probably insignificant given the short length of added route segments and the low percentage of change over the entire route system. Although a potential positive indirect effect could be additional forage in the form of road-killed carrion, this effect would be limited or not occur given the low speeds on these generally short spurs (maximum length of unauthorized route segment in golden eagle disturbance zone is 0.3 miles, the mean length is 0.14 miles).

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may be disturbed less than under Alternatives 1 and 3 that do not implement closures.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 2 on the sage-steppe group would aggregate with the effects outlined above in table 3-84. Those effects include 1,500 acres per year of treatments to improve sage-steppe, and 122,500 AUMs of grazing annually on the Modoc National Forest. This alternative would discontinue cross-country travel which would include 152 miles of unauthorized routes, but would add 339 miles of unauthorized routes to the NFTS. Therefore impacts to species in this group would be less than those in Alternative 1 but more than those in Alternative 3. The impact of additional routes added to the NFTS is small. For example, the 17 miles of unauthorized route in pronghorn habitat, added to the NFTS in this alternative, is equivalent to approximately 31 acres or about 0.05 percent of the potential pronghorn habitat. The 24 miles of added unauthorized route in sage-grouse habitat (CWHR model), in this alternative, is equivalent to approximately 44 acres or about 0.03 percent of the area the model predicts may potentially provide sage-grouse habitat. Overall, impacts from this alternative appear to be primarily related to disturbance and appear to aggregate with other impacts occurring on the landscape, particularly the trend of loss of habitat to juniper and annual grass encroachment. However, compared to the scope and intensity of habitat loss due to juniper and annual grass encroachment across the landscape, the impacts from Alternative 2 are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution for species in this group.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within the sage-steppe group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from continued cross-country travel would not occur.

The sage-steppe species would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation would not occur.

This alternative would not add any unauthorized routes. However the linear effects of roads would still occur on the 4,580 miles of NFTS roads. Table 3-155. displays the NFTS route mileage currently within habitats used by the focal species in this group.

Table 3-155. Alternative 3: Miles of Routes within Potential Habitat for the Sage-Steppe Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Pronghorn	0 miles	177 miles
Swainson's hawk	0 miles (CWHR habitat model) 0 miles (2.2 km buffer of known sites) 0 miles (402.3 m buffer of known sites)	165 miles (CWHR habitat model) 40.0 miles (2.2 km buffer of known sites) 4.8 miles (402.3 m buffer of known sites)
Greater sage-grouse	0 miles (CWHR habitat model) 0 miles (active management area)	338 miles (CWHR habitat model) 395 miles (active management area)
Golden eagle	0 miles	16.4 miles

Alternative 3 would have a total of 177 miles of NFTS route within the CWHR modeled habitat for pronghorn. No unauthorized routes would be added to the NFTS under this alternative. Alternative 2 and 5 would have approximately 9 percent more route mileage than this alternative, and Alternative 4 would have approximately 8 percent more route mileage than this alternative in pronghorn habitat. The lower route mileage would result in this alternative having the least potential disturbance to pronghorn of the alternatives. However, this disturbance effect is tempered by the average length of the unauthorized route segments in the other alternatives. Approximately 84 percent of all unauthorized route segments are less than 0.5 miles in length or much shorter than the 1500-meter (0.93 mile) distance used to approximate pronghorn reactions. Analysis indicates that 100 percent of the unauthorized routes in Alternatives 1, 2, 4, and 5 would lie within the influence zone of the existing NFTS route system. Thus, even though this alternative would have fewer routes than the other alternatives, the additional miles in the other alternatives do not result in additional disturbance.

With no unauthorized routes being added to the NFTS, the prohibition of cross-country travel would result in all of the unauthorized routes slowly regaining habitat characteristics similar to the surrounding lands. Assuming an average 15-foot route width, the 31 miles of unauthorized route in pronghorn habitat in this alternative represents about 57 acres. In the long-term period of 20 years, Alternative 3 would be in the process of growing the 57 acres into available pronghorn habitat. This would be more than in Alternatives 1, 2, 4, and 5 (0 acres, 26 acres, 31 acres, and 26 acres respectively). However, this appears to be an insignificant addition compared to the more than 62,000 acres of modeled potential pronghorn habitat.

Alternative 3, at the Forest-wide scale of potential habitat to Swainson's hawks, would potentially have less disturbance than the other alternatives as no unauthorized routes would be added to the NFTS. The known Swainson's hawk habitat at the 2.2-kilometer scale would not be impacted by the 0.2 miles of unauthorized route that would be added to the NFTS in Alternatives 1, 2, 4, and 5. At the 402.3-meter scale, there are no unauthorized routes that would be added to the NFTS in any of the alternatives. This alternative (Alternative 3) appears to have no difference in effects to Swainson's hawks from the other alternatives at the scale of the known sites (2.2 km and 402.3 m scales).

Alternative 3 would not add any unauthorized routes in potential sage-grouse habitat or within the active management area. The existing NFTS routes would total 337 miles within sage-grouse habitat. There are 395 miles of NFTS routes within the active management area. Route mileage within habitat for Alternatives 2 and 5 is approximately 7 percent more than would occur in Alternative 3. Alternative 4 would have approximately 7 percent more miles than this alternative within habitat. In the long-term, this alternative would potentially add approximately 63 acres of habitat compared to 0 acres added for Alternative 1, 19 acres added in Alternative 2, 20 acres added in Alternative 4 and 19 acres added in Alternative 5. This would appear to be an insignificant change given approximately 129,000 acres that potentially could provide habitat for sage-grouse according to the CWHR model.

Golden eagle activity centers would have approximately 16.4 miles of NFTS routes under this alternative. This is approximately 4 percent less route mileage than would occur under Alternatives 2 and 5, and approximately 2 percent less route mileage than would occur under Alternative 4. The impacts to golden eagles, from the lower route mileage in this alternative, are primarily decreased disturbance during the nesting season compared to the other alternatives. However, these impacts are probably insignificant given the short length of added route segments in the other alternatives and the low percentage of change over the entire road system.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

Cumulative Effects

This alternative would discontinue cross-country travel and would not add approximately 491 miles of unauthorized routes. The impacts to species in this group from the cross-country travel and from the unauthorized routes would cease and may partially counter some of the effects due to grazing or juniper and annual grass encroachment. However, the scope and intensity of the impact from ending cross-country travel is small (see the cumulative effects discussion above for Alternative 1). The positive effects from not adding the unauthorized routes begin to show immediately as disturbance would be immediately reduced. At the 20-year, long-term point, some additional sage habitat would have begun to accumulate on the unauthorized routes. However, the low rate and intensity of impacts from the cessation of cross-country travel do not appear to be sufficient to counter the impacts from ongoing grazing, juniper and annual grass encroachment or stochastic events such as wildfire or catastrophic disease. Overall, even though this alternative has the fewest negative effects of any of the alternatives, when aggregated with the overall effects of juniper and annual grass encroachment and grazing, long-term trends of declining habitat suitability for sage-steppe species remain unaffected. Overall, cumulative effects appear to be insufficient to alter the larger trends occurring on the landscape. Essentially, the impacts from Alternative 3 are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution for species in this group.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within the sage-steppe group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from continued cross-country travel would not occur.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-156. displays the route mileage that would be added to the NFTS within habitats used by the focal species in this group.

Table 3-156. Alternative 4: Miles of Route within Potential Habitat for the Sage-Steppe Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Pronghorn	14.0 miles	191 miles
Swainson's hawk	12.8 miles (CWHR habitat model) 0.2 miles (2.2 km buffer of known sites) 0 miles (402.3 m buffer of known sites)	178 miles (CWHR habitat model) 40 miles (2.2 km buffer of known sites) 5 miles (402.3 m buffer of known sites)
Greater sage-grouse	23.2 miles (CWHR habitat model) 25.5 miles (active management area)	361 miles (CWHR habitat model) 765 miles (active management area)
Golden eagle	0.3 miles	16.7 miles

Alternative 4 would have a total of 191 miles of NFTS routes within the CWHR modeled habitat for pronghorn. Of that total, this alternative includes approximately 14 miles of unauthorized routes that would be added to the NFTS within potential pronghorn habitat . This is 8 percent more than the quantity of routes that would exist under Alternative 3, which adds no unauthorized routes to the NFTS. Alternative 1 would have approximately 8 percent more mileage than this alternative. Alternatives 2 and 5 would have approximately 1 percent more route mileage than Alternative 4. The additional route miles would result in this alternative having potentially more disturbance to pronghorn than the alternative which adds no routes to the NFTS (Alternative 3). As discussed above, even though this alternative would have more route mileage than some other alternatives, the additional miles do not result in additional disturbance.

Indirectly, more routes added to the NFTS would equal less available habitat. Assuming an average 15-foot route width, the 14 miles of unauthorized route added to the NFTS that occurs in pronghorn habitat represents about 25 acres. In the long-term period of 20 years, Alternative 4 would have 25 acres that would not be returning into available pronghorn habitat. This would be approximately 26 acres less than would be available to grow into habitat in Alternative 3, approximately 31 acres more than the available amount for Alternative 1 and approximately 5 acres more than the available amount for Alternatives 2 and 5. However, this appears to be an insignificant addition compared to the more than 62,000 acres of modeled potential habitat for pronghorn.

Alternative 4 would potentially have more disturbance to Swainson's hawks than Alternative 3 due to 13 additional miles of NFTS routes in Alternative 4. This is about 8 percent more route mileage than Alternative 3. Alternative 4 would also have approximately 2 percent less route mileage than Alternative 2 and 5, and approximately 9 percent less than Alternative 1. These

impacts are somewhat speculative given the speculative nature of the CWHR habitat model for Swainson's hawks. The known Swainson's hawk habitat at the 2.2-kilometer scale would only be impacted by 0.2 miles of unauthorized routes in Alternatives 1, 2, 4, and 5. At the 402.3-meter scale, there are no unauthorized routes in Swainson's hawk habitat that would be added to the NFTS in any of the alternatives.

Alternative 4 would add approximately 23 miles of unauthorized routes to the NFTS in potential sage-grouse habitat across the Forest. When combined with the existing NFTS the route mileage would total of 361 miles. This is 7 percent more route mileage than under Alternative 3 which has the lowest route mileage. Route mileage within habitat in Alternative 4 totals approximately 3 percent less than would occur in Alternative 1. There is no effective difference between Alternatives 2 and 5 and Alternative 4 as the three alternatives differ by less than 0.7 miles or less than 0.2 percent. Alternative 4 would add 25.5 miles of route within the active management area. This would equate to approximately 46 acres or 0.02 percent of the active management area. Alternative 4 would not add any routes within ¼-mile of a historic lek within the active management area and would only add 0.4 miles within ¼-mile of leks outside of the active management area. Given the lack of impact adjacent to leks, and the absence of cross-country travel this alternative would have no direct or indirect impacts on sage-grouse in the near-term.

In the long-term, this alternative (4) would potentially have 20 fewer acres of sage-grouse habitat compared to Alternative 3, 1 acre less than Alternative 2, and Alternative 5. This would appear to be an insignificant change given approximately 129,000 acres that potentially could provide habitat for sage-grouse according to the CWHR model. The larger impact would be a reduction in potential disturbance and avoidance of direct impacts due to the prohibition of cross-country travel.

Golden eagle activity centers would have approximately 16.7 miles of NFTS routes under this alternative. This is approximately 2 percent more route mileage than would occur under Alternative 3 and approximately 2 percent less route mileage than would occur under Alternatives 2 and 5. Alternative 1 would have approximately 6 percent more routes (17.8 miles) than this alternative. The primary impacts to golden eagles from the routes is increased disturbance during the nesting season compared to Alternative 3 with its lower total route mileage and decreased disturbance compared to Alternatives 1, 2 and 5. However, these impacts are probably insignificant given the short length of added route segments and the low percentage of change over the entire NFTS. Although a potential positive indirect effect could be additional forage in the form of road-killed carrion, this effect would be limited or not occur given the low speeds on these generally short spurs (maximum length of proposed route additions in golden eagle habitat is 0.3 miles, the mean length is 0.14 miles).

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may be disturbed less than Alternative 1 and Alternative 3 which do not have seasonal closures.

Changes to class of use would not occur with this alternative.

Cumulative Effects

The effects of Alternative 4 on the sage-steppe group would aggregate with the effects outlined above in table 3-84. Those effects include 1,500 acres per year of treatments to improve sage-steppe during the next decade, and 122,500 AUMs of grazing annually on the Modoc National Forest. This alternative would discontinue cross-country travel which would include 213 miles of unauthorized routes, but would add 286 miles of unauthorized routes to the NFTS. Therefore

impacts to species in this group would be less than those in Alternative 1 but more than those in Alternative 3. The impact of additional routes added to the NFTS is small. For example, the 14 miles of unauthorized route in pronghorn habitat, added to the NFTS in this alternative, is equivalent to approximately 26 acres or about 0.04 percent of the potential pronghorn habitat. The 23 miles of added unauthorized route in sage-grouse habitat (CWHR model), in this alternative, is equivalent to approximately 42 acres or about 0.03 percent of the area the model predicts may potentially provide sage-grouse habitat. Overall, impacts from this alternative appear to be primarily related to disturbance and appear to aggregate with other impacts occurring on the landscape, particularly the trend of loss of habitat to juniper and annual grass encroachment. However, compared to the scope and intensity of habitat loss due to juniper and annual grass encroachment across the landscape, the impacts from Alternative 2 are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution for species in this group.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within the sage-steppe group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from continued cross-country travel would not occur.

This alternative does not continue the practice of cross-country, motorized vehicle travel. Therefore, there would be no impacts from cross-country, motorized travel.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-157. displays the route mileage proposed to be added to the NFTS within habitats used by the focal species in this group. This alternative has the same route mileage and configuration as Alternative 2. Because the road system is the same, the effects to sage-steppe species are the same for this alternative (Alternative 5) and Alternative 2.

Table 3-157. Alternative 5: Miles of Routes within Potential Habitat for the Sage-Steppe Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Pronghorn	16.8 miles	194 miles
Swainson's hawk	15.6 miles (CWHR habitat model) 0.2 miles (2.2 km buffer of known sites) 0 miles (402.3 m buffer of known sites)	181 miles (CWHR habitat model) 40.2 miles (2.2 km buffer of known sites) 4.8 miles (402.3 m buffer of known sites)
Greater sage-grouse	3.9 miles	361 miles
Golden eagle	0.6 miles	17 miles

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route and be identical to those that would occur with Alternative 2. These closure areas would have no disturbance from vehicles during the closure periods. The impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance; whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 5 on the sage-steppe group would aggregate with the effects outlined above in table 3-77. Alternative 5 has the same effects as Alternative 2 with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to sage-steppe species as compared to Alternative 2. This alternative has the same imperceptible and discountable cumulative effects as Alternative 2.

Comparison of Effects on Sage-Steppe Species, by Alternative

This section provides tabular comparisons of the five alternatives. Table 3-158. displays a comparison of habitat change metrics for the focal species in the sage-steppe group. Alternative 1 shows the most impacts to sage-steppe species and Alternative 3 the least.

Table 3-158. Comparison of Selected Effects on the Sage-Steppe Group, by Alternative

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Pronghorn (Modeled habitat on the MDF: 62,550)	NF habitat available for cross-country travel	62,530 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA*: 31.3 UA+NFTS: 209	UA: 16.8 UA+NFTS: 194 7%< A-1	UA: 0 UA+NFTS: 177 15%< A-1 9%< A-2	UA: 14.1 UA+NFTS: 191 8%< A-1 1%<A-2 8%> A-3	UA: 16.8 UA+NFTS: 194 7%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	57.0 (0.09%)	30.6 (0.05%)	0 (0%)	25.7 (0.04%)	30.6 (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	380.4 (0.6%)	353.1 (0.6%)	322.1 (0.5%)	347.6 (0.6%)	353.1 (0.6%)
Swainson's hawk (based on CWHR model potential habitat on the MDF: 59,450)	NF habitat available for cross-country travel	59,430 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 29.4 UA+NFTS: 194	UA: 15.6 UA+NFTS: 181 7%< A-1	UA: 0 UA+NFTS: 165 15%< A-1 9%< A-2	UA: 12.8 UA+NFTS: 178 9%< A-1 2%<A-2 8%> A-3	UA: 15.6 UA+NFTS: 181 7%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	53.5 (0.09%)	28.4 (0.05%)	0 (0%)	23.3 (0.04%)	28.4 (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	353.1 (0.6%)	329.4 (0.6%)	300.3 (0.5%)	324.0 (0.5%)	329.4 (0.6%)

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Swainson's hawk (based on 2.2 kilometer habitat zone around existing sites potential habitat on the MDF: 17,720)	NF habitat available for cross-country travel	17,722 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 0.2 UA+NFTS: 40	UA: 0.2 UA+NFTS: 40 0%< A-1	UA: 0 UA+NFTS: 40 <1%< A-1 <1%< A-2	UA: 0.2 UA+NFTS: 40 0%< A-1 0%<A-2 <1%> A-3	UA: 0.2 UA+NFTS: 40 0%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	0.4 (0.002%)	0.4 (0.002%)	0 (0%)	0.4 (0.002%)	0.4 (0.002%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	72.8 (0.4%)	72.8 (0.4%)	72.8 (0.4%)	72.8 (0.4%)	72.8 (0.4%)
Swainson's hawk (based on 402.3 meter habitat zone around existing sites, existing habitat on the MDF: 1,450)	NF habitat available for cross-country travel	1,450 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 0 UA+NFTS: 5	UA: 0 UA+NFTS: 5 0%< A-1	UA: 0 UA+NFTS: 5 0%< A-1 0%< A-2	UA: 0 UA+NFTS: 5 0%< A-1 0%<A-2 0%> A-3	UA: 0 UA+NFTS: 5
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	9.1 (0.6%)	9.1 (0.6%)	9.1 (0.6%)	9.1 (0.6%)	9.1 (0.6%)
Greater sage-grouse (Modeled habitat on the MDF: 128,940)	NF habitat available for cross-country travel	128,300	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 34.3 UA+NFTS: 372	UA: 23.9 UA+NFTS: 362 3%< A-1	UA: 0 UA+NFTS: 338 9%< A-1 7%< A-2	UA: 23.2 UA+NFTS: 361 3%< A-1 0%<A-2 7%> A-3	UA: 23.9 UA+NFTS: 362 3%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	62.4 (0.05%)	43.5 (0.03%)	0 (0%)	42.2 (0.03%)	43.5 (0.03%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	677.0 (0.5%)	658.8 (0.5%)	615.2 (0.5%)	657.0 (0.5%)	658.8 (0.5%)
Greater sage-grouse (National Forest lands within the active management area: 212,710)	NF within the active management area available for cross-country travel	212,710	0 acres	0 acres	0 acres	0 acres
	Miles of route in active management area	UA: 43.1 UA+NFTS:	UA: 31.3 UA+NFTS:	UA: 0 UA+NFTS:	UA: 25.5 UA+NFTS:	UA: 31.3 UA+NFTS:

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
		437.9	426.1 3%< A-1	394.8 10%< A-1 7%< A-2	420.3 4%< A-1 1%<A-2 6%> A-3	426.1 3%< A-1
	Equivalent acres of UA routes in habitat (% of active management area)	78.4 (0.04%)	57.0 (0.03%)	0 (0%)	46.4 (0.02%)	57.0 (0.03%)
	Equivalent acres of UA +NFTS routes in habitat (% of active management area)	797.0 (0.4%)	775.5 (0.4%)	718.5 (0.3%)	764.9 (0.4%)	775.5 (0.4%)
Golden eagle (Modeled habitat on the MDF: 5,550)	NF habitat available for cross-country travel	4,975	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 1.5 UA+NFTS: 18	UA: 0.6 UA+NFTS: 17 5%< A-1	UA: 0 UA+NFTS: 16 8%< A-1 4%< A-2	UA: 0.3 UA+NFTS: 17 6%< A-1 2%<A-2 2%> A-3	UA: 0.6 UA+NFTS: 17 5%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	2.7 (0.05%)	1.1 (0.02%)	0 (0%)	0.5 (0.01%)	1.1 (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	32.8 (0.6%)	30.9 (0.6%)	29.1 (0.5%)	30.9 (0.6%)	30.9 (0.6%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Sensitive Species Determinations

Swainson's hawk

In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

For the Modoc Travel Management Project Alternative 1, the biologist found that the alternative may affect individual Swainson's hawks as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2, 3, 4 and 5 would have no impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS within ¼-mile of existing Swainson's hawk sites. Alternatives 2, 3, 4 and 5 would therefore have no effects on Swainson's hawks or their habitats. Thus it is the biologist's determination that the Modoc Travel Management Project Alternative 1 may affect individuals but is not likely to result in a trend toward Federal listing and that Alternatives 2, 3, 4 and 5 would not affect Swainson's hawks or their habitat.

Greater sage-grouse

In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

For the Modoc Travel Management Project Alternative 1, the biologist found that the alternative may affect individual sage-grouse as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities.

Alternatives 2, 4 and 5 would prohibit cross-country travel and reduce the potential disturbance and indirect effects from additional routes being added to the NFTS compared to the potential impacts of Alternative 1. This reduction appears to be sufficiently low as to be undetectable and thus Alternatives 2, 4 and 5 would have no effect on sage-grouse. Alternative 3 would have no impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS. Alternative 3 would therefore have no effects on sage-grouse or their habitats. Thus it is the biologist's determination that the Modoc Travel Management Project Alternatives 2, 3, 4 and 5 would not affect greater sage-grouse or their habitat.

Summary of Effects Analysis Across all Alternatives

Table 3-159. provides a quick summary of the relative effects, in total, to wildlife of the alternatives. The reader is cautioned to consult the discussions for each effect as effects to some individual species may not follow this table. The summary tables at the end of each group display the raw difference that would occur for the focal species under each alternative. Those tables, along with the discussions provide a more complete picture of the potential effects of this project.

Table 3-159. Relative Ranking Comparison of Alternatives and Their Effects on Wildlife

Indicators – Terrestrial Biota	Rankings of Alternatives for Each Indicator[1]				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Acres open to motorized travel	1	5	5	5	5
Miles of unauthorized routes within terrestrial biota habitat	1	3	5	2	3
Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area	1	3	5	2	3
The proportion of a species (or species group's) habitat that is affected by motorized routes	1	3	5	2	3
Average for Terrestrial Biota	1	3.5	5	2.75	3.5

[1] A score of 5 indicates the alternative is the best for terrestrial biota related to the indicator; a score of 1 indicates the alternative is the worst for terrestrial biota related to the indicator.

Compliance with the Forest Plan and Other Direction.

All alternatives would comply with Forest plan direction concerning wildlife and routes

Aquatic Organisms

Introduction

Management of aquatic-dependent 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 to the degree consistent with multiple-use objectives established in each Forest Land and Resource Management Plan (LRMP). Management decisions related to motorized travel can affect aquatic species by increasing human-caused mortality, causing changes in behavior due to disturbance, and habitat modification (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 terrestrial and aquatic wildlife and their habitat.

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

Direction relevant to the proposed action as it affects aquatic biota includes the following:

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) species, 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 concerning TE species under their jurisdiction. It is Forest Service policy to analyze impacts to TE species to ensure management activities are not be likely to jeopardize the continued existence of a TE species, 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.

Clean Water Act of 1948 (as amended in 1972 and 1987): establishes as Federal policy for 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).

Non-point source pollution on national Forests is managed through the Regional Water Quality Management Plan (USDA Forest Service, Pacific Southwest Region, 2000), which relies on implementation of prescribed best management practices (BMPs). The Water Quality Management Plan includes one BMP for off-highway vehicle (OHV) use (4-7) and 28 BMPs related to road construction and maintenance (2-1 to 2-28) (See appendix G). All NFTS roads and trails open to OHV use are required to comply with these BMPs.

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.

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 non-point-source pollution and best management practices.

The Porter-Cologne Water-Quality Act, as amended in 2006, is 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 Northwest Forest Plan (NWFP) Aquatic Conservation Strategy (ACS) includes standards and guidelines that apply to the six Forests included entirely or partially within the Northwest Forest Plan. The ACS standards and guidelines require that a watershed analysis be completed that determines the influence of each road on ACS objectives, and that roads be designed to minimize impacts on riparian and aquatic resources. Construction of new roads in wetlands is prohibited. Adding unauthorized routes to the NFTS in meadows or wetlands constitutes road construction, and should be avoided. Stream crossings are required to be designed to pass a 100-year flood and allow for passage of aquatic fauna.

The Sierra Nevada Forest Plan Amendment (SNFPA): The Record of Decision (ROD) for the 2004 SNFPA includes standards and guidelines that apply to the 10 Sierra Nevada Forests for construction and relocation of roads, and for management of riparian conservation areas (RCAs). These standards and guidelines require the Forest Service to avoid road construction, reconstruction, and relocation in meadows and wetlands (SNFPA S&G 70). Reconstructing unauthorized routes to bring them to NFTS standards in meadows or wetlands should therefore be avoided. Only routes that already meet NFTS standards in meadows and wetlands should be proposed for addition to the NFTS. SNFPA S&G 92 requires that the Forest Service evaluate new management activities within RCAs and critical aquatic refuges (CARS) during environmental analysis to determine consistency with riparian conservation objectives (RCOs) at the project level and the Aquatic Management Strategy (AMS) goals for the landscape. Adding an unauthorized route to the NFTS is a new management activity and must comply with S&G 92. SNFPA S&G 100 requires the Forest Service to maintain and restore the hydrologic connectivity of streams, meadows, and wetlands by identifying roads and trails that intercept, divert, or disrupt flows paths and implementing corrective actions. SNFPA S&G 102 requires that the Forest Service determine if stream characteristics are within the range of natural variability prior to taking actions that could adversely affect streams.

There is a small portion of the Modoc National Forest covered by the NWFP ROD, as well as areas of the Forest that are exempt form the SNFPA ROD. Where that situation exists, the appropriate standard and guideline would be based on the Modoc National Forest (MDF) Land and Resource Management Plan (LRMP) prior to 2004

Forest Service Handbook 2670: Forest Service Sensitive (FSS) species are 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.

Effects Analysis Methodology

Area of Effect for Aquatic Resources

Two geographic areas were chosen to analyze the effects of the proposed routes on aquatic resources:

- The entire Modoc National Forest Analysis Area. This analysis area was used to analyze cumulative effects to aquatic species for all alternatives.
- The Zone of Influence Area. Direct and indirect effects to aquatic species were assessed using the area within 300 feet (perennial) and 150 feet (intermittent) of streams adjacent to existing or proposed routes. These distances correspond to Riparian Conservation Areas (RCA) distances, and are considered within the zone of influence for aquatic species. In general, indirect effects are most likely to occur within this zone of influence due to interception of runoff, compaction of soils, and detachment of sediment.

Analysis of Methodology

The analysis of effects on aquatic species was a three-step process. In the first step, all listed or proposed aquatic 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 Modoc National Forest (USFWS 2008) and the Region 5 Sensitive Species List (USFS 2006).

All of this information was used in step two of the analysis. Geographic Information System (GIS) was used to analyze existing habitat. Proposed routes from the alternatives were overlayed with GIS coverage layers to complete a risk assessment of adverse effects to soil and water quality. When the Maximum Erosion Hazard Rating (MEHR) for a soil was low to moderate, water runoff potential was rated as very low to moderate, watershed sensitivity was rated as low to moderate, and slope stability hazard was rated as low to moderate, therefore no field checking was completed as these were considered areas of low sensitivity.

The third step was to field check proposed routes that were not eliminated due to MEHR from the GIS analysis to determine if the route in its current condition was consistent with BMP 1.17 (Erosion Control on Skid Trails), 1.19 (Stream course and Aquatic Protection), and 2.26 (Obliteration or Decommissioning of Roads). Where the Maximum Erosion Hazard Rating (MEHR) rating required field checking, it was noted if the trail was eroding and determined if the erosion exceeded Modoc LRMP standards and guidelines. The routes and the associated zone of influence were also field checked to determine if there was a hydrologic connectivity to a perennial or seasonally flowing stream course.

Assumptions Specific to the Aquatic Biota Analysis

1. Habitats for the species being analyzed were assumed to be occupied if they contained the necessary life history elements.
2. Human-caused disturbances near small streams in mountainous terrain disrupt natural biological processes and have the potential to adversely affect biological characteristics and fragment habitats.
3. Sediment from roads can result in adverse effects to streams and aquatic habitats.
4. Unpaved roads located near or that cross small streams in mountainous terrain can result in adverse affects to aquatic habitat.

5. The overall effect of roads to aquatic habitats is related to the amount of sediment movement from road surfaces is highly variable within and among surface types and is related to levels of maintenance and road drainage and type of use of the road.
6. The reduction or elimination of vehicle traffic on a road near a stream will result in less sediment delivered from the road to the stream.
7. Effects from the type of road use (cars, trucks, motorcycles, all-terrain vehicles, etc.) and the amount of road use on top of snow is generally minor when compared to the proximity and length of unpaved roads relative to stream channels and the number of times unpaved roads cross the stream.
8. The elimination of vehicle traffic on a road near a stream during periods of wet road conditions will result in less sediment being delivered from the road to the stream. Vehicle use on wet roads has the potential to cause ruts and damage to the roads with a resultant increase in erosion of sediment from the road during rainfall events and periods of snowmelt.
9. The density of roads and trails at the watershed scale will not be substantially changed as a result of any of the action alternatives for at least the next 20 years because all of the action alternatives involve the prohibition of cross-country travel and vehicle use by the public rather than the physical removal of roads. Routes not added to the NFTS under Alternatives 2 through 5 would slowly re-vegetate and regain the conditions that exist on adjacent lands. The low levels of public non-motorized use, permitted use, or administrative use would be insufficient to overcome the natural in-growth of vegetation and accumulation of organic material into the unauthorized routes.
10. Routes without hydrologic connectivity to streams will have no effect on aquatic species.

Data Sources

GIS layers of the following information: routes, streams, habitats, and “designated”, or important aquatic areas (e.g., RCAs, CARs).

Site-specific surveys and assessment of any localized aquatic habitats within the zone of influence of routes proposed to be added to the National Forest Transportation System (NFTS).

Aquatic Biota Indicators

Miles of unauthorized routes within or adjacent to TES aquatic biota habitat. This is the area within 300 feet (perennial) and 150 feet (intermittent) of streams.

Miles of motorized routes and acres of areas at Forest-wide scale and within the habitat for each species.

The number of areas within 300 ft. (RCA width) of an added route or area.

Hydrologic connectivity to perennial streams.

Aquatic Biota Methodology by Action

1. Direct and indirect effects of the prohibition of cross-country motor vehicle travel:

Short-term time frame: 1 year

Long-term time frame: 20 years

Spatial boundary: Dependent on indicator

Indicator(s): (1) Miles of routes or areas open for motor vehicle use within or adjacent to aquatic resources, (2) Miles of routes or areas open for motor vehicle use with documented disturbances from motor vehicles that resulted in damage to aquatic resources, (3) Density of routes open for

motor vehicle use potentially affecting aquatic TES, (4) Miles of routes or areas open for motor vehicle use within riparian habitat, including meadows and stream banks, (5) Number of routes or areas open for motor vehicle use within habitats of known or historically occupied by TES herpafauna (reptiles or amphibians).

2. Direct and indirect effects of adding facilities (presently unauthorized roads) to the nfts, including identifying seasons of use and vehicle class:

Short-term time frame: 1 year

Long-term time frame: 20 years

Spatial boundary: Dependent on indicator

Indicators: (1) Miles of routes or areas open for motor vehicle use within or adjacent to aquatic resources, (2) Miles of routes or areas open for motor vehicle use with documented disturbances from motor vehicles that resulted in damage to aquatic resources, (3) Density of routes open for motor vehicle use potentially affecting aquatic TES, (4) Miles of routes or areas open for motor vehicle use within riparian habitat, including meadows and stream banks, (5) Number of routes or areas open for motor vehicle use within habitats of known or historically occupied by TES herpafauna.

Methodology: GIS analysis of added routes in relation to habitat and important and sensitive aquatic areas.

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

3. Cumulative Effects:

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

Long-term time frame: 20 years

Spatial boundary: Forest

Indicators: (1) Miles of routes or areas open for motor vehicle use within or adjacent to aquatic resources, (2) Miles of routes or areas open for motor vehicle use with documented disturbances from motor vehicles that resulted in damage to aquatic resources, (3) Density of routes open for motor vehicle potentially affecting aquatic TES, (4) Miles of routes or areas open for motor vehicle use within riparian habitat, including meadows and stream banks, (5) Number of routes or areas open for motor vehicle use within habitats of known or historically occupied by TES herpafauna.

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

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

Affected Environment and Environmental Consequences

Affected Environment

The Modoc National Forest provides habitat for over 350 species of birds, mammals, amphibians, and reptiles (Modoc National Forest LRMP). There are currently five aquatic species listed as Endangered or Threatened under the ESA, and 11 aquatic species listed as Forest Service Sensitive. These species and their habitats on the Modoc National Forest are described in detail in the Modoc National Forest Motorized Travel Management EIS Biological Evaluation and Biological Assessment (BE and BA), which can be found in the project record. In addition, there are 13 Management Indicator Species (MIS) on the Modoc National Forest. These species and their habitats are described in detail in the Modoc National Forest Motorized Travel Management Project MIS Report (see the project record).

Environmental Consequences

Alternative 1—No Action

Alternative 2—Proposed Action

Alternative 3

Alternative 4

Alternative 5

See the effects methodology section above regarding how this analysis was conducted.

Alternative 1—No Action

Under this alternative, no new routes would be added to the road system. There would be no seasonal closure of system roads, and mixed use would be allowed only on existing level 2 roads. There would be no addition of unauthorized routes to the transportation system. The Boles road would not be closed, and the Pumice Mine roads would not be closed to OHV use. There would be no seasonal closures. All of the existing unauthorized routes (491 miles) would still be available for use along with cross-country travel.

Direct and Indirect Effects

Direct effects to sensitive species from roads and motor vehicle use include individual mortality due to crushing. High levels of mortality due to crushing are not expected, and are essentially not an issue. Indirect effects to aquatic and aquatic dependent species resulting from roads and motor vehicle use would include habitat alteration due to elevated levels of in-channel sediment delivery and, to a lesser degree, riparian habitat alteration and collection (fishing and hunting).

There are a total of 6.74 miles of unauthorized routes within RCAs for perennial streams and lakes, and 37.84 miles of unauthorized routes within RCAs for seasonally flowing streams and lakes. There are 21.22 miles of unauthorized routes within designated CARs, of which 0 miles are within perennial streams and lakes and 0.66 miles of unauthorized routes within seasonally flowing streams and lakes. There are 4.01 miles of unauthorized routes within perennial streams and lakes of T and E species habitat, and 2.12 miles of unauthorized routes within seasonally flowing streams and lakes of T and E species habitat.

The impact from the use of existing unauthorized use is expected to be minimal. because they are mostly very short segments, and were never added to our official system. Two-thirds of the routes are less than ¼ mile in length. Only five percent of the routes are over 1 mile in length. Only a very small portion of these unauthorized routes cross stream channels.

Indirect effects to aquatic and aquatic dependent species resulting from roads and motor vehicle use would include habitat alteration due to elevated levels of in-channel sediment delivery and, to a lesser degree, riparian habitat alteration.

Although cross-country travel currently occurs throughout the Forest, the scope and impact from this travel would not result in a change of conditions for aquatic species. This use is very limited in scope and generally occurs outside of riparian habitats.

Cumulative Effects

Present and Reasonably Foreseeable Actions

The following actions were considered in cumulative effects analysis for each resource: fuel treatments and fire, range management, dam construction and maintenance, recreation, timber management and vegetation treatment, reForestation, road management, special uses, and noxious weed treatment. below is a description of these actions. Reasonably foreseeable and present actions on national Forest system lands considered in cumulative effects analysis are shown in appendix H, which was developed by reviewing the July – September 2008 Schedule of Proposed Actions.

Many actions have some potential for increasing road density either temporarily or permanently, including timber management (site preparation, planting, thinning, harvesting), prescribed fire, juniper removal and aspen enhancement, wetlands creation and maintenance, and recreational site development and maintenance.

Based on species-specific natural history characteristics, the primary direct and indirect effects to aquatic species from motor vehicle use are related to increased sediment delivery to stream channels and alteration of riparian vegetation.

English (2004) estimates that the Modoc National Forest receives 22,755 recreational visits from people participating in OHV use, and 897 visits from people participating in OHV use as a primary reason for their visit annually.

On a Forest-wide scale, this use is not expected to be a significant impact due to the limited amount of motor vehicle use in the areas of concern.

Alternative 2 – Proposed Action

Under Alternative 2, there are 1,168 unauthorized routes that are proposed to be added to the transportation system. The average road length to be added would be less than a third of a mile long. These routes add approximately 339 miles and constitute approximately 616 acres of roadway. This alternative has the most ground-disturbed sites being added to the transportation system. A total of 6.3 percent of the number of routes (approximately 5.9 percent of the total miles) proposed to be added to the transportation system would have some form of seasonal closure. The Boles Road would be closed to all use and the Pumice road would be closed to OHV use.

There would be 1.8 miles of unauthorized routes added to the transportation system within the RCAs for perennial streams and lakes. There would be 17.6 miles of unauthorized routes added within the RCAs for seasonally flowing streams and seasonally wet lakes. There would be no additions of unauthorized routes within CARs for perennial streams and lakes, and 0.5 miles of unauthorized routes added within CARs for seasonally flowing streams and lakes. There would be 1.16 miles of unauthorized routes within perennial streams and lakes of T and E species habitat and 0.62 miles of unauthorized routes within seasonally flowing streams and lakes of T and E species habitat.

Direct and Indirect Effects

Direct effects to sensitive species from roads and motor vehicle use include individual mortality due to crushing. Because the species being evaluated in this document are highly aquatic, high levels of mortality due to crushing are not expected, and are essentially not an issue. This is due to the unique ability of fish to swim away from objects approaching them in the water column. Indirect effects to aquatic and aquatic dependent species resulting from roads and motor vehicle use would include habitat alteration due to elevated levels of in-channel sediment delivery and, to a lesser degree, riparian habitat alteration and collection (fishing and hunting).

Currently there are approximately 491 miles of unauthorized routes that may be used for OHV travel. This alternative proposes to add 339 miles of those routes and 20 miles or 5.9 percent would receive seasonal closure for resource protection. The most typical condition is the trail tread having a strip of grass on both sides with a strip in the middle. This is characteristic of use by ATVs or pickup trucks, rather than motorcycles. OHV use on the Forest is highest during hunting season. Seasonal closure will result in a slight reduction of in-channel sediment delivery during periods of closure, but the use of these roads is very limited.

Big Valley Ranger District

There are a total 39.1 miles of unauthorized routes that are proposed to be added to the transportation system across 494,307 acres, or 0.14 percent of the BVRD. None of these routes is hydrologically connected to perennial streams or lakes, therefore there will be no increase in sedimentation or alteration of riparian vegetation.

Doublehead and Devil's Garden Ranger Districts

Approximately 268.5 miles of the 339 miles are located on the Doublehead and Devil's Garden Ranger Districts, or approximately 79 percent of the proposed routes on the Modoc National Forest. Of the 268.5 miles, only 0.08 miles or 0.15 acres are located within the RCAs for perennial streams or lakes. There are approximately 32 acres within seasonally flowing RCAs created by the proposed routes. None of these routes was identified as being hydrologically connected to the stream, network, or as being sediment sources, therefore there will be no increase in sedimentation or alteration of riparian vegetation.

Warner Mountain Ranger District

There are a total 31.4 miles of unauthorized routes that are proposed to be added to the transportation system across 361,564 acres, or 0.02 percent of the WMRD. The routes that are proposed to be added are old skid trails and temporary roads that have been made hydrologically stable by the installation of water bars. There are 1.72 miles of unauthorized routes, or 3.1 acres within RCAs for perennial stream or lakes. The largest concentration is associated with Lassen Creek (0.5 miles or less than one acre) and Northwest Shore Middle Alkali Lake (0.7 miles, or 1.3 acres). While the routes are located within the RCAs for perennial streams and lakes, they are not hydrologically connected to the stream courses, nor are they contributing sediment to the water column (see Soil and Water Resources report). There is no habitat present for T and E aquatic species present within any unauthorized routes on the Warner Mountain Ranger District, therefore there is no effect on any T and E species.

We do not anticipate a high level of long-term, sustained OHV use as a result of adding unauthorized routes to the NFTS. This is because near the population centers (i.e., towns and cities near the Lassen, Klamath, and Fremont-Winema national Forests and adjacent BLM lands), there are already OHV use areas. Occasionally there is OHV use on the Forest, but it is generally in association with other activities, (e.g., camping, woodcutting, hunting or other Forest recreational use). The typical OHV use on Forest is generally restricted to ATVs and other four-

wheel-drive vehicles, with limited motorcycle use. These users tend to use system roads and skid trails or temporary roads. English (2004) estimates that the Modoc National Forest receives 22,755 recreational visits from people participating in OHV use, and 897 visits from people participating in OHV use as a primary reason for their visit annually, therefore there will be no significant increase in sedimentation or alteration of riparian vegetation due to the addition of the addition of the unauthorized routes to the NFTS.

Cumulative effects

Present and Reasonably Foreseeable Actions

The following actions were considered in cumulative effects analysis for each resource: fuel treatments and fire, range management, dam construction and maintenance, recreation, timber management and vegetation treatment, reForestation, road management, special uses, and noxious weed treatment. Below is a description of these actions. Reasonably foreseeable and present actions on national Forest system lands considered in cumulative effects analysis are shown in appendix H, which was developed by reviewing the July – September 2008 Schedule of Proposed Actions.

Many actions have some potential for increasing road density either temporarily or permanently, including timber management (site preparation, planting, thinning, harvesting), prescribed fire, juniper removal and aspen enhancement, wetlands creation and maintenance, and recreational site development and maintenance.

Based on species-specific natural history characteristics, the primary direct and indirect effects to aquatic species from motor vehicle use are related to increased sediment delivery to stream channels and alteration of riparian vegetation. Based on the information presented above and the Soil and Water Resources section of this document, at the Forest scale, it does not appear that there would be discernable differences between this alternative in terms of their direct and indirect effects on aquatic and aquatic dependent species and their habitat, although there would be a slight reduction in the number and length of streams at a high risk of adverse effects to aquatic habitat when compared to Alternative 1.

English (2004) estimates that the Modoc National Forest receives 22,755 recreational visits from people participating in OHV use, and 897 visits from people participating in OHV use as a primary reason for their visit annually.

On a Forest-wide scale, this use is not expected to be a significant impact due to the limited amount of motor vehicle use in the areas of concern.

Alternative 3

Under Alternative 3, no new unauthorized routes would be added to the road system. There would be no seasonal closure of system roads, and mixed use of approximately 3,764 miles of Maintenance Level 2 roads would continue. The Boles Road would not be closed and the Pumice Mine Roads would not be closed to OHV use. There would be no additional seasonal closures. Cross-country travel would be banned.

There would be 0 miles of unauthorized routes added to the transportation system within the RCAs for perennial streams and lakes. There would be 0 miles of unauthorized routes added within the RCAs for seasonally flowing streams and seasonally wet lakes. There would be 0 miles of unauthorized routes within CARs for perennial streams and lakes and 0 miles of unauthorized routes added within CARs for seasonally flowing streams and lakes. There are 0 miles of unauthorized routes within perennial streams and lakes of T and E species habitat, and 0 miles of unauthorized routes within seasonally flowing streams and lakes of T and E species habitat.

Direct and Indirect Effects

The impact from this alternative is expected to have the greatest reduction of risk to of adverse aquatic habitat alteration, as unauthorized route use would be prohibited. Direct effects to aquatic macroinvertebrates include individual mortality due to crushing. High levels of mortality due to crushing are not expected and are essentially not an issue and would be eliminated within areas of prohibited of use.

Although cross-country travel currently occurs throughout the Forest, the scope and impact from prohibition of this travel would not result in a change of conditions for aquatic species. This use is very limited in scope and generally occurs outside of riparian habitats.

Indirect effects to aquatic and aquatic dependent species resulting from roads and motor vehicle use would include habitat alteration due to elevated levels of in-channel sediment delivery and, to a lesser, degree riparian habitat alteration.

Cumulative Effects

Present and Reasonably Foreseeable Actions

The following actions were considered in cumulative effects analysis for each resource: fuel treatments and fire, range management, dam construction and maintenance, recreation, timber management and vegetation treatment, reForestation, road management, special uses, and noxious weed treatment. below is a description of these actions. Reasonably foreseeable and present actions on National Forest System lands considered in cumulative effects analysis are shown in appendix H, which was developed by reviewing the July – September 2008 Schedule of Proposed Actions.

Many actions have some potential for increasing road density either temporarily or permanently, including timber management (site preparation, planting, thinning, harvesting), prescribed fire, juniper removal and aspen enhancement, wetlands creation and maintenance and recreational site development and maintenance.

Based on species-specific natural history characteristics, the primary direct and indirect effects to aquatic species from motor vehicle use are related to increased sediment delivery to stream channels and alteration of riparian vegetation.

English (2004) estimates that the Modoc National Forest receives 22,755 recreational visits from people participating in OHV use, and 897 visits from people participating in OHV use as a primary reason for their visit annually.

On a Forest-wide scale, this use is not expected to be a significant impact due to the limited amount of motor vehicle use in the areas of concern.

Alternative 4

Under Alternative 4, 1,025 unauthorized routes are proposed to be added to the transportation system. The average road length to be added would be less then a third of a mile. These routes would add approximately 286 miles and constitute approximately 521 acres of roadways across the Modoc National Forest. The Boles Road would be closed to all vehicles, and the Pumice Mine Road would be closed to OHV use. There are more seasonal closures on the transportation system under this action alternative than all of the other alternatives.

This alternative has fewer miles and number of routes to be added to the National Forest Transportation System on the Modoc National Forest than does Alternative 2.

Direct and Indirect Effects

There are no routes proposed to be added to the transportation system that were not analyzed under Alternative 2. There would be 0.51 miles of unauthorized routes within perennial streams and lakes of T and E species habitat and 0.23 miles of unauthorized routes within seasonally flowing streams and lakes of T and E species habitat. Reference Alternative 2 for direct and indirect effects.

Cumulative Effects

Reference Alternative 2 for cumulative effects.

Alternative 5

Under Alternative 5, there are 1,168 unauthorized routes that are proposed to be added to the transportation system, the same as Alternative 2. The average road length to be added would be less then a third of a mile long. These routes would add approximately 339 miles and constitutes approximately 617 acres of roadways. The Boles Road would be closed to all vehicles and the Pumice Mine Roads would be closed to OHV use. The seasonal closures to the transportation system under this action alternative are the same as Alternative 2, with the exception that there are two versus four different closure dates. There are nearly four times as many miles of mixed use (Alternative 5-531 miles versus Alternative 2-138 miles).

Direct and Indirect Effects

There are no routes proposed to be added to the transportation system that were not analyzed under Alternative 2. Reference Alternative 2 for direct and indirect effects.

Cumulative Effects

Reference Alternative 2 for cumulative effects.

Summary of Alternatives

Table 3-160. Miles of Unauthorized Roads within RCAs, CARs, and TES Habitat

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Miles of unauthorized roads within perennial stream and lake RCA	6.74	1.8	0	1.8	1.8
Miles of unauthorized roads within seasonally flowing stream and lake RCA	37.84	17.6	0	17.6	17.6
Miles of unauthorized roads within perennial stream and lake CAR	0	0	0	0	0
Miles of unauthorized roads within seasonally flowing stream and lake CAR	0.66	0.5	0	0.5	0.5

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Miles of unauthorized roads within perennial stream and lake habitat of TES species habitat	4.01	1.16	0	0.51	1.16
Miles of unauthorized roads within seasonally flowing stream and lake habitat of TES species habitat	2.12	0.62	0	0.23	0.62

Summary of Effects Analysis Across all Alternatives

Table 3-161. Summary and Ranking of Alternatives for Aquatic Biota

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.	3	5	5	5	5
Density of motorized routes as a measure of habitat effectiveness at the 6th field watershed level.	2	4	5	4	4
Miles of motorized routes and acres of areas at Forest-wide scale and within the habitat for each species.	2	4	5	4	4
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 ft.).	2	4	5	4	4
Number hydrologically sensitive areas within 300 ft. (RCA width) of an added route or area.	2	4	5	4	4
Average for Aquatic Biota	**2.2**	**4.2**	**5**	**4.2**	**4.2**

[1] A score of 5 indicates the alternative has the least impact on aquatic biota related to the indicator; A score of 1 indicates the alternative has the most impact to aquatic biota related to the indicator.

Compliance with the Forest Plan and Other Direction

By prohibiting cross-country motor vehicle traffic, all four of the Action Alternatives comply with the Modoc LRMP, the SNFPA, and the Endangered Species Act. These alternatives would be in compliance with Forest management policies and regulations.

Inventoried Roadless Areas and Roadless Characteristics

This section describes the affected environment for inventoried roadless areas, designated wilderness resources, and wilderness proposals of the California Wilderness Coalition (CWC). It will describe the area potentially affected by the alternatives and existing resource conditions within that area. Measurement indicators (listed below on this page) are used to describe the existing conditions for the Modoc National Forest. The measurement indicators will be used in the analysis to quantify and describe how well the Proposed Action and alternatives discussed in chapter 2 meet the project objectives of managing uncontrolled motor vehicle use and address resource concerns.

Analysis Framework: Modoc LRMP

The *Record of Decision for the Modoc LRMP* states,

> Nineteen roadless areas totaling (approximately) 201,600 acres, identified by the 1979 Road Area Review and Evaluation, were released for other multiple uses by the California Wilderness Act of 1984. Approximately 59,440 acres of the 201,600 acres are assigned to Management Prescription 4, Semi-Primitive Non-motorized Management (SPNM). The SPNM prescription will be applied to 23,013 acres of timberlands (See ROS maps for locations). Management by this prescription will retain the values necessary to meet the preservation objective while still providing options to meet the other objectives of the environmental agenda.

Another IRA was added after the LRMP ROD was signed making the total on the forest 20 IRAs. This is the Mill IRA, is 314 acres and is included in this analysis.

Effects Analysis Methodology

Data Sources

- Route inventories collected in Step 1 of the Travel Management project
- Existing Inventoried Roadless Area records within the Modoc National Forest GIS databases
- Citizens' Proposed Wilderness Area GIS data submitted by The Wilderness Society

Analysis Methodology

The analysis of effects on roadless characteristics was a simple GIS analysis displaying the Inventoried Roadless Areas and the Citizens' Wilderness Proposal with the current road system, along with the various alternatives discussed in this EIS.

Measurement indicators

Measurement indicators for this analysis are the miles of route additions.

Affected Environment and Existing Condition

The Modoc NF has 20 Inventoried Roadless Areas. Of these, most are roaded. No unauthorized roads are being proposed to be added within MDF Inventoried Roadless Areas under any action alternative. Every one of the areas designated by the CWC as potential roadless areas, are roaded. The mileage proposed to be added in Alternatives 2, 4, and 5 in the Citizens' Proposed Wilderness Areas is very small, especially compared to the existing NFTS roads that are already

in place. Alternative 4 does not include any of the unauthorized roads recommended for removal by the CWC.

Table 3-162 below displays the Inventoried Roadless Areas. The table provides the area size and system road mileage of the current transportation system, with proposed additions by alternative. The table also shows the Recreation Opportunity Spectrum (ROS) class. The ROS class is the type of experience a visitor can expect. The Modoc LRMP ROS map displays four classes: Roaded Natural, Semi-Primitive Motorized, Semi-Primitive Non-Motorized, and Semi-Primitive Wilderness.

Table 3-162. Proposed Unauthorized and Existing NFTS roads in MDF Inventoried Roadless Areas

Inventoried Roadless Area	ROS Class	Acres	Existing System Road Miles	Alt 1 Miles of Unauth-orized Roads	Alt 2 and 5 Miles Added	Alt 3 Miles Added	Alt 4 Miles Added
Bear Camp Flat	RN	2,477	6.44	0	0	0	0
Big Canyon	SPNM	6,615	3.20	0	0	0	0
Burnt Lava Flow	SPW	8,387	.90	0	0	0	0
Callahan Flow	SPNM	6,574	6.25	0	0	0	0
Crane Mountain	RN	1,255	.27	0	0	0	0
Damon Butte	RN	25,022	50.85	0	0	0	0
Dobie Flat	RN	15,078	28.88	0	0	0	0
Dry	SPNM	7,726	1.33	0	0	0	0
Hat Mountain	SPM	9,475	25.64	0	0	0	0
Knox Mountain	SPM	5,976	13.22	0	0	0	0
Lavas	SPM, RN	25,864	37.74	0	0	0	0
Mill	RN	315	1.04	0	0	0	0
Mount Bidwell	SPM	11,657	18.17	0	0	0	0
Mount Hoffman	SPNM, RN, SPW	9,780	2.35	0	0	0	0
Mount Vida	SPNM, RN	7,770	5.99	0	0	0	0
Parsnip	SPNM	8,485	5.57	0	0	0	0
Powley	SPNM	6,268	.26	0	0	0	0
Sears Flat	SPM	12,957	19.51	0	0	0	0
Soldier	SPNM	10,095	4.63	0	0	0	0
Steele Swamp	SPM	18,958	26.39	0	0	0	0
Total*		200,734	258.63	0	0	0	0

*The Total acreage varies from the original LRMP estimates because of improved GIS information.

Alternative 1 does not prohibit cross-country travel, including the use of 8.02 miles of unauthorized routes. No routes are proposes to be added in SPNM areas in any of the alternatives.

The Modoc NF has one Congressionally Designated Wilderness Area, the South Warner Wilderness, containing approximately 72,000 acres. No motorized travel is permitted in this area, and no additions to the transportation system are proposed under any alternative. The Forest also has the Devils Garden Research Natural Area, and three Special Interest Areas (Burnt Lava Flow, Medicine Lake Glass Flow and Glass Mountain Glass Flow) that are managed under the Semi-

Primitive Wilderness ROS Class. In these areas no routes are proposed to be added in any alternative.

This analysis also reviewed the nine areas recommended as the Citizen Wilderness and Wild and Scenic Rivers Inventory submitted by a Coalition of Wilderness Advocates. All but one of these proposed areas (Fandango Pass) are expansions of Forest Service Inventoried Roadless Areas.

The following table displays the Citizen's Wilderness Proposal. It contains a list of the proposed Wilderness areas, together with a cross walk to the Forest Service Inventoried Roadless Areas.

Table 3-163. Citizens' Wilderness Inventory

Citizens' Proposed Wilderness Name	Number of Individual and Separate Units (Area divided by roads or land mass)	Corresponding Forest Service Inventoried Roadless Area Name	ROS Class	Acres	Existing System Road Miles	Alt 1 Miles Added	Alts 2 and 5 Miles Added	Alt 3 Miles Added	Alt 4 Miles Added
Captain Jack	12	Lavas, Dobie Flat, Callahan Flow	SPNM, RN	58,373	55.70	1.02	1.3	0	0
Cedar Mountain	3	Soldier	SPNM, RN	19.840	4.55	2.07	1.03	0	.11
Dry Creek	1	Dry	SPNM, RN	10,755	3.99	0	0	0	0
Fandango Peak	2		RN	8,745	7.85	1.12	0	0	.11
Lost River	12	Steele Swamp	SPM, RN	62,009	35.46	8.64	5.64	0	.72
Medicine Lake	3	Burnt Lava, Mt. Hoffman	SPNM, RN	25,043	19.74	3.34	2.97	0	.14
Mt Bidwell	2	Mt Bidwell	SPM, RN	8,932	5.31	0	.04	0	0
Mt. Vida	3	Mt. Vida	RN, SPNM	13,454	7.95	1.47	1.19	0	.56
Parsnip	2	Parsnip	RN, SPNM	10,655	7.40	0	0	0	0
Powley Creek	1	Powley	SPNM, RN	15,354	19.51	7.49	3.92	0	.06
Signal Rattlesnake	2	Big Canyon	SPNM, RN	32,973	36.39	.82	.17	0	0
South Warner	3	Bear Camp	RN	8,096	5.04	.46	.25	0	.09
Total				274,170	208.89	26.43	16.51	0	1.79

Alternative 1 does not prohibit cross-country travel, including the use of 26.43 miles of unauthorized routes. Under this alternative these routes would continue to be used along with the continuation of travel across the land. They would not be added to the NFTS. There is a total of 208.89 miles of existing NFTS road within the Citizens' Proposed Wilderness areas. The largest number of roads proposed to be added to the NFTS is 16.51 miles in Alternative 2 and 5. Alternative 4 only adds roads that the CWC did not object to adding in the Citizens' Proposed Wilderness areas. Alternative 3 does not add any unauthorized routes, and prohibits cross-country travel.

Environmental Consequences

This section describes the environmental consequences on Inventoried Roadless Areas and the area of the Citizens' Wilderness Proposal.

Alternative 1: No Action

Direct and Indirect Effects

Alternative 1 would have the greatest potential negative effect on roadless area characteristics. The largest impact of this alternative is from cross-country travel, which has the potential to affect all but the most inaccessible areas. Cross-country travel by merely one vehicle has the low potential to cause loss of roadless characteristics. Vehicles traveling through mud can potentially alter surface hydrology. Noise from vehicles could be increased. The visual impact and loss of solitude of additional routes may increase over time from the existing 8.02 miles of unauthorized routes. However, the low amount of use on these routes would most likely result in these roads revegetating over time.

Cumulative Effects

Under this alternative, it is difficult to quantify if travel routes would increase, thus leading to the loss of roadless characteristics in the Inventoried Roadless Area or the Citizens' Wilderness Proposal.

Action Alternatives (2 through 5): Prohibition of Cross-country Travel

Direct and Indirect Effects of Prohibiting Cross-Country Travel

Closing the Forest to cross-country travel would stop the creation of additional unauthorized routes by recreation users, thus preserving the roadless character of Inventoried Roadless Areas and within the Citizens' Wilderness Proposal areas.

Cumulative Effects of Prohibiting Cross-Country Travel

There would be limited cumulative effects of stopping cross-country travel on the roadless character of Inventoried Roadless Areas or the Citizens' Wilderness proposals. Over time, stopping cross-country travel would allow tracks left by recreation users in the past to grow over and become more natural in appearance, thus adding to the roadless character of the areas. There would also be a reduction in noise.

Action Alternatives (2 through 5): Changes to the NFTS

Direct and Indirect Effects of Changes to the NFTS

There would be no direct or indirect effects on the roadless characteristics of Inventoried Roadless Areas or the Citizens' Wilderness Proposal by change in vehicle class. Seasonal use may change the roadless characteristics of an area by reducing rutting and therefore reducing runoff.

Cumulative Effects of Changes to the NFTS

Cumulative effects may be the potential for less damage to roads that have seasonal closures on them.

Alternatives 2 and 5: Additions to the NFTS

Direct and indirect Effects

There would be no direct or indirect effects to MDF Inventoried Roadless Areas, because additional routes to the NFTS are not proposed. Alternative 2 and 5 have 16.51 miles of roads added in areas of the Citizen's Wilderness Proposal. These roads are small spurs off of well-roaded areas. The largest is the road segment of the Applegate Trail in the Lost River Proposed Wilderness (a part of the Citizens' Wilderness Proposal) that has been in existence since the late 1800's, and was never picked up on the NFTS inventory. The Lost River PW also contains the NFTS road segment that is proposed for closure. The effect of adding these additional roads formalizes the existing roaded condition of the areas, thus further fragmenting the Citizen's Wilderness Proposals Areas. However, there are already 208.89 miles of existing NFTS roads. The prohibition of cross-country travel includes 26.43 miles of unauthorized routes in the Citizen's Wilderness Proposal areas.

Cumulative Effects

There would be no cumulative effects to the inventoried Roadless Areas since there are no direct or indirect effects of Alternatives 2 and 4. The cumulative effects on the Citizens' Wilderness Proposal results in the addition of 16.51 miles of road to the 208.89-mile NFTS road system that is present in the Citizen's Wilderness Proposal. The result of the addition would be a loss of wilderness characteristics of solitude. However, compared to the miles of existing NFTS roads, the additions would be small.

Alternatives 3 and 4: Additions to the NFTS

Direct and Indirect Effects

There would be no direct or indirect effects on wilderness characteristics within the Inventoried Roadless Areas or the Citizen's Wilderness Proposal areas, since no additional roads are proposed to be added to the NFTS under Alternatives 3, and only 1.79 miles in Alternative 4.

Cumulative Effects

The direct or indirect effects on wilderness characteristics with the Inventoried Roadless Areas or the Citizen's Wilderness proposal areas are insignificant, as are the cumulative effects.

Compliance with the Modoc LRMP and Other Direction

Alternative 1 does not meet the requirements of the Modoc LRMP as Amended, nor does it meet the requirements of the SNFPA, Travel Management Motor Vehicle Use Rule. All action alternatives are consistent with the Modoc LRMP and the Travel Management Rule.

Chapter 4. Consultation and Coordination

Preparers and Contributors

Listed below are the Modoc National Forest employees who contributed to this Draft Environmental Impact Statement.

Core Interdisciplinary Team Members

Name	Contributions	Degree(s)	Years of Experience
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Forest Gauna	Botany	BA Plant Biology	3
Judy Perkins	Botany	BA, MS English BS Botany PhD Organismal Biology and Ecology	8
Boyd Turner	Wildlife Biology	BS Wildlife Management	20
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Consultation

The Modoc National Forest consulted the following governmental agencies, organizations, and individuals during the writing of this Draft Environmental Impact Statement.

Federal, State, and Local Agencies

Alturas City Council	California Department of Transportation
Modoc County Board of Supervisors	California Department of Forestry, Alturas Forest Fire Station
Modoc County Planning Department	California Fish and Game
Modoc County Land Use Committee	Modoc County Vitality Group
Modoc National Wildlife Refuge	Lassen County Board of Supervisors
Ash Creek Wildlife Refuge	Natural Resources Conservation Service
Klamath Basin National Wildlife Refuges	Lassen National Forest
U. S. Fish and Wildlife Service	Shasta-Trinity National Forest
State Historic Preservation Office	Fremont-Winema National Forest
Bureau of Land Management, Alturas Field Office	Klamath National Forest
Bureau of Land Management, Eagle Lake Field Office	Bureau of Land Management, Surprise Field Office

Tribal Governments

Modoc Tribe of Oklahoma
Klamath Tribes, Oregon
Pit River Tr bes, California
Fort Bidwell Indian Community
Shasta Tribe, Inc.

Distribution of the Draft EIS

As part of the CEQ Regulations on the National Environmental Policy Act, the Modoc National Forest is circulating the Draft EIS to the following agencies, organizations, and individuals.

Those receiving the Draft DIS have 45 days to comment on it. Their comments should be as substantive as possible. According to the CEQ Regulations (§ 1503.4), the Modoc National Forest must respond in writing to every comment, even if such a response necessitates substantial changes to the DIS, such as the addition or deletion of alternatives or the analysis of new resource issues. The Modoc National Forest will publish its responses along with the Final EIS.

Federal Agencies

Agency	City & State
Director, Planning and Review Advisory Council on Historic Preservation	Washington, DC
Natural Resources Conservation Service National Environmental Coordinator U.S. Department of Agriculture	Washington, DC

Agency	City & State
National Marine Fisheries Service Habitat Conservationist's Division Southwest Region	Long Beach, CA
Deputy Director USDA APHIS PPD/EAD	Riverdale, MD
USDA National Agricultural L brary Head, Acquisitions & Serials Branch	Beltsville, MD
Environmental Protection Agency Region 9 EIS Review Coordinator	San Francisco, CA
Director, Office of Environmental Policy and Compliance US Department of the Interior	Washington, DC
Klamath National Forest	Yreka, CA
Lassen National Forest	Susanville, CA
Plumas National Forest	Quincy, CA
Shasta-Trinity National Forest	Redding, CA
USDI Fish & Wildlife Service	Klamath Falls, OR
USDI Fish & Wildlife Service	Tulelake, CA
USDI Fish & Wildlife Service	Alturas, CA
USDI Bureau of Reclamation	Sacramento, CA
USDI Bureau of Reclamation, Klamath Basin Area	Klamath Falls
USDI Lava Beds National Monument	Tulelake, CA
USDI Bureau of Land Management, Alturas Field Office	Alturas, CA
USDI Bureau of Land Management, Surprise Field Office	Cedarville, CA
USDI Bureau of Land Management, Susanville Field Office	Susanville, CA

State Agencies

Agency	City & State
California Department of Fish & Game	Sacramento, CA
State of California Resources Agency	Sacramento, CA
California Department of Food & Agriculture	Sacramento, CA
California Department of Transportation	Sacramento, CA
California Department of Forestry	Sacramento, CA
California Regional Water Quality Control Board	Sacramento, CA
California Regional Water Quality Control Board—Lahontan	Sacramento, CA
CDFA-IPC	Sacramento, CA
Honey Lake Wildlife Area	Wendel, CA

Other Governments

Agency	City & State
Modoc County Agriculture Commission	Alturas, CA
Modoc County Land Use Committee	Alturas, CA
Modoc County Library	Alturas, CA
Modoc County Public Works	Alturas, CA
Big Valley Joint Unified School District	Bieber, CA
Modoc County Board of Supervisors	Alturas, CA
Lassen County Board of Supervisors	Susanville, CA
Lassen County Road Department	Susanville, CA
Lava Beds Resource Conservation District	Tulelake, CA
Siskiyou County Board of Supervisors	
Pit River Resource Conservation District	Lookout, CA

Tribal Governments

Agency	City & State
Alturas Rancheria	Alturas, CA
Cedarville Rancheria	Alturas, CA
Ft. Bidwell Indian Community Council	Ft. Bidwell, CA
Hewise Band	Alturas, CA
Modoc Indian Health Project	Alturas, CA
Shasta Nation	Mcdoel, CA
The Klamath Tribes	Chiloquin, OR
The Native Coalition to Save the Medicine Lake Highlands	Mt. Shasta, CA
The Pit River Tribe	Burney, CA
The Shasta Tr be, Inc.	Ft. Jones, CA

Organizations

4-runners	Klamath Falls and Bend, OR
Blue Ribbon Coalition	Pocatello, ID
The Wilderness Society	San Francisco, CA
Klamath Forest Alliance	Klamath Falls, OR
Sierra Access Coalition	Quincy, CA
Modoc Cattlemens Association	Cedarville, CA
Center for Biological Diversity	San Francisto, CA
Wildlands CPR	Missoula, MT
CalPine Corporation	Pleasanton, CA
Back Country Horsemen	Alturas, CA
Modoc/Washoe Experimental Stewardship Committee	Cedarville, CA

Glossary

Advisory Council on Historic Preservation (ACHP)—Established by the National Historic Preservation Act (NHPA), the Advisory Council is an independent Federal agency headquartered in Washington, DC that promotes the preservation, enhancement, and productive use of the nation's cultural resources, and advises the President and Congress on national historic preservation policy. By statutory authority, the USDA has a member seat on the Advisory Council. The Advisory Council conducts regular business review of NHPA responsibilities within Federal agencies, including but not limited to, resource stewardship, public education, heritage tourism, tribal relations, resource protection, and implementation of Executive Order 13287—Preserve America. Disputes under NHPA Section 106 review that cannot be resolved between the SHPO and the Federal agency, are presented to the Advisory Council.

Allotment—A grazing allotment is a parcel of Federal land that is managed under one permit, to be used by livestock under certain conditions.

All-terrain vehicle (ATV)—A type of off-highway vehicle that travels on three or more low-pressure tires; has handlebar steering; is less than or equal to 50 inches in width; and has a seat designed to be straddled by the operator.

American Indian Religious Freedom Act of 1978—(AIRFA)(P.L. 92 STAT. 469) establishes, as a policy of the United States, protection and preservation for American Indians of their inherent right to freedom to believe, express, and exercise their traditional religions. The act directs agencies to consult with native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve American Indian religious cultural rights and practices.

Animal unit month (AUM)—The amount of forage required by one animal unit (AU) for one month. One animal unit is defined as a 1,000 lb. beef cow with or without a nursing calf, with a daily requirement of 26 lb. of dry matter forage.

Basal area—The area of the cross-section of a tree stem near the base, generally at breast height and inclusive of bark.

Best management practices (BMPs)—Forest Service water-quality maintenance and improvement measures. They were developed in compliance with section 208 of the Federal Clean Water Act, PL92-500, as amended. They were approved by the US EPA and certified by the California Water Resources Control Board. They are the measures both the state and Federal water-quality regulatory agencies expect the Forest Service to implement, to meet Federal and state water-quality objectives and to maintain and improve water quality.

Best Management Practices Evaluation Program—A standardized method of monitoring the implementation and effectiveness of BMPs in protection and maintenance of water quality.

Biological assessment (BA)—Information prepared by, or under the direction of, a Federal agency to determine whether a proposed action is likely to (1) adversely affect listed species or designated critical habitat, (2) jeopardize the continued existence of species that are proposed for listing, or (3) adversely modify proposed critical habitat.

Biological evaluation (BE)—A documented Forest Service review of activities in sufficient detail to determine how an action or proposed action may affect any Forest Service "Sensitive" species. This review is similar in scope and intensity to a BA (defined above).

Cavity—The excavated hollow in trees by birds or other natural phenomena; used for roosting and reproduction by many birds and mammals.

Critical habitat—Habitat for a species listed under the ESA that has been determined by the listing agency to be essential to the conservation of the species, and which may require special management considerations or protection.

Cross-country motor vehicle travel—Any travel off an authorized NFTS route. This includes travel on unauthorized routes or open land.

Cultural (heritage) resources—An object or definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence. Cultural resources are prehistoric, historic, archaeological, or architectural sites; structures, places, or objects and traditional cultural properties. In this document, cultural resources include the entire spectrum of resources for which the cultural program is responsible—from artifacts to cultural landscapes—without regard to eligibility for listing on the National Register of Historic Places.

Designated road, trail, or area—A National Forest System road, National Forest System trail, or an area on National Forest System lands that is designated for motor vehicle use pursuant to 36 CFR, part 212.51, on a motor vehicle use map (36 CFR 212.1).

Diameter at breast height (dbh)—The diameter of a tree measured 4 feet, 6 inches above the ground.

Endangered Species Act (ESA)—Primary law governing protections for species that are threatened or are in danger of extinction (16 USC 1531 *et seq.*).

Endangered species—Any plant or animal species that is in danger of extinction throughout all or a significant portion of its range as determined by the USDI Fish and Wildlife Service or NOAA Fisheries (see also Endangered Species Act).

Exotic Plant—*see* noxious weed.

Fen—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.

Five-county study area—For purposes of socioeconomic analysis—Modoc, Lassen, Siskiyou, Lake, and Klamath counties

Forb—An herbaceous plant that is not a graminod.

Forest road or trail—A road or trail wholly or partially within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and use of the National Forest System and the use and development of its resources (36 CFR 212.1).

Forest transportation system—The system of National Forest System roads, trails, and airfields on National Forest System lands (36 CFR 212.1).

Habitat type—An aggregation of all land areas potentially capable of producing similar plant communities at climax stage.

Habitat—The sum total of environmental conditions of a specific place occupied by a wildlife species or a population of such species.

Highway-licensed vehicle—Any motor vehicle that is licensed or certified under state law for general operation on all public roads within the state. Operators of highway-legal vehicles are subject to state traffic law, including requirements for operator licensing.

Historic Property(ies)—36 CFR 800.16 defines historic properties as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National

Register of Historic Places. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization, and that meet the National Register criteria."

Home range core area (HRCA)—An area of 1,000 acres that surrounds each territorial California spotted owl activity center. It encompasses the best available spotted owl habitat closest to the California spotted owl PAC where the most concentrated owl foraging activity is likely to occur.

HUC (hydrologic unit code)—The watershed code; in this document it is usually the 6th order watershed.

Indicator species—*See* management indicator species.

Indirect effects—Secondary effects that occur in locations other than where the initial action occured, or that occur significantly later in time.

Interdisciplinary (ID) team—A group of professional specialists with expertise in different resources that collaborate to develop and evaluate management alternatives.

Land allocation—The assignment of a management emphasis to particular land areas with the purpose of achieving goals and objectives. Land allocation decisions are determined in decision documents such as the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl.

Litter—An organic surface soil layer usually composed of identifiable leaves, branches, or other vegetative material, and animal remains.

Local road—A National Forest System road that connects a terminal facility with collector roads, arterial roads, or public highways, and that usually serves a single purpose involving intermittent use.

Local visitor—The National Visitor Use Monitoring Program defines local visitors as "those visitors who live within 30 straight-line miles of the Forest visited."

Maintenance level (ML)—Defined in Forest Service Handbook 7709.58, 10, 12. 3, as the level of service provided by, and maintenance required for, a specific road. Maintenance levels must be consistent with road management objectives and maintenance criteria. Roads may be maintained at one level and planned to be maintained at a different level at some future date. The operational maintenance level is the maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns; in other words, it defines the standard to which the road is currently being maintained. The objective maintenance level is the maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns.

Maintenance level 1 road—Defined in Forest Service Handbook 7709.58, 10, 12. 3 as intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed one year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level, and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate." Roads receiving level 1 maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses. These roads have the following attributes: (1) vehicular traffic is eliminated, including administrative traffic; (2) they are

physically blocked or entrance is disguised; (3) they are not subject to the requirements of the Highway Safety Act; (4) maintenance is done only to minimize resource impacts; and (5) no maintenance other than a condition survey may be required so as long as no potential exists for resource damage.

Maintenance level 2 road—Defined in Forest Service Handbook 7709.58, 10, 12.3 as roads open for use by high-clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either (1) to discourage or prohibit passenger cars or (2) to accept or discourage high-clearance vehicles. These roads have the following attributes: (1) they have low traffic volume and low speed; (2) they are typically local roads; (3) they typically connect collectors and other local roads; (4) dips are the preferred drainage treatment; (5) they are not subject to the requirements of the Highway Safety Act; (6) surface smoothness is not a consideration; and (7) they are not suitable for passenger cars.

Maintenance level 3 road—Defined in Forest Service Handbook 7709.58, 10, 12.3 as roads open and maintained for travel by prudent drivers in a standard passenger car. User comfort and convenience are low priorities. Roads in this maintenance level are typically low speed, single lane with turnouts, and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either “encourage” or “accept.” “Discourage” or “prohibit” strategies may be employed for certain classes of vehicles or users. These roads have the following attributes: (1) they are subject to the requirements of the Highway Safety Act and the Manual of Uniform Traffic Control Devices (MUTCD); (2) they have low to moderate traffic volume; (3) they typically connect arterial and collector roads; (4) a combination of dips and culverts provide drainage; (5) they may include some dispersed recreation roads; and (6) development of potholes or washboards may occur.

Maintenance level 4 road—Defined in Forest Service Handbook 7709.58, 10, 12.3 as roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved or dust abated. The most appropriate traffic management strategy is “encourage.” However, the “prohibit” strategy may apply to specific classes of vehicles or users at certain times. These roads have the following attributes: (1) they are subject to requirements of the Highway Safety Act and the Manual of Uniform Traffic Control Devices (MUTCD); (2) they have moderate traffic volume and speeds; (3) they may connect to county roads; (4) culverts provide drainage; (5) they are usually a collector road; and (6) they may include some developed recreation roads.

Maintenance level 5 road—Defined in Forest Service Handbook 7709.58, 10, 12.3 as roads that provide a high degree of user comfort and convenience. These roads are normally double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is “encourage.” These roads have the following attributes: (1) they are subject to the requirements of the Highway Safety Act and the Manual of Uniform Traffic Control Devices (MUTCD); (2) they have the highest traffic volume and speeds; (3) they typically connect state and county roads; (4) culverts provide drainage; (5) they are usually arterial and collector roads; (6) they may include some developed recreation roads; and (7) they are usually paved or chip-sealed.

Managed late-successional area (MLSA)—A land allocation under the Northwest Forest Plan. These areas are similar to the late-successional reserve land allocations, but are identified on the east side where fire is a natural part of the ecosystem.

Management indicator species—A species selected because its welfare is presumed to be an indicator of the welfare of other species sharing similar habitat requirements. A species of fish, wildlife, or plants that reflect ecological changes caused by land management activities.

Maximum modification—A visual quality objective meaning human activity may dominate the characteristic landscape but must, at the same time, use naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middle ground.

Mixed-use road—Segments of National Forest System roads that are identified and signed as open to state-licensed and unlicensed vehicles; generally more than 50 inches in width. They are usually, but not always, low-maintenance roads with no high-speed traffic.

Modification—A visual quality objective meaning human activity may dominate the characteristic landscape but must, at the same time, use naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middle ground.

Modoc-Klamath—Also known as the Klamath Tribes. It consists of members of the Modoc, Klamath, and Yahooskin American Indian tribes. The Modoc Tribe is the American Indian group that occupied the northern third of the Modoc National Forest.

Motor vehicle—Any vehicle which is self propelled, other than (1) a vehicle operated on rails; and (2) any wheelchair or mobility device that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area (36 CFR 212.1).

Motorized mixed use—Designation of an National Forest System road for use by both highway-legal and non-highway legal motor vehicles.

Motorized Recreation Programmatic Agreement—An agreement between the California and Nevada State Historic Preservation Offices and the Pacific Southwest Region of the Forest Service designed to guide the Forest Service compliance with Section 106 of the National Historic Preservation Act in regards to motorized vehicle-use management planning.

Motorized trail—A travel way usually, but not always, less than 50 inches in width, and usually, but not always, available for use by all-terrain vehicles (ATVs) or motorcycles. These travel ways may also be made available to high-clearance four-wheel drive vehicles, and may also be used by bicycles, horses, and hikers.

National Forest System road—A Forest road other than a road which has been authorized by a legally documented right-of-way by a state, county, or local public road authority (36 CFR 212.1).

National Forest System trail—A Forest trail other than a trail which has been authorized by a legally documented right-of-way held by a state, county, or local public road authority (36 CFR 212.1).

National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. 470), as amended, extends the policy in the Historic Sites Act to state and local historical sites, as well as those of national significance; expands the National Register of Historic Places, establishes the Advisory Council on Historic Preservation and the state historic preservation officers, and requires agencies to designate Federal preservation officers.

National Register of Historic Places (36 CFR part 60)—These regulations establish the National Register of Historic Places as a planning tool to help Federal agencies evaluate cultural resources in consultation with state historic preservation officer (SHPO) and the Advisory Council on

Historic Preservation (Advisory Council). 36 CFR 60.4 provides the criteria for determining whether cultural resources are eligible for listing on the National Register of Historic Places.

NHPA Section 101(d)(2) establishes criteria for designating tribal historic preservation officers to assume the functions of a state historic preservation officer on tribal lands.

NHPA Section 106 directs all Federal agencies to take into account the effects of their undertakings (actions, financial support, and authorizations) on properties included in or eligible for the National Register. Advisory Council on Historic Preservation regulations at 36 CFR, part 800, implement NHPA Section 106.

NHPA, Section 110, establishes inventory, nomination, protection, and preservation responsibilities for Federally owned historic properties.

NOAA Fisheries—The Federal agency responsible for administering the Endangered Species Act in regard to marine or anadromous species.

Non-highway-legal vehicle—Any motor vehicle that is not licensed or certified under state law for general operation on all public roads within the state. Operators of non-highway legal vehicles are subject to state requirements, if any, for licensing and operation of the vehicle in questions.

Northern Paiute—This American Indian group, known as the Gidu'tikadu, that occupied the eastern fringe of the Modoc National Forest along the Warner Mountains and into the adjacent Surprise Valley.

Northwest Forest Plan (NWFP)—A large-scale planning effort that set land and resource goals for lands within the range of the northern spotted owl. The decision document for this plan on the National Forests is the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl.

Noxious weed—Non-native invasive plant with the ability to disrupt or alter native plant communities and ecosystems.

Off-highway vehicle (OHV)—Any motor vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain (36 CFR 212.1).

PAC (protected activity center)—An area delineated around an activity center, usually to protect nesting activities. May be for spotted owls, goshawks, or great gray owls.

Partial retention—A visual quality objective that in general means human activities may be evident, but must remain subordinate to the characteristic landscape.

Pfankuch stability rating—A methodology developed by the Forest Service to determine if a stream channel is stable, and whether its trend is up or down. It evaluates stream bank stability based on physical factors found in the stream courses.

Pit River Tribe—This tribal group, consisting of 11 autonomous bands, occupied the lower two-thirds of the Modoc National Forest. Seven of the 11 bands have territories that overlap the Modoc National Forest.

Preservation—A visual quality objective that provides for ecological change only.

Propagule—Plant material, such as a seed or rhizome, from which a plant may grow. Propagules such as seeds or spores are products of sexual reproduction, producing plants with different genetic make-ups than their parent(s), whereas propagules such as rhizomes or bulbs propagate a plant asexually, growing out new plants with the exact genetic makeup of the parent.

PFC (proper functioning condition) Rating—standardized methodology to evaluate stream condition on Forest Service lands.

Public road—The road under the jurisdiction of and maintained by a public road authority and open to public travel (23 U.S.C. 101 (a)).

Recreation opportunity spectrum—A continuum of possible mixes or combinations of activities, settings, and probable experience opportunities.

Region 5 Cumulative Watershed Effects Model—A standardized methodology used within Forest Service Region 5 to determine if the affected sub-watershed is likely to incur an adverse cumulative effect to water quality from an alteration of the rainfall-runoff relationship. The model is based on the development of a threshold of concern for the sub-watershed, which is in turn based on geomorphic factors (e.g., stability of landforms, stream bifurcation ratio, and soil sensitivity to disturbance).

Retention—A visual quality objective that in general means human activities are not evident to the casual Forest visitor.

Riparian habitat—Area adjacent to lakes, ponds, rivers, and streams where vegetation has access to water.

Road—A motor vehicle route over 50 inches wide, unless identified and managed as a trail (36 CFR 212.1).

Route—A road or trail.

Scenic attractiveness—The scenic importance of a landscape based on human perceptions for the intrinsic beauty of land form, rock form, water form, and vegetation pattern. Reflects varying visual perception attributes of variety, unity, vividness, intactness, coherence, mystery, uniqueness, harmony, balance, and pattern. It is classified as—

a. distinctive

b. typical or common

c. undistinguished

Scenic resource—Attributes, characteristics, and features of landscapes that provide varying responses from, and varying degrees of benefits to, humans.

Sensitive species—Those species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers, or density or habitat capability that would reduce a species' existing distribution.

Snag—A standing dead tree usually without merchantable value for timber products, but may have characteristics of benefit to some cavity-nesting wildlife species.

Soil bulk density—A field measurement that by comparison of undisturbed versus disturbed areas, determines the amount of soil compaction that has occurred from Forest management activities.

State Historic Preservation Office (SHPO)—Established by the National Historic Preservation Act, the SHPO is the appointed official in each state responsible for fostering historic preservation programs at the local government level, nominating cultural resources to the National Register, creating preservation ordinances, and providing funds and technical assistance for preservation activities. In compliance with NHPA, Federal agencies must seek the views of the appropriate SHPO when identifying historic properties and assessing effects of an undertaking

on historic properties. Agencies also consult with SHPOs when developing both programmatic and project-specific memorandums of agreement. The SHPO and supporting professional staff are usually an agency within each state government.

Temporary road or trail—A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a Forest road or a Forest trail and that is not included in a Forest transportation atlas (36 CFR 212.1).

Threatened species—Any species of plant or animal that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, as determined by USDI Fish and Wildlife Service or NOAA Fisheries pursuant to the Endangered Species Act.

Traditional cultural property(ies)—A cultural resource that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. The entity evaluated for eligibility for inclusion in the National Register of Historic Places must be a tangible property; that is, a district, site, building, structure, or object as defined in 36 CFR 64.4.

Trail—A route 50 inches or less in width, or a route over 50 inches wide that is identified and managed as a trail (36 CFR 212.1).

Unauthorized route—A route that is not a Forest road or trail or a temporary road or trail, and that is not included in a Forest transportation atlas (36 CFR 212.1).

Ungulate—A mammal having hooves, e.g., deer, elk, and moose.

Vascular plants—All higher developed plants, including flowering plants, and grasses. Excludes lichens and mosses.

Vernal pool—Depression on a land surface with relatively impermeable soils, which fills with water in the winter and during spring snowmelt, and gradually dries out as the summer progresses. Similar habitats include playas, mud flats, and reservoir edges.

Viable population—A population that has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population on the planning area.

Visual quality objective—A desired level of excellence based on physical and sociological characteristics of an area. Refers to degree of acceptable alteration of the characteristic landscape.

Wetlands—Areas that are inundated by surface or ground water with a frequency sufficient to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, wet meadows, river overflows, mud flats, and natural ponds.Index

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