

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 from 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 overlaid 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 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 than 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 than 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.