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Draft Environmental Impact Statement for Public Motorized Travel Management Plan

Apache-Sitgreaves National Forests

Apache, Coconino, Greenlee and Navajo Counties, Arizona

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Draft Environmental Impact Statement for Public Motorized Travel Management Plan

Apache-Sitgreaves National Forests

Apache, Navajo, Greenlee and Coconino Counties, Arizona

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Abstract: To comply with the Travel Management Rule (TMR), the Apache-Sitgreaves National Forests propose to provide for a system of National Forest System (NFS) roads and motorized trails designated for motor vehicle use. As required in the TMR, the forests would prohibit motor vehicle use off the designated system. The proposed changes take into account opportunities to reduce impacts to biological, physical, and cultural resources. Five alternatives, including no action, were analyzed. All action alternatives would amend the "Apache-Sitgreaves National Forests Land and Resource Management Plan." All action alternatives would propose changes to designations of NFS roads and motorized trails for motor vehicle use. Included in the designations would be the limited use of motor vehicles within a specified distance of designated routes solely for the purpose of dispersed camping. Three action alternatives would designate corridors for motor vehicle use within a specified distance of designated routes solely for the purpose of big game retrieval.

Commenting: It is important that reviewers provide their comments at such times and in such a way that they are useful to the Agency's preparation of the EIS. Therefore, comments should be provided prior to the close of the comment period and should clearly articulate the reviewer's concerns and contentions. The submission of timely and specific comments can affect a reviewer's ability to participate in subsequent administrative review or judicial review. Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the public record for this proposed action. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative or judicial reviews.

Send Comments to: Apache-Sitgreaves National Forests: Travel Management
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Date Comments Must Be Received: To participate in administrative appeal or judicial reviews, you must submit your comments on this draft environmental impact statement during the 45-day notice and comment period, which begins the day after the notice of availability (NOA) is published in the Federal Register. The Apache-Sitgreaves National Forests will post the due date for comments to the Web site at: www.fs.fed.us/r3/asnf/projects/travel-management.

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Acronyms

ACHP: Advisory Council on Historic Preservation

AGFD: Arizona Game and Fish Department

APE: Area of potential effect

APIF: Arizona Partners in Flight

ATV: all-terrain vehicle

CEQ: Council on Environmental Quality

CFR: Code of Federal Regulations

DEIS: draft environmental impact statement

ESA: Endangered Species Act

FEIS: final environmental impact statement

FR: Federal Register

FS: Forest Service

FSM: Forest Service Manual

GIS: geographic information system

GMU: game management unit

HUC: hydrologic unit code

IRA: inventoried roadless area

MA: management area (designated in forest plan)

MBGR: motorized big game retrieval

MIS: management indicator species

ML: maintenance level

MSO: Mexican spotted owl

MUTCD: manual of uniform traffic control devices

MVUM: motor vehicle use map

NEPA: National Environmental Policy Act

NFS: National Forest System

NFSR: National Forest System roads

NFST: National Forest System trails

NHPA: National Historic Preservation Act

NOA: notice of availability

NOI: notice of intent

NVUM: national visitor use monitoring

OAW: outstanding Arizona waters

OHV: off-highway vehicle

ORV: off-road vehicle

PAC: protected activity center

PFA: post-fledgling area

ROD: record of decision

ROS: recreation opportunity spectrum

SHPO: State Historic Preservation Officer

SOPA: schedule of proposed actions

TAP: transportation analysis process

TCP: traditional cultural property

TES: terrestrial ecosystem survey

TMDL: total maximum daily load

TMR: travel management rule

USDA: U.S. Department of Agriculture

USDI: U.S. Department of the Interior

USFWS: U.S. Fish and Wildlife Service

VQO: visual quality objectives

WUI: wildland-urban interface

Summary

To comply with the Travel Management Rule, the Apache-Sitgreaves National Forests (referred to as forests or ASNFs) propose to provide for a system of National Forest System (NFS) roads, trails, and areas designated for motor vehicle use. This road and motorized trail system would provide access to the forest while protecting physical, biological and cultural resources. The proposed changes do not restrict where people's non-motorized activities may take place.

Background

To address concerns about the effects of unmanaged off-highway vehicles (OHVs), the Forest Service published final travel management regulations for motor vehicle use on national forests and grasslands on November 9, 2005. The Travel Management Rule "… *provides for a system of National Forest System roads, National Forest System trails, and areas on National Forest System lands that are designated by vehicle class and if appropriate, by time of year, for motor vehicle use. After these roads, trails, and areas are designated, motor vehicle use, not in accordance with these designations is prohibited...*"

A motor vehicle use map (MVUM) published by the forests will show where people are allowed to drive. The motor vehicle use map enforces the system designated for motorized use. In other words, people will only be allowed to drive on the roads, trails, and areas depicted on the motor vehicle use map. If they drive places that aren't on the map, they will be subject to a fine unless they have a permit or other authorization from the Forest Service. Because the forest will publish the motor vehicle use map annually, roads, trails, and areas can be added or removed each year after the proper environmental analysis is done.

Purpose and Need for Action

The purpose of this project is to comply with the Travel Management Rule by providing a system of roads, trails, and areas designated for motor vehicle use that reduces impacts to biological, physical, and cultural resources on the forests (36 CFR 212, sections 212, 251, 261). At 36 CFR 261.13, the forests are required to prohibit motor vehicle use off the system of designated roads, trails, and areas, and motor vehicle use that is not in accordance with the designations.

There is a need for a safe and efficient transportation system for public use, Agency administration, and resource protection, while recognizing historic and current uses of the forests. Specifically, there is a need for: (1) identifying the system of roads that would be open to motor vehicle use; (2) identifying the system of motorized trails for vehicles 50 inches or less in width; and (3) the optional designation of the limited use of motor vehicles within a specified distance of designated routes solely for the purposes of dispersed camping or retrieval of big game by an individual who has legally killed the animal.

There is a need to counter detrimental effects to resources from continued use of some roads and motorized trails, as well as cross-country travel. Some detrimental effects from motorized use of the forests include increased sediment deposits in streams which degrade water quality and fish habitat, the spread of invasive plants across the forests, disturbances to a variety of plant and wildlife species, and the risk of damaging cultural resource sites.

Public Involvement

Beginning in 2005 and continuing through 2008, the forests hosted and participated in 31 public meetings and workshops related to motorized travel management. This preliminary, pre-NEPA public input was used to develop the initial proposed action. On October 10, 2007, a Notice of Intent (NOI) to prepare an environmental impact statement (EIS) for motorized travel on the forests was published in the Federal Register. A correction to the miles of road on the transportation system and the availability of maps to the general public was published on October 31, 2007.

The forests conducted public meetings in November 2007 to present the proposed action. After consideration of the input received during those meetings, the forest supervisor modified the proposed action and included more miles of corridors for dispersed camping, increased the acres of the areas designated for motorized use, and slightly increased the miles of motorized trails. A new NOI was published in the Federal Register on February 29, 2008, on the modified proposed action. Additional public meetings were held in March 2008. Coordination with local governments has occurred since this period. The forests have received over 20,000 comments from 2005 through 2008. These comments have been incorporated into the development of alternatives B through E.

Tribal Consultation

The ASNF consulted with nine tribes and one chapter that use the ASNFs for traditional, cultural, or spiritual activities. These tribes were informed about travel management in October 2007 as part of the NEPA process. A followup consultation letter was sent in July 2008 regarding the modified proposed action. Consultation meetings were held with three tribes. The forests are in the process of scheduling meetings with the Pueblo of Zuni and San Carlos Apache Tribe. Concerns identified by the tribes have been taken into consideration and were incorporated into the development of alternatives.

Issues

The forests analyzed all comments to identify issues, which are defined as cause-effect relationships directly or indirectly caused by implementing the proposed action. The issues defined as within the scope of the project, and directly or indirectly caused by implementing the proposal, were used to develop the range of action alternatives.

Issue 1: Restricting Motorized Access for Dispersed Camping

Concern: Restricting motorized access for dispersed camping may increase interactions between campers and diminish the quality of experience. Designating routes and corridors for camping may eliminate favorite spots which have been used for decades.

Response: All alternatives provide open roads to access dispersed camping. Alternative B (modified proposed action) and alternative D increase the miles of camping corridors and roads that access identified dispersed camping over what is currently available.

Issue 2: Restricting Motorized Big Game Retrieval

Concern: Changing the motorized big game retrieval policy to a fixed distance corridor may result in hunters being unable to collect a downed animal in a timely manner.

Response: Alternatives B, C, and D respond to this issue by including motorized big game retrieval for several animal species.

Issue 3: Impacts to Resources from Motorized Use

Concern: Adding roads and camping corridors to the transportation system will adversely impact terrestrial and aquatic wildlife species, soil and water, and cultural resources.

Response: Alternative E was developed to provide motorized access with minimal miles of camping corridors and no motorized big game retrieval.

Issue 4: Economics: Loss of Revenues and Jobs

Concern: Restrictions on motorized access (a change from the current condition) could negatively impact local and state economies from a loss of local, tourist, and hunter generated revenues.

Response: The social and economic impacts the project would have on the region have been analyzed in chapter 3.

Alternatives

Alternative A (no action) represents the existing transportation system and proposes no changes. Cross-country travel off system roads on around 1.6 million acres would continue, except where currently prohibited.

Alternative B (modified proposed action and the preferred alternative) would eliminate motorized cross-country travel and designate a system of roads, trails, and areas for motorized use (table 1). The road system would have 5.6 percent fewer roads and 72 percent more motorized trails than the current system. Corridors would be designated 300 feet from either side of around 25 percent of the designated open roads (658 miles) for the sole purpose of accessing dispersed camping locations with motor vehicles. Motorized big game retrieval (MBGR) would be allowed within a 1-mile distance off the designated road and motorized trail system (1.2 million acres). There would be five motorized use areas designated on two ranger districts (459 acres).

Alternative C would eliminate motorized cross-country travel and designate a system of roads, trails, and areas for motorized use (table 1). The road system would have 1 percent more roads and the same miles of motorized trails as the current system. Twenty-eight miles of unauthorized roads would be added to the system, providing general access as well as motorized access to dispersed camping locations. MBGR would be allowed within a 1-mile distance off the designated road and motorized trail system (1.2 million acres).

Alternative D would eliminate motorized cross-country travel and designate a system of roads, trails, and areas for motorized use (table 1). The road system would have 3.6 percent fewer roads and 93 percent more motorized trails than the current system. Corridors would be designated 300 feet from either side of around 75 percent of the designated open roads (2,034 miles) for the sole

purpose of accessing dispersed camping locations with motor vehicles. MBGR would be allowed within a ¼-mile distance off the designated road and motorized trail system (700,000 acres). There would be five motorized use areas designated on two ranger districts (459 acres).

Alternative E would eliminate motorized cross-country travel and designate a system of roads, trails, and areas for motorized use (table 1). The road system would have 12.7 percent fewer roads and 31 percent more motorized trails than the current system. Corridors would be designated 300 feet from either side of around 5 percent of the designated open roads (118 miles) for the sole purpose of accessing dispersed camping locations with motor vehicles. MBGR would not be allowed off the designated system of roads and motorized trails.

Table 1. Comparison of road and motorized trail changes proposed by alternative

Action Proposed	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
National Forest System Roads (miles)					
Add unauthorized roads	0	53	28	37	64
Open closed NFS roads	0	358	0	415	220
Close NFS roads to all motor vehicles	0	493	0	479	559
Restrict currently open NFS roads to administrative and permitted use only	0	77	0	75	84
Total Miles Open Roads	**2,832**	**2,673**	**2,860**	**2,730**	**2,473**
Total Miles Closed Roads	**3,373**	**3,866**	**3,373**	**3,852**	**3,932**
National Forest System Trails (miles)					
Convert closed roads to trails for motor vehicles 50 inches or less in width	0	60	0	64	14
Convert open roads to trails for motor vehicles 50 inches or less in width	0	16	0	19	14
Add unauthorized roads as trails for motor vehicles 50 inches or less in width	0	34	0	62	20
Construct new trails for motor vehicles 50 inches or less in width	0	2	0	1	1
Total Miles Motorized Trails	**156**	**268**	**156**	**302**	**205**

Conclusions About the Effects of the Alternatives

The forests' road system was not designed for the primary purpose of meeting today's recreational needs; rather it began as access for timber removal and mining. The ability of the public to move around within the forests using motor vehicles is integral to the many recreation activities available. Visitors are not only using vehicles to get from one point to another, they are operating vehicles in a rural setting as a part of the recreational experience.

A general summary of the effects to resources from changes in the designated road and motorized trail system is provided here. The draft environmental impact statement (DEIS) examines direct,

indirect, and cumulative effects to the physical and social environments in and around the forests in detail in chapter 3.

Under alternative A, motorized cross-country travel, dispersed camping and MBGR would continue forestwide. It would be expected that with increasing populations, cross-country travel would increase causing resource damage. There would be increased mixed-user conflicts, associated noise levels, creation of user-created roads with resource damage and public safety concerns, and the creation of additional dispersed camping locations; some near riparian areas. This alternative would not provide additional motorized trail opportunities including loop trails.

Indirect effects to visitors seeking non-motorized opportunities would be high under alternative A, since cross-country motorized use would continue at present levels. These effects would include an increase in conflict with motorized users for recreation, hunting, noise, in transition areas between motorized and non-motorized uses, and along private lands. There would also be increased noise in semiprimitive nonmotorized and primitive settings.

Under the action alternatives (B, C, D, and E), the elimination of motorized cross-country travel on the forests would result in beneficial impacts on resources such as soils, water, vegetation, fish, wildlife, and cultural resources. This could provide negative impacts to motor vehicle users who enjoy traveling off the designated system of roads and trails under current conditions. The road and motorized trail systems, however, would continue to provide motorized recreation opportunities across the forests.

Since there would be limited change in activities by alternative related to jobs and economics, there would be no measurable direct and indirect effects on the economy relative to the scale. The employment and income figures representing the contribution of current activities to the economy of the assessment area (six counties) would be unchanged or changed so slightly they cannot be evaluated.

Effects on MBGR under alternatives B and C are not expected to be much different from current conditions under this alternative since MBGR is still allowed on around 80 percent of the area currently open. Under alternative C, around 44 percent would be open to MBGR of the area currently open. There could also be potential for user conflicts between hunters using motor vehicles to retrieve game and those who do not. Alternative E would not allow MBGR, and AGFD could have issues meeting its harvest objectives, meat could be spoiled, hunters could be injured by not being assisted with motor vehicles to retrieve game, and impacts to vegetation from elk grazing could increase. There would still be access into the forests on the designated road and motorized trail system, which could be used for game retrieval only on the designated routes and hunter’s would not be precluded from using non-motorized means of retrieving a downed animal.

On routes that are used repeatedly for MBGR (alternatives B, C, and D), there could be some resource damage from motor vehicle use, although it is not expected that this would occur very often. Additionally, there is expected to be some areas with concentrated use of dispersed camping within the corridors, resulting in some resource impacts to riparian areas, streams, and vegetation. Beneficial effects would occur to vegetation from elimination of motorized cross-country travel. Limited effects from crushing and burying plants with sediment in areas where motorized off-road travel would occur (dispersed camping corridors, within MBGR distances, and areas).

Compared to alternative A, the action alternatives would have reduced potential to spread weed seeds due to the elimination of motorized cross-country travel. Potential to spread seeds would exist in areas where off-road travel is allowed (dispersed camping corridors, MBGR areas, and areas) and drainages along roads and trails. Likewise, impacts to soil productivity and sediment loading into streams would be improved. There would still be impacts, however, to soil productivity and water quality, relative to the number of roads and motorized trails proposed by alternative.

There would be impacts to wildlife and fish species under all alternatives (A, B, C, D, and E). There are four federally listed wildlife species and two areas of associated critical habitat. The effect of any alternative on those species is not likely to jeopardize the continued existence of Mexican wolves and not likely to adversely affect (NLAA) Mexican spotted owl and critical habitat, southwestern willow flycatcher and critical habitat, and Chiricahua leopard frog. There are 58 Forest Service sensitive wildlife species and the effect of any alternative may impact individuals or habitat, but is not likely to contribute to the trend toward Federal listing (MIIH). There are 17 management indicator species (MIS) and the effect of any alternative would maintain forestwide habitat and population trends; action alternatives may improve trends from reduced off-road travel. There are 34 migratory bird species with no effect to populations under any alternative, and the action alternatives may improve some habitats.

There are seven threatened or endangered fish species, one candidate fish species, and four areas of associated critical habitats. Aquatic habitat for fish results in negative effects under all alternatives due to added sediment in drainages from the presence of roads and trails near surface water, road/stream crossings, and off-road travel; the amount of impacts varies by alternative based on the routes proposed (the action alternatives greatly reduce areas open to off-road travel, benefiting all fish species). The effects for the fish species are: seven species may effect, likely to adversely affect (LAA), one species may effect, not likely to adversely affect (NLAA), three critical habitats LAA, and one critical habitat NLAA. There are five Forest Service sensitive fish species and the effect of any alternative may impact individuals or habitats, but would not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species (MIIH).

Under alternative A, there would be no adverse effect to cultural resource sites, however, there would be a high potential from unauthorized routes and motorized cross-country travel to impact sites. The action alternatives would have no adverse effect to cultural resource sites, and mitigation measures would be adhered to. The number of sites potentially impacted varies by alternative.

Under the action alternatives, non-motorized users would continue to share the majority of the roads and trails with motorized users; however, the elimination of cross-country motorized travel would produce beneficial impacts to non-motorized recreation. There would be a reduction of roads in primitive and semiprimitive nonmotorized settings. User conflicts related to noise, traffic, dust, etc., would be reduced to a certain extent; although, incompatible recreation conflicts would continue in popular areas located in close proximity to motorized routes.

Decision to Be Made

Based on the effects to social, natural, and cultural resources, the forest supervisor will decide what changes to make to the current motorized travel system to be compliant with the TMR. The

decision will also include whether to provide motorized access for dispersed camping, whether to designate motorized use areas, and whether to provide access for motorized big game retrieval. The record of decision (ROD), which will be published after analyzing the public's comments on the DEIS, will document the decision with the rationale.

Chapter 1 – Purpose of and Need for Action

Document Structure

The Apache-Sitgreaves National Forests have prepared this draft environmental impact statement (DEIS) to analyze different ways to implement the Travel Management Rule (TMR). This DEIS discloses the direct, indirect, and cumulative environmental impacts which would result from the proposed action and alternatives, using best available science. The analysis complies with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. The document consists of the following:

Chapter 1. Purpose of and Need for Action: This chapter describes the history of the project proposal, the purpose and need for the project, and the proposal for achieving the purpose and need. This chapter also describes how the Forest Service informed the public of the proposal and how the public responded.

Chapter 2. Alternatives, Including the Proposed Action: This chapter provides a detailed description of the proposed action and alternative methods for achieving the purpose. The alternatives were developed based on key issues raised by the public and other agencies. This chapter also includes a summary of the environmental consequences for each alternative.

Chapter 3. Affected Environment and Environmental Consequences: This chapter describes the environmental effects of implementing each alternative. The analysis in this chapter is organized by resource topic.

Chapter 4. List of Preparers; Consultation and Coordination: This chapter provides a list of people who prepared this document and the list of agencies, organizations, and persons to whom copies of the statement are sent.

Glossary: A description of terms used in the document.

Literature Cited: A list of references used for the project.

Appendix: The appendix consists of multiple parts and provides more detailed information to support the analyses presented in the DEIS.

Index

The project record, including more detailed analyses of forest resources, is located at the Apache-Sitgreaves National Forests Supervisor's Office, P.O. Box 640, Springerville, AZ 85938. Records are available pursuant to the provisions of the Freedom of Information Act (40 CFR 1506.6(f)).

Introduction

The Apache-Sitgreaves National Forests (referred to as the forests or ASNFs) are located in east-central Arizona (figure 1) and range in elevation from approximately 3,500 feet near Clifton to more than 11,400 feet on Mt. Baldy. There are 2,110,196 acres within the current forests boundaries. The forests cover portions of Coconino, Navajo, Apache, and Greenlee Counties (figure 2). The forests are administratively divided into five ranger districts: Alpine, Black Mesa, Clifton, Lakeside, and Springerville. Motor vehicles are used to access the forests for both motorized and non-motorized activities including sightseeing, camping, hiking, hunting, fishing, horseback riding, and firewood cutting, as well as permitted and administrative uses.

Background

On November 9, 2005, the Forest Service published final travel management regulations governing off-highway vehicles (OHVs) and other motor vehicle uses on all national forests and grasslands. The Travel Management Rule (TMR) amended regulations in 36 CFR (Code of Federal Regulations), Parts 212, 251(b) and 261(a), and removed obsolete direction at 36 CFR 295. These three regulations—36 CFR, Parts 212, 251(b), and 261(a)—are referred collectively as TMR throughout this document. The TMR was developed in response to the substantial increase in use of OHVs on National Forest System (NFS) lands and related damage to forest resources caused by unmanaged OHV use over the past 30 years. The regulations implement Executive Orders 11644 and 11989 regarding off-road use of motor vehicles on Federal lands.

The TMR provides for a system of NFS roads, trails, and areas on NFS lands designated for motor vehicle use (36 CFR 212.50(a)). After the roads, trails, and areas are designated, motor vehicle use not in accordance with these designations is prohibited, including motor vehicle use off designated roads and trails and outside designated areas (36 CFR 261.13). Therefore, under the TMR, forests that do not already restrict motorized travel to designated NFS roads, trails, and areas on NFS lands must do so. Once a decision is made, forests must display motorized roads, trails, and areas on a motor vehicle use map (MVUM) and provide it to the public free of charge (36 CFR 212.56).

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 NFS roads, trails, and areas for motor vehicle use (36 CFR 212.50(b)). Therefore, only changes to the existing system will be analyzed in this NEPA document.

Definitions (36 CFR 212.1)

Road – A motor vehicle route over 50 inches wide, unless identified and managed as a trail.

Trail – A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail.

Forest or system road or trail – A road or trail wholly or partially within or adjacent to and serving NFS lands that the Forest Service determines is necessary for the protection, administration, and utilization of the NFS, and the use and development of its resources.

Unauthorized road – A road or trail that is not a forest road or trail, or a temporary road or trail and that is not included in a forest transportation atlas.

Area – A discrete, specifically delineated space that is smaller (in most cases, much smaller) than a ranger district.

Regulation 36 CFR 212.51(a) states that roads, motorized trails, and areas shall be designated by vehicle class and, if appropriate, by time of year by the responsible official, provided that the following vehicles and uses are exempted from these designations: (1) aircraft; (2) watercraft; (3) over-snow vehicles; (4) limited administrative use by the Forest Service; (5) use of any fire, military, emergency, or law enforcement vehicle for emergency purposes; (6) authorized use of any combat or combat support vehicle for national defense purposes; (7) law enforcement response to violations of law, including pursuit; and (8) motor vehicle use specifically authorized under a written authorization issued under Federal law or regulations. Exemption 8 includes (but is not limited to) uses under Forest Service written authorizations (i.e., permits) and includes uses such as access for range improvements, firewood cutting, gathering forest products (e.g., seedlings,

rocks, pinecones), ceremonial gathering by tribes, outfitter and guide services, maintenance of utility corridors (e.g., power lines, pipelines), administrative use by other Federal or State agencies, and special use permit events.

In addition to specific exemptions, the TMR decision would not change the management of, or restriction of, non-motorized methods of travel on the forests, such as hiking, biking, horseback riding, etc. On National Forest System roads, roadside parking adjacent to the designated routes would continue to be allowed per Forest Service Manual (FSM) 7716.1(1). The designation includes parking a motor vehicle on the side of the road when it is safe to do so without causing damage to NFS resources or facilities, unless prohibited by state law, traffic sign, or order pursuant to (36 CFR 261.54).

In 2008, the forests finalized the travel analysis process (TAP). The purpose of the TAP was to help the forests identify the minimum road system necessary to provide safe and efficient travel and for administration, utilization, and protection of NFS lands (36 CFR 212.5(b)). The TAP also identified unneeded roads and made recommendations for the future designation process. The TAP was used to assist in the formulation of the proposed action for this project. The TAP is on the forest's Web site (http://www.fs.fed.us/r3/asnf/projects/travel-management).

Existing Transportation System

There are 2,832 miles of open NFS roads (table 2), 156 miles of motorized trails, and approximately 3,373 miles of closed roads. In looking at the existing transportation system, as described by the most current information in the forest's transportation database, many data errors and outdated information were discovered and the database has been corrected:

- 100 miles of roads coded as closed (maintenance level 1) in the database are actually being managed as open and public motorized use is being allowed on the ground.
- 375 miles of roads coded as decommissioned in the database are actually being managed as open and public motorized use is being allowed on the ground.

The 2,832 miles of open NFS roads shown under the existing condition now includes these 475 miles of incorrectly coded roads in the database. This system reflects ground conditions, how the forests have been managing the road system, and how the public has been using the road system. The existing system is made up of roads that are open to highway legal vehicles (standard passenger cars) and roads that are open to all motor vehicles. This includes roads with access restricted on a seasonal basis and roads closed during extreme weather conditions or for emergencies, but which are otherwise open for general public use (FSM 7705). In addition to the existing open road system, there are potentially additional miles of unauthorized routes that exist, but have not been inventoried.

Approximately 1.6 million acres of the forests are currently open to cross-country motorized travel. This has been in place since the Apache-Sitgreaves land and resource management plan was approved in 1987. The forest plan states that the forests are open to off-road vehicle (ORV) use with the exception of designated wilderness and the Blue Range Primitive Area.

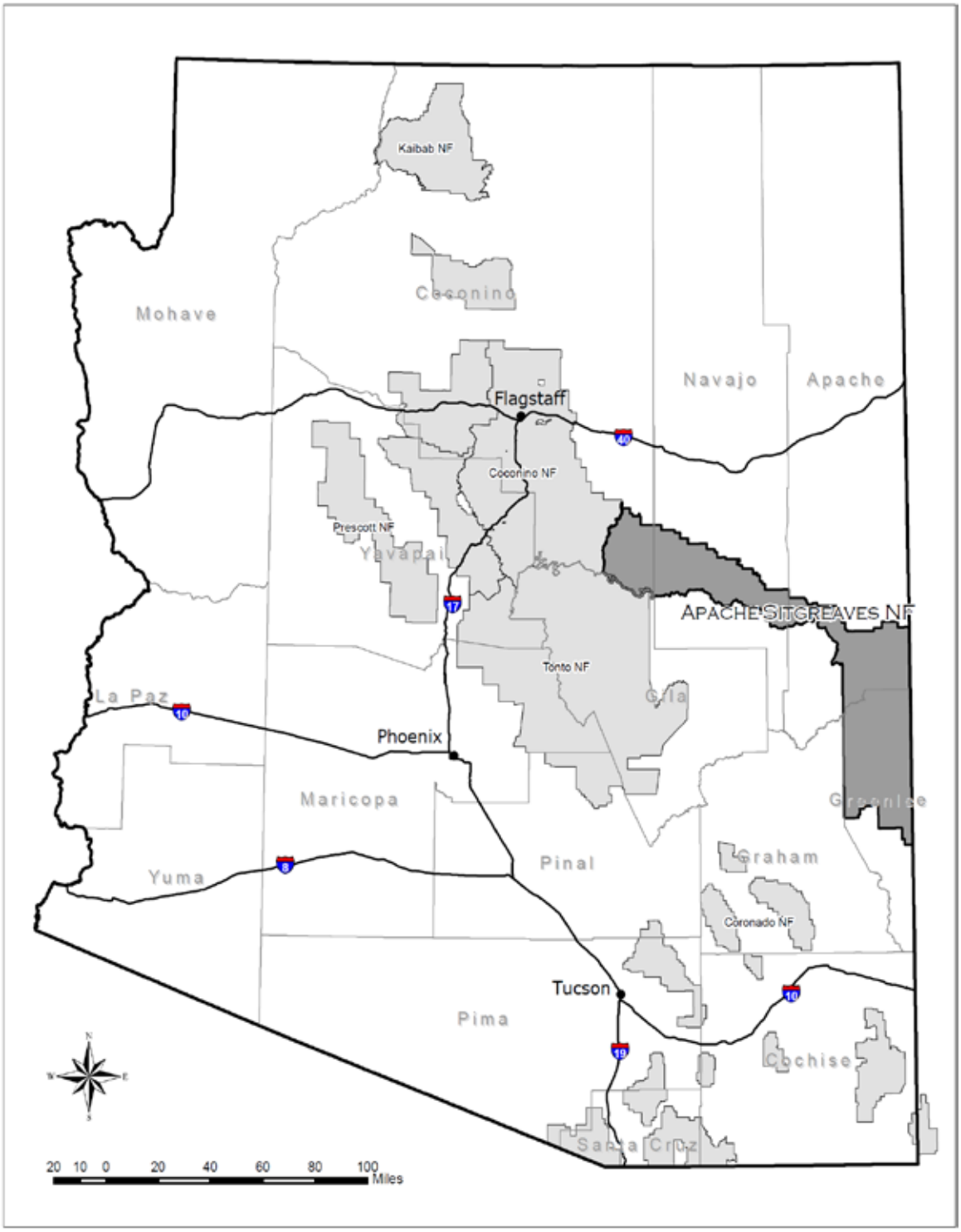

Figure 1. Location of the Apache-Sitgreaves National Forests in Arizona

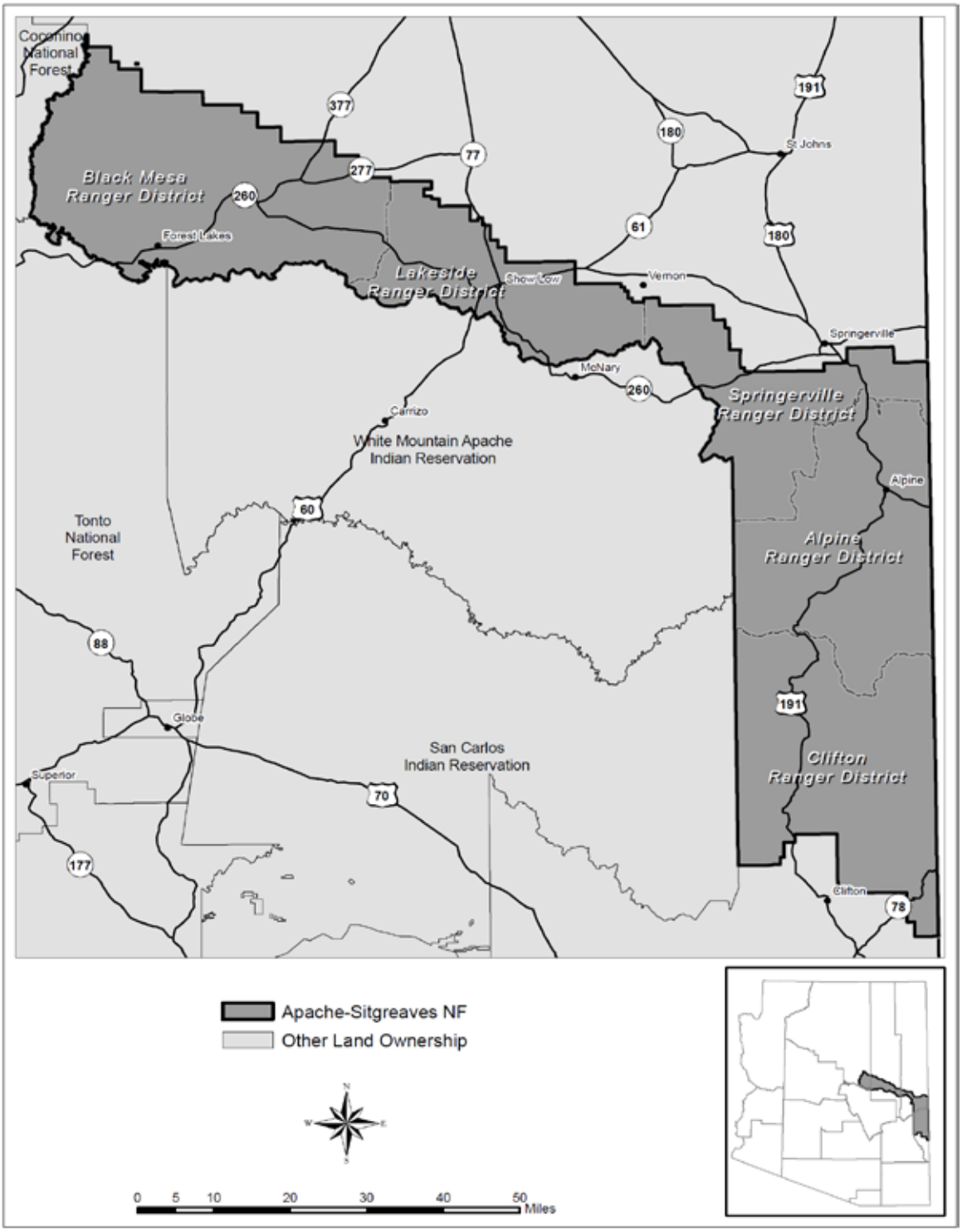

Figure 2. Ranger districts on the Apache-Sitgreaves National Forests

Table 2. Existing road mileage on the Apache-Sitgreaves National Forests

Road Type	Total Miles
Highway legal vehicles	765
Open to all motor vehicles	2,067
Total Open NFS Roads	**2,832**
Total Closed NFS Roads	**3,373**

The forests currently have motorized travel designations and decisions which were made under other authorities that apply to over 383,000 acres (USDA FS 2008a). For example, the Mt. Baldy, Escudilla, and Bear Wallow Wilderness areas and the Blue Range Primitive Area have had motorized use restricted or prohibited by legislation. There are nine special orders that identify motor vehicle travel restrictions by specific geographic area and season. Please refer to appendix C for existing motor vehicle prohibitions carried forward in this analysis.

Purpose and Need for Action

The purpose of this project is to comply with the Travel Management Rule by providing a system of roads, trails, and areas designated for motor vehicle use that reduces impacts to biological, physical, and cultural resources on the forests (36 CFR 212, sections 212, 251, 261). At 36 CFR 261.13, the forests are required to prohibit motor vehicle use off the system of designated roads, trails, and areas and motor vehicle use that is not in accordance with the designations.

There is a need for a safe and efficient transportation system for public use, Agency administration, and resource protection, while recognizing historic and current uses of the forests. Specifically, there is a need for: (1) identifying the system of roads that would be open to motor vehicle use; (2) identifying the system of motorized trails for vehicles 50 inches or less in width; and (3) optional designation of the limited use of motor vehicles within a specified distance of designated routes solely for the purposes of dispersed camping or retrieval of big game by an individual who has legally killed the animal.

There is a need to counter detrimental effects to resources from continued use of some roads and motorized trails, as well as cross-country travel. Some detrimental effects from motorized use of the forests include increased sediment deposits in streams which degrade water quality and fish habitat, the spread of invasive plants across the forests, disturbances to a variety of plant and wildlife species, and the risk of damaging cultural resource sites.

Modified Proposed Action

The forests published the proposed action in October 2007 requesting public comment. A large number of comments received indicated the original proposed action did not provide adequate motorized access because it proposed removing too many roads and areas from the motorized road and trail system. In response, the forest supervisor decided to modify the proposed action. The modified proposed action was released for public comment in February 2008 and was subsequently modified to respond to internal and external comments received as provided for in 36 CFR 220.5(e)(1). See the “Alternatives Considered but Eliminated from Detailed Study”

section of chapter 2 under the heading "Original Proposed Action," to review the specific changes that occurred between modifications. The result of this process, alternative B, is described here and maps are found in appendix A. This proposal includes more miles of corridors for dispersed camping, increased acreage of motorized use areas, and slightly increased miles of motorized trails. As a result, the forestwide transportation system would include 2,673 miles of NFS roads designated for motor vehicle use and 268 miles of motorized NFS trails designated for vehicles 50 inches or less in width. The proposal would:

- Amend the forest plan to: (1) prohibit cross-country motorized travel off the designated system of roads, trails, and areas except as identified on the MVUM, as required by 36 CFR 261.13 and to be consistent with the language and intent of 36 CFR 212.50 and 261.13; and (2) remove obsolete references to using the RATM process (see appendix B which summarizes proposed changes to the forest plan).
- Designate 1 mile distance from either side of NFS roads and trails open to motor vehicles and on NFS lands adjacent to open roads managed by other State and Federal agencies except where motorized restrictions exist, solely for the purpose of motorized big game retrieval (MBGR).
- Designate five areas (totaling 459 acres) on the Black Mesa and Lakeside Ranger Districts as open to all motor vehicles.
- Designate 300-foot corridors along either side of 658 miles of road for the sole purpose of motorized dispersed camping per 36 CFR 212.51(b).
- Add 53 miles of unauthorized routes as roads open to all motor vehicles (of these, 28 miles are proposed to provide general access as well as access to existing dispersed camping locations).
- Designate 358 miles of closed roads as open to motor vehicle use.
- Convert 60 miles of closed road to motorized trails for vehicles 50 inches or less in width.
- Convert 16 miles of open road to motorized trails for vehicles 50 inches or less in width.
- Add 34 miles of unauthorized routes as motorized trails for vehicles 50 inches or less in width.
- Construct 0.8 mile of new motorized trail on the Lakeside Ranger District for vehicles 50 inches or less in width. Construct 1.3 miles of new motorized trail on the Black Mesa Ranger District for vehicles 50 inches or less in width.
- Close 493 miles of currently open roads to motor vehicle use for resource protection.
- Restrict 77 miles of roads currently open to all motor vehicles, to administrative and permitted use only, by opening 7 miles of closed roads and adding 1 mile of unauthorized road restricted to administrative and permitted use only.

Decision Framework

The forest supervisor of the Apache-Sitgreaves National Forests is the responsible official who will evaluate the purpose and need for action, the modified proposed action along with the other alternatives, and consider the environmental consequences to decide:

- What changes to the existing transportation system would be necessary to be compliant with TMR. This may include adding or removing NFS roads and trails authorized for motorized travel, and adding unauthorized roads and trails to the designated motorized system;
- Whether to provide motorized access for dispersed camping within corridors along specified routes;
- Whether to designate areas for motor vehicle use, and if so, under what conditions; and,
- Whether to provide motorized access for big game retrieval within specified distances of certain designated routes.

After a decision has been made, a motor vehicle use map (MVUM) will be published and will display the new designated transportation system with the changes made in the NEPA decision. The forest supervisor must amend the Apache-Sitgreaves forest plan to prohibit cross-country motorized travel off the designated system of roads and motorized trails and to be consistent with the language and intent of the TMR (36 CFR 212, sections 212, 251, 261).

Public Involvement

Scoping and Comments Received

This project has been listed on the forest's schedule of proposed actions beginning in 2005. Local citizens, State, county, local, and tribal governments; and other Federal agencies were invited to collaborate with the forests. From 2005 to 2008, the forests hosted and participated in 31 public meetings and workshops related to motorized travel management and the travel analysis process (TAP) across the forests and in local communities. The following local groups participated in workshops and provided specific input: the Town of Eagar, White Mountain Conservation League, White Mountain Open Trails Association, Apache County ATV Roughriders, Grand Canyon Wildlands Council, and Citizens for Multiple Land Use and Access (CMLUA). This preliminary, pre-NEPA public input was used to develop the initial proposed action.

On October 10, 2007, a notice of intent (NOI) to prepare an environmental impact statement (EIS) for motorized travel on the forests (72 FR 57514–57517) was published in the Federal Register. On October 31, 2007, a corrected NOI (72 FR 61607) was published in the Federal Register correcting the miles of road on the transportation system and the availability of maps to the general public.

The forests conducted five public meetings in November 2007 in the communities of Lakeside, Eagar, Clifton, Heber-Overgaard, and Alpine to present the proposed action. Public comment indicated the proposed action did not provide adequate motorized opportunities and access for dispersed camping. After consideration of the input received during those meetings, the forest supervisor modified the proposed action and included more miles of corridor for dispersed camping, increased the acres of the areas designated for motorized use, and slightly increased the miles of motorized trails.

A new NOI was published in the Federal Register on February 29, 2008 (73 FR 11088-11091), requesting public comment on the modified proposed action. Additional public meetings were held in March 2008 in the communities of Show Low, Springerville, Clifton, Safford, Heber-Overgaard, and Alpine. Coordination with local governments has occurred since this period.

The forests have received over 20,000 comments since the initial scoping in 2005-2008. Categories of interest include motorized access for dispersed camping, big game retrieval and other motorized uses, impacts to wildlife, soil and water and air, specially designated areas and scenery/visuals, economics, potential conflicts between motorized and non-motorized uses, noise, public safety, availability of recreation opportunities, and impacts to grazing and ranching. These comments have been incorporated into the development of alternatives B through E.

Tribal Consultation

The ASNF consulted with nine tribes and one chapter that use the ASNFs for traditional, cultural, or spiritual activities. The following tribes and chapter were consulted: White Mountain Apache Tribe, San Carlos Apache Tribe, Hopi Nation, Navajo Nation, Pueblo of Zuni, Yavapai-Apache Tribe, Tonto Apache Tribe, Fort McDowell Yavapai Nation, Yavapai-Prescott Indian Tribe, and the Ramah Chapter of the Navajo Nation.

These tribes were informed about travel management in October 2007 as part of the NEPA process. A followup consultation letter was sent in July 2008 regarding the modified proposed action. Two tribes provided written responses: the Navajo Nation and White Mountain Apache Tribe. Consultation meetings were held with the Hopi Tribe (November 2009), Navajo Nation (February 2010) and White Mountain Apache Tribe (April 2010). The forests are in the process of scheduling meetings with the Pueblo of Zuni and San Carlos Apache Tribe. So far, two concerns were identified by the tribes regarding travel management: (1) continued looting and damage to archaeological sites, and (2) has the forest taken the protection of cultural resources into consideration. These issues were taken into consideration and were incorporated into the development of alternatives.

Issues

The forests analyzed all comments to identify issues, which are defined as cause-effect relationships directly or indirectly caused by implementing the proposed action. The issues defined as within the scope of the project, and directly or indirectly caused by implementing the proposal, were used to develop the range of action alternatives. Other comments, eliminated from detailed study were identified as those: (1) outside the scope of the proposed action; (2) already decided by law, regulation, forest plan, or other higher level decision; (3) irrelevant to the decision to be made; or (4) conjectural and not supported by scientific or factual evidence.

The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" The following issues were used to develop alternatives and focus the analysis for this project. All comments and the forests' response to these comments are located in the project record.

Issue 1: Restricting Motorized Access for Dispersed Camping

Concern: Restricting motorized access for dispersed camping may increase interactions between campers and diminish the quality of experience. Designating routes and corridors for camping may eliminate favorite spots which have been used for decades.

Response: All alternatives provide open roads to access dispersed camping. Alternative B (modified proposed action) and alternative D increase the miles of camping corridors and roads that access identified dispersed camping over what is currently available.

Units of Measure

- Miles/acres/location of motorized dispersed camping corridors, and
- Miles/location of roads accessing dispersed camping locations.

Issue 2: Restricting Motorized Big Game Retrieval

Concern: Changing the motorized big game retrieval policy to a fixed distance corridor may result in hunters being unable to collect a downed animal in a timely manner.

Response: Alternatives B, C, and D respond to this issue by including motorized big game retrieval for several animal species.

Unit of Measure: Acres available for motorized big game retrieval.

Issue 3: Impacts to Resources from Motorized Use

Concern: Adding roads and camping corridors to the transportation system will adversely impact terrestrial and aquatic wildlife species, soil and water, and cultural resources.

Response: Alternative E was developed to provide motorized access with minimal miles of camping corridors and no motorized big game retrieval.

Units of Measure

- Miles and/or acres of habitat affected.
- Proximity (distance) of motorized roads and trails to riparian vegetation and wetlands.
- Miles/acres of motorized use on sensitive soils.
- Number of cultural resources (sites) potentially impacted.

Issue 4: Economics: Loss of Revenues and Jobs

Concern: Restrictions on motorized access (a change from the current condition) could negatively impact local and State economies from a loss of local, tourist, and hunter generated revenues.

Response: The social and economic impacts the project would have on the region has been analyzed in chapter 3.

Unit of Measure: Revenues and jobs generated from motorized (recreation related) activities.

Chapter 2 – Alternatives, Including the Proposed Action

Introduction

This chapter describes and compares the alternatives considered for this analysis. It includes a description of each alternative considered. This chapter presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice between alternatives by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative, and some of the information is based upon the environmental, social, and economic effects of implementing each alternative. These effects are discussed in detail in chapter 3 of this document. Maps of the alternatives are found in appendix A.

Conditions Applicable to All Alternatives

Under all alternatives, there are certain laws and policies already in place which would remain:

- Motorized use on NFS roads and NFS trails is subject to Arizona State law.
- In accordance with 36 CFR 261.12 on NFS roads and NFS trails the following is prohibited: (c) damaging and leaving in a damaged condition any such road, trail, or segment thereof.
- In accordance with 36 CFR 261.15, use of vehicles off roads (h), it is prohibited to operate any vehicle off NFS, State, or county roads in a manner which damages or unreasonably disturbs the land, wildlife, or vegetative resources.
- The provisions of the Alaska National Interest Lands Conservation Act (ANILCA: PL 96-487) that require the Forest Service to allow access to private in-holdings will continue to apply.
- As provided for in the TMR, none of the alternatives preclude the forest from closing roads, trails, or areas to motorized use through emergency closure orders.
- Counties, tribes, states, private companies and citizens may have been granted rights of access, or in some cases have been assigned jurisdiction over some roads on NFS lands. Rights that have been legally established will continue to be recognized.
- Parking would be allowed under all alternatives within one vehicle length from the edge of the road surface, where it is safe to do so.
- Where off-road motorized big game retrieval (MBGR) is proposed, it would be authorized in accordance with the annual hunting regulations published by the Arizona Department of Game and Fish for elk, mule deer and black bear. Retrieval would be authorized for late summer and fall hunts limited to individuals with hunting licenses that have legally killed an animal. Motorized retrieval of other game animals would not be allowed. No MBGR would be allowed in wilderness or primitive areas. Only one vehicle would be allowed MBGR per harvested animal.

Consistency with the Forest Plan

The forest plan defines a set of goals, objectives, standards, and guidelines that provide direction for managing the forests and their resources (USDA FS 1987a). See appendix D for some

pertinent forest plan direction that applies to this project. All alternatives are consistent with standards and guidelines in the forest plan and are consistent with applicable laws, regulation and policy, unless noted.

Alternatives Considered in Detail

In addition to no action (alternative A) and modified proposed action (alternative B), the forests developed three additional action alternatives to address the issues identified during scoping.

Alternative A — No Action

The National Environmental Policy Act (NEPA) regulations require no action to be included as a baseline, continuing with the present course of action for comparison to all action alternatives. This alternative proposes no change to the existing motorized system. The forest plan and other written direction (e.g., closure orders) would continue to guide motor vehicle use on the forests. The TMR would not be implemented, and no MVUM would be produced. No changes to the existing transportation system would be made. Cross-country travel off system roads on approximately 1.6 million acres would continue to be allowed. Existing motorized prohibitions and seasonal closures would remain in place (appendix C). It is important to note that not prohibiting motor vehicle use off the designated system would not be compliant with the TMR.

Alternative A would result in a system of 2,832 miles of NFS roads open for motor vehicle use and 156 miles of motorized NFS trails designated for motor vehicles 50 inches and less in width (table 3). Motorized big game retrieval and motorized dispersed camping would continue forestwide except where motorized restrictions exist. Maps displaying open roads and motorized trails under this alternative are found in appendix A.

Alternative B – Modified Proposed Action (Preferred Alternative)

The modified proposed action (see the “Public Involvement” section for information on why the original proposed action was modified) addresses the purpose and need by providing motorized access to the forests while protecting resources. This alternative responds to “Issue 1: Restricting Motorized Access for Dispersed Camping” and “Issue 3: Impacts to Resources from Motorized Use.” Maps displaying open roads, motorized trails, and motorized areas under this alternative are found in appendix A. Seasonal road closures are displayed in appendix C.

This alternative would result in a system of 2,673 miles of NFS roads designated for motor vehicle use and 268 miles of NFS trails designated for vehicles 50 inches or less in width. Alternative B would:

- Amend the Apache-Sitgreaves forest plan to: (1) prohibit cross-country motorized travel off the designated system of roads, trails, and areas except as identified on the MVUM, as required by 36 CFR 261.13 and to be consistent with the language and intent of 36 CFR 212.50 and 261.13; and (2) remove obsolete references to using the resource access and travel management (RATM) process (see appendix B which summarizes the proposed changes to the forest plan).
- Designate 1 mile distance along either side of NFS roads and trails open to motor vehicles and on NFS lands adjacent to open roads managed by other State and Federal

agencies except where motorized restrictions exist, solely for the purpose of motorized big game retrieval.

- Designate five areas (totaling 459 acres) on the Black Mesa and Lakeside Ranger Districts as open to all motor vehicles.
- Designate 300-foot corridors along either side of 658 miles of road for the sole purpose of motorized dispersed camping per 36 CFR 212.51(b).
- Add 53 miles of unauthorized routes as roads open to all motor vehicles (of these, 28 miles are proposed to provide general access as well as access to existing dispersed camping locations).
- Designate 358 miles of closed roads as open to motor vehicle use.
- Convert 60 miles of closed road to motorized trails for vehicles 50 inches or less in width.
- Convert 16 miles of open road to motorized trails for vehicles 50 inches or less in width.
- Add 34 miles of unauthorized routes as motorized trails for vehicles 50 inches or less in width.
- Construct 0.8 mile of new motorized trail on the Lakeside Ranger District for vehicles 50 inches or less in width. Construct 1.3 miles of new motorized trail on the Black Mesa Ranger District for vehicles 50 inches or less in width.
- Close 493 miles of currently open roads to motor vehicle use for resource protection.
- Restrict 77 miles of roads currently open to all motor vehicles, to administrative and permitted use only, by opening 7 miles of closed roads and adding 1 mile of unauthorized road restricted to administrative and permitted use only.

Alternative C

Alternative C responds to “Issue 1: Restricting Motorized Access for Dispersed Camping” and “Issue 2: Restricting Motorized Big Game Retrieval,” and closely resembles the existing transportation system. Cross-country motorized use would be eliminated in order to make the alternative consistent with the TMR. The miles of roads designated for motor vehicle use would be similar to the existing system, and no additional roads would be closed. To compensate for prohibiting motorized travel off system routes, roads would be designated to provide general access as well as access to dispersed camping sites, and a corridor for motorized big game retrieval would be allowed. Maps displaying open roads and motorized trails under this alternative are found in appendix A. Seasonal road closures are displayed in appendix C.

This alternative would result in a system of 2,860 miles of NFS roads designated for motor vehicle use and 156 miles of NFS trails designated for vehicles 50 inches or less in width. Alternative C would:

- Amend the Apache-Sitgreaves forest plan to: (1) prohibit cross-country motorized travel off the designated system of roads, trails, and areas except as identified on the MVUM, as required by 36 CFR 261.13 and to be consistent with the language and intent of 36 CFR 212.50 and 261.13; and (2) remove obsolete references to using the RATM process (see appendix B which summarizes the proposed changes to the forest plan).

- Designate 1 mile distance along either side of NFS roads and trails open to motor vehicles and on NFS lands adjacent to open roads managed by other State and Federal agencies except where motorized restrictions exist, solely for the purpose of motorized big game retrieval.
- Add 28 miles of unauthorized routes as roads open to motor vehicle use (provides general access as well as access to existing dispersed camping locations).

Alternative D

Alternative D was developed to address "Issue 1: Restricting Motorized Access for Dispersed Camping," "Issue 2: Restricting Motorized Big Game Retrieval," and "Issue 3: Impacts to Resources from Motorized Use." This alternative increases motorized access for dispersed camping through corridors and designated routes. This alternative adds miles of unauthorized routes as roads and motorized trails, designates areas, includes corridors for motorized big game retrieval, and closes roads for resource protection. Maps displaying open roads, motorized trails, and motorized areas under this alternative are in appendix A. Seasonal road closures are displayed in appendix C.

This alternative would result in a system of 2,730 miles of NFS roads designated for motor vehicle use and 302 miles of NFS trails designated for vehicles 50 inches or less in width. Alternative D would:

- Amend the Apache-Sitgreaves forest plan to: (1) prohibit cross-country motorized travel off the designated system of roads, trails, and areas except as identified on the MVUM, as required by 36 CFR 261.13 and to be consistent with the language and intent of 36 CFR 212.50 and 261.13; and (2) remove obsolete references to using the RATM process (see appendix B which summarizes the proposed changes to the forest plan).
- Designate ¼-mile distance along either side of NFS roads and trails open to motor vehicles and on NFS lands adjacent to open roads managed by other State and Federal agencies except where motorized restrictions exist, solely for the purpose of motorized big game retrieval.
- Designate five areas (totaling 459 acres) on the Black Mesa and Lakeside Ranger Districts as open to all motor vehicles.
- Designate 300-foot corridors along either side of 2,034 miles of road for the sole purpose of motorized dispersed camping per 36 CFR 212.51(b).
- Designate 415 miles of closed roads as open to motor vehicle use.
- Add 37 miles of unauthorized routes as roads open to all motor vehicles (provides general access as well as access to existing dispersed camping).
- Convert 64 miles of closed road to motorized trails for vehicles 50 inches or less in width.
- Convert 19 miles of open road to motorized trails for vehicles 50 inches or less in width.
- Add 62 miles of unauthorized routes as motorized trails for motor vehicles 50 inches or less in width.

- Construct 1.3 miles of trail for motor vehicles 50 inches or less in width on the Black Mesa Ranger District.
- Close 479 miles of currently open roads to motor vehicle use for resource protection.
- Restrict 75 miles of roads currently open to all motor vehicles, to administrative and permitted use only, by opening 5 miles of closed road, and adding 11 miles of unauthorized roads restricted to administrative and permitted use only.

Alternative E

Alternative E was developed to address "Issue 1: Restricting Motorized Access for Dispersed Camping" and "Issue 3: Impacts to Resources from Motorized Use." This alternative adds miles of NFS roads and trails but includes minimal miles of corridors to access dispersed camping locations. This alternative closes roads for resource protection and would not allow corridors for motorized big game retrieval. Maps displaying open roads and motorized trails under this alternative are found in appendix A. Seasonal road closures are displayed in appendix C.

This alternative would result in a system of 2,473 miles of NFS roads designated for motor vehicle use and 206 miles of NFS trails designated for vehicles less than 50 inches in width. Alternative E would:

- Amend the Apache-Sitgreaves forest plan to: (1) prohibit cross-country motorized travel off the designated system of roads, trails, and areas except as identified on the MVUM, as required by 36 CFR 261.13 and to be consistent with the language and intent of 36 CFR 212.50 and 261.13; and (2) remove obsolete references to using the RATM process (see appendix B which summarizes the proposed changes to the forest plan).
- Designate 300-foot corridors along either side of 118 miles of road for the sole purpose of motorized dispersed camping per 36 CFR 212.51(b).
- Add 64 miles of unauthorized routes as roads open to all motor vehicles (provides general access and access to identified dispersed camping locations).
- Designate 220 miles of closed roads as open to motor vehicle use.
- Convert 14 miles of closed road to motorized trails for vehicles 50 inches or less in width.
- Convert 14 miles of open road to motorized trails for vehicles 50 inches or less in width.
- Add 20 miles of unauthorized route as motorized trails for vehicles 50 inches or less in width.
- Construct 1.3 miles of trail for motor vehicles 50 inches or less in width on the Black Mesa Ranger District.
- Close 559 miles of currently open roads to motor vehicle use for resource protection.
- Restrict 84 miles of roads currently open to all motor vehicles, to administrative and permitted use only, by opening 5 miles of closed road and adding less than 1 mile of unauthorized road restricted to administrative and permitted use only.

Mitigation Common to All Action Alternatives

The Council on Environmental Quality's (CEQ) regulations for implementing NEPA define mitigation as measures that avoid, minimize, reduce, rectify, or compensate for impacts to the physical environment resulting from Federal actions (40 CFR 1508.20). Mitigation measures would be done as part of implementing the decision to lessen any potential damage to natural or cultural resources. In addition to the "Conditions Applicable to All Alternatives" section in this chapter, forest plan requirements (standards and guidelines) as well as mitigation would be applied to all action alternatives (appendix D).

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). The Forest Service and public developed alternatives that were not analyzed in detail. Comments received in response to the proposed action provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of consideration, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, five alternatives were considered but eliminated from detailed consideration for reasons summarized below.

Original Proposed Action

The original proposed action released in October 2007 would have designated 2,868 miles of open road and motorized trails, 409 miles of motorized dispersed camping corridors (within 300 feet from designated roads), seven motorized use areas (1,433 acres) and identified a 1-mile corridor along designated roads for MBGR. Public comments indicated the proposed action did not provide adequate motorized opportunities and access for dispersed camping.

After consideration of the input received during those meetings, the forest supervisor added a modified proposed action. The modified proposed action released in February 2008 proposed to designate 2,961 miles of roads and motorized trails, 938 miles of motorized dispersed camping corridors (within 300 feet from designated roads), eight areas designated for motor vehicle use (5,989 acres) and identified a 1-mile corridor along designated roads for MBGR. Based on public comment on the modified proposed action, the team developed what is currently described as alternative B. Therefore, the original proposed action was eliminated and not further analyzed in detail.

An Alternative that Increases the Transportation System to Approximately 7,000 Miles

Many public comments suggested an alternative that opened all existing closed roads increasing the transportation system to approximately 7,000 miles. Additions to the existing transportation system at this magnitude were not considered manageable and would not have passed the TMR 212.55 criteria for the designation of roads, trails, and areas.

Over 3,000 miles of NSFRs would have required additional field surveys to determine effects on heritage sites. At least 85 known archaeological sites would have been adversely affected.

Moving forward with this alternative would have been difficult to comply with Executive Order 11593, the Southwestern Region travel management protocol with the Arizona State Historical Office (AZ SHPO), and with forest plan direction specific to authorized off-road vehicle use (camping corridors) in areas with high heritage site density. The National Historic Preservation Act (NHPA) would have been difficult to implement due to the magnitude of surveys and the amount of mitigation needed to minimize adverse effects.

Approximately 830 miles of road would have been within the habitat of some protected terrestrial and aquatic threatened and endangered species, and approximately 280 miles of roads would have intersected threatened and endangered fish habitat. Endangered Species Act (ESA) and National Forest Management Act (NFMA) requirements in terms of species recovery and viability would have been difficult to achieve. Additionally, this alternative would have designated roads in the Blue Range Primitive Area and in inventoried roadless areas.

Additionally, the cost of maintaining this road system would not have been feasible given the current and expected budgets for road maintenance. The forests are in a current position of having a large backlog of deferred maintenance for the existing road system. For these reasons, this alternative would not meet the purpose and need and was not analyzed in detail.

An Alternative that Bases the Motorized Transportation System Solely on Annual Funding for Road Maintenance

The interdisciplinary team considered an alternative based solely on existing funding for road and motorized trail maintenance. Designated NFS roads would be 28 percent of the existing system, totaling 850 miles. This would be considered a sustainable road system from an economic standpoint. Under this alternative, all annual maintenance needs could potentially be met for designated roads and motorized trails assuming continued maintenance funding at current levels. Maintenance that is not annual or routine (deferred) would still not be accomplished unless additional funding is secured. This road system would have only provided for essential administrative access, access to key recreation sites, and a very limited seasonal road system for hunting access. In addition, the motorized trail system would be less than the existing system and would not meet expectations from the public and extensive recreation desires for motorized travel on NFS lands.

An alternative based solely on funding would not meet the purpose and need and would not provide needed access for effective and efficient administration and use of the forests. For these reasons, this alternative was not analyzed in detail.

An Alternative that Uses the Minimum Road System Based Solely on TAP Recommendations

The travel analysis process (TAP) was completed in 2008, and in part, identified the minimum road system needed to manage the forests. It recommends approximately 1,180 miles of roads designated open to motor vehicles. Comments were received from the public from 2005 through 2008, which indicated a strong desire for increased motorized access for dispersed camping and motorized big game retrieval that exceeded the minimum road system. This alternative did not respond to these needs brought up by the public and would, therefore, not meet the purpose and need to recognize historic and current uses of the forests. In contrast, public input was received desiring a smaller road system than existing, and in response, the range of alternatives that were

analyzed in detail consisted of three alternatives (alternatives B, D, and E) that would result in a system with fewer miles of open roads than the current system, while still meeting the purpose and need.

The travel management rule focuses on motor vehicle use on NFS roads, trails and areas, rather than a road system (36 CFR 212.51(a)) and does not require a forest to adopt the minimum road system as an objective or desired condition. The purpose and need of the proposed action for this analysis is to meet the requirements of the travel management rule. For these reasons the minimum road system was eliminated from detailed study.

An Alternative that Adds Roads to the Blue Range Primitive Area

There were recommendations to designate unauthorized roads along the Blue River to access around 13 favored dispersed camping locations. Along NFSR 281 Y and V, recommendations were to open the two closed roads, about 3 miles long and located within the Blue Range Primitive Area (BRPA). The BRPA was established on June 21, 1933, by the Chief of the Forest Service and was recommended for wilderness designation by President Nixon in 1972. Although it is not a designated wilderness, the BRPA is managed as such under FSM 2320.3(11), which states “Manage primitive areas as wilderness areas consistent with 36 CFR 293.17 until their designation as wilderness or other use is determined by Congress.” The forests must give due consideration to the wilderness resource value under 16 USC 529, and manage the BRPA consistent with the forest plan. Management of the BRPA is subject to PL 98-406, Section 103(b)(4) requiring management of the BRPA for the purpose of protecting its “suitability for wilderness designation.”

The current regulation generally prohibits roads, motorized travel, commercial timber harvest, and special use occupancy involving permanent structures in primitive areas. However, the regulation allows for continued use of existing roads and roads necessary for a statutory right of ingress and egress under appropriate conditions. The roads in question are considered unauthorized and the forest supervisor does not have the authority to designate roads within the BRPA. For this reason, this alternative was not analyzed in detail.

Comparison of Alternatives

This section provides a comparison of alternatives (tables 3 and 4) and a summary of the alternatives with the environmental consequences. Information in tables 3 and 4 is focused where effects can be distinguished quantitatively or qualitatively between alternatives. Further discussion of effects on resources by alternative can be found in chapter 3.

Table 3. Comparison of elements between all alternatives

Action Proposed	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
National Forest System Roads (miles)					
Add unauthorized roads to system	0	53	28	37	64
Open closed NFS roads	0	358	0	415	220
Close NFS roads to all motor vehicles	0	493	0	479	559
Restrict currently open NFS roads to administrative and permitted use only	0	77	0	75	84
Total Miles of Open NFS Roads	**2,832**	**2,673**	**2,860**	**2,730**	**2,473**
Total Miles of Closed NFS Roads	**3,373**	**3,866**	**3,373**	**3,852**	**3,932**
National Forest System Trails (miles)					
Convert closed NFS roads to trails for motor vehicles 50 inches or less in width	0	60	0	64	14
Convert open NFS roads to trails for motor vehicles 50 inches or less in width	0	16	0	19	14
Add unauthorized roads as NFS trails for motor vehicles 50 inches or less in width	0	34	0	62	20
Construct new NFS trails for motor vehicles 50 inches or less in width	0	2	0	1	1
Total Miles of Motorized NFS Trails	**156**	**268**	**156**	**302**	**205**
Motorized Off-Road Travel					
Create 300-foot wide corridors (from either side of road) for the sole purpose of dispersed camping.	Allowed forestwide except where motorized restrictions exist (1.6 million acres).	Corridors designated along 658 miles of NFS roads (48,000 acres).	No corridors, however, unauthorized routes added which provide access to existing camping sites up to 28 miles (2,000 acres).	Corridors designated along 2,034 miles of NFS roads (148,000 acres).	Corridors designated along 118 miles of NFS roads (8,500 acres).

Action Proposed	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Motorized big game retrieval (MBGR) areas for elk, mule deer, and black bear late summer and fall hunts.	Allowed forestwide except where motorized restrictions exist (1.6 million acres).	A 1-mile distance designated from both sides of NFS roads and NFS trails and on NFS lands adjacent to open roads managed by other agencies except where motorized restrictions exist (1.2 million acres).	A 1-mile distance designated from both sides of NFS roads and NFS trails and on NFS lands adjacent to open roads managed by other agencies except where motorized restrictions exist (1.2 million acres).	A ¼-mile distance designated from both sides of NFS roads and NFS trails and on NFS lands adjacent to open roads managed by other agencies except where motorized restrictions exist (700,000 acres).	Not allowed.
Designate areas for motor vehicle use (number/acres).	Allowed forestwide (1.6 million acres).	5 areas/459 acres	0	5 areas/459 acres	0

Table 4. Summary of environmental consequences by alternative

	Alternative A No Action	Alternative B Preferred Alternative	Alternative C	Alternative D	Alternative E
Transportation					
Motorized Access (NFS roads, NFS trails, off-road travel)	No change from current road and trail system, and cross-country travel would remain forestwide.	Road system decreases by 159 miles (5.6 percent).	Road system increases by 28 miles (1 percent).	Road system decreases by 102 miles (3.6 percent).	Road system decreases by 359 miles (12.7 percent).
		Trail system increases by 112 miles (72 percent).	No change in trails.	Trail system increases by 146 miles (94 percent).	Trail system increases by 49 miles (31 percent).
		Off-road travel limited to: 300-foot corridors for dispersed camping, 1-mile distance for MBGR, and five areas.	Off-road travel limited to: roads providing access for dispersed camping, 1-mile distance for MBGR.	Off-road travel limited to: 300-foot corridors for dispersed camping, ¼-mile distance for MBGR, and five areas.	Off-road travel limited to: 300-foot corridors for dispersed camping.
Maintenance Costs	Roads: $4.7M	Roads: $4.6M ($167,963 less cost, decrease by 3.5 percent)	Roads: $4.7M ($3,836 more cost, increase by 0.1 percent)	Roads: $4.6M ($155,603 less cost, decrease by 3.3 percent)	Roads: $4.5M ($223,049 less cost, decrease by 4.7 percent)
	Trails: $70K	Trails: $120K ($50,400 more cost, increase by 72 percent)	Trails: $70K	Trails: $136K ($65,700 more cost, increase by 94 percent)	Trails: $93K ($22,500 more cost, increase by 31 percent)
	Additional one-time implementation cost: NA	Additional one-time implementation cost (adding unauthorized roads): $70K	Additional one-time implementation cost (adding unauthorized roads): $14K	Additional one-time implementation cost (adding unauthorized roads): $50K	Additional one-time implementation cost (adding unauthorized roads): $60K

		Alternative A No Action	Alternative B Preferred Alternative	Alternative C	Alternative D	Alternative E
Public Safety		Safety concerns from continued use of unauthorized (user-created) roads and motorized trails.	Improved safety by maintaining unauthorized roads and trails added to the system (87 miles added).	Improved safety by maintaining unauthorized roads added to the system (28 miles added).	Improved safety by maintaining unauthorized roads and trails added to the system (99 miles added).	Improved safety by maintaining unauthorized roads and trails added to the system (84 miles added).
Road Density (miles per square mile)	**Open**	0.9	0.91	0.91	1.2	0.83
	Closed	1.9	1.88	1.91	1.88	1.87
Recreation						
Impacts to Motorized Users		No change in motorized recreation opportunities.	Motorized cross-country travel would be eliminated. It would be illegal to drive off the designated route system. Motorized recreation opportunities would still exist across the forests with alternatives B and D offering the most motorized trails and areas, and alternatives C and D offering the most miles of open roads.			
Impacts to Non-motorized Users		Continued motorized cross-country travel and unauthorized routes. Existing non-motorized uses would remain.	Motorized travel limited to designated road and trail system and more opportunities for finding areas of natural appearance and low levels of human contact. Elimination of motorized cross-country travel would provide more areas for non-motorized recreation only. All existing non-motorized uses would remain.			
Noise		Motorized travel allowed forestwide.	Motor vehicles limited to designated route system. Elimination of motorized cross-country travel would provide many areas where motor vehicles would not be allowed, thus related noise would be reduced.			
Conflicts (motorized and non-motorized users)		Mixed uses allowed forestwide.	There would be an increase in areas available for non-motorized travel, resulting in less mixed user conflicts. However, incompatible recreation conflicts would occur in popular areas located close to motorized routes.			
Wilderness, Primitive Area (BRPA), and Roadless Areas (IRA)						
Impacts to Wilderness Characteristics (miles NFS roads)		No change to characteristics. 40 miles IRA 0.2 miles BRPA	No change to characteristics. 31 miles IRA 1.2 miles BRPA	No change to characteristics. 40 miles IRA 1.2 miles BRPA	No change to characteristics. 31 miles IRA 1.2 miles BRPA	No change to characteristics. 23 miles IRA 1.2 miles BRPA

	Alternative A No Action	Alternative B Preferred Alternative	Alternative C	Alternative D	Alternative E
Wild and Scenic Rivers					
Impacts to Eligibility of Wild and Scenic Rivers (miles of roads and trails)	No change in eligibility. 76.9 miles in WSR corridors.	No change in eligibility. Addition of 8 miles and closure of 4.7 miles in WSR corridors, resulting in 80 miles total.	No change in eligibility. Addition of 0.8 mile in WSR corridors resulting in 77.7 miles total.	No change in eligibility. Addition of 9.3 miles and closure of 4.4 miles in WSR corridors resulting in 82 miles total.	No change in eligibility. Addition of 4.4 miles and closure of 17.2 miles in WSR corridors resulting in 64 miles total.
Scenery Management					
Impact on Visual Quality Objective (VQO) Thresholds in the Forest Plan	Would exceed VQO thresholds in retention and partial retention areas due to continued use of unauthorized roads and motorized trails.	Variations in acres of VQOs would all be below thresholds			
		Less variations in acres of VQO than alternative A.	Less variations in acres of VQO than alternatives A, B, and D.	Less variations in acres of VQO than alternatives A and B.	Less variations in acres of VQO than alternatives A, B, C, and D.
Socioeconomics					
Change in Jobs and Incomes from Motorized Recreation Related Activities	No change	Since there would be limited change in activities related to jobs and economics, there would be no measurable direct and indirect effects on the economy relative to the scale. The employment and income figures representing the contribution of current activities to the economy of the assessment area (six counties) would be unchanged or changed so slightly they cannot be evaluated.			
Vegetation					
Impacts to Plants from Off-road Travel	Allowed forestwide, continued crushing from vehicles and burying of plants with sediment.	Beneficial effect to plants from elimination of motorized cross-country travel. Limited effects from crushing and burying plants with sediment in areas where motorized off-road travel would occur (dispersed camping corridors, within MBGR distances, and areas).			
		Less effect than alternative A	Less effect than alternatives A and B	Less effect than alternatives A, B,and C.	Less effect than alternatives A, B, C, and D.

	Alternative A No Action	Alternative B Preferred Alternative	Alternative C	Alternative D	Alternative E
NoxiousWeeds	High potential for spread and establishment of weed seeds forestwide from cross-country travel, and potential to spread off NFS land along road and trail drainages.	Reduced potential to spread weed seeds. Potential to spread seeds would exist in areas where off-road travel is allowed (dispersed camping corridors, MBGR areas, and areas) and drainages along roads and trails.			
		Less effect than alternative A.	Less effect than alternatives A and B.	Less effect than alternatives A, B, and C.	Less effect than alternatives A, B, C, and D.
Soils					
Soil Productivity	Miles of road and trail surfaces remove soil productivity.	Miles of road and trail surfaces and acres of areas for motor vehicle use remove soil productivity.			
		Less effect than alternatives A and D	Less effect than alternative A.	Less effect than alternative A.	Less effect than alternatives A, B, and D
Soil Erosion*	650 miles of roads and trails and 580,000 acres on erosive TES soils, 230 miles of roads and trails and 390,000 acres on slopes over 40 percent	No change from current miles of roads and trails on erosive TES soils and steep slopes			
		A total of 5,800 acres on erosive TES, no acres on steep slopes.	No acres on erosive TES soils or steep slopes.	A total of 25,000 acres on erosive TES, 125 acres on steep slopes.	A total of 1,800 acres on erosive TES, no acres on steep slopes.
		Less effect than alternatives A and D.	Less effect than alternatives A, B, D, and E.	Less effect than alternative A.	Less effect than alternatives A, B, and D.
Watershed					
Peak Runoff Amounts to Drainages*	Around 2,700 stream crossings, around 900 miles of roads and trails, and 400,000 acres within 300 feet of surface water.	Around 2,500 stream crossings.	Around 2,700 stream crossings.	Around 2,500 stream crossings.	Around 2,300 stream crossings.
		A total of 880 miles and 7,500 acres within 300 feet of surface water	A total of 930 miles and no acres within 300 feet of surface water.	A total of 900 miles and 32,000 acres within 300 feet of surface water.	A total of 800 miles and 1,600 acres within 300 feet of surface water.
		Less effect than alternatives A and D.	Less effect than alternatives A, B, and D.	Less effect than alternative A.	Less effect than alternatives A, B, and D.

	Alternative A No Action	Alternative B Preferred Alternative	Alternative C	Alternative D	Alternative E
Water Quality	Increased peak runoff from road/trail proximity to surface water result in increased sediment and decreased water quality.	Decreased peak runoff from road/trail proximity to surface water would result in reduced effects of sediment loading to water quality.			
		Less effect than alternatives A and D.	Less effect than alternatives A, B, and D.	Less effect than alternative A.	Less effect than alternatives A, B, and D.
Air Quality					
Fugitive Dust Generation	No measureable effect from roads, trails, or motorized cross-country travel.	No measurable effect.			
		Less effect than alternative A.	Less effect than alternatives A, B, D, and E.	Less effect than alternative A.	Less effect than alternatives A, B, and D.
Wildlife and Rare Plants					
Federally Listed Species (4) and Critical Habitat (2)	Not likely to jeopardize the continued existence of Mexican wolves; not likely to adversely affect (NLAA) for MSO and critical habitat, southwestern willow flycatcher and critical habitat, and Chiricahua leopard frog.				
Sensitive Species (58), MIS (17), and Migratory Birds (34)	Sensitive species: may impact individuals or habitat, but not likely to contribute trend toward Federal listing (MIIH); MIS: maintain forestwide habitat and population trends, action alternatives may improve trends from reduced off-road travel; migratory birds: no effect to populations, action alternatives may improve some habitats.				
Summary of Wildlife Impacts	Greatest likelihood of vehicle interactions with wildlife from cross-country travel and impacts from human disturbance and resource damage.	Elimination of cross-country travel, designation of motorized use areas, corridors, MBGR 1-mile distance, and closing roads result in less area of disturbance than alternative A.	Elimination of cross-country travel, no motorized use areas, no corridors, and MBGR 1-mile distance result in less area of impacts than alternatives A, B, D, and E.	Elimination of cross-country travel, designation of motorized use areas, corridors, MBGR ¼-mile distance, and closing roads would result in less area of disturbance than alternative A.	Elimination of cross-country travel, no areas, fewer corridors than alternatives B and D, no MBGR, and closing more roads than alternatives B and D, results in less area of disturbance than alternatives A, B, and D.

	Alternative A No Action	Alternative B Preferred Alternative	Alternative C	Alternative D	Alternative E
Fisheries					
Aquatic Habitat	Aquatic habitat for fish results in negative effects under all alternatives due to added sediment in drainages from the presence of roads and trails near surface water, road/stream crossings, and off-road travel; the amount of impacts varies by alternative based on the routes proposed (the action alternatives greatly reduce areas open to off-road travel, benefitting all fish species). Alternative B has fewer impacts than A; alternative C has fewer impacts than A, B, D, and E; alternative D has fewer impacts than A; alternative E has fewer impacts than A, B, and D.				
Federally Listed Species and Critical Habitats – seven fish listed as threatened or endangered, one candidate species, four have critical habitat	Seven species may effect, likely to adversely affect (LAA). One species may effect, not likely to adversely affect (NLAA).	Seven species (LAA) One species (NLAA)	Seven species (LAA) One species (NLAA)	Seven species (LAA) One species (NLAA)	Seven species (LAA) One species (NLAA)
	Three critical habitats LAA, one critical habitat NLAA.	Three critical habitats, LAA one critical habitat NLAA.	Three critical habitats LAA, one critical habitat NLAA.	Three critical habitats LAA, one critical habitat NLAA.	Three critical habitats LAA, one critical habitat NLAA.
Forest Service Sensitive Species – five fish species	All alternatives "may impact individuals or habitats, but would not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species" (MIIH).				
Cultural Resources					
Potential Impact to Sites	No adverse effect, high potential from unauthorized routes and motorized cross-country travel.	No adverse effect			
		Less potential for impacts than alternatives A and D.	Less potential for impacts than alternatives A, B, D, and E.	Less potential for impacts than alternative A.	Less potential for impacts than alternatives A, B, and D.

*Miles include roads and trails on NFS lands, not just routes under FS jurisdiction, unlike other resources.

Chapter 3 – Affected Environment and Environmental Consequences

This chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives as described in chapter 2. In development of the environmental analyses that follow, the best available science was considered and documented in the project record. This analysis is tiered to the "Environmental Impact Statement for the Apache-Sitgreaves National Forests Plan" and associated record of decision (USDA FS 1987 b, c). The predicted environmental consequences are dependent on the application of forest plan standards and guidelines, mitigation measures and best management practices (BMPs) designed to reduce impacts (see appendix D).

The environmental analysis focuses on issues identified through the scoping process. An environmental effect, impact, or consequence is defined as a modification or change in the existing environment brought about by the action taken. Effects are direct, indirect, or cumulative and may be temporary (short term) or permanent (long term). Effects can vary in degree, ranging from only a slightly discernable change to a major alteration of the environment.

Short-term Uses and Long-term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101). Short-term uses are those that generally occur for a finite time period. Long-term productivity refers to the ability of the land to produce a continuous supply of a resource.

The change in the designated road system under any action alternatives does not jeopardize the long-term productivity of the lands and resources on the Apache-Sitgreaves National Forests. There would be beneficial impacts to some biological, physical and cultural resources by prohibiting motorized cross-country travel off the designated system of roads and motorized trails. A description of impacts by resource can be found in the "Effects of Each Alternative by Resource" section of this chapter.

Unavoidable Adverse Effects

Regardless of the alternative, there would be unavoidable adverse effects from the use of motor vehicles on the forests. The severity of the effects would be minimized by adhering to mitigation measures built into the alternatives. When management activities occur, some effects cannot be avoided. Even the no action alternative has effects on the environment. A description of impacts expected by alternative can be found by resource area in this chapter. Some unavoidable impacts could include soil, vegetation, water, fish and wildlife, among others.

Irreversible and Irretrievable Commitments of Resources

An irreversible effect is a change in a natural resource that cannot be reversed. An irreversible commitment of resources refers primarily to the use of non-renewable resources such as minerals or the loss of cultural resources, or to the extinction of a wildlife species. An irretrievable effect is a loss of production or use of a renewable natural resource for a period of time, but is reversible, such as the loss of soil productivity or wildlife habitat from the presence of a road.

By definition, cultural resource sites and traditional cultural properties are not renewable and damage to them cannot be reversed. Alternative A could result in the irreversible loss of cultural resource sites from continued motorized cross-country travel across the forests. The continued use of unauthorized routes would increase the potential of impacting sites. Under the action alternatives, sites would continue to be impacted by motorized vehicle disturbance, but on a much smaller scale than the existing condition, since many areas would be closed to motorized off-road travel. Under all alternatives, the programmatic agreement with SHPO would be adhered to, which is designed to mitigate effects, resulting in no adverse effects to cultural sites.

All alternatives would result in the irretrievable commitment of some of the forests' soil productivity. This effect, however, would be negligible when considered at the scale of the forest, and forest plan standards and guidelines would be met for soil disturbance. The action alternatives all add unauthorized roads to the system and designate them for motor vehicle use. Alternatives B, D, and E add unauthorized trails to the system. These roads and trails, inherently remove the soil productivity from the route surface. The action alternatives designate motorized corridors which are expected to result in bare ground in some places. This effect would be negligible at the forestwide scale. See the "Soils and Watershed" section for more details.

The loss or modification of habitat for fish and wildlife species could constitute an irretrievable commitment of resources since the timeframe could be decades for the habitat to recover. There are no anticipated losses of any fish or wildlife species populations or an impact to habitats that would lead toward Federal listing for any species not currently listed under any alternative. See the discussion in the "Fisheries" and "Terrestrial and Semi-Aquatic Wildlife and Rare Plants" sections.

Other Required Disclosures

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." As a proposed Federal project, the forests travel management decisions are subject to compliance with other Federal and State laws. The following actions have been taken to document and ensure compliance with other laws.

Consultation with Arizona State Historical Preservation Office (SHPO) - Compliance with the National Historic Preservation Act (NHPA). The Southwestern Region has developed a standard consultation protocol for travel management route designation as appendix I of the programmatic agreement (PA). By following the procedures of the PA, the Advisory Council on Historic Preservation (ACHP) and SHPO have agreed that the forests will satisfy legal requirements for the identification, evaluation, and treatment of historic

properties. The forests will comply with the protocol for designating roads, trails and areas in lieu of standard consultation in the PA and the council's regulations (36 CFR 800).

Consultation with U.S. Fish and Wildlife Service (USFWS) - Compliance with the Endangered Species Act (ESA). Biological assessments (BAs) for fisheries and wildlife have been prepared for the preferred alternative and will be submitted to the U.S. Fish and Wildlife Service for formal consultation according to the ESA, and will be completed prior to a decision on this project. Effects to any threatened, endangered, and sensitive wildlife, fish, and plant species are discussed in the "Terrestrial and Semi-Aquatic Wildlife and Rare Plants" and "Fisheries" sections of this chapter. The BAs and associated specialist reports are found in the project record.

Effect of Each Alternative by Resource

The following resources were analyzed for anticipated effects from implementing each alternative: the forests transportation system, recreation and special areas, scenery, socio-economics, forest vegetation, soils and watershed, air quality, wildlife and rare plants, fisheries, and cultural resources. Specialist reports containing further documentation of the analyses and resulting effects can be found in the project record located at the Apache-Sitgreaves National Forests Supervisor's Office in Springerville, Arizona; and are incorporated by reference in places.

This DEIS looks at effects on a forestwide scale rather than describing the site-specific effect at each road or trail. The analysis does not list every road and trail and predict the effects at that particular site. Specialists, however, sometimes used individual sites as examples.

The analysis in this chapter focuses on effects of only the proposed changes to the current designated system, not effects to the whole designated system. The TMR does not require the Forest Service to reconsider any previous administrative decisions that allow, restrict, or prohibit motor vehicle use (Federal Register, vol. 70, no. 216, pg 68268, as reflected in 36 CFR 212.50(b)).

Forest Plan Amendments

Implementation of the Travel Management Rule (TMR) is not a discretionary decision as it is mandated. Since the Apache-Sitgreaves forest plan allowed motorized cross-country travel, the forest plan would need to be amended if alternative B, C, D, or E is implemented. A detailed description of the proposed amendment is found in appendix B. Since the amendment would allow use that is depicted in each alternative, the effect of the amendment by resource is included within direct and indirect effects described by resource.

Transportation System

This section describes the existing transportation system and displays the changes each alternative would make to the system and includes costs of road maintenance. The criteria used for comparing the existing condition to the alternatives are based on the following:

- **Motorized access**: this analysis addresses "Issue 1: Restricting Motorized Access for Dispersed Camping," quantified by the increase or decrease in motorized access to the forests based on miles of roads, trails and areas designated for motorized use.

- **Road maintenance**: maintenance requirements and relationship to the budget in terms of the forests' ability to conduct maintenance on motorized roads and trails.
- **Public safety**: the consequences associated with roads, trails and areas accessed by motor vehicles, restricting trail use to vehicles 50 inches or less in width, authorizing dispersed camping in corridors, and general safeness of roads.
- **Road density**: changes to open road density and forest plan consistency.

Public response and comments were heavily focused on these criteria. Some people felt that access to the forests should not be limited in any way, however, many commenter's favored limited off-road travel in support of protecting natural resources. The public provided specific information as to which roads to close or open, which was considered when the alternatives were developed. Some of the public encouraged the forests to maintain the roads and trails based on funding constraints and to consider congestion and increased maintenance needed if the miles of open roads are reduced. The public requested that the forests analyze roads in terms of conditions that would make roads unsafe for use, such as steepness or congestion.

Affected Environment

Motorized Access

The forests' road system is accessed primarily from the: (1) north on State Highway 77 near the town of Show Low, and U.S. Highway 191 near the towns of Springerville and Eagar; (2) east on U.S. Highway 180 near the town of Alpine, and U.S. Highway 60 near the towns of Springerville and Eagar; (3) south on U.S. Highway 191 near the town of Clifton, and U.S. Highway 60 near the town of Show Low; and (4) west on State Highway 260 near the towns of Heber and Overgaard, continuing to the towns of Show Low and Eagar.

Historically, roads on the forests were created for accessing commodities, primarily for mining, timber, and livestock production. Some roads were created to connect small communities. While the roads continue to provide access for resource management, livestock production and mineral extraction, the majority of use today comes from public recreation and forest products extraction.

There are 2,832 miles of open NFS roads and 156 miles of NFS motorized trails (table 3) in the current road and trail system. The forest road system does not include private roads or roads under the jurisdiction of State, county, or local public road authority. The existing system is made up of roads open to highway legal vehicles and roads open to all types of motorized vehicles. There are also currently 3,373 miles of closed roads on the forests. Approximately 1.6 million acres are currently open to cross-country motorized travel, which has been in place since the forest plan was approved in 1987. The forest plan states the forests are open to off-road vehicles (ORV) with the exception of wilderness and the Blue Range Primitive Area.

Road Maintenance

A term used by the Forest Service to describe the service provided by, and maintenance required for, a specific road is the maintenance level (ML). A road is assigned a maintenance level based on the vehicle type and the intended use of the road. The maintenance level also provides an indication of the level of comfort the user would expect while operating a motorized vehicle on the road. There are five maintenance levels (ML1 – ML5) with ML1 having minimal to no maintenance and ML5 having the greatest.

The estimated annual maintenance costs per mile of road by maintenance level were based on historic maintenance costs. Annual maintenance involves the preventative and cyclical maintenance required to keep a road functioning in accordance with the assigned maintenance level. Annual costs for ML2 roads average $220 per mile local unit rates. Maintenance for these low standard roads typically involves addressing resource concerns including drainage, and user comfort is not a consideration. Annual maintenance costs for ML3-5 roads average from $4,501 to $10,587 per mile at local unit rates. Costs are higher because these roads tend to be wider, require a higher standard including surface blading for passenger car vehicle use and are subject to the Highway Safety Act.

As shown in table 5, the forests annual maintenance needs using local average unit costs totaled $4.7 million, while the budget was $1.5 million in 2007 and $2.1 million in 2008 and 2009 (USDA FS 2008a). Deferred maintenance is the cumulative total of all annual maintenance not accomplished as needed. Deferred maintenance costs for ML3-5 roads currently averages from $40,842 to $71,427 per mile. If the annual maintenance budget does not keep up with the maintenance needed, deferred maintenance backlogs grow. Smaller tasks not accomplished over time may result in major reconstruction needs.

Table 5. Annual road maintenance costs on the forests for 2008

ML	Miles	Annual Local Rates per Mile[1]	Total Annual Costs Using Local Rates[1]	Deferred Costs per Mile	Total Annual and Deferred Costs	Annual Regional Rates per Mile[2]	Total Annual Costs Using Regional Rates[2]
5	49	$10,587	$518,763	$40,842	$2,001,258	$11,273	$552,377
4	88	$4,501	$396,088	$55,972	$4,925,536	$9,851	$866,888
3	628	$4,911	$3,084,108	$71,427	$44,856,156	$6,751	$4,239,628
2	2,067	$223	$460,941	$171	$353,457	$420	$868,140
1	3,373	$86	$290,078	$140	$472,220	$107	$360,911
Total	**6,205**		**4,749,978**		**$52,608,627**		**$6,887,944**

[1] Annual maintenance costs are calculated using the forests' local unit rates per mile for 2008.

[2] Regional average unit rates are shown for comparison to local unit costs. Local unit costs are used for comparison of alternatives.

Public Safety – Mixed Use

Public safety involves the type, amount, and speed of traffic on a forest road. Most NFS roads are driven at relatively low speeds, which prevent some accidents from occurring and reduce the severity of accidents that do occur. The volume of vehicles on NFS roads is generally lower than traffic on main roads, which also reduces the chance of accidents. A potential hazard to drivers is roads where motorized mixed use, or use by both highway legal and non-highway legal vehicles, occurs. The Forest Service Southwestern Region policy is to conduct an analysis on any road where mixed use occurs. During the analysis, risks are identified and recommendations made including mitigation measures to reduce risks associated with designating roads as mixed use.

While most of the forests' ML3–5 roads are used by highway legal vehicles, two roads—NFSR 504, Heber Mormon Crossing and NFSR 169, Deer Lake Road—provide recreational access for

all-terrain vehicles and other non-highway legal OHVs. A mixed use study was completed on these two roads and can be found in the project record and in the TAP report.

Signing of roads according to the Manual of Uniform Traffic Control Devices (MUTCD) is another safety precaution on NFS roads. The forests have received funding in the past 3 years for warning and regulatory signing. Some roads are signed based on the MUTCD, improving safety for users of the roads. To date, 293 miles of NFS roads (38 percent of ML3-5) have had sign studies completed and 226 miles have been signed according to the MUTCD.

Road Density

Forest plan direction for road density is specific to management of the transportation system. Total road densities should average 3.5 miles per square mile or less of total forest area. Open road densities should average 2.0 miles per square mile or less (USDA FS 1987a). There are no road density standards or guidelines for other resources such as terrestrial and aquatic wildlife. By using GIS analysis to conduct the road density calculations, the existing motorized road and trail density is 0.9 mile of open motorized routes per square mile and 1.9 miles of all motorized routes per square mile.

Environmental Consequences

This section includes the direct and indirect effects by alternative and concludes with the cumulative effects. The criteria described above are used to compare alternatives: motorized access, road maintenance, safety, and road density. Table 6 displays the maintenance costs by alternative for the NFS roads and table 7 displays maintenance costs by alternative for NFS motorized trails.

Direct and Indirect Effects Common to All Action Alternatives

- Eliminating cross-country travel would make current funding for route closure signs and devices used to mark areas as closed to cross-country travel, available for road and trail maintenance instead.
- Motor vehicle use would only be allowed on roads, trails, and areas designated for motorized use. This would make it less complicated for forest users to understand where they can travel with motor vehicles.
- Safety issues would be reduced by not having motor vehicles on unauthorized user-created routes.
- Each action alternative would cost more to implement than the current forest travel management budget. The current budget also does not provide enough funding for maintenance of existing roads and trails.
- Mixed use would continue on NFSR 504, Heber Mormon Crossing, and NFSR 169, Deer Lake Road, providing motorized access for ATVs and other non-highway legal OHVs.
- The forests would continue to monitor traffic numbers on ML 3–5 roads ensuring the current design is adequate.

Alternative A

No changes to the current road and motorized trail system would occur under this alternative. This includes no road closures, no unauthorized roads incorporated into the designated road system, no opening of roads currently closed to motor vehicles, and no motorized trail additions. The current forest transportation system was originally designed to provide for administrative and public access to NFS lands and did not consider non-highway legal vehicles.

Motorized access would not be affected. By not adding routes to the system, nor making any changes to the existing roads and motorized trails, no additional maintenance costs would be incurred. With no changes to the current road and trail system, deterioration of unmaintained roads would continue. Costs of annual road maintenance for all maintenance levels would total approximately $4.7 million, and the deferred road maintenance backlog would continue to grow. The costs of repairing resource damage associated with unmanaged motorized use including cross-country travel can be anticipated but has not been quantified. Annual maintenance costs of the motorized trail system would be $70,200.

Motorized cross-country travel would not be managed or addressed, and any existing safety concerns with resulting unauthorized routes would continue. Existing road densities would remain unchanged and are within forest plan standards and guidelines.

Alternative B

There would be a net decrease in total miles of open roads by 5.6 percent. Compared to the baseline (alternative A), costs for annual maintenance of roads under alternative B decreases by $168,272 (-3.5 percent). This would allow funding to be used for the deferred maintenance backlog. Annual maintenance costs of the motorized trail system would increase by $50,400. The proposed addition of unauthorized routes to the system as either ML2 roads or motorized trails would increase public safety since these routes would be maintained. The net decrease in miles of open roads does not pose a safety concern due to a traffic increase on other roads as the number of people accessing the forests is not expected to change (refer to “Recreation” section).

Changes to the transportation system would have implementation costs. Route signing and transportation atlas updates would cost $500 per mile for adding the unauthorized routes to the system, totaling approximately $44,000. Other proposed changes would have a cost of $25 per mile to account for transportation atlas updates totaling $25,300. The total approximated one-time implementation cost—separate from annual, on-the-ground maintenance costs—is $69,300.

Road density in terms of miles of open motorized routes per square mile increases by 0.01 and road density for all routes decreases by 0.02 from alternative A. This indicates that motorized route mileage on the forests, given the proposed opening and closing of different routes is nearly equal to existing conditions and would be consistent with forest plan direction.

Alternative C

There would be a net increase in total miles of open roads by 1 percent, mainly short spurs to provide motorized access to dispersed camping sites. Compared to the baseline (alternative A), costs for annual maintenance of roads under alternative C increase by $3,527 (0.1 percent). Although this increases the annual maintenance cost, it is insignificant to the $1.4 million budget. Unauthorized routes would be added as ML2 roads and maintained as such, providing an increase

in public safety over the existing condition of no maintenance on unauthorized routes. Annual maintenance costs of the motorized trail system would remain the same.

Changes to the transportation system would have implementation costs and long-term maintenance requirements. Route signing and transportation atlas updates would cost $500 per mile for adding the unauthorized routes to the system, totaling approximately $14,000 (one-time cost), separate from annual on-the-ground maintenance costs.

Road density in terms of miles of open motorized routes per square mile increases by 0.01 and road density for all routes increases by 0.01 from alternative A. This indicates that motorized route mileage on the forests, given the proposed opening and closing of different routes, is nearly equal to existing conditions and would be consistent with forest plan direction.

Alternative D

There would be a net decrease in total miles of open roads by 3.6 percent. Compared to the baseline (alternative A), costs for annual maintenance of roads under alternative D decreases by $155,912 (-3.3 percent). This would allow funding to be used for the deferred maintenance backlog. Annual maintenance costs of the motorized trail system would increase by $65,700. The proposed addition of unauthorized routes to the system as either ML2 roads or motorized trails would increase public safety since these routes would be maintained. The net decrease in miles of open roads does not pose a safety concern due to a traffic increase on other roads as the number of people accessing the forest is not expected to change (see “Recreation” section).

Changes to the transportation system would have implementation costs and long-term maintenance requirements. Route signing and transportation atlas updates would cost $500 per mile for adding the unauthorized routes to the system, totaling approximately $24,000. Other proposed changes would have a cost of $25 per mile to account for transportation atlas updates totaling $26,025. The total approximated one-time implementation cost, separate from annual on-the-ground maintenance costs, is $50,025.

Road density in terms of miles of open motorized routes per square mile increases by 0.3 and road density for all routes decreases by 0.02 from alternative A. This indicates that motorized route mileage on the forests, given the proposed opening and closing of different routes is nearly equal to existing conditions and would be consistent with forest plan direction.

Alternative E

There would be a net decrease in total miles of open roads by 13 percent. Compared to the baseline (alternative A), costs for annual maintenance of roads under alternative E decreases by $223,358 (-4.7 percent). This would allow funding to be used toward the deferred maintenance backlog. Annual maintenance costs of the motorized trail system would increase by $22,500. The proposed addition of unauthorized routes to the system as either ML2 roads or motorized trails would increase public safety since these routes would be maintained. The net decrease in miles of open roads could pose a safety concern due to an increase in traffic on ML2 roads, but it is unknown to what extent.

Changes to the transportation system would have implementation costs and long-term maintenance requirements. Route signing and transportation atlas updates would cost $500 per mile for adding the unauthorized routes to the system, totaling approximately $42,500. Other

proposed changes would have a cost of $25 per mile to account for transportation atlas updates totaling $16,800. The total approximated one-time implementation cost, separate from annual on-the-ground maintenance costs, is $59,300.

Road density in terms of miles of open motorized routes per square mile decreases by 0.07 and road density for all routes decreases by 0.03 from alternative A. This indicates that motorized route mileage on the forests, given the proposed opening and closing of different routes would reduce the overall road density and would be consistent with forest plan direction.

Table 6. Annual road maintenance costs by maintenance level by alternative

Alt.	ML 1 $86/mi (Miles)	ML 2 $223/mi (Miles)	ML 3 $4,911/mi (Miles)	ML 4 $4,501/mi (Miles)	ML 5 $10,587/mi (Miles)	Total Annual Maintenance Costs
A	3,373	2,067	628	88	49	$4,749,978
B	3,529	1,941	575	107	51	$4,581,706
C	3,344	2,094	628	88	49	$4,753,505
D	3,473	1,996	576	107	51	$4,594,066
E	3,731	1,744	590	89	49	$4,526,620

Table 7. Annual motorized trail maintenance costs by alternative

Alt.	Total Miles	Total Annual Maintenance Costs
A	156	$70,200
B	268	$120,600
C	156	$70,200
D	302	$135,900
E	206	$92,700

Cumulative Effects on the Transportation System

The cumulative effects analysis considers past, present, and foreseeable future actions that could contribute to the direct and indirect effects. The existing condition described above reflects the past activities that resulted in the road and motorized trail systems that exist today. Present and future projects as listed in appendix E, cumulatively would have little effect on the forestwide transportation system. The following present and future actions when combined with the designated road system under the action alternatives would cumulatively reduce the annual maintenance costs allowing more funding to be used toward the deferred maintenance backlog. These actions would also cumulatively result in improved public safety in addition to the action alternatives due to maintenance operations performed on the route systems.

- Alpine Ranger District Blue River Gravel Pits Development and Pueblo Park Mineral Materials Pit Development would provide a nearby materials source for road

maintenance, reducing the cost of maintaining roads due to a shorter distance to reach materials.

- Additional road easements would put the burden of road maintenance on the easement holder and reduce costs to the forests.
- Legacy funded road projects may reduce sediment delivery to adjacent watersheds.
- American Recovery and Reinvestment Act (ARRA) awarded road projects consisted of resurfacing aggregate ML 3–5 roads in 2010. Around 28 miles of roads were improved (eliminating the deferred maintenance on these roads) and 0.5 mile of unauthorized routes were obliterated.

Recreation

This section describes the existing recreation opportunities on the forests. The effects of each alternative on the motorized and non-motorized recreation opportunities are included. “Issue 1: Restricting Motorized Access for Dispersed Camping,” “Issue 2: Restricting Motorized Big Game Retrieval,” and “Issue 3: Impacts to Resources from Motorized Use” are addressed in this analysis. The criteria used for comparing the existing condition to the alternatives are based on the change in motorized and non-motorized recreation opportunities.

Comments from the public related to recreation centered largely on how forest visitors would be affected by a change in the existing road and motorized trail system, as well as changes to motorized cross-country travel. Other concerns included impacts to recreational experiences, both motorized and non-motorized, access within the forests, and potential for mixed user conflicts.

Affected Environment

National Visitor Use Monitoring (NVUM)

Information regarding recreation visitor use and desired experiences were collected from a variety of Federal, State, and local sources. The primary source for estimates of visitor uses and preferences is the NVUM survey, which was conducted from October 2000 to September 2001 (Kocis et al. 2002). The Forest Service initiated the NVUM project in 1998 as a response to the need to better understand the use, importance of, and satisfaction with NFS recreation opportunities. The following discussion summarizes data from the NVUM to provide quantified information on forest recreation.

The forests received 1.9 million visits to recreation facilities (Kocis et al. 2002). The majority of visitors were above 30 years old, although children under the age of 16 made up the largest age group. Most visitors originate from locations outside communities located near the forests, partly due to the proximity of Phoenix (1.5- to 4-hour drive). According to the Census Bureau, the Phoenix population was around 6.5 million in 2007, up 26 percent from 2000 (ADOC 2006). More than 50 percent of visitors stayed overnight on the forests. As shown in table 8, the top five recreation activities were relaxing, viewing natural features, viewing wildlife, hiking/walking, and driving for pleasure. Driving for pleasure reflects some of the greatest participation at 53 percent, when compared to other activities. Approximately 11 percent of visitors used OHVs, but only 4 percent identified OHV use as their primary recreational activity.

Table 8. NVUM survey summarized to show percent participation in activities and primary activities of recreation visitors to the forests

Activity	Percent Participation (more than one activity could be checked)	Percent Who Indicated as Primary Activity
Camping in developed sites	35.7	7.2
Primitive camping	19.4	3.3
Backpacking and camping in unroaded areas	4.0	0.1
Resorts and cabins on NFS lands	13.7	0.0
Picnicking and day gatherings in developed sites	47.8	1.5
Viewing wildlife on NFS lands	73.5	1.0
Viewing natural features (scenery) on NFS lands	79.3	3.5
Visiting historic and prehistoric sites	11.0	0.1
Visiting nature center or visitor information services	18.3	0.5
Nature study	4.8	0.0
General – relaxing, escaping noise and heat	84.2	41.3
Fishing – all types	50.5	19.6
Hunting – all types	3.0	1.3
Off-highway vehicle travel	11.3	4.0
Driving for pleasure on roads	53.3	3.2
Motorized water travel (boats, ski sleds)	6.8	0.2
Other motorized land/air activities (plane, other)	1.1	0.0
Hiking or walking	62.2	8.7
Horseback riding	3.4	0.4
Bicycling, including mountain bikes	11.5	0.3
Non-motorized water travel (canoe, raft)	6.4	0.0
Other non-motorized activities (swimming, sports)	6.9	0.9

Recreation Opportunities

The forests provide a diversity of recreation opportunities throughout five ranger districts (Black Mesa, Lakeside, Springerville, Alpine and Clifton). The prominent Mogollon Rim is a distinguishing feature of the forests, defining a clear boundary between the deserts and the Colorado Plateau. The recreation settings range from primitive to highly developed, including campgrounds, picnic areas, boating and fishing sites, trailheads, two visitor centers, scenic overlooks, wilderness, and primitive areas. There are 45 developed campgrounds with more than 1,200 campsites ranging from car and tent camping to RV sites.

The forests host a wide range of motorized and non-motorized recreation opportunities year round. Motorized recreation involves the use of highway legal vehicles, all-terrain vehicles (ATVs), snowmobiles, and highly customized and specialized machines able to travel extreme

terrain. Non-motorized recreational activities include hiking, camping, mountain bike riding, horseback riding, wildlife viewing, picnicking, rock climbing, hunting, fishing, recreational shooting, cross-country skiing, snowshoeing, snow camping, and snow play.

The forests have implemented more management along the Mogollon Rim to support facilities and development of ATV staging areas and trailheads. In addition to dispersed OHV use within the forests, sanctioned motorized events have gained in popularity over the past 25 years. For example, the Arizona ATV Outlaw Trail Jamboree has held a 5-day ATV event on the forests since 2003. In 2008 there were 312 participants who traveled over 50,000 cumulative miles of designated roads and motorized trails. Whiplash Motorsports has annually held an off-road racing event for over 30 years with a participation rate of up to 700 individuals and approximately 2,000 spectators. This event occurs on 26 miles of motorized routes within a 1,600-acre area.

Recreation Settings by Ranger District

- **Black Mesa Ranger District:** This is the westernmost geographical zone. This area contains Rim Lakes Recreation Area, Black Canyon Lake, Chevelon Canyon, and hundreds of thousands of acres of gently rolling terrain. The majority of trails are located in and around the Rim Lakes Recreation Area and along State Highway 260.
- **Lakeside Ranger District:** Located near the communities of Show Low, Lakeside/Pinetop, McNary, and Pinedale. The terrain ranges from juniper flats and ridges on the north end, to rugged canyon bottoms, meadows, small streams, and occasional clearings on the east end.
- **Springerville Ranger District:** Located near the communities of Springerville, Eager, and Greer. This area contains Big Lake Recreation Area and Mt. Baldy Wilderness.
- **Alpine Ranger District:** Contains a portion of the Blue Range Primitive Area and the East and West Forks of the Black River.
- **Clifton Ranger District:** The southernmost geographic area of the forests located near the communities of Clifton, Morenci, and Safford. The Coronado Trail Scenic Byway bisects this district as does a portion of the Blue Range Primitive Area.

Roads and Motorized Trails

The forests' road system was not designed for the primary purpose of meeting today's recreational needs; rather it began as access for timber removal and mining. Access to communities and to roads that lead into the forests begins with highly developed interstate and state highways. Many county roads have been in existence since the area was first settled, and some lead directly into the forest. Roads on the forests fall under several jurisdictions, but the vast majority are under Forest Service jurisdiction.

The ability of the public to move around within the forests using motor vehicles is integral to the many recreation activities available. Visitors are not only using vehicles to get from one point to another, they are operating vehicles in a rural setting as part of the recreational experience. Some visitors prefer motorized access for scenic driving to access vistas, lakes and streams, cultural sites, developed and dispersed recreation sites, camping areas, interpretive exhibits, and overlooks. Natural appearing settings, motorized access, and high quality scenery are important characteristics for this user group.

The number of OHVs used in Arizona has risen dramatically. Almost 500,000 households within the State have one or more OHVs. Furthermore, as many as 30,000 new ATVs and motorcycles are purchased annually (USDA FS 2007a; Arizona State Parks 2009a). Motorized recreationists include those who prefer non-paved surfaces from maintained and graded dirt roads to unmaintained rocky routes that present a challenge. A preference is shown for remote natural appearing landscapes with unmaintained routes that have little evidence of human sights, sounds, and disturbances.

Motorized users desire increased opportunities, which provide for quality and diverse recreation experiences including, but not limited to, hunting and fishing access, access to scenic overlooks, and connecting existing motorized systems to create loop opportunities. There is a desire from the public for creation of more motorized areas and trails on the forests to provide more recreation opportunities including connecting loop trails.

Currently, there are 2,067 miles of maintenance level 2 roads open to all motorized vehicles, including OHVs. There are 765 miles of ML 3-5 roads open to highway legal vehicles. There are also 156 miles of trails open to motorized vehicles that are 50 inches or less in width.

Cross-country Motorized Travel

Currently, the forests have approximately 383,000 acres restricted either seasonally or year-round to non-motorized use only. Conversely, more than 1,624,055 acres do not presently have motorized restrictions in place. This equates to approximately 80 percent of the forests being currently open for motorized cross-country use.

There are numerous unauthorized (user-created) routes on the forests. These routes are not considered permanent or temporary forest roads or trails, since they are not included in the forests transportation atlas or as part of the authorized transportation system. Some unauthorized routes are old timber, range, and mining roads that no longer serve their intended purpose, but continue to be used for motorized access. Most unauthorized routes are the result of repeated use by cross-country drivers. Many of these are 2-track, 8 feet wide or less, and are relatively short (less than ¼-mile long). Others have been established by people who drive off system routes for firewood gathering, dispersed camping, or the experience of off-road driving, or to retrieve big game animals.

Unauthorized routes are not designed or constructed to standards for safety and avoidance of resource degradation and often result in measureable impacts to resources including soil, watershed, vegetation, wildlife, and primitive values. Some efforts have been made to close these routes, especially where excessive resource damage is occurring. Closed routes, however, continue to be accessed with motor vehicles despite efforts to close these roads.

Motorized Dispersed Camping

The forests have the greatest number of overnights stays over any other forest in the Nation (USDA FS 2007b). Over half of all forests' visitors spend the night, and approximately 20 percent choose to primitive camp within dispersed areas. While camping is often not the primary reason for visiting the forests, it is often associated with other activities. Currently, motorized dispersed campsites are accessed by a variety of means including roads, trails, and unauthorized routes.

There are currently around 1,611 sites that have been identified as being used for motorized dispersed camping along the existing route system and along some unauthorized routes. The dispersed campsites that are located in close proximity to riparian areas and water tend to see higher levels of use than sites in other areas. Some existing resource impacts that are a result of dispersed camping are crushed vegetation, clearing of vegetation in some areas, campfire rings, and sanitation issues.

Dispersed camping is allowed on designated motorized routes on the forests, although Arizona State law mandates that dispersed camping sites must be at least a quarter mile from watering holes and water sources (ARS Title 17). Under the Travel Management Rule (36 CFR 212.51(b)), "In designating routes, the responsible official may include...the limited motorized use of vehicles within a specified distance of certain forest roads or trails where motor vehicle use is allowed… solely for the purposes of dispersed camping."

Hunting and Motorized Big Game Retrieval

The Arizona Game and Fish Department (AGFD) is responsible for management of game populations within Arizona. Nationally, recent surveys indicate a downward trend in participation by hunters. From 2001 to 2006 the number of hunters dropped by 4 percent (USFWS 2007a). While it is unknown how those trends relate directly to the Apache-Sitgreaves National Forests, the forests are believed to be experiencing changes consistent with national trends.

The motor vehicle supported hunter travels to and from a hunting area by some type of vehicle to retrieve harvested big game animals using their motorized vehicle. AGFD asserts that MBGR is used as a tool to increase hunter success; thereby aiding the AGFD to meet its harvest objectives, reduce meat spoilage, reduce injuries to hunters, and address habitat impacts due to elk grazing (AGFD 2009). During the past 15 to 20 years, the forests have seen an increase in OHV use during hunting season.

Big game hunting is concentrated during the fall season from September through December. Big game species hunted within this region include: collared peccary, pronghorn antelope, bighorn sheep, black bear, Rocky Mountain elk, mule deer, mountain lion, and white-tail deer. The forests lie within the AGFD Region 1 hunting unit, which is further divided into 10 individual game management units (GMUs). Of these 10 units, 9 are within the forests' boundaries.

Table 9 shows the average number of elk and deer permits issued on the forests for 2008 (AGFD 2009). This table also includes the harvest numbers, the average number of off-road retrievals, and the number of motorized retrievals.

Table 9. Average number of permits issued in 2008 for elk and deer, average number of off-road and motorized retrievals, and harvest numbers

Unit*	Average No. of permits	Harvest Numbers**	Average No. Off-road Retrievals	Percent of Permits Using Motor Vehicles (average)
3A, 3C	1,835	715	515	28%
3B	751	58	111	15%
4A	1,303	316	225	17%
4B	977	225	117	12%

Unit*	Average No. of permits	Harvest Numbers**	Average No. Off-road Retrievals	Percent of Permits Using Motor Vehicles (average)
1	1,535	705	483	31%
27	2,655	730	305	11%
Total	**9,056**	**2,749**	**1,756**	**19%**

* Unit 28 is a small area on the forests, so was not included here, however, there were 24 harvested elk and deer in 2008 in this GMU.

**harvest numbers include elk, mule deer, and bear.

Conflict Between Motorized and Non-motorized Users

Unmanaged recreation has been identified as one of four major threats facing the National Forest System (USDA FS 2007a). As growth in visitor use occurs on the forests, personal expectations specific to the quality of experience increases conflicts among user groups. Some visitors who utilize the forests for recreation (including motorized recreation) have become unsettled when their experience failed to meet expectations.

Though motorized and non-motorized users seek the same setting in which to recreate, their values differ enough to cause conflict. Both groups enjoy scenic trails, solitude, places close to water, varied terrain, and large areas in which to travel. Non-motorized recreationists enjoy slower trips and expect the forest to be quiet, while motorized groups want more speed.

Noise is one of the biggest sources of conflicts between these two groups. ATV engine noise is a major source of conflict to non-motorized recreationists, many of whom seek solace from modern technology or access the public lands to view wildlife. The increase in OHV use during hunting season has resulted in conflicts between hunters with differing philosophies (e.g. motorized vs. non-motorized access and game retrieval). There is also conflict at transition areas where motorized and non-motorized use occurs, with increased potential for motorized users to cross the boundaries. Encroachment associated with motorized cross-country travel onto adjacent private lands has also occurred.

Noise from Motorized Use

Noise is defined as unwanted sound and the pitch or loudness could cause a sound to be objectionable. The sources of noise are predominately from motorized vehicles and recreationists at developed recreation facilities, dispersed camping sites, and from motorized cross-country travel. In quiet environments, virtually any change in local activities will cause an increase in noise levels and a loss of “peace and quiet.” Such increases may be considered annoying to recreationists, even if the increase is small.

Areas with the highest noise levels most often contain numerous roads and trails with high OHV use. Currently, there are 1.6 million acres of the forests open to motorized cross-country travel. Motorized use and associated noise is not uniformly occurring across this entire area. There are currently 2,832 miles of roads and 156 miles of motorized trails, on which motor vehicles would produce noise.

Noise levels vary considerably within the analysis area, but much of the forests remain relatively quiet with little human-caused noise. Those seeking areas with a low level of noise can find it in

areas such as Escudilla Wilderness or the Blue Range Primitive Area, where motorized use is not allowed. Those who are not concerned with higher levels of noise can utilize other areas where motorized recreation is acceptable or even encouraged. There are numerous areas that provide a range of noise levels between these extremes.

Non-motorized Recreation

Non-motorized visitors to the forests include hikers, fisherman, backpackers, equestrians, wildlife viewers, mountain bikers, snowshoers, cross-country skiers, and photographers. Non-motorized visitors prefer natural appearing environments with little evidence of disturbance or noise, and few restrictions or visitor controls. Approximately 58 percent of Arizonans use non-motorized trails as their core activity for the majority of their recreational trail time (Arizona State Parks, 2009a).

Currently, there are 3,373 miles of roads closed to motor vehicle use and 1,142 miles of trails closed to motor vehicle use, that are available for non-motorized recreation such as hiking, horseback riding, and mountain biking. There are areas on the forests that provide visitors with primitive recreation settings. These include wilderness areas, inventoried roadless areas (IRAs), wild and scenic river corridors, the Blue Range Primitive Area, and areas with primitive and semiprimitive nonmotorized settings. Currently, there are roads within some of these areas. There are 50 miles of roads within IRAs and the Blue Range Primitive Area, 77 miles within wild and scenic river corridors, and 421 miles in primitive and semiprimitive nonmotorized settings.

Environmental Consequences

This section includes the direct and indirect effects by alternative and concludes with the cumulative effects. See the recreation specialist report for more detailed descriptions by alternative. The following assumptions were used in analysis of the effects on recreation:

- Population growth in communities near the forests and surrounding areas will continue to increase resulting in increased demand for areas to recreate.
- Since user preferences are so diverse, it is assumed that not all user preferences can be accommodated on every acre of land on the forests.
- Management of non-motorized activities will not change (bird watching, horseback riding, backpacking, bicycling, fishing, hiking, etc.).
- At transition areas, where motorized and non-motorized use occurs, the potential exists for motorized users to either intentionally or inadvertently cross boundaries.

Table 10. Comparison of MBGR, dispersed camping sites, and primitive settings by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Acres MBGR within Each GMU on the Forests					
Unit 1	349,666	338,972	330,481	200,634	0
Unit 3A	17,581	17,581	17,575	8,821	0
Unit 3B	83,977	80,979	81,485	45,440	0
Unit 3C	270,504	268,256	268,854	151,940	0

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Unit 4A	16,016	156,005	161,990	82,626	0
Unit 4B	171,881	168,270	161,467	86,970	0
Unit 5A	55	19	20	3	0
Unit 27	548,406	247,000	237,516	134,590	0
Unit 28	15,805	314	314	205	0
Total	**1,624,055**	**1,277,534**	**1,259,829**	**711,305**	**0**
Percent Change	**0%**	**-21%**	**-22%**	**-44%**	**-100%**
Number of Identified Dispersed Campsites					
Total known campsites	1,611	1,611	1,611	1,611	1,611
Campsites within corridors	n/a	598	0	1,335	0
Campsites accessible via roads/trails	1,611	869	1,112	11	1,334
Campsites NOT accessible by road/trails or corridors	0	144	499	265	277
Percent Change	**0%**	**-9%**	**-31%**	**-16%**	**-17%**
Miles of Roads and Trails in Non-motorized Settings					
Primitive setting	14	3	1	3	2
Semiprimitive nonmotorized setting	407	27	1	35	16

Alternative A

Motorized cross-country travel, dispersed camping, and MBGR would continue on approximately 1.6 million acres (table 10). It would be expected that with increasing populations, cross-country travel would increase causing negative effects such as resource damage, increased mixed user conflicts, associated noise levels, creation of user-created roads with concerns of resource damage and public safety, and creation of additional dispersed camping locations, most likely near riparian areas. Use of the existing road (2,832 miles) and motorized trail (156 miles) system would continue for motorized recreation. The need for more motorized trails with connecting loops would not be met under this alternative. Dispersed camping would still be allowed and access would be provided to 1,611 known dispersed camping locations (table 10).

Indirect effects to visitors seeking non-motorized opportunities would be high, since cross-country motorized use would continue at present levels. These effects would include an increase in conflict with motorized users for recreation, hunting, and noise, in transition areas between motorized and non-motorized uses, and along private lands. There would also be increased noise in semiprimitive nonmotorized and primitive settings.

Alternative B

This alternative would designate 53 miles of unauthorized roads open to motor vehicles and would open 358 miles of closed roads. There would be 493 miles of roads closed to motor vehicle use and 77 miles would be converted to administrative and permitted use only. The resulting

designated road system would be 2,673 miles, which is a 5.6 percent reduction from the current road system. There would be an additional 112 miles (increase of additional 72 percent) of motorized trails designated, which would provide additional opportunities and loop opportunities for motor vehicles less than 50 inches in width. Together, this road and motorized trail system would continue to provide motorized recreation opportunities across the forests.

This alternative would eliminate motorized cross-country travel on the forests. There would be five motorized use areas (459 acres) designated, however, the amount of area available for motorized off-road travel would be extensively decreased from 1.6 million acres. It is expected that this elimination of cross-country motor vehicle use would have beneficial impacts on resources such as soils, water, vegetation, fish, wildlife, and cultural resources. This could provide negative impacts to motor vehicle users who enjoy traveling off the designated system of roads and trails nearly forestwide under current conditions.

Off-road motorized travel would be allowed on 658 miles within 300 feet from either side of the road for general access and motorized dispersed camping (around 48,000 acres). There would be 1,467 known dispersed camping locations within the corridors, still accessible with motor vehicles (table 10). There is expected to be some areas with concentrated use of dispersed camping within these corridors resulting in some resource impacts to riparian areas and streams, vegetation, and possibly scenery.

MBGR would be allowed within a 1-mile distance from the road and motorized trail system. This results in around 1.2 million acres where MBGR would be allowed, with some restrictions such as hunting seasons, certain species, and legally taken animals. Effects on MBGR are not expected to be much different from current conditions under this alternative since MBGR is still allowed on around 80 percent of the area currently open. Differences in acres by GMU can be found in table 10. On routes that are used repeatedly, there could be some resource damage from motor vehicle use. There could also be potential for user conflicts between hunters using motor vehicles to retrieve game and those who do not.

There would be an increase in areas available for non-motorized travel, resulting in less mixed user conflicts. There would be a reduction of roads in primitive and semiprimitive nonmotorized settings of 93 percent (table 10). This would result in less noise from off-road motor vehicle travel, and non-motorized users would find increased opportunities for natural appearing environments and low levels of human contact. Under this alternative, non-motorized users would continue to share the majority of the roads and trails with motorized users; however, the elimination of cross-country motorized travel would produce beneficial impacts to non-motorized recreation. There would be additional roads designated in wild and scenic river corridors as well as roads closed (table 12) and a 14 percent reduction in roads within IRAs. User conflicts related to noise, traffic, dust, etc., would be abated to a certain extent; although, incompatible recreation conflicts would continue in popular areas located in close proximity to motorized routes.

Alternative C

This alternative would designate 28 miles of unauthorized roads open to motor vehicles. The resulting designated road system would be 2,860 miles, which is a 1 percent increase from the current road system. There would be no additional miles of motorized trails designated, which would not provide any additional opportunities or loop opportunities for motor vehicles less than 50 inches in width. This road and motorized trail system would continue to provide motorized

recreation opportunities across the forests and would be most similar to existing conditions when compared to the other action alternatives.

This alternative would eliminate motorized cross-country travel on the forests. There would not be any motorized use areas designated, and the amount of area available for motorized cross-country travel would be reduced by 100 percent from 1.6 million acres. It is expected that this elimination of cross-country motor vehicle use would have beneficial impacts on resources such as soils, water, vegetation, fish, wildlife, and cultural resources. This would provide negative impacts to motor vehicle users who enjoy traveling off the designated system of roads and trails nearly forestwide under current conditions.

Off-road motorized travel would be allowed on 28 miles for general access and motorized dispersed camping (around 2,000 acres). There would not be any corridors assigned to these roads since they provide direct access to around 1,112 dispersed camping locations (table 10). There is expected to be some areas with concentrated use of dispersed camping along these roads resulting in some resource impacts to riparian areas and streams, vegetation, and possibly scenery.

MBGR would be allowed within a 1-mile distance from the road and motorized trail system. This results in around 1.2 million acres where MBGR would be allowed, with some restrictions such as hunting seasons, certain species, and legally taken animals. Effects on MBGR are not expected to be much different from current conditions under this alternative since MBGR is still allowed on around 80 percent of the area currently open. Differences in acres by GMU can be found in table 10. On routes that are used repeatedly, there could be some resource damage from motor vehicle use. There could also be potential for user conflicts between hunters using motor vehicles to retrieve game and those who do not.

There would be an increase in areas available for non-motorized travel, resulting in less mixed user conflicts. There would be a reduction of roads in primitive and semiprimitive nonmotorized settings of almost 100 percent (table 10). This would result in less noise from off-road motor vehicle travel, and non-motorized users would find increased opportunities for natural appearing environments and low levels of human contact. Under this alternative, non-motorized users would continue to share the majority of the roads and trails with motorized users; however, the elimination of cross-country motorized travel would produce beneficial impacts to non-motorized recreation. There would be an additional 0.8 mile of roads designated in wild and scenic river corridors (table 12) and there would be no change in roads within IRAs. User conflicts related to noise, traffic, dust, etc., would be abated to a certain extent; although, incompatible recreation conflicts would continue in popular areas located in close proximity to motorized routes.

Alternative D

This alternative would designate 37 miles of unauthorized roads open to motor vehicles and would open 415 miles of closed roads. There would be 479 miles of roads closed to motor vehicle use and 75 miles would be converted to administrative and permitted use only. The resulting designated road system would be 2,730 miles, which is a 3.6 percent reduction from the current road system. There would be an additional 146 miles (increase of additional 93 percent) of motorized trails designated, which would provide additional opportunities and loop opportunities for motor vehicles less than 50 inches in width. Together, the changes to the road and motorized trail system would be similar to changes proposed in alternative B and would continue to provide motorized recreation opportunities across the forests.

This alternative would eliminate motorized cross-country travel on the forests. There would be five motorized use areas (459 acres) designated, however, the amount of area available for motorized off-road travel would be extensively decreased from 1.6 million acres. It is expected that this elimination of cross-country motor vehicle use would have beneficial impacts on resources such as soils, water, vegetation, fish, wildlife, and cultural resources. This could provide negative impacts to motor vehicle users who enjoy traveling off the designated system of roads and trails nearly forestwide under current conditions.

Off-road motorized travel would be allowed on 2,034 miles within 300 feet from either side of the road for general access and motorized dispersed camping providing the greatest amount of acres compared to all other action alternatives (around 148,000 acres). There would be 1,346 known dispersed camping locations within the corridors, still accessible with motor vehicles (table 10). There is expected to be some areas with concentrated use of dispersed camping within these corridors resulting in some resource impacts to riparian areas and streams, vegetation, and possibly scenery.

MBGR would be allowed within a one-quarter mile distance from the road and motorized trail system. This results in around 700,000 acres where MBGR would be allowed, with some restrictions such as hunting seasons, certain species, and legally taken animals. Effects on MBGR would be a reduction in areas available to MBGR from the existing condition. MBGR would be allowed on around 44 percent of the area currently open. Differences in acres by GMU can be found in table 10. On routes that are used repeatedly, there could be some resource damage from motor vehicle use. There could also be potential for user conflicts between hunters using motor vehicles to retrieve game and those who do not.

There would be an increase in areas available for non-motorized travel, resulting in less mixed user conflicts. There would be a reduction of roads in primitive and semiprimitive nonmotorized settings of 91 percent (table 10). This would result in less noise from off-road motor vehicle travel and non-motorized users would find increased opportunities for natural appearing environments and low levels of human contact. Under this alternative, non-motorized users would continue to share the majority of the roads and trails with motorized users; however, the elimination of cross-country motorized travel would produce beneficial impacts to non-motorized recreation. Similar to alternative B, there would be additional roads designated in wild and scenic river corridors as well as roads closed (table 12) and a 14 percent reduction in roads within IRAs. User conflicts related to noise, traffic, dust, etc., would be abated to a certain extent; although, incompatible recreation conflicts would continue in popular areas located in close proximity to motorized routes.

Alternative E

This alternative would designate 64 miles of unauthorized roads open to motor vehicles and would open 220 miles of closed roads. There would be 559 miles of roads closed to motor vehicle use and 84 miles would be converted to administrative and permitted use only. The resulting designated road system would be 2,473 miles, which is a 12.7 percent reduction from the current road system. There would be an additional 49 miles (increase of additional 31 percent) of motorized trails designated, which would provide additional opportunities and loop opportunities for motor vehicles less than 50 inches in width. Together, this designated system would have fewer roads and motorized trails than alternative B or D, but would continue to provide motorized recreation opportunities across the forests.

This alternative would eliminate motorized cross-country travel on the forests. There would not be any motorized use areas designated, and the amount of area available for motorized cross-country travel would be reduced by 100 percent from 1.6 million acres. It is expected that this elimination of cross-country motor vehicle use would have beneficial impacts on resources such as soils, water, vegetation, fish, wildlife, and cultural resources. This would provide negative impacts to motor vehicle users who enjoy traveling off the designated system of roads and trails nearly forestwide under current conditions.

Off-road motorized travel would be allowed on 118 miles within 300 feet from either side of the road for general access and motorized dispersed camping (around 8,500 acres). There would be 1,334 known dispersed camping locations within the corridors still accessible with motor vehicles (table 10). There is expected to be some areas with concentrated use of dispersed camping within these corridors resulting in some resource impacts to riparian areas and streams, vegetation, and possibly scenery.

No MBGR would be allowed which would result in a 100 percent reduction from alternative A (table 10). By not allowing MBGR on the forests, AGFD could have issues meeting its harvest objectives, meat could be spoiled, hunters could be injured by not being assisted with motor vehicles to retrieve game, and impacts to vegetation from elk grazing could increase. There would still be access into the forests on the designated road and motorized trail system, which could be used for game retrieval only on the designated routes, and hunters would not be precluded from using non-motorized means of retrieving a downed animal.

There would be an increase in areas available for non-motorized travel, which would be the greatest of all alternatives, resulting in less mixed user conflicts. There would be a reduction of roads in primitive and semiprimitive nonmotorized settings of 96 percent (table 10). This would result in less noise from off-road motor vehicle travel, and non-motorized users would find the greatest number of opportunities when compared with other alternatives for natural appearing environments and low levels of human contact.

Under this alternative, non-motorized users would continue to share the majority of the roads and trails with motorized users; however, the elimination of cross-country motorized travel would produce beneficial impacts to non-motorized recreation. There would be additional roads designated in wild and scenic river corridors as well as 17 miles of roads closed, which is more than the other action alternatives (table 12) and there would be a 34 percent reduction in roads within IRAs compared to alternative A. User conflicts related to noise, traffic, dust, etc., would be abated to a certain extent; although, incompatible recreation conflicts would continue in popular areas located in close proximity to motorized routes.

Cumulative Effects on Recreation

A cumulative effect is an effect on the environment that results from the incremental effect a proposed action has when added to the effects of other past, present, and reasonably foreseeable future actions. See appendix E for a table of past, present, and planned future projects on the forests. Some specific projects from appendix E that may cumulatively impact the recreation resource on the forests, in addition to the designated road and motorized trail systems proposed, are described here. There are trail construction, reconstruction, and maintenance projects planned, which would further enhance the trail system. One of the trails planned for maintenance and reconstruction is the OHV Heber-Overgaard Trail North on the Black Mesa Ranger District.

There are some land exchanges planned, which could provide additional recreation opportunities. Ongoing road maintenance activities would provide improvements to the road system for the public.

Law Enforcement

Currently, there is access to law enforcement officers and special agents from local cities, the State of Arizona, Forest Service, and forest protection officers and officers from the Arizona Game and Fish Department. These individuals all have the ability to enforce regulations related to use of motor vehicles on the forests. Under alternative A, the current access to law enforcement would continue or be increased when possible. With the "open unless posted closed" policy, it is difficult to know if a road is an open system route or an unauthorized route. It has become difficult to keep up with posting closed road signs or constructing closure devices as they are removed almost as quickly as they are installed.

By implementing the Travel Management Rule, it would be illegal for motor vehicle drivers to leave the designated system of roads, trails, and corridors/areas. The motor vehicle use map (MVUM) would be the primary tool for determining if a person is operating a motor vehicle in an authorized location or not. It would be important that the MVUM be very clear and easy to read since it is assumed that the easier it is to follow the map, the more likely people are to comply with it. There would be a period of time of educating forest visitors on the new rule. Under the action alternatives, there would be no change in access to law enforcement, so no direct, indirect, or cumulative effects would occur. By having the MVUM as a single source to identify where people are allowed to drive, it would ease enforcement and improve compliance.

Wild and Scenic River Eligibility

The National Wild and Scenic Rivers Act (PL 90-542) was established by Congress in 1968 to preserve free-flowing rivers that possess certain "outstandingly remarkable" values. Pursuant to Section 5(d)(1) of the act, the Secretary of Agriculture requires the Forest Service to evaluate rivers within its jurisdiction for their potential for inclusion in the National Wild and Scenic Rivers System. Evaluation of a river's potential as a wild and scenic river consists of the following 3-step process: (1) determination of eligibility (inventory); (2) potential classification as wild, scenic, or recreational (inventory); and (3) determination of suitability (decision). Step 3 is a decision by the Forest Service to recommend to Congress the stream or segment for designation as a wild and scenic river. The forests conducted an updated eligibility evaluation in 2009 for all ranger districts and produced the "Eligibility Report for the National Wild and Scenic River System" (USDA FS 2009b). There are no designated wild and scenic rivers on the forests, but there are rivers eligible for designation and those are shown in table 11.

Table 11. Eligible wild and scenic river segments on the Apache-Sitgreaves NFs

River Name	Length (miles)[3]	Outstandingly Remarkable Values[1]								Class[2]
		A	B	C	D	E	F	G	H	
Alpine Ranger District										
Bear Wallow Creek	3.7	x			x				x	W
	0.9	x			x				x	R

River Name	Length (miles)[3]	Outstandingly Remarkable Values[1]								Class[2]
		A	B	C	D	E	F	G	H	
Black River	0.5	x	x		x	x			x	S
	11.0	x	x		x	x			x	W
	7.3	x	x		x	x			x	W
Blue River	24.7	x	x		x	x	x	x	x	R
	5.7	x	x		x	x	x	x	x	W
Campbell Blue Creek	6.5	x	x		x	x			x	R
	4.1	x	x		x	x			x	W
	1.1	x	x		x	x			x	R
East Fork Black River	8.2	x	x		x	x	x			R
	1.2	x	x		x	x	x			S
	3.3	x	x		x	x	x			W
Fish Creek	9.9		x		x	x				S
	0.6		x		x	x				R
K P Creek	11.3	x								W
Little Blue Creek	1.1	x	x							W
North Fork East Fork Black River	3.1	x			x	x				W
West Fork Black River	0.4	x	x		x	x	x		x	W
Black Mesa Ranger District										
Chevelon Creek	5.3	x		x	x	x			x	S
	12.8	x		x	x	x			x	W
	10.7	x		x	x	x			x	W
	2.4	x		x	x	x			x	R
East Clear Creek	20.8	x			x					S
Leonard Canyon	23.3				x					R
	0.2				x					R
Willow Creek	18.9	x		x		x			x	W
Woods Canyon	4.9	x				x			x	W
Clifton Ranger District										
Blue River	4.2	x	x		x	x	x	x	x	S
	8.1	x	x		x	x	x	x	x	W
	10.3	x	x		x	x	x	x	x	W
Coal Creek	5.4		x		x	x	x			W
	3.8		x		x	x	x			R
	0.6		x		x	x	x			S
	4.2		x		x	x	x			W
	0.8		x		x	x	x			R
Dix Creek	1.5				x	x				S
	0.7				x	x				S
	1.1				x	x				S
Eagle Creek	17.0				x	x			x	R

River Name	Length (miles)[3]	Outstandingly Remarkable Values[1]								Class[2]
		A	B	C	D	E	F	G	H	
East Eagle Creek	7.5		x		x					W
	3.5		x		x					S
	3.5		x		x					R
Little Blue Creek	17.2	x	x							W
Pigeon Creek	4.8							x		W
	10.3							x		R
San Francisco River	9.0	x	x		x	x			x	W
	15.0	x	x		x	x			x	R
Sardine Creek	8.9	x								W
Turkey Creek	8.2	x	x			x		x		W
	1.0	x	x			x		x		W
Springerville Ranger District										
East Fork Little Colorado River	9.3	x	x		x	x			x	S
North Fork East Fork Black River	4.8	x			x	x				W
	1.0	x			x	x				S
	4.9	x			x	x				W
South Fork Little Colorado River	1.4	x								S
	5.9	x								S
West Fork Black River	8.3	x	x		x	x	x		x	W
	3.0	x	x		x	x	x		x	S
West Fork Little Colorado River	1.7	x	x			x				R
	4.3	x	x			x				W
	2.1	x	x			x				W
Adjacent Areas to the Apache-Sitgreaves National Forests										
Blue River	0.4	x	x		x	x	x	x	x	R
Campbell Blue Creek	0.4	x	x		x	x			x	R
Chevelon Creek	<1	x		x	x	x			x	W
Coal Creek	3.1		x		x	x	x			R
Eagle Creek	2.5				x	x			x	R
East Clear Creek	4.2	x			x					S
Leonard Canyon	<1				x					R

[1]Outstandingly remarkable values: A-Scenic, B-Recreation, C-Geologic, D-Fish, E-Wildlife, F-Heritage/Historic, G-Heritage/Prehistoric, H-Vegetation/Ecology

[2]Classification: W-Wild River, S-Scenic River, R-Recreational River (see glossary for definitions)

[3]Full descriptions of stream segment locations can be found in the forests' eligibility report (USDA FS 2009b).

Eligible wild and scenic rivers have temporary corridors established at a distance of one-quarter mile from the centerline of the stream. These corridors are adjusted when, and if, an eligible river is designated by Congress. Table 12 lists the roads and motorized trails within eligible wild and scenic river corridors. A list of the specific stream corridors which would have roads and motorized trails by alternative is available in the project record (GIS datasets). Under all alternatives, there would be no impact to the outstandingly remarkable values of eligible rivers as

displayed in table 11 and, therefore, there would be no direct, indirect, or cumulative effects on the wild and scenic river eligibility for any rivers and segments on the forests.

Table 12. Roads and motorized trails within eligible wild and scenic river corridors by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Roads and motorized trails designated open (miles)	76.9	+7.9	+.8	+9.3	+4.4
Roads and motorized trails to be closed or for administrative use only (miles)	0	-4.7	0	-4.4	-17.2
Total Roads and Trails in WSR Corridors (miles)	**76.9**	**80.1**	**77.7**	**81.8**	**64.1**

Wilderness, Primitive, and Roadless Areas

The National Wilderness Act of 1964 and the Arizona Wilderness Act of 1984 resulted in the designation of three wilderness areas on the forests: Mount Baldy, Escudilla, and Bear Wallow. Although it is not a designated wilderness, the Blue Range Primitive Area (BRPA) is managed as such under FSM 2320.3(11), which states “Manage primitive areas as wilderness areas consistent with 36 CFR 293.17 until their designation as wilderness or other use is determined by Congress.” Within the wilderness and primitive areas, no motorized or mechanized vehicles, including mountain bikes, are allowed; one may travel only on foot and horseback. Since motor vehicle use is prohibited in wilderness areas, alternatives A, B, C, D and E would have no direct, indirect, or cumulative effects on the wilderness characteristics of the Mount Baldy, Escudilla, and Bear Wallow Wilderness areas.

There are existing roads within the BRPA. There is 10.6 miles of County Road GR-67004 currently within the BRPA that is not under Forest Service jurisdiction. This road is used to access many areas of private land along the Blue River. There is an additional 0.2 mile of Forest Service road also within the BRPA. This road segment (FS Road 281Z) is used to access private land and it would remain on the designated road system under all alternatives. There is also 1 mile of Forest Service Road 711 within the BRPA. This road is currently listed as a closed road, however, it is used to access a cabin and well system. It is proposed under the action alternatives to convert this road from a closed road to open for administrative and permitted use only to continue providing permitted access to the cabin and well. Although there are existing roads within the BRPA, all alternatives would have no effect on the area’s wilderness characteristics.

There are 17 inventoried roadless areas (IRAs) within the forests. There are 275 miles of non-motorized trails within IRAs on the forests, but there are no motorized trails within IRAs. The names and acreages of the IRAs are presented in table 13. IRAs are managed to maintain roadless area characteristics. There are currently 40 miles of roads within the IRAs. Alternatives B and D propose changes to the designated system resulting in 31 miles of roads within IRAs. Alternative C would not propose any changes to the roads in IRAs, while alternative E would result in a designated system of 23 miles of roads in IRAs. Under all alternatives, there would be no direct, indirect, or cumulative effects to eligibility as potential wilderness or impacts to roadless area characteristics in any of the IRAs.

Table 13. Inventoried roadless areas on the Apache-Sitgreaves National Forests

Roadless Area	Acres	Roadless Area	Acres
Leonard Canyon	3,082	Bear Wallow	11,895
Chevelon Canyon	5,569	Salt House	21,848
Escudilla Mountain	6,101	Hot Air	31,703
Campbell Blue	7,003	Pipestem	34,751
Mother Hubbard	2,086	Lower San Francisco	59,124
Centerfire	13,113	Sunset	29,063
Nolan	6,652	Mitchell Peak	35,525
Black River Canyon	11,802	Painted Bluffs	43,162
Hells Hole	15,457		

Scenery Management

This section describes the existing quality of scenery on the forests. The effects of each alternative on the scenic qualities are included. “Issue 3, Impacts to Resources from Motorized Use” is addressed in this analysis. There were concerns raised by the public related to potential impacts to the scenery and visual quality from motorized travel on the forests. The criteria used for comparing the existing condition to the alternatives are based on the following:

- Potential exceedance in visual quality objective (VQO) thresholds and scenic quality from the proposed changes to the transportation system.

Affected Environment

The Visual Management System (VMS) is used to derive VQOs from a combination of three factors: (1) the variation of a landscape; (2) the level of concern visitors have for scenic quality while viewing the landscape from certain areas or routes; and (3) the distance viewers are from the landscape or a feature on the landscape, such as a road (USDA FS 1979). A map can be produced which shows VQOs across the forests and is used in land use planning to evaluate scenic quality.

The variation of a landscape is quantified by variety classes ranging from A to C. Variety class A represents areas with distinctive or unusual features exhibiting variety in form, line, color, and texture. Landforms, rocks, water and vegetation can stand out as unusual on the landscape. In comparison, class C features have very little variety, if any, in form, line, color, and texture. An example would be continuous acres of a single vegetation types such as sagebrush vegetation.

The level of concern or sensitivity visitors have while viewing national forests is determined by those traveling through the forests on developed roads and trails, or who are using areas such as campgrounds and visitor centers, and recreating at streams and lakes. These levels are ranked from 1 to 3, with 1 having the highest sensitivity and 3 the lowest sensitivity to scenic quality.

The distance viewers are from the landscape is analyzed by identifying viewpoints where people would be expected to have high concern for scenic quality. On the forests this would include the Mogollon Rim scenic overlook on the Black Mesa Ranger District, the Blue Range Primitive Area scenic overlook on the Clifton Ranger District, the developed recreation site at Big Lake on the Springerville Ranger District, and designated wilderness. Under the VMS, areas that are seldom seen generally have a lower sensitivity level. Distance zones are developed to describe particular divisions of the landscape being viewed. The three distance zones are: foreground, middle ground and background. Foreground is areas within ¼ to ½ mile from the observer, middle ground extends from the foreground zone to 3 to 5 miles from the observer, and background extends beyond that for as far as the eye can see.

There are four VQOs for which management direction is provided in the forest plan ranging from allowing almost no change to the landscape to allowing many types of changes. The VQOs are: preservation, retention, partial retention, and modification/maximum modification. Table 14 displays the acres of each VQO with the existing miles of roads and motorized trails. There are unauthorized routes within all VQOs resulting from motorized cross-country travel.

Preservation (P): Applies to wilderness areas, primitive areas, other special classified areas, areas awaiting classification, and unique management units. Only ecological changes may occur to the landscape and most management activities are prohibited resulting in very minimal changes to visuals.

Retention (R): Provides for management activities which are not visually evident to the casual forest observer and may only repeat form, line, color, or textures common in the landscape. Changes in size, amount, intensity, direction, and pattern should not be evident.

Partial Retention (PR): Provides for management activities which are visually subordinate to the landscape. Activities may repeat form, line, color, or texture common in the landscape but changes in size, amount, intensity, direction, and pattern must remain visually subordinate. Activities may introduce form, line, color, or texture which are found infrequently or not at all in the landscape, but should still remain subordinate to the overall landscape.

Modification/maximum modification (M/MM): Allows for management activities to visually dominate the landscape. Vegetative and landform alteration must borrow from naturally established form, line, color, or texture resulting in visual characteristics matching the surrounding area. Structures, roads, slash, root wads, etc., must remain visually subordinate.

Table 14. Acres of VQOs on the forests with miles of roads and trails within each VQO

VQO Class	Acres on Forests	Miles Existing Open Roads	Miles Existing Closed Roads	Miles Existing Motorized Trails
Preservation	194,148	12	3	0
Retention	604,324	878	1,345	29
Partial Retention	919,000	1,225	493	101
Modification/maximum modification	391,000	696	710	25

Forest Plan Thresholds for VQOs

To meet specific resource management objectives, the following VQO variations are allowed for management areas (forest plan, Recreation Management, pp. 35-36):

- VQO-P: No Change from existing
- VQO-R: +2 percent change from existing in foreground, +5 percent in background, middle ground
- VQO-PR: +5 percent change from existing in foreground, +10 percent in background and middle ground
- VQO-M/MM: +10 percent change from existing in all zones

These allowable variations in acres by VQO were established to ensure visuals were not severely impacted by projects such as timber harvesting. These allowable variations are less relevant to the travel management analysis since it is not likely that designation of roads, motorized trails, and areas for motorized use would result in changing enough acres to result in a change to the VQOs. The analysis focuses on whether or not VQOs will be met and what the general impacts would be.

Motorized Use and Its Impacts on Quality of Scenery

The majority of the existing transportation system was developed in the 1950s for timber harvesting. Once timber related activities were complete, few roads were closed. There is still visual evidence on all districts of past timber projects, particularly roads located in sensitive areas such as drainage bottoms.

Other than old timber related roads, the transportation system has been designed with the objective of retaining scenic quality. Existing ML2-5 roads have been designed to minimize impacts to some degree to visuals and meet forest plan requirements. This design includes structures that blend with the landscape and reduce soil loss and erosion. Maintenance of roads and trails maintains visual quality by mitigating resource damages. Past and present vegetation treatments and prescribed fire projects have closed hundreds of miles of old roads.

Resource damage from motorized use off the designated road and trail system is visible for years. There are likely thousands of miles of unauthorized routes across the forests. In most cases on these unauthorized routes, motor vehicle use damages vegetation, soils and water, and detracts from scenic quality. Some closed roads are revegetating, but a high percentage of closed roads are still being used.

Motorized access to dispersed campsites has left long lasting visual impacts on the forests, especially in riparian corridors and wetlands. In some cases on the forests, the lack of designated routes or the conditions of routes (routes that have not been maintained) have resulted in the creation of multiple tracks. These unauthorized routes have resulted in vegetation removal and bare ground. These routes diminish the natural appearance and reduce the scenic quality associated with the forest landscapes.

Environmental Consequences

This section includes the direct and indirect effects by alternative and concludes with the cumulative effects. The forests GIS data identified miles of roads in each VQO, which was used

to determine potential exceedance to VQO thresholds by alternative. Environmental consequences to recreation, soils, watershed, vegetation, and transportation were used in terms of predicting outcomes to scenery. Consistency with forest plan VQO thresholds was evaluated in addition to the potential change to the quality of scenery from the proposed transportation system. See the scenery management specialist report for more detailed descriptions by alternative. Mitigation measures applicable to alternatives B, D, and E are found in appendix D.

The following assumptions were used in analysis of the effects on scenery:

- Designated NFS roads and trails are generally in an acceptable condition, unless information exists to the contrary. Most NFS roads and trails were designed to minimize resource damage. ML1 roads are closed and are expected to revegetate unless reopened. Unauthorized routes not designated for motorized travel are expected to revegetate.
- Motorized off-road travel would have direct impacts such as crushing of foliage or root systems. If off-road use occurs on the same route repeatedly—for example to access dispersed campsites or multiple trips on the same route for MBGR—there could be impacts to scenery from the removal of vegetation. For single trips, as is expected for MBGR, limited direct effects on vegetation would occur since plants generally recover within one growing season.

Alternative A

The scenic quality on the forests designated transportation system on the existing 2,832 miles of roads and 156 miles of motorized trails would remain unchanged from current conditions. In areas currently managed for non-motorized use (383,000 acres), there would be no change to scenic quality as a result of the transportation system, with the exception of the possible creation of unauthorized routes, which could impact scenic quality in these areas.

Alternative A poses the greatest risk of degraded scenic quality because cross-country travel would not be controlled, which has the biggest potential for impact to scenic quality. Cross-country travel would be allowed forestwide over 1.6 million acres with potential to create resource damage (vegetation crushing and soil erosion) by motorized travel. This is especially the case in unsuitable locations where physical impacts should be subordinate to the natural landscape (VQO-R and VQO-PR). Unauthorized routes would continue and possibly increase across all VQOs as influence from nearby populations increases. Since unauthorized use is not managed and will likely increase, the overall scenic quality would decline under this alternative.

As a result, all VQOs would be met under this alternative, except at some point the variance allowed by the forest plan may be exceeded in VQO-R and VQO-PR.

Alternative B

This alternative would meet all VQO forest plan thresholds for percent of variation in acres by VQO class. There would be no change to existing VQO classes. This alternative adds 53 miles of unauthorized routes and designates them for motor vehicle use and opens 358 miles of currently closed roads to motorized travel. Additionally, 493 miles of roads would be closed to motorized travel and 77 miles would be converted to administrative and permitted use only. Closed, open, and unauthorized routes (112 miles) would be converted to motorized trails. Impacts to VQO would be no net increase of acres associated with roads and motorized trails in “P,” a net increase

of 103 acres or 0.01 percent in “R,” a net increase of 125 acres or 0.1 percent in “PR,” and a decrease of 300 acres in “M/MM.”

Motorized cross-country travel would be eliminated under this alternative, which would prevent impacts to scenic quality from this activity, as compared with alternative A. The proposed road and motorized trail system is not expected to change any VQOs. The remaining unauthorized routes that currently exist and are not proposed to be part of the designated system under this alternative would revegetate and improve the scenic quality.

In dispersed camping corridors (around 48,000 acres), scenic quality would decrease from the presence of vehicle tracks when a route is used repeatedly. The camping corridors are in the foreground of highly traveled roads, and many are adjacent to rivers and streams. No change is expected to VQOs from motorized dispersed camping.

Off-road motorized travel for MBGR would continue at a fixed distance (1 mile) from routes resulting in an area of 1.2 million acres. Where off-road travel creates a track that is used repeatedly, there could be a decline in scenic quality. Off-road motorized travel for MBGR, however, is expected to be sporadic across the forests and the likelihood of vehicles going over the same path to retrieve downed animals is low. Therefore, for the majority of MBGR, there is expected to be little to no impact to scenic quality and no resulting change to VQOs.

Alternative B proposes opening five designated areas to motorized travel. VQO classes range from M/MM to PR in four areas and to R in one area. Some vegetation disturbance has already occurred in four of the five areas. Whether scenic quality is retained is highly dependent on timing, duration and intensity of use. If the areas are used intensively, vehicle tracks would be prevalent and scenic quality would degrade since some areas would be easily viewed from roads that receive high use during summer and fall.

Alternative C

This alternative would meet all VQO forest plan thresholds for percent of variation in acres by VQO class. There would be no change to existing VQO classes. This alternative adds 28 miles of unauthorized routes and designates them for motor vehicle use. The rest of the road and motorized trail system would remain unchanged. Impacts to VQO would be no increase associated with roads in “P,” a net increase of 29 acres in “R,” a net increase of 34 acres in “PR,” and an increase of 8 acres in “M/MM.” Each of these changes in acres would have less than 0.01 percent change in the size of the VQO areas.

Motorized cross-country travel would be eliminated under this alternative which would prevent impacts to scenic quality from this activity, as compared with alternative A. The proposed road and motorized trail system is not expected to change any VQOs. The remaining unauthorized routes that currently exist and are not proposed to be part of the designated system under this alternative would revegetate and improve the scenic quality.

In dispersed camping areas along the 28 miles of unauthorized roads that would be designated for motor vehicle use (around 2,000 acres), scenic quality could decrease from the presence of vehicle tracks when a route is used repeatedly. This alternative has the least acres available for motorized dispersed camping compared to the other action alternatives. No change is expected to VQOs from motorized dispersed camping.

Off-road motorized travel for MBGR would continue at a fixed distance (1 mile) from routes resulting in an area of 1.2 million acres. Where off-road travel creates a track that is used repeatedly, there could be a decline in scenic quality. Off-road motorized travel for MBGR, however, is expected to be sporadic across the forests and the likelihood of vehicles going over the same path to retrieve downed animals is low. Therefore, for the majority of MBGR, there is expected to be little to no impact to scenic quality and no resulting change to VQOs.

Alternative D

This alternative would meet all VQO forest plan thresholds for percent of variation in acres by VQO class. There would be no change to existing VQO classes. This alternative adds 37 miles of unauthorized routes and designates them for motor vehicle use and opens 415 miles of currently closed roads to motorized travel. Additionally, 479 miles of roads would be closed to motorized travel and 75 miles would be converted to administrative and permitted use only. Closed, open, and unauthorized routes (146 miles) would be converted to motorized trails. Impacts to VQO would be a net decrease of 1 acre of roads in “P,” a net increase of 183 acres or 0.03 percent in “R,” a net increase of 40 acres or less than 0.01 percent in “PR,” and a decrease of 91 acres in “M/MM.”

Motorized cross-country travel would be eliminated under this alternative which would prevent impacts to scenic quality from this activity, as compared with alternative A. The proposed road and motorized trail system is not expected to change any VQOs. The remaining unauthorized routes that currently exist and are not proposed to be part of the designated system under this alternative would revegetate and improve the scenic quality.

In dispersed camping corridors (around 148,000 acres), scenic quality would decrease from the presence of vehicle tracks when a route is used repeatedly. This alternative has the most acres available for motorized dispersed camping compared to the other action alternatives. The camping corridors are in the foreground of highly traveled roads and many are adjacent to rivers and streams. No changes is expected to VQOs from motorized dispersed camping.

Off-road motorized travel for MBGR would continue at a fixed distance (1/4 mile) from routes resulting in an area of 700,000 acres. Where off-road travel creates a track that is used repeatedly, there could be a decline in scenic quality. Off-road motorized travel for MBGR, however, is expected to be sporadic across the forests and the likelihood of vehicles going over the same path to retrieve downed animals is low. Therefore, for the majority of MBGR, there is expected to be little to no impact to scenic quality and no resulting change to VQOs.

Alternative B proposes opening five designated areas to motorized travel. VQO classes range from M/MM to PR in four areas and to R in one area. Some vegetation disturbance has already occurred in four of the five areas. Whether scenic quality is retained is highly dependent on timing, duration and intensity of use. If the areas are used intensively, vehicle tracks would be prevalent and scenic quality would degrade, since some areas would be easily viewed from roads that receive high use during summer and fall.

Alternative E

This alternative would meet all VQO forest plan thresholds for percent of variation in acres by VQO class. There would be no change to existing VQO classes. This alternative adds 64 miles of unauthorized routes and designates them for motor vehicle use, and opens 220 miles of currently

closed roads to motorized travel. Additionally, 559 miles of roads would be closed to motorized travel, and 84 miles would be converted to administrative and permitted use only. Closed, open, and unauthorized routes (49 miles) would be converted to motorized trails. Impacts to VQO would be a net decrease of 2 acres of roads in “P,” a net decrease of 62 acres in “R,” a net decrease of 113 acres in “PR,” and a decrease of 463 acres in “M/MM.”

Motorized cross-country travel would be eliminated under this alternative which would prevent impacts to scenic quality from this activity, as compared with alternative A. The proposed road and motorized trail system is not expected to change any VQOs. The remaining unauthorized routes that currently exist and are not proposed to be part of the designated system under this alternative would revegetate and improve the scenic quality.

In dispersed camping corridors (around 8,500 acres), scenic quality would decrease from the presence of vehicle tracks when a route is used repeatedly. The camping corridors are in the foreground of highly traveled roads, and many are adjacent to rivers and streams. No change is expected to VQOs from motorized dispersed camping. There would be no MBGR allowed under this alternative, so there would be no related impacts to scenic quality or VQOs.

Cumulative Effects on Scenery Management

The existing condition is a result of past impacts to the scenic environment and is described in the “Affected Environment” section. Under alternative A, vegetation loss and resource damage would continue primarily from motorized cross-country travel. The cumulative impacts from some projects listed in appendix E that could contribute changes to scenery in VQOs (thinning, fuels treatments), could create a contrast with characteristics of the natural environment and lead to a decline in scenic quality in the short term (1 to 10 years). However, these future projects would likely improve scenic quality in the long term (15 to 30 years) by moving vegetation toward forest plan desired conditions. Areas with VQOs of P, R, and PR would have the greatest potential to have impacts to scenic quality.

For all action alternatives, elimination of cross-country travel and road closures when combined with foreseeable projects such as thinning and fuels management may have short-term impacts in areas where the planned activities are near areas used for motorized dispersed camping or motor vehicle use areas. These projects (appendix E) have the potential to improve scenic quality in the long term by moving vegetation toward forest plan desired conditions. Ongoing activities such as road and trail maintenance, when combined with a system of roads and motorized trails, would result in improvement of scenic quality as resource damage in visually sensitive areas is minimized or eliminated. It is not expected that any cumulative effects on scenic quality would result in changes to VQOs under any alternative.

Socioeconomics

This section describes the social and economic environment on areas in and surrounding the forests. The effects of each alternative on socioeconomics are included, as well as effects to environmental justice. “Issue 4, Economics: Loss of Revenue and Jobs” is addressed in this analysis. The analysis on the social environment also addresses, in part, Issues 1 and 2 (motorized access for dispersed camping and MBGR). The criteria used for comparing the existing condition to the alternatives are based on revenues and jobs generated from motorized (recreation related) activities.

The socioeconomic analysis is derived from the Apache-Sitgreaves National Forests Economic and Social Sustainability Assessment (USDA FS 2009a). The analysis (hereafter referred to as the sustainability analysis) is the best available science to assess the forests contribution to economic and social sustainability. For the purposes of evaluating how travel management decisions affect social and economic outputs, this information provides the most comprehensive and relevant data.

Affected Environment

The assessment area is four counties in Arizona which the forests overlap as well as two counties in New Mexico, which the forests border. These are the Apache, Navajo, Coconino and Greenlee Counties in Arizona and Grant and Catron Counties in New Mexico. Within the assessment area, prominent cities and towns in Arizona include Heber-Overgaard, Show Low, Alpine, Springerville, Payson, Pinetop-Lakeside, St. Johns, Forest Lakes, Clifton, Snowflake-Taylor, Greer, Eager and Winslow; and in New Mexico include Reserve and Silver City.

Due to the physical distances, economic activities in northern Apache and Navajo Counties generally do not influence the forests management and, conversely, management of the forests does not affect those areas. Less than 1 percent of the forests' Arizona visitors are from Coconino County. Western Catron County was included because county residents contribute to Apache County through the purchase of goods and services. In addition, recreationists commonly travel from Reserve, New Mexico.

There are over 31 million acres of land across the counties with 23 percent managed by the Apache-Sitgreaves National Forests. Greenlee and Catron Counties have large percentages of Forest Service land (64 and 50 percent, respectively). This is relevant to this analysis in terms of qualifying to what extent transportation management on the forests may affect counties.

Countywide data was used to estimate economic impacts. Models of the local economy were built using IMPLAN (Impact Analysis for Planning, Professional Version 2.0) and 2007 data. IMPLAN was utilized to develop estimates of the level of jobs and income generated per thousand visits by activity type. The estimates are input to the Recreation Economic Contribution Application (RECA called TMECA in the specialist report). RECA is a spreadsheet that, along with data collected from the 2001 NVUM survey, estimates local economic contributions of different types of recreational activities on NFS roads and motorized trails. The models used the area of potential economic impact, industry sector data (how much activity happens in a type of business), and demand (number of people visiting the forest and the activities they participate in).

Population

Population growth in the assessment area, except Coconino, has been well below the Arizona and New Mexico average (table 15). Each county, except Greenlee (AZ) and Catron (NM), experienced net population growth between 1990 and 2000. Catron County has the lowest population density with one individual for every 2 square miles. In contrast, Navajo County is the most densely populated with almost 10 people per square mile. Growth rates for the under-18 population were considerably lower than overall population growth within the five counties between 1990 and 2000. Conversely, the 65 and over populations grew at a higher rate than average for their respective states and considerably faster than county populations. The assessment area per capita income is far below the national average of $31,000.

Table 15. County populations and projected changes in 2010 and 2020

County*	2000 Population	Projected 2010 Population	Percent Change	Projected 2020 Population	Percent Change
Apache	69,423	76,645	10	85,766	12
Coconino	116,320	147,352	27	169,343	15
Greenlee	8,547	9,605	12	10,271	7
Navajo	97,470	99,979	3	111,946	12
Catron	3,543	4,063	15	4,459	10
Arizona	5,130,632	6,145,108	20	7,363,604	20
New Mexico	1,819,046	2,112,986	16	2,383,116	13

*Grant County was not analyzed in this population trend analysis (USDA FS 2009a).

Populations have moderate racial and ethnic diversification. Hispanic presence has increased from 20 to 25 percent of the total population since 1940, while the African American population increased 0.1 percent. The Native American population has grown 83 percent over the past 6 decades. However, as a percentage of Arizona's population, it has declined from 11 percent in 1940 to 5 percent in 2000 (U.S. Census Bureau 2005).

Employment and Income

Total employment in the six counties was 152,497 in 2000. Wage and salary employment accounted for 80 percent. Farm proprietor (self-employment as opposed to corporate farms) employment was 1 percent of all jobs. The sector providing the largest portion of employment (including wage and salary employment) was government, followed by services and retail trade. Services and retail trade contain the industries most likely to be affected by recreation activities on the forests. The manufacturing sector and the agricultural services, forestry, fishing, and other sectors represented 3 and 0.5 percent of total employment respectively.

Employment growth in each of the six counties between 1990 and 2000 was below that of their respective states. Employment growth for Navajo and Apache Counties (27 and 39 percent, respectively) was less than the 48 percent increase for Arizona. Wage and salary employment was below the Arizona average in all but Greenlee County, but non-farm proprietor employment increased substantially, particularly in Apache County. Overall, employment growth within the six counties averaged 34 percent from 1990 to 2000, compared to 48 percent in Arizona and 27 percent in New Mexico (USDA FS 2009a).

In the early stages of the forests' and Arizona's development, extractive industries such as mining, ranching, farming, and timber harvesting were the mainstays of local economies because these resources were needed by a growing population. In recent decades, however, the counties surrounding the forests have joined neighboring western states in experiencing a major decline in extractive industries because of national social changes. Industry declines have been accompanied by declines in employment and income traditionally provided by these sectors. There has been, and will likely continue to be, a transition from employment based on extractive industries to one based on services, recreation, and construction (USDA FS 2009a).

The 2002 per capita personal income of the four Arizona counties was $19,333, only 63 percent of the national average (approximately $31,000). The average income growth rate in the assessment area over the past 3 decades is just under 8 percent, slightly below the 8 percent New Mexico growth rate and well below the 10 percent Arizona average. This suggests that the assessment area lags behind the region in individual economic status, in contrast to Arizona's strong, continuing growth.

OHV Economic Contributions

Based on the Arizona Trails 2005 Plan, OHV users represent 24 percent of the state population, which includes residents who use motorized vehicles on trails for multiple purposes. Of that, 7 percent reported that motorized trail use accounted for the majority of time (Arizona State Parks 2009b). Less than 2 percent of the estimated use on the forests is attributed to OHV use.

Arizona State Parks estimated OHV use and camping, along with hunting and fishing, stimulate the regional economy through direct local expenditures on motorized vehicles, trailers, equipment and accessories, and insurance and maintenance costs. Local spending on food, gas and lodging, and souvenirs also indirectly benefits the region by supporting wages and income in the local economy, as well as contributing local and State tax dollar revenue.

OHV users alone spend an estimated $3.1 billion to $4 billion annually in Arizona (Silberman 2003). The estimated expenditure per overnight visit for non-local OHV use is $84 and $63 for local overnight visits (USDA FS 2009a). All-terrain vehicles registered with the Arizona Motor Vehicle Division increased 347 percent from 1998 (51,453 vehicles) to July 2006 (230,000 vehicles). This does not include untitled OHVs, out of state visitors, or other OHVs that recreate in Arizona. In 2009, Arizona State Parks estimated that $780,000 was generated from OHV sticker purchases (Arizona State Parks 2009a).

The Apache-Sitgreaves National Forests Economic Contribution

The recreation economic contribution stimulates the greatest levels of employment and labor income for the forests. However, 3 percent of the estimated employment and 6 percent of the estimated labor income are attributed to the recreation activities of local residents. While providing recreation opportunities to local residents is an important contribution, the recreation expenditures of locals do not represent new money introduced into the economy. If national forest related opportunities were not present, it is likely residents would participate in other locally based recreation activities and this money would still be retained in the local economy. Approximately 97 percent of the jobs and 94 percent of the labor income are generated from expenditures by non-local visitors bringing new money into the area (table 16).

The forests activities are estimated to be responsible for approximately 7 percent of jobs and 5 percent of labor income within the regional economy (table 17). The wholesale trade, lodging and food services, and arts, entertainment, and recreation sectors benefit from the forests contributions to a greater extent than other sectors.

Table 16. Apache-Sitgreaves National Forests estimated labor income and employment contribution in 2006

Economic Contribution Area	Total Contribution	Contribution from Recreation Activities of Local Residents	New Money Contribution
Thousands of 2006 Dollars Contributed			
Recreation	$43,866	$3,882	$39,983
Total Forest Management	$83,301	$4,910	$78,391
Percent Total Labor Income	100%	6%	94%
Number of Jobs Contributed			
Recreation	1,678	140	1,538
Total Forest Management	3,119	179	2,940
Percent Total Employment	100%	3%	97%

Table 17. Forest Service 2006 contribution to jobs and revenue in the assessment area

Industry Sector	Employment (Jobs)			Labor Income (Thousands of 2006 Dollars)		
	Area Totals	ASNFs Related	Percent of Total	Area Totals	ASNFs Related	Percent of Total
Agriculture	950	344	36.2	$13,060	$6,482	49.6
Mining	2,524	16	0.6	$172,047	$602	0.4
Utilities	376	10	2.7	$24,739	$661	2.7
Construction	3,082	22	0.7	$105,371	$763	0.7
Manufacturing	979	158	16.1	$50,615	$3,725	7.4
Wholesale trade	475	126	26.5	$18,082	$4,813	26.6
Transportation/storage	1,360	68	5.0	$84,663	$2,034	2.4
Retail trade	4,444	317	7.1	$113,333	$7,571	6.7
Information	922	28	3.0	$37,131	$1,112	3.0
Finance/insurance	649	27	4.2	$23,695	$963	4.1
Real Estate/rental	679	39	5.7	$21,700	$1,342	6.2
Prof./scientific services	718	43	6.0	$25,704	$1,295	5.0
Management of companies	185	11	5.9	$9,050	$542	6.0
Administration, Waste Management	795	35	4.4	$18,672	$744	4.0
Educational Services	454	10	2.2	$13,125	$167	1.3
Health Care	2,777	69	2.5	$103,732	$2,574	2.5
Arts, Entertainment, and Recreation	323	123	38.1	$7,274	$3,055	42.0
Lodging/ Food Services	3,211	995	31.0	$45,012	$14,573	32.4
Other Services	2,464	89	3.6	$45,052	$1,766	3.9
Government	18,608	588	3.2	$742,836	$28,509	3.8
Total	**45,974**	**3,119**	**6.8%**	**$1,674,902**	**$83,301**	**5.0%**

As shown in table 18, total motorized activities on the forests account for 4.27 percent of total jobs (including direct, indirect and induced jobs) and 4.23 percent of total labor income (including direct, indirect and induced labor income). Direct jobs supported by all other activities account for 66.9 percent of all jobs contributed to the local economy from recreation on the forests, and indirect and induced jobs account for another 20.1 percent.

Table 18. Percent total employment and labor income supported by activity type on the forests

Type of Activity on the Forests		Employment (Percent of full and part-time jobs)		Labor Income (2008 dollars) (Percent of Total Income)	
		Direct	Indirect and Induced	Direct	Indirect and Induced
Non-Motorized Use					
Backpacking	Local	0.12%	0.04%	0.10%	0.05%
	Non-local	0.12%	0.04%	0.11%	0.05%
Hiking/Walking	Local	1.46%	0.44%	1.30%	0.60%
	Non-local	3.79%	1.12%	3.35%	1.53%
Horseback Riding	Local	0.09%	0.03%	0.08%	0.04%
	Non-local	0.24%	0.07%	0.21%	0.10%
Bicycling	Local	0.09%	0.03%	0.08%	0.04%
	Non-local	0.24%	0.07%	0.21%	0.10%
Other Nonmotorized	Local	0.15%	0.04%	0.13%	0.06%
	Non-local	0.38%	0.11%	0.34%	0.15%
Total Nonmotorized		**6.67%**	**1.98%**	**5.92%**	**2.71%**
Motorized Use					
OHV Use	Local	0.74%	0.23%	0.65%	0.32%
	Non-local	0.88%	0.27%	0.78%	0.37%
Driving for Pleasure	Local	0.99%	0.30%	0.85%	0.42%
	Non-local	0.66%	0.19%	0.58%	0.27%
Snowmobiling	Local	0.00%	0.00%	0.00%	0.00%
	Non-local	0.00%	0.00%	0.00%	0.00%
Total Motorized		**3.27%**	**1.00%**	**2.85%**	**1.37%**
All Other Use					
All Other Activities -	Local	28.4%	8.6%	25.3%	11.9%
	Non-local	38.5%	11.5%	34.1%	15.8%
Total Other		**66.9%**	**20.1%**	**59.4%**	**27.7%**
Totals		**76.9%**	**23.1%**	**68.2%**	**31.8%**
		100%		100%	

Source: TMECA, 2009 and IMPLAN, 2007

In terms of total employment and income in the study area, recreation on the forests in 2008 accounted for 0.885 percent of total jobs and 0.588 percent of total labor income (table 19). Non-local motorized use on the forests supports 0.017 percent and 0.012 percent of total jobs and labor

income in the assessment area, respectively. Local motorized use on the forests supports 0.02 percent and 0.013 percent of total jobs and labor income, respectively.

Table 19. Percent of assessment area, employment and labor income from recreation on the forests in 2008

		Employment Effects (full and part time jobs)	Labor Income (2008 dollars)
Total Non-Motorized Use	Local	0.022%	0.014%
	Non-Local	0.054%	0.036%
Total Motorized Use	Local	0.020%	0.013%
	Non-Local	0.017%	0.012%
Total All Other Use	Local	0.323%	0.215%
	Non-Local	0.436%	0.289%
	Total Use	0.885%	0.588%

Source: TMECA, 2009 and IMPLAN, 2007

Environmental Consequences

This section includes the direct and indirect effects by alternative and concludes with the cumulative effects. The following assumptions were used in analysis of the effects on socioeconomics:

- Under all alternatives, there would be no change to special use authorizations. This includes, but is not limited to, forest product gathering, access to private lands, grazing authorizations, outfitter and guides, and temporary recreation events. In terms of continuation of lifestyle and the social values attributed to conducting livestock grazing activities on the forests, there would be no change as a result of this analysis and decision.
- In all alternatives, access to developed recreation sites and opportunities (such as campgrounds, day use areas, picnic sites) would remain unchanged.
- Visitor use originating from outside locations would continue to increase due to growth of urban populations, such as Phoenix. Increasing visitation by non-local forest users would result in the creation of more jobs and income than the same increase in visitation by local forest users.

Alternative A

Alternative A maintains the existing transportation system with 2,832 miles of road designated for motor vehicle use and 156 miles of motorized trails. There would be no change in motorized or non-motorized use. Cross-country travel off system roads forestwide on 1.6 million acres would continue, except where currently prohibited. Access to 1,611 dispersed campsites and MBGR would not change.

The employment and income figures that represent the contribution of current activities to the assessment area (six counties) would remain unchanged in the short term (up to 10 years). In 2008, these numbers were 0.037 percent of jobs and 0.025 percent of income that was contributed

to the assessment area economy from recreation on the forests. In the long term (over 10 years), the trend of increasing population and economic growth would result in increased demand for recreation opportunities specifically motorized trails and dispersed camping sites. If the physical, biological, and cultural resources are not managed for this increased demand, overcrowding and resource damage could occur and possibly displace some recreation forest visitors.

Alternative B

Alternative B would result in 2,673 miles of road open for motor vehicle use and 268 miles of motorized trails. Both roads and corridors would be available to access dispersed camping on about 25 percent of open roads. In comparison to alternative A, the miles of open roads would decrease by less than 6 percent but miles of motorized trails would increase by 72 percent. Cross-country motorized travel would be eliminated. Motorized access to dispersed camping would remain, with 1,467 existing sites still accessible by motor vehicles. Five motorized use areas would be designated providing motor vehicle use opportunities on 459 acres. Although the acres available for MBGR are reduced (from 1.6 million acres to 1.2 million acres), when compared to alternative A, the opportunity would exist in all game management units.

By putting a designated road and motorized trail system in place, sustainability of resources would be provided as population and economic growth continues. In the long term (over 10 years), the trend of increasing population and economic growth would result in increased demand for recreation opportunities specifically motorized trails and dispersed camping sites. Under this alternative some physical, biological, and cultural resources would be managed for this increased demand by eliminating cross-country travel. This alternative responds to the demand for more motorized trails, continued motorized access to dispersed campsites, the addition of motorized use areas, and MBGR would still be allowed across all game management units within the 1-mile distance from roads.

Since there would be limited change in activities related to jobs and economics, there would be no measurable direct and indirect effects on the economy relative to the scale. The employment and income figures representing the contribution of current activities to the economy of the assessment area (six counties) would be unchanged or changed so slightly they cannot be evaluated.

Alternative C

Alternative C most closely resembles the existing transportation system. The miles of motorized trails would not change (156 miles). The increase in roads is associated with designating general access and motorized access to existing dispersed camping sites. Motorized access to dispersed camping would remain, with 1,112 existing sites still accessible by motor vehicles. Cross-country motorized travel would be eliminated. Although the acres available for MBGR are reduced (from 1.6 million acres to 1.2 million acres), when compared to alternative A, the opportunity would exist in all game management units.

By putting a designated road and motorized trail system in place, sustainability of resources would be provided as population and economic growth continues. In the long term (over 10 years), the trend of increasing population and economic growth would result in increased demand for recreation opportunities specifically motorized trails and dispersed camping sites. Under this alternative some physical, biological, and cultural resources would be managed for this increased

demand by eliminating cross-country travel. This alternative responds to the demand for continued motorized access to dispersed campsites and MBGR would still be allowed across all game management units within the 1-mile distance from roads.

Since there would be limited change in activities related to jobs and economics, there would be no measurable direct and indirect effects on the economy relative to the scale. The employment and income figures representing the contribution of current activities to the economy of the assessment area (six counties) would be unchanged or changed so slightly they cannot be evaluated.

Alternative D

Alternative D would result in 2,730 miles of roads open for motor vehicle use and 302 miles of motorized trails. In comparison to alternative A, the miles of open roads decrease slightly by less than 4 percent, but the most miles of dispersed camping corridors and motorized trail miles would be designated. Cross-country motorized travel would be eliminated. Motorized access to dispersed camping would remain, with 1,346 existing sites still accessible by motor vehicles. The increase in miles of motorized corridors encompasses most existing dispersed camping sites on the forests. Five motorized use areas would be designated providing motor vehicle use opportunities on 459 acres. Although the acres available for MBGR are reduced (from 1.6 million acres to 700,000 acres), when compared to alternative A, the opportunity would exist in all game management units.

By putting a designated road and motorized trail system in place, sustainability of resources would be provided as population and economic growth continues. In the long term (over 10 years), the trend of increasing population and economic growth would result in increased demand for recreation opportunities specifically motorized trails and dispersed camping sites. Under this alternative some physical, biological, and cultural resources would be managed for this increased demand by eliminating cross-country travel. This alternative responds to the demand for more motorized trails, continued motorized access to dispersed campsites, the addition of motorized use areas, and MBGR would still be allowed across all game management units within the ¼-mile distance from roads.

Since there would be limited change in activities related to jobs and economics, there would be no measurable direct and indirect effects on the economy relative to the scale. The employment and income figures representing the contribution of current activities to the economy of the assessment area (six counties) would be unchanged or changed so slightly they cannot be evaluated.

Alternative E

Alternative E decreases miles of open roads but increases miles of motorized trails. Alternative E would result in 2,473 miles of roads open for motor vehicle use and 205 miles of motorized trails. In comparison to alternative A, there would be 13 percent fewer open roads but about 31 percent more motorized trails. Cross-country motorized travel would be eliminated. Motorized access to dispersed camping would remain, with 1,334 existing sites still accessible by motor vehicles. Alternative E has the most potential to displace hunters who rely on MBGR. The designated road and motorized trail system would still offer access into the forests. Non-motorized means of big game retrieval could be utilized off the designated road and motorized trail system.

By putting a designated road and motorized trail system in place, sustainability of resources would be provided as population and economic growth continues. In the long term (over 10 years), the trend of increasing population and economic growth would result in increased demand for recreation opportunities specifically motorized trails and dispersed camping sites. Under this alternative some physical, biological, and cultural resources would be managed for this increased demand by eliminating cross-country travel. This alternative responds to the demand for more motorized trails and continued motorized access to dispersed campsites.

Since there would be limited change in activities related to jobs and economics, there would be no measurable direct and indirect effects on the economy relative to the scale. The employment and income figures representing the contribution of current activities to the economy of the assessment area (six counties) would be unchanged or changed so slightly they cannot be evaluated.

Cumulative Effects on Socioeconomics

Under all alternatives, the direct and indirect effects to the economy of the assessment area (six counties) would be unchanged or changed so slightly they cannot be evaluated. Given no measurable direct and indirect effects under any alternative, there would be no measurable cumulative effects. Cumulatively, how foreseeable transportation decisions, when combined with adjacent forest decisions (Tonto, Gila, and Coconino), would affect the local and regional economy are unknown until the decisions are implemented.

Environmental Justice

Regulatory guidance for the evaluation of environmental justice includes both Executive Orders 12898 and 13045. Executive Order 12898 governs Federal actions to address environmental justice in minority and low-income populations. It requires agencies to "…make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities…"

Executive Order 13045 governs Federal actions to protect children from environmental health and safety risks. It requires agencies to "…make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and shall ensure that its policies, programs, activities, and standards address disproportionate risks…"

The Council on Environmental Quality (CEQ) defines a minority as individuals belonging to one of the following groups: American Indian or Alaska Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic (CEQ 1997). The past 50 years have seen only moderate racial diversification in Arizona. The Hispanic presence has increased from 20 to 25 percent of the total population since 1940, while African American populations increased 0.1 percent. The Native American population has grown from 44,076 to 275,321 over the past 6 decades. However, as a percentage of Arizona's population, it has declined from 11 percent in 1940 to 5 percent in 2000 (USDA FS 2009a).

A low income population is determined using annual statistic poverty thresholds from the U.S. Census Bureau (CEQ 1997). The 2002 per capita personal income of the Arizona counties was $19,333, or 63 percent of the national average. Poverty levels in the assessment area are above

state averages (14 percent for Arizona and 18 percent for New Mexico in 1999) and are highest in Native American populations (42 percent).

The average unemployment rates by county from 1980 through 2004 ranged from a high of 15 percent in Apache County to a low of 7 percent in Coconino County. The average in all counties was higher than the state averages of just over 5 percent in Arizona and 6 percent in New Mexico. Navajo County's rate of 12 percent is substantially affected by high employment rates in Whiteriver (average of 22 percent) (USDA FS 2009a). Around 26 percent of the population had incomes below the poverty level in 1999 and poverty levels have continually declined. Greenlee County has lower poverty levels because of high mining related employment (USDA FS 2009a).

Environmental Consequences

No change to affected populations would occur under alternative A, since cross-country travel would still be allowed forestwide, and the current road and motorized trail system would remain. Implementing the changes to the transportation system under any action alternative would have no disproportionate effects on populations of minority, low income, or children. The net change in miles of road open for motorized uses for the action alternatives is no more than 13 percent when compared to the existing transportation system. Motorized trail opportunities would be maintained or increased under all action alternatives. Motorized access to dispersed camping is maintained or minimally decreased while opportunities to access dispersed camping via non-motorized means are unchanged. Since there would be a very limited change in activities, the employment and income figures that represent the contribution of current activities to the economy of the assessment area (six counties) would be unchanged or changed so slightly that they cannot be evaluated.

Vegetation

This section describes the existing native vegetation communities and noxious weeds on the forests. The effects of each alternative on the vegetation communities and noxious weeds are included. The spread of noxious weeds was a topic brought up during public comment periods. Whether roads or motorized trails and MBGR would affect spread and infestation by noxious weeds on the forests is evaluated in this section. The following issues are addressed in this analysis in relation to vegetation effects: "Issue 1: Restricting Motorized Access for Dispersed Camping," "Issue 2: Restricting Motorized Big Game Retrieval," and "Issue 3: Impacts to Resources from Motorized Use." The criteria used for comparing the existing condition to the alternatives are based on:

- Number of acres of types of vegetation communities impacted from the existing condition. This would be a change from a non-vegetated condition to a vegetated condition and vice-versa.
- Potential for the establishment or spread of noxious weed infestations.

Affected Environment

Vegetation Types

Elevations on the forests range from approximately 3,500 feet near Clifton, Arizona, to nearly 11,000 feet west of Springerville, Arizona. The landscape is equally varied and includes

mountains, hills, cinder cones, plains, plateaus, deep canyons, and escarpments (USDA FS 2008b). The climate also varies in the forests from hot steppe at the lower elevations to boreal at higher elevations (Laing et al. 1987). The vegetation communities of forests match the uneven terrain, wide elevation range, and extreme climatic regimes with a variety of ecosystems.

Vegetation communities were broken down into potential natural vegetation types. Vegetation types are groupings of ecosystems that share similar vegetation composition and historic processes such as fire, drought, and grazing by native animal species. Two references were used in developing the vegetation types for the forests: (1) the "Terrestrial Ecosystem Survey of the Apache-Sitgreaves National Forests" (USDA FS 2008b), and (2) The Nature Conservancy (TNC) analysis on the Forest Service Southwestern Region NFS lands throughout Arizona and New Mexico (Vander-Lee et al. 2006). Since TES provides data at a better resolution and accuracy for the forests than the TNC data, it was used for mapping and quantitative data such as acreage. The TNC analysis was used primarily for vegetation type descriptions. The vegetation type descriptions can be found in the vegetation specialist report in the project record.

Thirteen vegetation types were identified on the forests. Table 20 displays the acres of vegetation types from the forests' potential natural vegetation GIS database. Ponderosa pine forests, Madrean pine-oak woodlands, and mixed conifer with frequent fire forests encompass the majority of acreage at 64 percent. Grasslands comprise 17 percent and riparian areas only cover 1.5 percent of the forests, but include the majority of riparian areas in all of northeastern Arizona (USDA FS 2008b). The miles of roads crossing each vegetation type under the current designated road system is displayed in table 21, under alternative A.

Table 20. Acres of vegetation types on the forests

Vegetation Types		Acres	Percent of Forest
Forests	Ponderosa pine	626,989	30
	Dry mixed conifer with frequent fire	290,003	14
	Spruce-fir with wet mixed conifer	59,053	3
Woodlands	Madrean pine-oak	399,557	19
	Pinyon-juniper	240,772	11
Grasslands	Great Basin	192,642	9
	Semidesert	108,692	5
	Montane/subalpine	59,627	3
Chaparral	Interior	56,069	3
Riparian Areas	Wetland/cienega	12,483	1
	Mixed broadleaf deciduous	7,631	<1
	Montane willow	7,197	<1
	Cottonwood-willow	6,274	<1
Non-vegetated Areas	Urban, agricultural, quarry	39,928	2
	Water	3,279	<1
Total		**2,110,196**	**100**

Wildlife impacts (elk in particular) on the existing vegetation in meadows and riparian wetlands on the forests include browsing and trampling of woody components, reproduction of aspen, changes in some plant composition, and some compaction of soil. As such, elk in particular are considered a baseline impact to forest vegetation.

Noxious Weeds

Noxious weeds are defined as alien plants that aggressively invade or are detrimental to native plant communities. These weeds are normally introduced from other areas of the world and arrive without natural enemies (insects and disease) to keep them in check. Noxious weeds occur in higher densities along roadways, areas disturbed by timber harvests, campgrounds, motorized trails, trailheads, livestock, utility corridors, and ditches. Outside of mechanically disturbed areas, riparian areas are the most common places for weeds to establish and spread.

Weed seed is most often transported on roads and motorized trails by humans, vehicles, equipment, horses, livestock, wildlife, wind, and water. Roads and motorized trails provide corridors for the spread of noxious weeds. Soil disturbances associated with the maintenance and decommissioning of roads and motorized trails create potential weed habitat. Continual use of roads and motorized trails can provide a continuous supply of seed. Once established, weeds spread to adjacent undisturbed habitats.

On the forests, there are currently 53 noxious and invasive weeds covering between 20,000 and 26,350 acres, and this is a management concern (USDA FS 2008c). Noxious weeds are found in all 13 vegetation communities. Riparian areas represent the greatest proportion of acreage affected within a vegetation type, with around 11 percent of the mixed broadleaf deciduous riparian areas infested. The riparian areas also have the greatest number of recorded nonnative species: 49 to 52 species (USDA FS 2008c). The largest number of acres infested are found in the pinyon-juniper forests (3,700 acres) and the ponderosa pine forests (13,450 acres). A list of weed species found on the forests is provided in the vegetation specialist report.

Environmental Consequences

This section includes the direct and indirect effects by alternative and concludes with the cumulative effects. The following indicator measures are used to evaluate the alternatives: (1) miles of open roads and motorized trails; (2) acres of forests open to off-road travel (motorized dispersed camping corridors, motorized areas, and MBGR); and (3) acres of riparian vegetation affected by open roads, motorized trails, and cross-country travel. Table 21 shows the miles of open roads and trails by alternative which would cross each vegetation type. Table 22 shows the acres of dispersed camping corridors by alternative which would cross each vegetation type. Table 23 shows the acres of MBGR by alternative which would cross each vegetation type.

Environmental consequences for Forest Service sensitive plant species for the forests can be found in the “Terrestrial and Semi-aquatic Wildlife and Rare Plants” section and associated specialist report. Most descriptions of effects only pertain to NFS lands, however, a somewhat larger footprint is discussed to encompass the most common corridors of weed spread that might include roads, stream courses and associated riparian areas, or domestic or wild grazing animals.

The following assumptions were used in analysis of the effects on vegetation and noxious weeds:

- All action alternatives would either close existing roads, or open existing closed roads or add existing unauthorized roads to the road and motorized trail system. Two districts are proposing less than 2 miles of trail construction which do not entail all new trail construction as an unauthorized route already exists.
- All vehicle types—ranging from motorcycles, ATVs, 4-wheel-drive vehicles, to passenger cars—are assumed to have the same level of impact on roads and motorized trails and are evaluated as equal. Although different vehicle types may impact roads on different levels and in different ways, there is not adequate data to differentiate the amount of use per vehicle type.
- Motorized off-road travel would have direct impacts such as crushing of foliage or root systems. By undercutting root systems, soil erosion and burial of vegetation from soil deposition would occur. Roads and motorized trails remove potential habitat for numerous plant species found adjacent to road and trail surfaces. For MBGR, single trips have limited direct effects on vegetation since plants generally recover within one growing season. When a route is used repeatedly for off-road MBGR, the vegetation becomes exposed to many trips by motor vehicles and impacts to plants and exposed root systems occur.
- ML1 roads are expected to revegetate unless reopened. Roads not traveled produce less sediment than those with traffic (Luce and Black, 2001). Closed roads would continue to be a source of chronic sediment production, but the road would adjust and stabilize, reducing sediment production, particularly in comparison to open roads subject to vehicular use. Closed roads would continue to influence surface and subsurface hydrology for the life of the road. Reduction of road miles within a watershed would take time before negative effects are no longer realized.
- Unauthorized routes not designated for motorized travel are expected to revegetate. Unauthorized routes not subject to use would continue to be a source of chronic sediment production, but revegetation would stabilize soils reducing sediment production, particularly in comparison to open roads subject to vehicular use. This would provide positive effects to vegetation under all action alternatives.
- Designated NFS roads and NFS trails are generally in acceptable condition, unless information exists to the contrary. This is because most roads and trails were constructed with engineered design. Various types of improvements from surfacing to a multitude of drainage structures improve the road (reduce sediment and erosion) compared to an unauthorized road.
- Unauthorized routes may not be in an acceptable condition, unless site-specific information exists to the contrary. This is based on the fact that unauthorized routes were created without engineered design.
- Visitor use is expected to increase as surrounding populations increase and as demand for recreational opportunities also increases.

Alternative A

Alternative A, no action, has the potential for the greatest risk to plant species because it maintains cross-country travel forestwide and includes all 13 vegetation types. Cross-country travel directly impacts vegetation and increases soil erosion and sedimentation adjacent to vehicle tracks. With few restrictions on cross-country travel, riparian areas are subject to damage from motor vehicles. Resource damage would occur where motor vehicles travel cross-country to retrieve big game and for dispersed camping, and would be spread across all vegetation types since the forests are currently open to these activities.

Alternative A would maintain all currently open roads and motorized trails on the forests. These roads and trails are already established and have removed potential habitat for plant species within the forests. The acreage occupied by route surfaces lacks vegetation. There have been impacts to vegetation adjacent to open roads and motorized trails from the removal of potential habitat for plant species.

Alternative A also has the greatest potential to infest the forests with weeds due to cross-country travel. This alternative has the greatest potential to transport weed seeds along roads and drainages, eventually reaching areas downstream, off of NFS lands and onto neighboring lands. The spread of noxious weeds from existing roads and trails would continue to occur along 2,832 miles of open roads and 156 miles of motorized trails.

Alternative B

Alternative B would result in 2,673 miles of roads and 268 miles of motorized trails designated for motor vehicle use. Although there is a decrease in open roads from alternative A, there would be additional impacts to vegetation from adding 53 miles of unauthorized roads to the system. The roads added to the system, as well as adding trails, would result in the removal of potential habitat for plant species since the acreage occupied by route surfaces would lack vegetation. There would be impacts to vegetation adjacent to open roads and motorized trails from the removal of potential habitat for plant species. The loss of ground cover due to crushing exposed root systems and compaction would result in increased soil erosion along road and trail surfaces and eventual rutting and gullying. Areas of soil deposition would bury some vegetation, such as grasses, along roads.

The areas open to off-road travel would be reduced from alternative A. The 300-foot wide dispersed camping corridors would provide fewer acres of direct disturbance as compared with the existing condition. This reduction would result in a beneficial effect to plants and their habitats. Motor vehicle use within dispersed camping corridors (table 22), motorized use areas, and for MBGR (table 23) would directly remove some vegetation through compaction and crushing from vehicles. Use of dispersed camping corridors would increase soil erosion and cause indirect impacts to vegetation. The corridors are present in all 13 vegetation types and are in many riparian areas. In riparian areas and wetlands, any ground disturbance from motorized vehicles would leave impacts to the vegetation and soils that could take substantial time to recover.

Alternative B has reduced potential to spread noxious weeds when compared to alternative A, and the potential is proportional to the miles of roads and motorized trails proposed. The reduced potential to spread weeds is primarily from restricting off-road travel to designated areas only.

Consequently, it would also have a reduced potential to spread weed seeds off of NFS lands through connected roads or down drainages.

Alternative C

Alternative C would result in 2,860 miles of roads and 156 miles of motorized trails designated for motor vehicle use. This alternative is similar to alternative A in total mileage, however, it would prohibit cross-country motorized travel. This would greatly reduce the effects to vegetation from motor vehicles and would have an overall beneficial effect to vegetation through a lower impact to vegetation habitat. There would be 28 miles of unauthorized routes added to the system, some of which could be used to access dispersed camping (table 22). There would be impacts to vegetation adjacent to open roads and motorized trails from the removal of potential habitat for plant species, which would be similar to alternative A. The loss of ground cover due to crushing exposed root systems and compaction would result in increased soil erosion along road and trail surfaces and eventual rutting and gullying. Areas of soil deposition would bury some vegetation, such as grasses, along roads.

There would be areas designated for MBGR (table 23) which would directly remove some vegetation through compaction and crushing from vehicles. The areas for MBGR are present in all 13 vegetation types and are in many riparian areas. In riparian areas and wetlands, any ground disturbance from motorized vehicles would leave impacts to the vegetation and soils that could take substantial time to recover.

Alternative C has reduced potential to spread noxious weeds when compared to alternatives A and B and is proportional to the miles of roads and motorized trails proposed. The reduced potential to spread weeds is primarily from restricting off-road travel to designated areas only. The designation of existing unauthorized routes (28 miles or 1 percent change in the road system) is dispersed throughout the forests and would not measurably increase the potential for noxious weeds to spread.

Alternative C has the same effects to noxious weeds as described for alternative B except the reduced potential to spread weeds is proportional to the miles of roads and motorized trails proposed.

Alternative D

Alternative D would result in 2,730 miles of roads and 302 miles of motorized trails designated for motor vehicle use and would increase the risk to plant species and their habitats. Although there is a decrease in open roads from alternative A, there would be additional impacts to vegetation from adding 37 miles of unauthorized roads to the system. Effects of the miles of roads and trails would be similar to those described under alterative B.

The areas open to off-road travel would be reduced from alternative A. The 300-foot-wide dispersed camping corridors would provide fewer acres of direct disturbance as compared with the existing condition. This reduction would result in a beneficial effect to plants and their habitats. Compared with the other action alternatives, this alternative opens the most area to dispersed camping at 148,000 acres.

There would also be areas designated for motor vehicle use as well as for MBGR, although compared with alternatives B and D, there are fewer acres designated for MBGR under this

alternative at around 700,000 acres (table 23). Travel to dispersed camping sites, travel within designated areas, and for MBGR would directly remove some vegetation through compaction and crushing from vehicles. Use of dispersed camping corridors would increase soil erosion and cause indirect impacts to vegetation along the route. The corridors are present in all 13 vegetation types and are in many riparian areas (table 22). In riparian areas and wetlands, any ground disturbance from motorized vehicles would leave impacts to the vegetation and soils that could take substantial time to recover.

Alternative D has the same effects to noxious weeds as described for alternative B except the reduced potential to spread weeds is proportional to the miles of roads and motorized trails proposed.

Alternative E

Alternative E would result in 2,473 miles of roads and 205 miles of motorized trails designated for motor vehicle use and would impact the least amount of plant species and their habitat of all the alternatives. This alternative would prohibit cross-country motorized travel. This would greatly reduce the effects to vegetation from motor vehicles and would have an overall beneficial effect to vegetation. There would be 64 miles of unauthorized routes added to the system. There would be impacts to vegetation adjacent to open roads and motorized trails from the removal of potential habitat for plant species, which would be less than alternative A. The loss of ground cover due to crushing exposed root systems and compaction would result in increased soil erosion along road and trail surfaces and eventual rutting and gullying. Areas of soil deposition would bury some vegetation, such as grasses, along roads.

Alternative E would not designate any motorized use areas and would prohibit MBGR across the forests (table 23). This would have a beneficial impact on vegetation by removing the direct and indirect effects on vegetation from cross-country travel on over 1.6 million acres of the forests. The 300-foot-wide corridors for dispersed camping would provide fewer acres of direct disturbance as compared with the existing condition and alternatives B and D. This reduction would result in a beneficial effect to plants and their habitats. In riparian areas and wetlands, any ground disturbance from motorized vehicles would leave impacts to the vegetation and soils that could take substantial time to recover.

Alternative E has reduced potential to spread noxious weeds when compared to all the alternatives, and the potential is proportional to the miles of roads and motorized trails proposed. The reduced potential to spread weeds is primarily from restricting off-road travel for dispersed camping and not providing MBGR or motorized use areas. Consequently, it would also have a reduced potential to spread weed seeds off of NFS lands through connected roads or down drainages.

Table 21. Miles of open roads and motorized trails crossing vegetation types by alternative

Vegetation Types	Alternatives				
	A	B	C	D	E
Cottonwood willow riparian forest	17	16	17	19	11
Great Basin grassland	361	349	363	354	332
Interior chaparral	6	5	6	5	2
Madrean pine-oak woodland	125	128	126	126	120
Mixed broad leaf deciduous riparian forest	19	19	19	19	14
Mixed conifer with frequent fire	419	479	427	508	408
Montane/subalpine grassland	113	130	115	136	124
Montane willow riparian forest	13	12	13	12	9
Pinyon-juniper woodland	348	316	349	322	300
Ponderosa pine	1,347	1,239	1,359	1,294	1,131
Semidesert grasslands	96	100	96	100	91
Spruce-fir with wet mixed conifer	68	85	70	89	75
Wetland/cienega	24	31	25	33	28
Other (non-vegetative and off-forest)	32	32	31	15	33
Total	**2,988**	**2,941**	**3,016**	**3,032**	**2,678**

Total miles are approximate due to rounding and are reflective of the GIS data at the time of analysis.

Table 22. Acres of dispersed camping corridors by vegetation type by alternative

Vegetation Types	Alternatives				
	A	B	C	D	E
Cottonwood willow riparian forest	4,509	299	N/A	365	132
Great Basin grassland	174,02	1,978	N/A	20,424	1,457
Interior chaparral	36,183	87	N/A	610	25
Madrean pine-oak woodland	265,18	3,016	N/A	7,247	1,430
Mixed broad leaf deciduous riparian	3,823	60	N/A	776	49
Mixed conifer with frequent fire	213,99	5,559	N/A	25,747	1
Montane/subalpine grassland	47,576	1,330	N/A	7,775	0
Montane willow riparian forest	3,447	149	N/A	290	108
Pinyon-juniper woodland	210,96	1,693	N/A	9,500	1,059
Ponderosa pine	525,05	28,702	N/A	63,135	2,798
Semidesert grasslands	94,476	3,396	N/A	4,900	1,540
Spruce-fir with wet mixed conifer	34,120	1,158	N/A	5,362	0
Wetland/cienega	9,274	379	N/A	1,672	0
Total	**1,622,6**	**47,854**	**N/A**	**147,80**	**8,559**

Total acres are approximate due to rounding and are reflective of the GIS data at the time of analysis.

Table 23. Acres of MBGR areas by vegetation type by alternative

Vegetation Types	Alternatives				
	A	B	C	D	E
Cottonwood willow riparian forest	4,509	4,449	3,951	2,754	0
Great Basin grassland	174,023	170,691	168,480	95,768	0
Interior chaparral	36,183	4,113	3,921	1,828	0
Madrean pine-oak woodland	265,180	68,415	65,791	28,650	0
Mixed broad leaf deciduous riparian	3,823	2,262	2,262	1,837	0
Mixed conifer with frequent fire	213,992	198,992	193,820	118,420	0
Montane/subalpine grassland	47,576	46,957	46,123	28,734	0
Montane willow riparian forest	3,447	2,983	2,927	2,078	0
Pinyon-juniper woodland	210,965	196,331	196,611	89,709	0
Ponderosa pine	525,057	501,620	497,458	291,891	0
Semidesert grasslands	94,476	37,483	35,981	20,582	0
Spruce-fir with wet mixed conifer	34,120	32,491	31,938	21,922	0
Wetland/cienega	9,274	9,225	9,036	6,277	0
Total	**1,622,622**	**1,276,011**	**1,258,299**	**710,450**	**0**

Total acres are approximate due to rounding and are reflective of the GIS data at the time of analysis.

Cumulative Effects on Vegetation

The cumulative effects analysis geographic boundary is the forests' boundary. Past activities on the forests that have resulted in impacts to vegetation and the spread of noxious weeds include timber management, vegetation management, extensive wildfire, prescribed burns, and fuels management. Livestock grazing has occurred on the forests for over 100 years and has impacted sensitive riparian areas, potentially increasing the impacts to riparian and wetland plant species and increasing the risk of noxious weeds. Other habitat management activities include the revegetation and mitigation of approximately 2,000 acres of the Rodeo-Chediski Fire. There is now spotted knapweed present in the areas burned by this fire. Areas of the Rodeo-Chediski Fire (2002) could still produce impacts to vegetation on a large scale, especially if beetle killed areas catch fire.

As exact impacts of the various project effects are unknown, a description of the anticipated effects is given to provide context for the significance of the activity type. Since implementation of travel management is forestwide, the activities are discussed in general. Future actions on State and private lands that are likely to occur are increased community development and energy development.

- **Vegetation Management:** Vegetation management projects were listed in the current SOPA and are forest restoration projects. These projects have the potential to stabilize upland vegetation in the long term, and potentially increase runoff thus enhancing vegetation.
- **Fuels Management/Reduction:** Fuels reduction projects were listed on the current SOPA. These projects have the potential to restore the health of forest and woodland communities by reducing the understory density and competition between species and

individuals. These projects would have minimal direct and cumulative impacts at a forestwide scale.

- **Prescribed Burns:** Prescribed burns were listed in the current SOPA. The R-C prescribed burn is located in the Lakeside and Black Mesa Ranger Districts, and the Campbell Blue prescribed burn is in the Alpine Ranger District. These prescribed burns have the potential to restore the forest and woodland communities by reducing fuels in the short term. In the long term, the prescribed burns would reduce the potential for uncharacteristic wildfires. These projects are on a small scale and are not likely to change vegetation communities across the forests.
- **Livestock Grazing:** Grazing livestock have the potential to severely impact riparian areas if not managed properly. The forests permit livestock grazing in all districts. The current SOPA has allotment management plans listed for re-analysis that span all of the districts. These revisions to the allotments have the potential to better manage livestock grazing and potentially reduce impacts to riparian areas. Grazing occurs all across the forests and is the most influential activity in terms of affecting vegetation, vegetation types, and plant succession.
- **Natural Erosion Rates**: Natural erosion is continuous and cannot be reduced by management. Natural erosion rates are cumulative in that human-caused erosion rates add to natural erosion rates, producing totals that affect downstream sediment loads.

Implementation of any alternative in conjunction with other activities (discussed above) may impact vegetation on a local scale. The actual amount of this increase or decrease is indistinguishable from natural levels of disturbance. The designation of roads and motorized trails and areas for motor vehicle use, combined with the elimination of cross-country travel, has the potential to impact vegetation composition, plant populations, and the spread of noxious weeds. Present and future actions have the potential to provide cumulative effects, however, the action alternatives would result in a road and motorized trail system that is only within 10 percent of current miles.

Soils and Watershed

This section describes the existing watershed, soil, and water quality characteristics on the forests, as related to motorized use. The effects of each alternative on these resources are included. “Issue 3, Impacts to Resources from Motorized Use” is addressed in this analysis. To compare effects of the alternatives, the analysis is based on the fifth-code watershed level, also called a hydrologic unit code (HUC). Figure 3 displays the fourth-code HUCs across the forest. The soils and watershed specialist report contains a map of the fifth-code HUCs. The criteria used for comparing the existing condition to the alternatives are based on the following: climate and precipitation amounts; elevation change; vegetation cover; soil types and soil characteristics; and watershed health.

Affected Environment

Watershed

Watersheds are critical natural resources that: provide water quality protection; help sustain ecosystems; provide clean water supplies; provide high quality recreational opportunities; and help prevent or reduce downstream effects from flooding or high runoff events. Watersheds exist

in a natural balance between environmental processes such as precipitation amount, seasonal climate, snow accumulation and melt, evaporation from surface water and vegetation, ground water recharge from precipitation, and ground water discharge that provides streamflow during dry periods.

A concern with regard to effects from travel management on the forest watersheds is the generation of sediment in wetlands and riparian areas from motor vehicle use on roads, trails, and areas. Road densities are included because the greater the road density, the greater the risk of adverse watershed effects related to erosion and sedimentation. Other dynamics on the forest influencing sediment levels include the number of road-stream crossings and the proximity of roads to streams. Greater stream and road densities within a watershed equate to greater interactions between the roads and streams, and an increased risk of sediment contamination to streams caused by activities or erosion on the roads. Roads that cross streams, follow streams, or are in close proximity (within 300 feet) to streams, lakes, and wetlands increase the potential for sediment contamination to streams and other water bodies.

Off-road motorized vehicle use on the forest adds significantly to the risk of sediment contamination to streams by spreading soil and vegetation disturbance over wider areas that are less controlled and more difficult to manage than established roads. Since no maintenance or erosion control mitigation occurs on tracks made by cross-country motorized vehicle use, any erosion that starts in these tracks will get worse without any means to stop it. As lakes and wetlands often provide desirable scenery and recreation opportunities, roads tend to concentrate in these areas. This juxtaposition increases the interaction between vehicle use and surface water.

The five proposed motorized use areas (proposed under alternatives B and D) are located in the watershed of the Little Colorado River, which has a high sediment load; however, its current condition does not resemble presettlement conditions. Much of the Little Colorado River's watershed to the north of the forests' boundary lies in arid, cold desert grasslands that have low ground cover and highly erosive soils. Table 25 displays the watersheds with factors related to motorized use, providing an existing condition. The watershed and soil resource specialist report located in the project record provides detailed lists of the existing condition of watersheds and surface waters on the forests.

Surface Water

Surface water on the forests includes streams, springs, seeps, fens, cienegas, wetlands, riparian areas, lakes, ponds, reservoirs, and numerous stock ponds and tanks. They contribute to aesthetic resources; habitat for terrestrial wildlife and fisheries; natural water purification processes; flood control; and agricultural and recreational uses.

Based on GIS analysis, there are 996 miles of perennial streams and 3,399 miles of intermittent streams on the forests. Ephemeral and intermittent streams in GIS combine to total 6,284 miles of dry washes that flow only during storm events or intermittently. As the GIS data only has major ephemeral drainages, the actual miles of ephemerals could be up to 10 times the miles of perennial and intermittent streams. Open water comprises 3,771 acres. An estimated 29,430 acres of riparian/wetland ecosystems are associated with all surface waters on the forests (USDA FS 2008b). The forests contain headwaters of the Little Colorado, Black, Blue, and San Francisco Rivers, all of which originate in the northern portion of the Apache National Forest in the vicinity

of Mount Baldy Wilderness and the area between Baldy Peak and the Arizona-New Mexico border.

The Little Colorado River is a direct tributary to the Colorado River, whereas the Black, Blue, and San Francisco Rivers are all tributaries to the Salt and Gila Rivers to the south. The Gila River, in turn, is a direct tributary to the Colorado River, with the confluence in the southwest corner of the state at Yuma, Arizona. Numerous streams in the Sitgreaves National Forest drain north from the crest of the Mogollon Rim and are tributaries to the Little Colorado River. Some of the principle streams draining this region of the forests, as reflected by fifth-level HUC watershed names, are: Clear Creek, Chevelon Canyon Creek, Black Canyon, Phoenix Park Wash, Cottonwood Wash, Show Low Creek, and Silver Creek.

Water Quality

The Arizona Department of Environmental Quality (ADEQ) has identified water quality standards and beneficial uses for waters of the State. Waterbodies that do not meet water quality standards with implementation of existing management measures are listed by the State as impaired under Section 303(d) of the Clean Water Act (CWA). To ensure Arizona's water quality standards are met, the allowable pollutant load or total maximum daily load (TMDL) is allocated to potential sources (i.e. point or nonpoint sources) for each of the pollutants in question. It is the responsibility of the Forest Service as a Federal land management agency, through implementation of the CWA, to protect and restore the quality of public waters under its jurisdiction. Protecting water quality is addressed in several sections of the CWA, including sections 303 and 319. Best management practices (BMPs) are used to meet water quality standards (or water quality goals and objectives) for nonpoint source pollution under Section 319.

The 303(d) list for 2006 to 2008 indicates that two stream segments within the forests—one is on the San Francisco River from the headwaters to the New Mexico border—are impaired because of sediment (ADEQ 2008a). Much of this 13.1-mile river reach is located on private lands in the San Francisco River valley adjacent to U.S. Route 180. However, both the beginning and end of the stream segment are located in the Apache National Forest. Although not all of the reach is under Forest Service authority, activities and management practices on the forests would likely influence water quality in this stream reach. This stream reach is on the 303(d) list based on turbidity exceedances obtained from 10 samples collected by ADEQ in 1999 to 2000 (EPA 2008a). The second impaired stream segment is the lower stretch of Nutrioso Creek. The majority of the impaired stream segment is on private and State lands, but the beginning of the segment is on the forests (ADEQ 2008a). Additionally, the Blue River is being looked at for a possible TMDL study regarding contaminants. The reach of concern runs from Strayhorse Creek to the confluence with the San Francisco River.

The State of Arizona has identified stream segments that are particularly pristine and where no degradation of water quality is allowed. These are called "Outstanding Arizona Waters" (OAW), nine of which are located in the high elevation regions northeast, east, and southeast of Mount Baldy Wilderness on the Apache National Forest (ADEQ 2003). Since no water quality degradation is allowed in the OAW stream reaches, any roads, motorized trails, or cross-country use in close proximity to these streams would be a problem due to the increased risks of contamination caused by the presence of motorized vehicles and increased sedimentation and turbidity from roads and cross-country disturbance. The nine OAWs on the forests are:

1. Bear Wallow Creek, from its headwaters to the boundary of the San Carlos Indian Reservation;
2. South Fork Bear Wallow Creek, from its headwaters to Bear Wallow Creek;
3. North Fork Bear Wallow Creek, from its headwaters to Bear Wallow Creek;
4. Hay Creek, from its headwaters to its confluence with the West Fork of the Black River;
5. KP Creek, from its headwaters to its confluence with the Blue River;
6. Lee Valley Creek, from its headwaters to Lee Valley Reservoir;
7. West Fork Little Colorado River, above Government Springs;
8. Snake Creek, from its headwaters to its confluence with the Black River; and
9. Stinky Creek, from the Fort Apache Indian Reservation boundary to its confluence with the West Fork of the Black River.

Soils

The reference for soil descriptions and characteristics on the forests is the terrestrial ecosystem survey (TES). The TES is the primary method for describing and categorizing the physical and environmental characteristics on the forests (Laing et al. 1987). Of 123 total TES units, 59 units of concern were evaluated in further detail (see specialist report for additional information). Table 24 displays the TES units of concern evaluated for risks to activities proposed under this project.

Biological soil crusts (BSCs) are common in dry climate regions of the Colorado Plateau and are very important for the development of soils and protection against erosion. BSCs are very sensitive to disturbance and are very important to soil development, soil health, and provide protection against erosion. BSCs have not been quantified in detail on the forests, but it is assumed BSCs are present in parts of dry, low elevation areas, particularly in the pinyon-juniper woodlands vegetation type (USDA FS 2008b). There is no way to quantify the effects of the project alternatives on BSCs. Therefore, the relative effects of the alternatives on BSCs are discussed in a general way.

Flood Plains and Wetlands

Executive Order 11988 requires the Forest Service to provide leadership and take action to minimize adverse impacts associated with occupancy and modification of flood plains and reduce risks of flood loss; minimize impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by flood plains. Executive Order 11990 requires the Forest Service to take action to minimize destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.

Wetlands are areas saturated by surface or ground water at a frequency which influences the nature of soil development and the types of plants and animals supported. There are 29,430 acres of riparian and wetland areas on the forests (USDA FS 2008b). Although riparian and wetland areas occupy less than 2 percent of the forests, they are key to productive fisheries and wildlife habitat, reduce flooding, maintain high quality water for downstream users, are ground water recharge areas, and provide diverse scenery and recreation sites. Riparian and wetland areas also are important to sustaining timber and forage production.

Table 24. Soil TES units of concern within the forests

Soil Group	TES Units of Concern	Soil Group Characteristics
Vertic Clay	182, 187, 202, 379, 412, 469, 470, 479, 481 502, 504, 515, 531, 580, and 589	Highly expansive soils; low bearing strength when wet; sensitive to cross-country traffic; sensitive to compaction; subject to piping and gully erosion; can be mitigated, partly by avoiding use during wet seasons/conditions.
Riparian and Wetland Habitat	4, 10, 16, 58, 60, 100, 102, 198, and 208	Level to low slopes (0 to 5 percent); riparian and wetland habitats; sensitive to cross-country use and within the 300-foot camping corridor; sensitive to compaction; subject to frequent flash flooding.
Datil Formation Soils	140, 141, 208, 516, 565, and 570	Steep to very steep slopes (40 to 120 percent); soils are either derived from or associated with sandstones of Datil Formation (volcanic ash); extremely sensitive to erosion; healthy, undisturbed vegetative cover and ground litter is essential for erosion prevention; once erosion begins, it is very difficult to mitigate to stop the process.
Cindery Soils	505, 536, 556, 567, and 584	Moderately steep to steep slopes (15 to 40 percent); occur on the steep flanks of cinder cones in the Springerville Volcanic Field (Condit 1991); extremely sensitive to erosion; healthy, undisturbed vegetative cover and ground litter maintained to at least 80 percent ground cover is essential for erosion prevention; these areas are a concern for cross-country use and unsurfaced roads on native soils.
Steep Slopes Greater than 40 Percent	55, 130, 131, 141, 189, 206, 220, 312, 412, 481, 512, 514, 516, 560, 565, 567, 570, 582, 585, 586, 612, 618, 620, 628, 634, 638, 650, 673, 691, 714, 720, and 732	Steep to very steep slopes (40 to 120 percent); steep slopes exacerbate the erosion potential of the soils; steep slope areas are a particular concern for cross-country use and unsurfaced roads on native soils.
Other TES Units Not Included in the TES Units of Concern	Total of 64 units. Listed in table 9 in specialist report as units not highlighted in yellow.	Low risk of negative effects due to travel management issues.

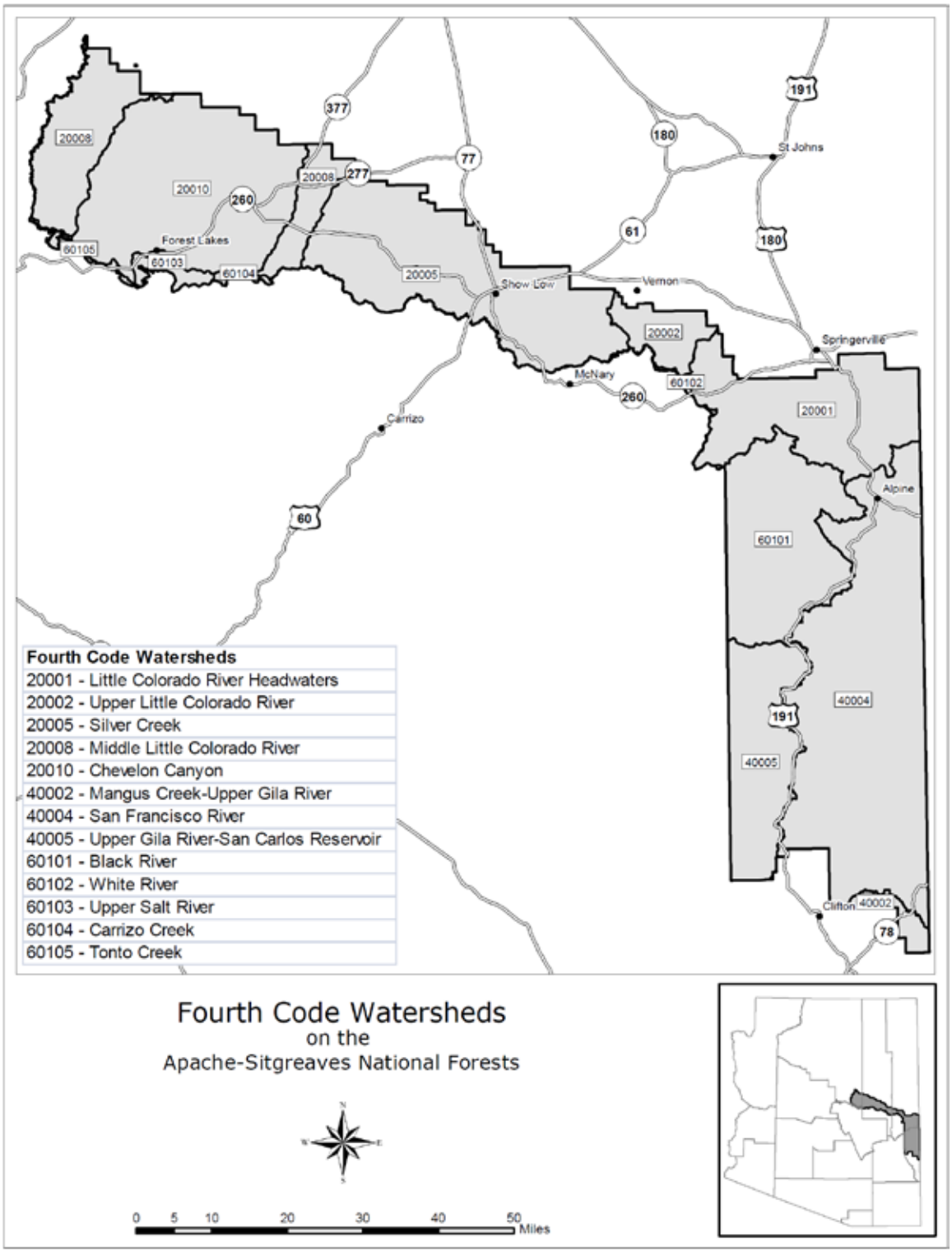

Figure 3. Fourth-code watersheds on the forests

Table 25. Fourth and fifth HUC watersheds existing condition summary

Fourth Level Hydrologic Unit Code (HUC) and Associated 5th Level HUCs	Open Road Miles and Road Density Miles/mi^2	Perennial Streams			Intermittent/Ephemeral Streams			Lakes and Wetlands	
		Stream Miles and No. of Road Crossings	Miles Open Roads within 300 Feet of Streams	Acres Off-road Travel within 300 Feet of Streams	Stream Miles and No. of Road Crossings	Miles Open Road within 300 Feet of Streams	Acres Off-road Travel within 300 Feet of Streams	Miles Open Road within 300 Feet of Lakes/ wetlands	Acres Off-road Travel within 300 Feet of Lakes/ wetlands
Little Colorado River headwaters (Carnero, Coyote, Nutrioso, South Fork)	362/ 0.56 to 1.19	317/89	34	9,001	408/185	65	23,101	64	14,061
Upper Little Colorado River (Big Hollow Wash, Oso Draw)	130/ 1.14-1.77	13/8	2	960	113/79	27	7,662	9	2,604
Silver Creek (Cottonwood, Show Low, Upper Silver Creek)	805/ 1.21-1.65	40/9	6	1,141	982/676	237	37,972	31	5,356
Middle Little Colorado River (Lower and Upper Clear Phoenix Park Wash, Dry Lake)	439/ 1.28 to 1.94	49/6	2	2005	542/268	93	29,017	7	1,898
Chevelon Canyon (Black Canyon, Lower and Upper Chevelon Canyon)	741/ 1.22 to 1.47	38/2	1	246	1,035/509	176	50,436	29	5,875
Mangus Creek-Upper Gila River (Apache Creek, Upper Gila River)	6/ 0.20	0	0.7	0	61/4	1.0	4,352	0	0

Fourth Level Hydrologic Unit Code (HUC) and Associated 5th Level HUCs	Open Road Miles and Road Density Miles/mi^2	Perennial Streams			Intermittent/Ephemeral Streams			Lakes and Wetlands	
		Stream Miles and No. of Road Crossings	Miles Open Roads within 300 Feet of Streams	Acres Off-road Travel within 300 Feet of Streams	Stream Miles and No. of Road Crossings	Miles Open Road within 300 Feet of Streams	Acres Off-road Travel within 300 Feet of Streams	Miles Open Road within 300 Feet of Lakes/ wetlands	Acres Off-road Travel within 300 Feet of Lakes/ wetlands
San Francisco River (Centerfire Creek, Chase Creek, Lower and Upper Blue River, Mule Creek, Pueblo Creek)	364/ 0. 11 to 1.23	310/79	364	4,190	2,039/260	983	75,486	26	4,630
Upper Gila River - San Carlos Reservoir	147/ 0.52 to 12.25	56/28	14	2,736	618/88	35	41,042	19	6,017
Black River (Middle and Upper Black River)	421/ 0.78 to 1.24	274/63	54	12,079	584/240	99	35,242	64	18,132
White River (Upper North Fork White River)	3/ 0.63	0	0	0	3/0	0	191	0	213
Upper Salt River (Canyon Creek)	31/ 1.19	0	0	0	39/8	3	92	0	0
Carrizo Creek (Carrizo Creek (local drainage) and Corduroy Creek)	23/ 2.83 to 10.57	0	0	0	8/3	0	1	0	0
Tonto Creek (Haigler Creek, Tonto Creek)	23/ 2.69	0	0	0	5/3	1	0	0	0

Environmental Consequences

This section includes the direct and indirect effects by alternative and concludes with the cumulative effects.

The following assumptions were used in analysis of the effects on soils and watershed:

- All vehicle types, ranging from motorcycles, ATVs, and 4-wheel-drive vehicles to passenger cars are assumed to have the same level of impact on roads and motorized trails and are evaluated as equal.
- Education and enforcement of regulations would limit adverse effects to designated routes. The public would not use closed roads, would not create unauthorized routes, and would follow rules regarding designated road and cross-country use.
- Designated NFS roads and trails are generally in an acceptable (contributing sediment, eroding) condition, unless information exists to the contrary. This is because most NFS roads and trails were constructed with engineered design. Various types of improvements from surfacing to a multitude of drainage structures improve the roads (reduce sediment and erosion) compared to unauthorized roads.
- Unauthorized routes may not be in an acceptable condition (are contributing sediment and are eroding) unless site-specific information exists to the contrary. This is because unauthorized routes were created without engineered design.
- Visitor use of the forests would increase as surrounding populations increase, and there is likely to be corresponding increases in demand for recreational opportunities.
- ML1 roads would be expected to revegetate and heal unless reopened for administrative purposes. Roads that are not traveled would produce less sediment than those with traffic (Luce and Black 2001).
- ML1 roads would continue to be a source of chronic sediment production, but the road would adjust to the environment and stabilize, reducing the amount of sediment production, particularly in comparison to open roads subject to vehicular use. Any reduction of road miles within a watershed from road closures would take time before negative effects are no longer realized.
- Unauthorized routes would be expected to revegetate and heal over time. The routes would continue to be a source of chronic sediment production. However, revegetation would stabilize soils, reducing the amount of sediment production, particularly in comparison to open roads subject to vehicular use.
- Roads and motorized trails in close proximity to drainageways have the potential to increase peak runoff into drainageways and impair water quality with added sediment loading. The more roads, trails, and stream crossings in close proximity to drainageways, the greater potential for negative effects. Reduced numbers of road/drainageway interactions is likely to reduce the potential for effects to drainageways.

Additional indicators used to assess impacts to watersheds include:

- Miles of roads and trails designated for motor vehicle use containing OAWs or 303d-listed streams impaired by sediment, suspended sediment, or turbidity.
- Number of roads and trails designated for motor vehicle use crossing perennial streams, intermittent streams, and mapped ephemeral stream drainages.
- Miles of roads and trails designated as open to motor vehicles within 300 feet of perennial streams, intermittent streams, mapped ephemeral stream drainages, lakes, and wetlands.
- Miles of roads and trails designated as open to motor vehicles on slopes greater than 40 percent.
- Acres of designated areas and dispersed camping corridors overlying TES units of concern.
- Acres of designated areas and dispersed camping corridors within 300 feet of perennial streams, intermittent streams, mapped ephemeral stream drainages, lakes, and wetlands.
- Acres of designated areas on slopes greater than 40 percent.

Direct and Indirect Effects Common to All Alternatives

Under all alternatives, motorized use would result in increased potential for both wind and water erosion, reduced productivity of soils due to compaction and erosion, destruction of vegetative cover and natural ground litter, damage to riparian zones, increased sedimentation into stream channels and water bodies, and changes in surface waterflow routes when compared to presettlement conditions. Destruction of biological soil crusts would occur particularly by off-road motorized travel. There is potential for streambank damage at vehicle crossings and in recreation areas along streams. There is potential for reduced surface water quality from sedimentation, increased turbidity, and introduction of automotive fluids from spills, leaks, and direct contact of vehicles with streams and water bodies. Dust from traffic on unpaved roads would settle out across the landscape and on water bodies. This has potential to increase sediment loads washed into the drainage network (ephemeral drainages, intermittent streams and perennial streams).

Outstanding Arizona Waters (OAWs) are not located adjacent to extensive miles of unsurfaced roads. There would be no measurable impact to their status in any alternative. All alternatives would meet the intent of regulatory requirements pertaining to OAWs, State water quality standards, and wetland, riparian and soil productivity direction given in the forest plan.

In addition most “engineered roads” are surfaced, which limits effects to native soils that may be more sensitive than gravel surfacing. Sensitive soils on TES units of concern affect exposed native soils in ditches, cut slopes, fill slopes, and on unsurfaced road surfaces more so than on graveled surfaces where native soils are covered. Effects to soils and watersheds, including water quality and sedimentation issues, will decrease from existing levels under alternatives B, C, D, and E due to less off-road travel.

Alternative A

Motorized cross-country travel would continue forestwide, including 582,272 acres on TES units of concern which contain highly erosive soils or sensitive areas. Due to the lack of data, exact levels of existing erosion cannot be determined; however, by reviewing tolerance erosion rates in TES it is likely that thresholds of soil erosion would not be exceeded in uplands (non-riparian areas). While some low elevation vegetation types may exceed thresholds, overall soil erosion thresholds are not being exceeded. Only in specific instances or localized areas—such as road cuts, drainage ditches, road drainage crossings, unpaved road surfaces or other limited disturbed areas—are erosion rates elevated (table 26). These localized areas almost always fall under specific BMPs that address capturing excessive sediment.

Under alternative A, sediment delivery from roads to the drainage network is expected to remain at current levels. There are areas that naturally generate high levels of sediment, such as barren outcroppings of the Datil geologic formation, but these areas are fairly limited across the forests and do not affect extensive areas. No additional mitigation or extra maintenance is proposed. Current levels of erosion contribute to: (1) some level of upland and aquatic habitat quality degradation; (2) excess sediment reaching downstream resources (dams and/or habitat); and (3) some degree of change to hydrographs, resulting in elevated peak discharges and potentially greater total discharge.

Alternative B

The proposed open road and motorized trail system would have similar road/stream crossings and miles of roads within 300 feet of perennial, intermittent, and ephemeral streams, lakes, and wetlands as alternative A (table 26). In addition, there are 16 more miles of roads and motorized trails on TES units of concern than alternative A. This would translate to more potential for erosion on TES units with an increased risk of soil erosion. There may be specific areas where roads or motorized trails are designated on TES units of concern where erosion rates would be elevated to the point that negative effects would be anticipated.

The difference between A and B that would have the most effect forestwide would be that alternative B would only allow off-road travel in 48,000 acres of dispersed camping corridors and designated areas, which is a 97 percent decrease from alternative A. This includes a reduction of 99 percent of off-road travel on TES units of concern within camping corridors and areas. Alternative B would reduce the amount of the forests open to motorized off-road travel from alternative A and would result in a beneficial impact to plant species and their habitat. However, alternative B would open roads and motorized trails on 50 more miles within sixth-code subwatersheds containing 303d-listed streams and OAWs.

In areas designated for motorized use, torrential rainfalls or sudden snowmelt events would be expected to generate more sediment than similar undisturbed areas with higher ground cover. As there is no special mitigation to capture sediment from designated areas, this would eventually wind up in the drainage system. All five designated areas are in the greater Little Colorado River watershed which has a naturally high sediment load. However, two of these areas are within established materials pits which have little drainage release, which results in no effect.

The designation of roads, trails, and areas would result in an overall reduction in indirect effects of motorized travel across the watersheds. The reduction in off-road motor vehicle use would allow areas to recover naturally and would reduce erosion and sedimentation transport. The

reduction in dispersed camping corridors and designated areas on sensitive TES units would reduce erosion and sediment transport. With the reduction of off-road travel, large areas would result in natural recovery of vegetation, and an overall reduction in erosion, sediment transport, and sedimentation to streams and waterbodies would occur.

Alternative C

Alternative C is nearly identical to alternative A (table 26). However, under alternative C, off-road motorized travel would be prohibited on 70 percent of the forests. This greatly reduces the direct and indirect impacts to sensitive soils by eliminating corresponding impacts. Some off-road travel would occur for MBGR, but effects would be limited in scope and scale. The 28 miles of trails to identified dispersed camping sites would be added to the system; however, these 28 miles currently already occur, so would not add to current disturbance levels.

Other major differences under alternative C compared to alternative A are the lack of designated camping corridors and areas. These could reduce overall forestwide effects to soil and watershed resources. Most camping related activities do not generate significant amounts of sediment, as most of these activities occur on flat slopes where sediment cannot get very far before it settles out due to high ground cover. However, many sites are adjacent to riparian areas, streams and wetlands. Not having areas designated would be of benefit as during heavy rainfalls or sudden snowmelt events, these places would be expected to generate more sediment than undisturbed areas having higher ground cover.

Indirectly, reducing vehicular effects to 2,000 acres from 1.6 million acres would allow areas disturbed by previous cross-country motor vehicle use to begin revegetating, which would reduce erosion and sedimentation transport. As a result of lower sediment yield to the drainage network, less maintenance to road related structures would be expected (culverts), some level of aquatic habitat improvement would be expected downstream, a lower more gradual hydrologic discharge would be expected with less tendency to cause damage from high peak flows, and a longer residence time of water on the watershed would be expected, which promotes infiltration and ground water recharge. These benefits would not be measurable.

Alternative D

In general, and within specific fifth-code watersheds, the open road and motorized trail network proposed under alternative D would be similar to that under alternative B with similar road/stream crossings and miles of roads within 300 feet of perennial, intermittent, and ephemeral streams, lakes, and wetlands (table 26). In addition, the total number of miles of roads and motorized trails on TES units of concern is 699 miles, which is a 4.8 percent increase over alternative A. This would translate to slightly higher potential for erosion on the TES units with increased risk of soil erosion. There may be specific areas where roads or motorized trails are designated on particularly unstable slopes where erosion rates would be elevated to the point that negative effects are expected.

The difference between alternatives D and A that would have the most effect forestwide would be that alternative D would only allow off-road travel in 148,000 acres of dispersed camping corridors and designated areas, which is a 96 percent decrease from alternative A. This includes a reduction in off-road travel on TES units of concern. However, alternative D would open roads and motorized trails on watersheds containing 303d-listed streams for contamination.

In areas designated for motor vehicle use, heavy rainfalls or sudden snowmelt events would be expected to generate more sediment than similar undisturbed areas with higher ground cover. As there is no special mitigation to capture sediment from designated areas (monitor and address as needed), this sediment would eventually wind up in the drainage system. All five designated areas are in the Little Colorado River watershed; however, two of these areas are within established materials pits which have little drainage release, which results in no effect.

Indirectly, the designation of roads, trails, and areas would result in an overall reduction in effects of motorized travel across the watersheds. The high reduction in off-road motor vehicle use would allow areas that are no longer affected to recover naturally and would reduce erosion and sedimentation transport. The reduction in dispersed camping corridors and designated areas on the sensitive TES units would reduce erosion and sediment transport. With the reduction of off-road travel, large areas would result in natural recovery of vegetation, and an overall reduction in erosion, sediment transport, and sedimentation to streams and waterbodies would occur.

Alternative E

Alternative E is expected to produce the least direct effects of all five alternatives. Overall, alternative E would open up the least amount of the forests to off-road travel and would maintain the lowest mileage of open roads and trails (table 26). The combination of not opening any designated areas, fewer miles of open roads and motorized trails, and designating dispersed camping areas would contribute to less effect to soil and watershed resources. Alternative E would retain fewer roads and motorized trails when compared to alternative A. This would include 441 fewer road/stream crossings and 114 fewer miles within 300 feet of perennial, intermittent, and ephemeral streams, lakes, and wetlands. This would reduce the effects to riparian and wetland areas.

Alternative E would reduce miles along TES units of concern by 6 percent, which would decrease the potential for erosion. Only in specific instances or in localized areas where a road or motorized trail is located on a particularly unstable slope would the beneficial effects be noticeable.

Alternative E would decrease the acres designated for motor vehicle use to 8,500 acres of dispersed camping corridors and would not designate any areas. This includes a reduction of 99.7 percent of off-road travel on TES units of concern. Dispersed camping on watersheds and soil resources are negligible since most camping occurs on flat areas. Not designating areas would prevent the concentration of off-road motorized use in small areas with the potential to increase sediment transfer to the Little Colorado River drainage system. Alternative E would also prohibit MGBR, further reducing vehicular impacts.

The reduction in off-road motor vehicle use would allow areas that are no longer affected to recover naturally and would reduce erosion and sedimentation transport. The 99 percent reduction in dispersed camping corridors (and no motorized use areas) on sensitive TES units would reduce erosion and sediment transport. With the reduction of off-road travel, large areas would result in natural recovery of vegetation and an overall reduction in erosion, sediment transport, and sedimentation to streams and waterbodies would occur.

Table 26. Comparison of effects by alternative on soils, watershed, and water quality

Indicator Criteria Affecting Soils and Watersheds	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
FS Roads and Trails (miles)	2,988	3,027	3,016	3,107	2,763
"Other" Roads and Trails	843	843	843	843	843
Totals	3,831	3,870	3,859	3,950	3,606
Total number of stream crossings (intermittent/ephemeral streams (first row) and perennial streams (second row)) for open roads and motorized trails.	2,445	2,175	2,458	2,241	2,027
	302	320	306	329	279
Miles of open roads and motorized trails within 300 feet of perennial streams (first row), intermittent and ephemeral streams (second row), and lakes and wetlands (third row).	146	155	148	160	138
	698	642	703	659	593
	79	82	80	84	78
Miles of open roads and motorized trails in 6th code watersheds containing "Outstanding State Resource Waters" or 303d-listed streams impaired by sediment.	329	379	332	389	337
Acres of dispersed camping corridors and areas within 300 feet of perennial streams (first row), intermittent and ephemeral streams (second row), and lakes and wetlands (third row).	37,493	394	0	3,673	6
	348,592	5,905	0	24,992	1,463
	17,801	1,258	0	3,206	161
Miles of open roads and motorized trails on TES units of concern (miles/percent change from alternative A).	667	683	672	699	626
	N/A	+2.3%	+0.7%	+4.8%	-6.1%
Miles of open roads and motorized trails on steep slopes TES group (miles/ percent change from alternative A).	234	239	237	242	221
	N/A	2.1%	1.3%	3.4%	-5.6%
Miles of open roads and motorized trails on riparian and wetland TES group (miles/percent change from alternative A).	130	127	131	131	111
	N/A	-2.3%	0.8%	0.8%	-14.6%
Acres of dispersed camping corridors and areas on TES units of concern (miles/percent change from alternative A).	582,272	5,874	0.0	25,233	1826
	N/A	-99.0%	-100.0%	-95.7%	-99.7%
Acres of areas on steep slopes (> 40 percent) (miles/percent change from alternative A).	390,542	0	0	126.4	0
	N/A	-100.0%	-100.0%	-99.9%	-100.0%

Cumulative Effects on Soils and Watershed

The cumulative effects analysis boundary is the geographic boundary of the forests. This encompasses the majority of effects that could occur within the fifth-level HUC watersheds. Impacts are discussed in a general qualitative manner.

Past activities on the forests that have resulted in increased soil erosion and sedimentation within the watersheds include mining, timber management, vegetation management, livestock grazing, extensive wildfire, prescribed burns, road maintenance, recreation, and fuels management. Livestock grazing has occurred on the forests for over 100 years and has impacted sensitive riparian areas potentially increasing the effects to drainageways in watersheds. In addition, livestock grazing has had effects on upland characteristics such as watershed health through removing ground cover, soil compaction, trailing that can form water channels, and impacting wildlife habitat quality. Other habitat management activities include the reforestation of approximately 2,000 acres of the Rodeo-Chediski Fire.

Future State and private actions that are likely to occur (no specific projects were identified) are increased community development, water related development (ground water wells and diversion of surface water) and energy development, as well as many of the same activities that occurred in the past (recreation, road maintenance, livestock grazing, fuels management, timber management, etc.). Ecological processes that could contribute to a cumulative effect if they happen at a large enough scale to have an impact include erratic climatic events, wildfires, and insect infestations.

For all alternatives, the proposed activities when combined with past, present and foreseeable future actions would not result in measurable changes in sediment yield at the watershed scale.

Air Quality

This section describes the existing air quality across the forests. The effects of each alternative on the air quality are included. “Issue 3, Impacts to Resources from Motorized Use” is addressed in this analysis. The criteria used for comparing the existing condition to the alternatives is based on the miles of roads and motorized trails which would be open to motorized use.

Some comments received by the public suggest OHV use as a primary cause of fugitive dust on the forests. This analysis focuses on roadways and trails likely to have the largest contribution to increased levels of particulate matter due to fugitive dust. This includes unsurfaced, high-clearance roadways (ML2), gravel surfaced roadways (ML3-4), and motorized trails. Paved roadways (ML5) are likely to contribute little fugitive dust.

Affected Environment

The Environmental Protection Agency (EPA) rates air quality for criteria pollutants on a scale called the Air Quality Index (AQI). AQI values below 100 are considered satisfactory. When AQI values are above 100, air quality is considered to be unhealthy. The State of Arizona publishes an annual report summarizing the AQI by county. The forests are located in portions of four counties, and the AQI for the most recent 3 full years of data (2005-2007) for Apache, Navajo, and Coconino Counties had an AQI value of 1, well within the satisfactory range (ADEQ 2008b).

Climate Change

Motor vehicle use involves the production of greenhouse gases which are understood to contribute to global climate change. Although it is implied that emissions from motor vehicle use contain greenhouse gases that may ultimately contribute to global climate change, it is not possible to predict the amount of public motor vehicle use occurring forestwide. Many outside factors—including the price of fuel, state of the economy, and alternate recreational opportunities—may contribute to an individual's decision to use a motor vehicle on the forests.

Fugitive Dust Emissions

Emissions related to motor vehicle use may impact the health of visitors and residents and may impair scenic vistas. In summer months, motor vehicles can stir up dust on dirt roads and emit exhaust pollutants. Travel on unsurfaced roads can substantially increase local atmospheric concentrations of fine particulate matter (PM) unless those roads are treated for dust abatement. Fugitive dust is fine PM from windblown soil and dust which becomes airborne and has the potential to adversely affect human health or the environment. The Clean Air Act (CAA) of 1977 requires attainment of National Ambient Air Quality Standards (NAAQS), including PM.

The impacts to air quality from vehicular activity on the forests are directly related to the number of miles of roads and trails open to motorized travel. Of the emissions associated with vehicular activity on the forests' roadways, fugitive dust is anticipated to have the greatest impact on air quality. Although there is an obvious relationship between vehicle miles traveled and air pollution from dust and exhaust, there is no direct relationship between mileage of available roads and actual miles traveled by motor vehicles. This is more of a function of peak usage times such as during summer holidays when the forests get high use. During winter, the same forest roads generate almost no usage and associated pollution.

Visibility

The Clean Air Act outlines different airsheds based on protection of air quality (EPA 2008b). Class I areas include designated wilderness areas over 5,000 acres. Four Class I areas near the forests includes the Chiricahua Wilderness, Grand Canyon National Park and Petrified Forest National Park. These areas have the most stringent degree of protection from emission sources that can cause air quality degradation. The Regional Haze Rule State Implementation Plan (40 CFR 51.309(d)(7)) administered by the ADEQ for Arizona from December 23, 2003, states that "road dust is not a measurable contributor on a regional level to visibility impairment in the 16 Class 1 areas."

In Class II areas, ADEQ sets emission limits to meet or maintain the criteria pollutant standards. Class II areas usually experience ambient pollution levels that limit visibility for many days of the year. Any area that is not designated Class I is by default considered Class II. The forests are categorized as Class I for the Mt. Baldy Wilderness and Class II for the remainder of the forests. Currently, sulfates (primarily from coal burning power plants) and nitrates from power plants are the primary source of visibility impairment in other parts of the State.

Environmental Consequences

This section includes the direct and indirect effects by alternative and concludes with the cumulative effects. Quantification of impacts was not performed. Due to the qualitative approach

taken in this analysis, several assumptions are necessary for comparison of the alternatives: (1) miles of roads and motorized trails are directly proportional to impacts on air quality; (2) all roadway characteristics are identical (moisture content, silt content, etc.); (3) all vehicle speeds are roughly comparable; (4) all vehicle types are identical; and (5) the number of vehicles per mile is identical for all roads and trails. The air quality specialist report is found in the project record and contains full discussions of this analysis.

Alternative A

The current state of science cannot support a direct calculation of climate change resulting from a minor source such as motor vehicle use on the forests. Further, the growth of trees in the forests provides a carbon sink that would offset any effect of emissions from vehicles. On a global scale, this alternative can be considered insufficient to cause any change to the climate.

The direct impact to air quality associated with no action is minimal. Increased concentrations of particulate matter along roadways due to fugitive dust are localized and short term. Road maintenance is associated with some degree of incidental dust generation and operations associated with crushing and hauling gravel for surfacing. Although these are short-term impacts, it is an impact that relates to existing road mileage.

In terms of indirect effects to air quality, downwind impacts of dust or pollutants generated on NFS roads could conceivably play a role. However, dust generated on unpaved roads generally settles out within a short distance (around 20 feet) of the point of generation. Larger particle sizes of road dust drop out within tens of feet, while smallest particle sizes will drop out well within a quarter mile. Unless winds carry road dust a farther distance, dust generated on the forests does not leave the forests.

In terms of effects of vehicle exhausts, dilution and air mixing reduces potential effects within a short distance. Although sources of pollution, such as vehicles, can pose a problem when operated in close quarters such as a city, the number of vehicles operating across the whole forest is not deemed to measurably impact off-forest air quality. In addition, most vehicles traversing the forests on the road network are approved to meet EPA emission standards, which effectively reduce off-forest impacts even further. The indirect impacts to air quality associated with the alternative are nonmeasurable on a forestwide scale.

Direct and Indirect Effects Under all Action Alternatives

The effects of alternatives B, C, D, and E on climate change are the same as described under alternative A.

The effects of alternatives B, C, D, and E on air quality are extremely limited. Due to less motorized off-road travel, this could theoretically translate into less vehicular exhaust and fugitive dust (PM), however, actual differences may be immeasurable. Effects of fugitive dust are generally short term and local in nature. Prevailing winds act to disperse dust over a large area in a short time, making the effect nonmeasurable. Therefore, visibility would not measurably be affected by any of the action alternatives. Since the number of motor vehicles is not expected to change, the amount of fugitive dust generated by motor vehicles under the action alternatives would not be noticeably different from what is generated on the existing road system.

Vehicular emissions under any action alternative could interact with other compounds in the air. Compared to alternative A, the action alternatives could be expected to have less indirect impact. The impacts to the ambient air quality of the forests due to vehicular travel, whether through engine exhaust or fugitive dust, are not expected to cause or contribute to an exceedance of air quality standards. Implementation of any action alternatives is not anticipated to have any measurable adverse long-term impacts on air quality.

The total number of miles of accessible roads and trails is increased from the no action alternative in alternatives C and D and decreased in alternatives B and E, and the impacts would increase or decrease accordingly (table 27). Any increases combined with much more limited off-road travel could result in a regional negligible reduced impact through a small reduction in the vehicle miles traveled and adverse air quality impacts from dust and vehicular emissions.

Air quality effects associated with dispersed camping corridors may include vehicle emissions and campfire smoke. Effects from MBGR would be sporadic and largely from vehicle emissions. These activities would not appreciably impact ambient air quality on the forests.

Table 27. Miles of open road/trail and percent change in road density by alternative

Criteria	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Miles of open road and motorized trails and percent change in road density	2,988	2,941 -47 miles/ -1.6%	3,016 +28 miles/ +0.9%	3,032 +44 miles/ +1.5%	2,678 -310 miles/ -10.4%

Cumulative Effects on Air Quality

Cumulative impacts for air quality consider the impacts of the alternatives with past, present, and reasonably foreseeable future actions. Those activities which may result in an adverse impact to air quality include the following:

- Prescribed burns
- Road reconstruction or maintenance
- Commercial operations (timber harvesting, sand/gravel operations, etc.)
- Continued use of ADOT deicing salt compounds on state highways across the forests. Road salts dry on pavement surfaces to form a white coating that turns into white dust in traffic which can result in localized impacts to air quality.

Prescribed burns listed in the SOPA can provide a negative impact on the local and regional air quality, but are controlled in order to meet air quality standards. Road impacts in terms of air quality are negligible compared with emissions from prescribed burns, however, prescribed burning operations are managed so as not to exceed any air quality limits. During wildfires or broadcast burns, public access and travel is normally limited for safety reasons and not necessarily tied to air quality concerns.

Road reconstruction and maintenance can provide localized, short-term impacts to air quality, but mitigation measures are generally required to minimize the impacts. Commercial operations that include the crushing, hauling, or mining of aggregate material, or operations that require constant and heavy use of the roadways by large vehicles may adversely impact the air quality if

mitigation measures are not employed. Dust abatement may be used to reduce both air and water quality effects of localized high traffic areas. The main impacts to air quality within the state of Arizona focus on the limited amount of heavy industry in the state (coal fired power plants, a pulp mill, large-scale open pit mining) and large metropolitan areas (Phoenix and Tucson).

Cumulative effects to the forests' only Class I airshed (Mt. Baldy Wilderness) is considered negligible for several reasons including: (1) Mt. Baldy is located upwind of all roads on the forests and this area has very few roads and little traffic; (2) the only roads located close to the wilderness to the north and northeast are high standard roads. Other gravel roads to the northeast of the wilderness receive lower amounts of traffic and less dust is generated; and (3) roads that can generate dust in proximity to the wilderness are located 1 to 2 miles away, and road dust normally does not travel that far. Only during high winds can dust travel farther, however, it would travel to the northeast away from the wilderness.

Terrestrial and Semi-Aquatic Wildlife and Rare Plants

This analysis focuses on federally listed species, Forest Service sensitive species, migratory birds, and management indicator species. The analysis is based only on proposed changes to the current transportation system forestwide. Direct and indirect effects are described for each species, and cumulative effects are presented at the end of the section for all terrestrial and semi-aquatic wildlife and rare plant species. "Issue 3, Impacts to Resources from Motorized Use" is addressed.

The specialist report for wildlife and rare plants contains detailed information on the habitats, populations, and effects, and can be found in the project record. A biological assessment (BA) was prepared for wildlife and is also in the project record. The Forest Service consulted on the 11 forest plans for the Southwestern Region pursuant to Section 7 of the Endangered Species Act, and a biological opinion was issued in 2005 (USDA FS 2005). It has been determined that implementation of any proposed alternative in this analysis would be consistent with the regionwide biological opinion.

The following assumptions were made for evaluating the potential effects to all listed species:

- Due to the large scale of this project, it was not possible to analyze site-specific effects on each species. To facilitate this analysis, habitat types were used as surrogates for individual species and impacts on habitats used to relate effects to individual species or groups dependent on the habitats.
- Little information is known about some species, including habitat needs and locations of populations. Preferred habitat types were used to relate to general effects to the species. In all cases, presence of a species is implied in specific habitats and direct and indirect effects reflect this assumption.
- Motorized use in general has some level of direct and indirect effects on terrestrial and semi-aquatic wildlife species and rare plants. Use of unauthorized routes has impacted vegetation and caused some erosion and sedimentation (refer to the "Vegetation" and "Soils and Watershed" sections).
- Visitor use is expected to increase as surrounding populations and demand for recreational opportunities increases.

- All vehicle types, ranging from cars to OHVs, are assumed to have the same level of impact on roads and motorized trails and are evaluated equally. Although different vehicle types may impact wildlife on different levels, data is not available to differentiate these impacts.

How Routes and Vehicles Affect Wildlife

Roads and motorized trails impact wildlife to varying degrees based on frequency and timing of use. Routes can affect behavior, survival, reproduction, and distribution of wildlife, and cross-country motorized use can alter habitat characteristics. Routes cause fragmentation of habitat, which can remove security for wildlife species, provide disturbance from human presence, increase vulnerability due to interactions with vehicles, and introduce migration barriers. However, roads and trails are often used by wildlife for travel and mobility. Bouchard et al. (2009) documented that small mammals avoid going onto roads, most likely due to the lack of protective cover.

While much of the literature on road mortality discusses deer and elk, a number of other species are also susceptible, such as amphibians that migrate to breeding grounds. Jochimsen et al. (2004) provides an extensive literature review of the effects of roads on amphibians and reptiles due to direct injury or mortality from physical contact with vehicles. Species that move slowly, such as snakes are more likely to suffer from road mortality.

Changes in vegetation composition and density could result in altered habitat use by some species. Direct crushing of plants by motorized cross-country travel could cause injury and mortality of individual plants or groups of plants. The quality of forage for some species could also be impacted from the spread of noxious weeds.

Overview of Direct and Indirect Effects to Wildlife from All Alternatives

The miles of designated roads and motorized trails vary by alternative. Under the no action alternative, the creation of unauthorized routes may have greater impact on wildlife than the designated roads and trails. The action alternatives with fewer roads and trails open to motorized use would concentrate human disturbance impacts to wildlife into smaller areas. By concentrating the disturbance, there could be impacts to some wildlife species. However, keeping motorized travel to designated routes would benefit wildlife as this would limit direct travel related disturbance to the routes. Opening roads or trails that were previously closed would allow traffic on routes in previously undisturbed wildlife habitats. Closing roads to motor vehicles would increase wildlife habitat quality and security in those areas.

Motorized off-road travel also varies by alternative. Off-road travel may impact wildlife from human access such as increased noise levels, physical intrusions, and providing access for hunters and poachers. The unpredictable nature of motorized off-road use may impact habitat security, especially in sensitive habitat areas. The no action alternative would allow cross-country travel forestwide, causing the most impacts to wildlife. The action alternatives greatly diminish the amount of acres available for off-road travel and some alternatives set corridors for dispersed camping, MBGR, and set aside specific areas for motorized use. This is expected to result in a beneficial impact to wildlife and plant species by decreasing the amount of human disturbance which will, in turn, create security.

Federally Listed Threatened, Endangered, and Proposed Candidate Species and Designated Critical Habitat

Threatened, endangered, and proposed animal and plant species are designated under the authority of the Endangered Species Act (ESA) of 1973, as amended. The act requires consultation (or conference for proposed species) with the Secretary of the Interior whenever a Federal action affects a species listed under the act, or if the action affects designated critical habitat. Two federally listed threatened, one federally listed endangered, and one experimental/nonessential species occur on the forests (table 28). Critical habitat for two species has been designated. No proposed species or proposed critical habitat occurs on the forests.

Table 28. Federally threatened, endangered, and proposed species on the Apache-Sitgreaves NFs

Species	ESA Status	Habitat and Distribution
Mexican wolf *(Canis lupus baileyi)*	experimental/ nonessential	Reintroduced to the forests in 1998. The primary and secondary recovery zones for Mexican wolf are located within the forests.
Southwestern willow flycatcher *(Empidonax traillii extimus)*	endangered with critical habitat	Nest at two sites near Greer on the Little Colorado River and one site near Alpine on the San Francisco River. Critical habitat designated for the East Fork, West Fork, and mainstem of the Little Colorado River on the Springerville Ranger District.
Mexican spotted owl *(Strix occidentalis lucida)*	threatened with critical habitat	Present in the Basin Range West and Upper Gila Mountains recovery units. Approximately 354,000 acres protected and restricted habitat, and 142 protected activity centers (PACs).
Chiricahua leopard frog *(Rana chiricahuensis)*	threatened	Scattered occurrences with known populations near Nutrioso, Coleman, Campbell Blue, Dix, and Hannagan Creeks, and the San Francisco River.

Affected Environment

Mexican Wolf

Wolves are top predators that have flexibility in using different prey and habitats. Historically, wolves occupied every habitat in the northern hemisphere that supported populations of ungulates. Mexican wolves historically inhabited Arizona and New Mexico (USFWS 2010). In 1998, Mexican wolves were reintroduced on the forests at the Alpine and Clifton Ranger Districts. In 2008, seven wild packs produced litters, marking the seventh consecutive year in which wild-born wolves bred and raised pups in the wild (USFWS 2010). The 2008 end-of-year count confirmed 52 Mexican wolves within 10 packs (5 in Arizona and 5 in New Mexico), and 6 single wolves. The growth of the population is a positive sign that the reintroductions were successful.

Wolf packs establish territories in which they hunt for prey. Historically, Mexican wolves were associated with montane woodlands characterized by sparsely to densely forested mountainous terrain and adjacent grasslands in habitats found at elevations of 4,000 to 5,000 feet where ungulate prey were numerous. Home ranges are around 180 square miles with core use areas averaging 23 square miles (Interagency Field Team, 2005). There is existing wolf habitat forestwide covering 2.1 million acres and of this area, 1.6 million acres are currently open to motorized cross-country travel.

Southwestern Willow Flycatcher

The historical breeding range of the southwestern willow flycatcher covered southwestern states including Arizona. The flycatcher's current range is similar to the historical range, but the quantity of suitable habitat within that range is much reduced from historical levels. From 1996 to 2007, AGFD conducted surveys for southwestern willow flycatchers in Arizona, including the White Mountains. Three nesting sites were documented on the forests with numbers of nest territories ranging from a high of 14 documented in 1995 to a low of 2 in 2002 (USFWS 2002). Flycatcher's nest at two sites near Greer on the Little Colorado River headwaters (Springerville Ranger District), and at one site near Alpine on the San Francisco River headwaters (Alpine Ranger District).

Critical habitat has been designated on 21.8 miles (1,931 acres) for the East Fork and West Fork, and the mainstem of the Little Colorado River, on the Springerville Ranger District. All of this area is currently open to motorized cross-country travel. Primary constituent elements are riparian habitat in a dynamic successional riverine environment for nesting, foraging, migration, dispersal, and shelter that comprises:

- trees and shrubs including willows, box elder, tamarisk, Russian olive, buttonbush, cottonwood;
- dense riparian vegetation with thickets of trees and shrubs ranging in height from 6 to 98 feet. Lower stature thickets (6-13 feet) found at higher elevation riparian forests and tall stature thickets found at middle and lower elevation riparian forests;
- areas of dense riparian foliage from the ground up to approximately 13 feet or dense foliage at the shrub level, or as a low, dense tree canopy;
- sites for nesting that contain a dense tree or shrub canopy with densities ranging from 50 to 100 percent;
- dense patches of riparian forests interspersed with small openings of water or marsh, or shorter/sparser vegetation creating a mosaic not uniformly dense. Patch size may be as small as 0.25 acre.

Mexican Spotted Owl

Range for the Mexican spotted owl (MSO) extends from southern Utah and central Colorado south through the mountainous regions of the Southwest, including Arizona. Many populations occur in relatively isolated mountain ranges, sometimes separated by large expanses of non-forested habitats. More than half the U.S. population occurs in the Upper Gila Mountains Recovery Unit in Arizona (covers the ASNFs) and New Mexico (USFWS 1995). See USFWS (1995) for a spot map showing distribution based on observations from 1990 to 1993.

Home ranges are between 941 and 3,831 acres measured from radio telemetry data (USDA FS 2006). On the forests, this species is in the Basin Range West and Upper Gila Mountains Recovery Units. There are approximately 354,000 acres of protected and restricted habitat, and 142 protected activity centers (PACs), all of which are in areas currently open to motorized cross-country travel. Arizona and New Mexico MSO populations have been estimated at around 2,000 individuals (USFWS 1995). A demography study in the Upper Gila Recovery Unit between 1991 and 1998 indicated a declining trend in populations. Based on forests' monitoring between 1984 and 2009, this downward trend appears to remain.

The forests contain 1,004,019 acres of MSO designated critical habitat. The primary constituent elements essential to conservation include physical and biological features that support nesting, roosting, and foraging, and include:

- a range of tree species, including mixed conifer, pine-oak, and riparian forests, composed of tree sizes reflecting different ages of trees, 30 to 45 percent of which are large trees with a trunk diameter of 12 inches or more when measured at 4.5 feet from the ground;
- a shade canopy created by tree branches covering 40 percent or more of the ground;
- large snags with a trunk diameter of at least 12 inches when measured at 4.5 feet from the ground;
- elements related to maintenance of adequate prey species such as high volumes of fallen trees and other woody debris; a wide range of tree and plant species, including hardwoods; and adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration;
- elements related to canyon habitat such as the presence of water (often providing cooler and higher humidity than surrounding areas), clumps or stringers of mixed conifer, pine-oak, pinyon-juniper, and/or riparian vegetation; canyon walls containing crevices, ledges, or caves; and a high percent of ground litter and woody debris (USFWS 2004).

Chiricahua Leopard Frog

This species occurs in southeastern Arizona and extreme southwestern New Mexico. It occurs at elevations of 3,500 to 6,600 feet in Arizona. Its southern range limit is poorly defined due to taxonomic uncertainties. A few scattered occurrences of the frogs exist across the forests. Known populations occur in Nutrioso, Coleman, Campbell Blue, Dix, and Hannagan Creeks, and the San Francisco River. The Chiricahua Leopard Frog Recovery Plan (USFWS 2007b) identifies recovery units and provides maps showing the unit boundaries, which overlap onto the forests. Three of the eight recovery units (RUs) for Chiricahua leopard frogs exist all or in part within the boundaries of the forests, including RU 5, 6, and 7. RU 5 lies both above and below the western and central portions of the Mogollon Rim. RU 6 lies across the eastern Mogollon Rim of Arizona into the Gila Wilderness of New Mexico. This RU includes portions of the upper reaches of the Gila River and Mule Creek in New Mexico, and the Blue River in Arizona. (USFWS 2007b)

Chiricahua leopard frogs are historically habitat generalists and have been found in a variety of natural and manmade aquatic systems. Natural systems include rivers, permanent streams, permanent pools in intermittent streams, beaver ponds, wetlands, and springs. Artificial systems include earthen cattle tanks, livestock drinkers, irrigation sloughs, wells, and mine adits. Upland aquatic sites serve as dispersal and possibly foraging and temporary breeding habitat, while disturbed or developed sites act as habitat barriers that decrease the likelihood of successful dispersal and act as population sinks.

Important habitat characteristics include permanent or nearly permanent water free of or containing low densities of nonnative predators. Shallow water with emergent and perimeter vegetation provides habitat for egg deposition, tadpole and adult thermoregulation or basking sites, and foraging sites, while deeper water, root masses, and undercut banks provide refuge from predators. Aquatic sites should have substrate that will allow for the growth of algae and diatoms

to serve as food for developing tadpoles and to allow for overwintering hibernation (Southwest Endangered Species Act Team, 2008).

Environmental Consequences

A determination of not likely to jeopardize the continued existence of the species (no effect, NE) was made for Mexican wolves for all alternatives. A determination of may affect, not likely to adversely affect (NLAA) was made for southwestern willow flycatcher and its critical habitat, Mexican spotted owl and its critical habitat, and Chiricahua leopard frogs for all alternatives. Table 29 provides the comparison by alternative of proposed actions occurring within the habitats for the four species analyzed.

Table 29. Change from current condition for threatened and endangered species

Proposed Actions	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Mexican Wolf					
Off-road motorized travel and MBGR (acres)	No change	-366,611	-366,611	-912,172	-1,622,622
Roads (miles)	No change	-159	+28	-102	-359
Motorized trails (miles)	No change	+113	No change	+147	+51
Motorized use areas (acres)	No change	+459	No change	+459	No change
Closed roads (miles)	No change	+493	No change	+479	+559
Motorized corridors (miles/acres)	No change	+658 /+47,854	No change	+2,034 /+147,802	+118 /+8,575
New trails (miles)	No change	+2.0	No change	+2.0	+2.0
Roads for administrative or permitted use only (miles)	No change	+78	No change	+75	+85
Southwestern Willow Flycatcher (SWWF)					
Off-road motorized travel and MBGR (acres)	No change	-366,611	-366,611	-912,172	-1,622,622
Roads (miles)	No change	-159	+28	-102	-359
Roads open to motorized travel within critical habitat	No change				
Motorized trails (miles)	No change	+113	No change	+156	+156
Motorized trails within critical habitat	No change				
Motorized use areas (acres)	No change	+459	No change	+459	No change
Motorized use areas within critical habitat	No change				
Closed roads (miles)	No change	+493	+479	+479	+559
Closed roads within critical habitat (miles)	No change	+1.0	No change	No change	No change
Closed roads within buffer zones for SWWF (miles)	No change	+54	No change	+53	No change

Proposed Actions	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Motorized corridors (miles/acres)	No change	+658	No change	+2,034/ +147,802	+118/ +8,559
Motorized corridors within critical habitat	No change				
New trails	No change				
New trails within critical habitat	No change				
Roads for administrative or permitted use only (miles)	No change	+78	No change	+75	+85
Roads for administrative or permitted use only within critical habitat	No change				
Mexican Spotted Owl					
Off-road motorized travel and MBGR (acres)	No change	-366,611	-366,611	-112, 172	-1,622,622
Off-road motorized travel and MBGR in PACs (acres)	No change	-7,034	-354,000	-31,155	-354,000
Off-road motorized travel and MBGR in critical habitat (acres)	No change	-953,515	-1,004,019	-661,071	-1,004,019
Roads (miles)	No change	-159	+28	-102	-359
Roads in PACs (miles)	No change	-71.2	+0.87	-69.56	+36.27
Roads in critical habitat (miles)	No change	-3,422.99	+20.16	-3408.04	+427.77
Motorized trails (miles)	No change	+113	No change	+156	-62
Motorized trails in PACs	No change				
Motorized trails in critical habitat (miles)	No change	+105	No change	+105	+67
Motorized use areas (acres)	No change	+459	No change	+459	No change
Motorized use areas in PACs	No change				
Motorized use areas in critical habitat (acres)	No change	+387	No change	+387	No change
Closed roads (miles)	No change	+493	No change	+479	+559
Closed roads in PACs (miles)	No change	+163	No change	+160	+179
Closed roads in critical habitat (miles)	No change	+2,207	No change	+2153	+2,387
Motorized corridors (acres)	No change	+658/ +47,854	No change	+2,034/ +147,802	+118/ +8,559
Motorized corridors in PACs (miles)	No change	+400	No change	+892	+13
Motorized corridors in critical habitat (miles/acres)	No change	+337/ +24,537	No change	+1106/ +79,940	+2,036
New trails (miles)	No change	+2.0	No change	+2.0	2.0
New trails in PACs	No change				

Proposed Actions	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
New trails in critical habitat (miles)	No change	+0.84	No change	+0.84	+0.84
Roads for administrative or permitted use only (miles)	No change	+86	No change	+75	+85
Roads for administrative or permitted use only in PACs (miles)	No change	+2.0	No change	+2	+2
Roads for administrative or permitted use only in critical habitat (miles)	No change	+27	No change	+21	+26
Chiricahua Leopard Frog					
Off-road motorized travel and MBGR (acres)	No change	-366,611	-366,611	-912,172	-1,622,622
Roads (miles)	No change	-159	+28	-102	-359
Motorized trails (miles)	No change	+113	No change	+147	+51
Motorized use areas (acres)	No change	+459	No change	+459	No change
Closed roads (miles)	No change	-492	No change	-479	+559
Motorized corridors (miles/acres)	No change	+658 /+47,854	No change	+2,034 /+147,802	+118 /+8,575
New trails (miles)	No change	+2.0	No change	+2.0	+2.0
Roads for administrative or permitted use only (miles)	No change	+78	No change	+75	+85

Alternative A

Mexican Wolf

Continued access on open roads and trails as well as forestwide cross-country travel is likely to facilitate human access to areas where there are wolves. This is expected to continue at current levels, with the accompanying mortality associated with illegal shooting of wolves and other impacts associated with human disturbance in wolf habitat. There would also be a level of effect from vehicular collisions, which is considered to be the second greatest source of mortality in the Blue Range wolf population. Much of the primary recovery zone for the wolf falls within the Blue Range Primitive Area, and cross-country motorized travel is not allowed within this area so direct and indirect effects would be minimal.

Based on the analysis of direct and indirect effects, alternative A is “not likely to jeopardize the continued existence” of Mexican wolves or their habitat.

Southwestern Willow Flycatcher

Cross-country motorized travel would continue forestwide including areas designated as critical habitat. Approximately 4 miles of open roads occur within critical habitat for this species. Much of the occupied habitat on the forests is inaccessible to motorized use, but is within ¼ mile of open roads. Motorized use and open roads within or adjacent to habitat has potential to influence behavior, survival, reproduction and distribution of these species, as well as alter habitat.

Currently, cross-country motorized use on the forests has minimal impacts on flycatchers and occupied suitable habitat, but has the potential to adversely impact this species and the recovery of its nesting habitat in the future. Open roads within critical habitat are considered to have greater impacts on potential suitable habitat, primarily through fragmentation and alteration of habitat structure in areas currently unoccupied by flycatchers.

Based on the analysis of direct and indirect effects, alternative A “may affect, but is not likely to adversely affect” (NLAA) southwestern willow flycatchers and “may affect, but is not likely to adversely affect” (NLAA) designated critical habitat for southwestern willow flycatchers.

Mexican Spotted Owl

Cross-country motorized travel would continue forestwide including MSO PACs and critical habitat. Motorized use within or adjacent to MSO habitat has potential to influence behavior, survival, reproduction and species distribution, and alter habitat. Cross-country motorized use is thought to have minimal impacts on spotted owls and their habitat, but there is potential to adversely impact MSO and its habitat in the future if forestwide cross-country motorized travel continues. The level of direct and indirect effects would increase over time under alternative A.

Open roads in PACs and critical habitat have the potential to alter behavior, survival, reproduction, and distribution of the species (table 30). There is likely a disturbance level from motorized travel at occupied nesting habitat on the forests, but this is thought to be minimal and has not precluded nesting in these areas. Roads and trails open to motorized travel may have indirect effects on primary constituent elements of designated critical habitat primarily by facilitating access into areas that may support nesting, foraging or roosting. These effects, though considered to be minimal, could include disturbance to individuals and modification of habitat.

Based on the analysis of direct and indirect effects, alternative A “may affect, but is not likely to adversely affect” (NLAA) MSO. Alternative A “may affect, but is not likely to adversely affect” (NLAA) MSO designated critical habitat.

Table 30. Miles of open roads in MSO PACs and critical habitat by alternative

Alternative	Mile Open Roads in PACs (percent change from existing)	Miles Open Roads in MSO Critical Habitat (percent change from existing)
A	119	3,951
B	48 (-60%)	528 (-87%)
C	0.9 (-99%)	20 (-99%)
D	49 (-58%)	543 (-86%)
E	39 (-67%)	428 (-89%)

Chiricahua Leopard Frog

Cross-country motorized travel would be forestwide on approximately 1.6 million acres, including areas occupied by Chiricahua leopard frogs. Motorized use within or adjacent to frog habitat has the potential to influence behavior, survival, reproduction and distribution of the

species, and alter habitat. Cross-country motorized use would have minimal impacts on this species and habitat, but has the potential to adversely impact this species in the future due to off-road travel. The majority of occupied Chiricahua leopard frog sites on the forests occur in isolated locations within the Blue Range Primitive Area, so no direct or indirect effects from roads and trails open to motorized travel would occur. In other areas, it is likely that roads and trails would have effects. Where roads and trails cross streams, the potential for direct injury or mortality, destruction of egg masses, or alteration of habitat is high.

Based on the analysis of direct and indirect effects, alternative A “may affect, but is not likely to adversely affect” (NLAA) Chiricahua leopard frogs and their habitat.

Alternative B

Mexican Wolf

The reduction of 366,611 acres open to off-road motorized use would benefit wolves. Not only would the potential for vehicular collision be reduced forestwide, but motorized access to areas inhabited by wolves would be reduced. There would be 46 miles more open roads and trails under this alternative. Access into areas where wolves are located would continue and would likely occur at a similar rate as it does currently. Any reduction in vehicular collisions or other human caused mortality would not be measurable due to the relatively small decrease in roads.

Five motorized use areas would occur within the experimental population area boundary for wolves. Noise disturbance and human presence is likely to cause wolves to avoid these areas, so interactions between people and wolves would probably not occur. Some roads proposed for closure under this alternative occur in the primary and secondary recovery areas for wolves, and several occur within the experimental population area boundary. Road closures are expected to be beneficial by decreasing potential for interactions between people and wolves. Corridors are designated within the primary and secondary recovery zones for Mexican wolves, and in areas throughout the experimental population area. There would be an increase in the level of impact on species occurring in areas where corridors are designated.

Based on the analysis of direct and indirect effects, alternative B is “not likely to jeopardize the continued existence” of Mexican wolves or their habitat.

Southwestern Willow Flycatcher

The reduction in off-road motorized use is considered beneficial to flycatchers and critical habitat. This would reduce impacts on potential suitable habitat within the 21.8-mile critical habitat corridor by limiting motorized use to the designated road system. MBGR would continue within designated critical habitat and occupied nesting habitat. Direct and indirect effects on designated critical habitat could include destruction or modification of potential suitable habitat, and fragmentation. Effects in nesting habitat would be minimal and limited to individuals.

Of the 46 additional miles of open roads and trails, none of the additional trails occur in or adjacent to occupied, suitable unoccupied or potential suitable habitat, so no direct or indirect effects would occur. Approximately 0.19 mile of open roads would be within critical habitat. Overall, the reduction in miles of open roads is expected to benefit flycatchers, but would not be measureable due to the small area affected, the distance from flycatcher habitat, and the small population size of this species on the forests.

The motorized use areas and corridors would not be located within or adjacent to critical habitat, occupied or unoccupied suitable habitat, or potential suitable habitat. Road closures are expected to be beneficial to flycatchers and would decrease open roads by 17.4 percent. Alternative B proposes 54 miles of road closures within buffer zones for southwestern willow flycatchers and 1 mile of road closure within critical habitat. Direct and indirect effects for short-term activities related to road closures would include potential for disturbance of individuals and temporary habitat disturbance. Over the long term, habitat fragmentation would be reduced, habitat security and quality would improve, and disturbance would be reduced.

Based on the analysis of direct and indirect effects, alternative B “may affect, but is not likely to adversely affect” (NLAA) southwestern willow flycatchers and “may affect, but is not likely to adversely affect” (NLAA) designated critical habitat for southwestern willow flycatchers.

Mexican Spotted Owl

The reduction of 366,611 acres open to off-road motorized use benefit MSO and its habitat. Under this alternative, a reduction of 7,034 acres of protected and restricted MSO habitat would be open to MBGR, compared with alternative A, and access to these areas would be limited. Open roads in PACs and critical habitat have the potential to alter behavior, survival, reproduction, and distribution of the species. There would be 46 additional miles of open roads and trails under this alternative. The miles in MSO PACs and critical habitat are in table 30. Overall, the reduction in open roads would benefit MSO but there would continue to be effects, however, these effects would be significantly less than alternative A.

None of the motorized use areas are within or adjacent to PACs or restricted habitat, so would have no direct or indirect effects on nesting owls or habitat. All five motorized use areas, however, are within designated critical habitat, so direct and indirect effects would occur. Primary constituent elements that would be directly and negatively affected are residual plant cover and volume of fallen trees and other woody debris. This is considered a minimal effect due to the large area of critical habitat designated on the forests (1 million acres) and the small area affected (0.046 percent of designated critical habitat on the forests). The level of disturbance within and directly adjacent to these areas would displace individuals to adjacent areas. Extensive acreage of suitable roosting and foraging habitat exists in adjacent areas where disturbance levels are less.

Approximately 163 miles of road would be closed within PACs, and 2,207 miles would be closed within designated critical habitat. These closures would benefit MSO and its habitat by reducing the potential for disturbance during breeding and nesting, and preventing habitat modification. Approximately 400 miles of corridors would be designated within PACs and 337 miles would be in designated critical habitat. There would be an increase in the level of impact on MSO in areas where corridors are designated. None of the additional trails would be located within or adjacent to PACs, protected or restricted habitat for MSO, so no effects would occur. Critical habitat has been designated where the new trails are proposed for construction, so direct and indirect effects could occur and would be similar to existing conditions due to the existence of unauthorized routes in the same area that already have effects.

Approximately 28 miles of roads would be restricted to administrative and permitted use only within areas designated as critical habitat for spotted owls, and an additional 2 miles would be restricted in PACs. Restricting use to administrative and permitted use only is expected to have impacts similar to closing roads, including decreasing the potential for disturbance and habitat modification.

Based on the analysis of direct and indirect effects, alternative B “may affect, but is not likely to adversely affect” (NLAA) MSO. Alternative B “may affect, but is not likely to adversely affect” (NLAA) MSO designated critical habitat.

Chiricahua Leopard Frog

Reducing off-road travel and MBGR areas would be considered beneficial to the Chiricahua leopard frog. This would reduce the potential for direct and indirect impacts on individuals, dispersal, and habitat from motorized use. MBGR would have effects where it occurs in suitable or potential habitat for this species. MBGR would not be allowed in the Blue Range Primitive Area, so this population segment would not be affected. Direct and indirect effects on habitat could include modification of suitable habitat and fragmentation.

None of the additional miles of open trails occur in or adjacent to occupied or suitable habitat for these frogs, so no direct effects would occur. There is a slight chance that the new trails could affect dispersal of individuals of this species. Overall, the reduction in the miles of open roads is expected to benefit this species, but would not be measureable due to the small area affected, the distance from suitable habitat, and the small population size of this species on the forests.

None of the motorized areas occur within or adjacent to occupied or suitable habitat for these frogs. The closest occupied site occurs many miles from the areas proposed, so no effects would occur. This would be a decrease of 17.4 percent of roads from the existing system due to road closures which would benefit leopard frogs and their habitat by reducing potential for mortality, injury and disturbance; reducing effects during dispersal; and preventing habitat modification.

No corridors are proposed for designation in occupied habitat for these frogs, but some are designated within ¼ mile of occupied sites. The potential for human disturbance over a longer period of time increases in the area within and directly adjacent to the corridor. This increases the likelihood that individuals would be disturbed, injured or killed, or their habitat would be affected from human activity. Egg masses may be destroyed or disturbed, as well as tadpoles or young frogs. Effects on dispersal of frogs may increase with designation of corridors, including fragmentation and impacts on dispersal patterns. None of the proposed trail construction would be in suitable habitat for the frogs so there would not be effects from this activity.

Based on the analysis of direct and indirect effects, alternative B “may affect, but is not likely to adversely affect” (NLAA) Chiricahua leopard frogs and their habitat.

Alternative C

Mexican Wolf

Cross-country motorized use would be eliminated, and MBGR would be allowed within 1 mile of open roads. Direct and indirect effects for these activities would be similar as described for alternative B, but with fewer acres impacted. The only differences between roads and motorized trails from alternative A is the slight increase (+28) in miles of roads. The differences in effects between the alternatives are not measureable due to their small size.

Based on the analysis of direct and indirect effects, alternative C is “not likely to jeopardize the continued existence” of Mexican wolves or their habitat.

Southwestern Willow Flycatcher

Cross-country motorized use would be eliminated, and MBGR would be allowed within 1 mile of open roads. Direct and indirect effects would be similar to alternative B, but with fewer acres impacted. The only difference between roads and motorized trails from alternative A is the slight increase (+28) in miles of roads. None of the open trails occur in occupied, suitable unoccupied or potential suitable habitat for flycatchers, but some occur within ¼ mile of occupied habitat, so direct or indirect effects from disturbance in these areas could occur. Approximately 0.19 mile of open roads would be within critical habitat. Overall, the reduction in miles of open roads is expected to benefit flycatchers, but would not be measureable due to the small area affected, the distance from flycatcher habitat, and the small population size of this species on the forests.

Based on the analysis of direct and indirect effects, alternative C “may affect, but is not likely to adversely affect” (NLAA) southwestern willow flycatchers and “may affect, but is not likely to adversely affect” (NLAA) designated critical habitat for southwestern willow flycatchers.

Mexican Spotted Owl

Cross-country motorized use would be eliminated, and MBGR would be allowed within 1 mile of open roads. Direct and indirect effects would be similar to alternative B, but with fewer acres impacted. Open roads in PACs and critical habitat have the potential to alter behavior, survival, reproduction, and distribution of the species. The miles of roads in MSO PACs and critical habitat are in table 30. There is a reduction of 28 miles of roads from the current condition and of this, approximately 0.9 mile exists within PAC boundaries and 20 miles are within critical habitat. This would be a decrease of 3,929 miles within critical habitat and118 miles within PAC boundaries from the current condition. Direct and indirect effects on Mexican spotted owls and their habitat would be much reduced from the existing condition.

Based on the analysis of direct and indirect effects, alternative C “may affect, but is not likely to adversely affect” (NLAA) MSO. Alternative C “may affect, but is not likely to adversely affect” (NLAA) MSO designated critical habitat.

Chiricahua Leopard Frog

Cross-country motorized use would be eliminated, and MBGR would be allowed within 1 mile of open roads. Direct and indirect effects would be similar to alternative B, but with fewer acres impacted. Effects from reducing the road and trail system would be similar to alternative B.

Based on the analysis of direct and indirect effects, alternative C “may affect, but is not likely to adversely affect” (NLAA) Chiricahua leopard frogs and their habitat.

Alternative D

Mexican Wolf

The reduction of 912,172 acres open to off-road motorized use would benefit wolves. The ¼-mile MBGR distance combined with areas open to off-road travel would be less area of disturbance to wolves than alternatives A and B. Direct and indirect effects to wolves from off-road travel would be similar to alternative B. There would be a decrease of 45 miles of open roads and trails, but any reduction in vehicular collisions or other human-caused mortality would not be measurable due to the relatively small decrease in miles. Five motorized use areas would occur within the experimental population area boundary for wolves. Effects in these areas would be the same as

alternative B. There would be 14 fewer miles of road closed in this alternative than under alternative B. The difference in effects from closed roads between this alternative and alternative B are not measureable due to the small change. Alternative D proposes designating significantly more corridors than any of the other alternatives, with a resulting increase in direct and indirect effects expected to the Mexican wolf.

Based on the analysis of direct and indirect effects, alternative D is “not likely to jeopardize the continued existence” of Mexican wolves or their habitat.

Southwestern Willow Flycatcher

The reduction of 912,172 acres open to off-road motorized use would benefit flycatchers. This is a decrease from alternative B, but an increase from alternative C. The ¼-mile MBGR distance combined with areas open to off-road travel would be less area of disturbance than alternatives A and B. Direct and indirect effects to flycatchers from off-road travel would be similar to alternative B.

None of the additional miles of open trails occur in occupied, suitable unoccupied, or potential suitable habitat for flycatchers, so effects from open trails would be the same as described for alternative B. Approximately 0.19 mile of open roads would exist within critical habitat for flycatchers. Overall, the reduction in miles of open roads is expected to be of benefit to flycatchers, but the benefit would not be measureable due to the small area affected, the distance from suitable flycatcher habitat, and the small population size of this species on the forests.

The motorized use areas and corridors would not be located within or adjacent to critical habitat, occupied or unoccupied suitable habitat, or potential suitable habitat. A decrease of 16.9 percent of roads would be closed, and is slightly less than proposed under alternative B. Approximately 53 miles of roads would be closed within buffer zones of flycatchers. Road closures are expected to be beneficial to the flycatcher. Other direct and indirect effects would be similar to those described for alternative B.

Based on the analysis of direct and indirect effects, alternative D “may affect, but is not likely to adversely affect” (NLAA) southwestern willow flycatchers and “may affect, but is not likely to adversely affect” (NLAA) designated critical habitat for southwestern willow flycatchers.

Mexican Spotted Owl

Within MSO PACs, 19,349 acres would remain open to MBGR. Within designated critical habitat, 342,948 acres would remain open for MBGR. This is a decrease from alternative B, but an increase from alternative C. Direct and indirect effects would be most similar to those described for alternative B, but effects from MBGR would be at a reduced scale. Open roads in PACs and critical habitat have the potential to alter behavior, survival, reproduction, and distribution of the species. The miles of roads in MSO PACs and critical habitat are in table 30. This reduction in open roads would benefit MSO and its habitat. Direct and indirect effects in the five motorized area would be the same as alternative B.

Approximately 160 miles of road would be closed within PACs and 2,153 miles would be closed in designated critical habitat. These closures would benefit MSO and habitat by reducing the potential for disturbance during breeding and nesting, and preventing habitat modification. Approximately 892 acres of corridors would be designated within PACs and 79,940 acres would be in designated critical habitat. Effects of corridor would be similar to alternative B. Effects of

constructing trails would be the same as alternative B. Approximately 75 miles of roads would be restricted to authorized use only. Approximately 21 miles would be restricted in designated as critical habitat and 2 miles would be in PACs. Effects would be similar to alternative B.

Based on the analysis of direct and indirect effects, alternative D “may affect, but is not likely to adversely affect” (NLAA) MSO. Alternative D “may affect, but is not likely to adversely affect” (NLAA) MSO designated critical habitat.

Chiricahua Leopard Frog

By reducing off-road motorized use, Chiricahua leopard frogs would benefit. Effects would be similar to alternative B, but the effects from MBGR would be at a reduced scale. The reduction in the miles of open roads is expected to benefit these frogs and their habitat with effects similar to those described for alternative B. The increase in trails would have minimal effects on leopard frogs, mostly in the form of direct and indirect effects on dispersing frogs and could include disruption of dispersal patterns, injury or mortality of individuals, and behavioral modification resulting from disturbance. Effects from the five motorized areas would be the same as alternative B. Road closures of 16.9 percent of the existing system would have similar effects to alternative B. Effects in designated corridors would be similar to alternative B. The construction of trails would have the same effects as alternative B.

Based on the analysis of direct and indirect effects, alternative D “may affect, but is not likely to adversely affect” (NLAA) Chiricahua leopard frogs and their habitat.

Alternative E

Mexican Wolf

Cross-country motorized use would be eliminated and MBGR would not be allowed. Direct and indirect effects for these activities would be similar as described for alternative B, but with fewer acres impacted. There would be a decrease of 308 miles of open roads and trails, but any reduction in vehicular collisions or other human-caused mortality would not be measurable due to the relatively small decrease in miles. An additional 66 miles of roads would be closed under this alternative than alternative B. This would be 12 percent more roads closed than under alternative B, so benefits to wolves would be greater under this alternative. By eliminating cross-country motorized use, the level of direct and indirect effects would be reduced so greatly that designating 118 miles of corridors would be considered minimal when compared to alternative A.

Based on the analysis of direct and indirect effects, alternative E is “not likely to jeopardize the continued existence” of Mexican wolves or their habitat.

Southwestern Willow Flycatcher

Cross-country motorized use would be eliminated, and MBGR would not be allowed. Direct and indirect effects would be similar as described for alternative B, but with fewer acres impacted. None of the additional trails occur in occupied, suitable unoccupied, or potential suitable habitat for flycatchers, so effects would be the same as alternative B. Approximately 0.19 mile of open roads would exist within critical habitat for flycatchers. Overall, the reduction in roads would be of benefit to flycatchers, but would not be measureable due to the small area affected, the distance from suitable flycatcher habitat, and the small population size on the forests. Slightly more roads would be closed than alternatives B and D, but none of the road closures are proposed in occupied or unoccupied habitat for flycatchers, so no direct effects would occur. No roads would be closed

within critical habitat so no effects would occur. No corridors would be designated within close proximity to occupied habitat or within designated critical habitat.

Based on the analysis of direct and indirect effects, alternative E “may affect, but is not likely to adversely affect” (NLAA) southwestern willow flycatchers and “may affect, but is not likely to adversely affect” (NLAA) designated critical habitat for southwestern willow flycatchers.

Mexican Spotted Owl

Cross-country motorized use would be eliminated, and MBGR would not be allowed. Direct and indirect effects would be similar as described for alternative B, but with fewer acres impacted. Open roads in PACs and critical habitat have the potential to alter behavior, survival, reproduction, and distribution of the species. The miles of roads in MSO PACs and critical habitat are in table 30. This reduction in open roads would benefit MSO and habitat. Direct and indirect effects in the five motorized areas would be the same as alternative B. Approximately 175 miles of road would be closed within PACs, and 2,387 miles would be closed within designated critical habitat. Effects would be similar to alternative B.

Approximately 13 miles of corridors would be designated in PACs, and 2,036 acres would be in designated critical habitat. These effects of corridors would be similar to alternative B. Alternative E proposes designating fewer corridors than alternatives B and D, with a corresponding reduction in effects. Effects of constructing trails would be the same as alternative B. Approximately 85 miles of roads would be restricted to permitted and authorized use only. Approximately 26 miles would be restricted in designated as critical habitat and 2 miles would be in PACs. Effects would be similar to alternative B.

Based on the analysis of direct and indirect effects, alternative E “may affect, but is not likely to adversely affect” (NLAA) MSO. Alternative E “may affect, but is not likely to adversely affect” (NLAA) MSO designated critical habitat.

Chiricahua Leopard Frog

Cross-country motorized use would be eliminated, and MBGR would not be allowed. Direct and indirect effects would be similar as described for alternative B, but with fewer acres impacted. Effects on these frogs from the changes in road and trail miles would be similar to alternative B. Effects in designated corridors would be similar to alternative B. The construction of trails would have the same effects as alternative B.

Based on the analysis of direct and indirect effects, alternative E “may affect, but is not likely to adversely affect” (NLAA) Chiricahua leopard frogs and their habitat.

Forest Service Sensitive Species

The forests received the Southwestern Region (R3) Regional Forester’s Sensitive Species list, dated September, 2007 (USDA FS 2007d). There are 58 sensitive species on the Apache-Sitgreaves National Forests. Sensitive species are defined as plant and animal species identified by the Regional Forester for which population viability is a concern, as evidenced by: (a) significant current or predicted downward trends in population numbers or density, or (b) significant current or predicted downward trends in habitat capability that would reduce a species’ existing distribution (FSM 2670.5).

The species have been grouped into amphibians, birds, invertebrates, mammals, reptiles, and rare plants for purposes of discussing habitats and potential effects from changing the forests' designated road and trail system. Given the number of species, the discussion has been simplified into a table (table 31) showing habitat types, acres of habitat on the forests, and current population status on the forests. The direct and indirect effects are displayed by species with specific miles of route changes and acres of area changes in table 31. Cumulative effects are discussed at the end of the wildlife section for all species. The wildlife specialist report contains a detailed description of habitats.

Amphibians

Individuals may be impacted from mortality due to being run over by vehicles and habitat alteration. Increased sediment into wetlands and water or pools, and impacts to vegetation from cross-country travel and along roads and motorized trails would diminish habitat quality.

Birds

Threats to bald eagles include habitat loss, prey loss, illegal shooting, and collisions. Abert's towhees are sensitive to disturbance at nest and roost sites, and avoid habitat near roads due to traffic disturbance. Burrowing owls are vulnerable to habitat loss and fragmentation, and mortality from vehicular collisions. Dechant, et al., (rev. 2002) documented that Bairds sparrows were significantly more abundant along trails than roads indicating a preference for areas with less disturbance. Threats to zone-tailed hawks and common black-hawks include degradation of habitat and nest and roost site disturbance. Yellow-billed cuckoos can be impacted by alteration of flows in rivers and streams. Gray catbirds are sensitive to alteration and elimination of riparian habitat and associated prey species. The Arizona Bell's vireo is threatened by loss and degradation of habitat through human activities. Adverse impacts to vireo habitat result from human disturbance such as dispersed camping and use of OHVs causing nests to be abandoned. Goshawks use a wide range of forest communities during the breeding season, but prefer mature and old-growth forest for nesting and hunting. There is some evidence goshawks are resilient to forest fragmentation and can re-establish. The primary impact on peregrine falcons is effects to prey, and human disturbance at nests inhibit reproductive success.

Invertebrates

The California floater is sensitive to declining water quality. The Ferris' copper is sensitive to meadow habitat alterations. The three-forks springsnail is sensitive to human disturbance and impacts to spring ecosystems. Most habitat on the forests for these snails is fenced from motorized use and no direct or indirect effects would occur in these areas.

Mammals

Threats to Merriams and dwarf shrews, White Mountain ground squirrel, White Mountain chipmunk, Springerville silky pocket mouse, and Arizona montane vole include habitat loss and degradation. The water shrew is vulnerable to recreational use of stream and lakeside habitats and reduced water quality. The western red bat is threatened by habitat loss. Spotted bats are threatened by habitat alteration from reduction in wet meadow quality for foraging. Allen's lappet-browed bat is vulnerable to habitat loss from vandalism due to human disturbance. Townsend's big-eared bats are vulnerable to extirpation due to human activity at roosts in caves

especially during reproductive and hibernal periods; and impacts to insect prey in wetlands including increased sediment and decreased water quality. Greater western mastiff-bats are vulnerable to activities that disturb cliff habitats. New Mexico meadow jumping mouse is vulnerable to changes in land use and habitat destruction, and roads may act as barriers and sources of mortality, however, forage is provided along roadsides. Southern red-backed voles are threatened by habitat loss from human causes.

Reptiles

Management concerns for Mexican gartersnakes include habitat destruction. Threats to narrow-headed gartersnakes include habitat modification, increased recreational use in riparian areas, and habitat fragmentation.

Rare Plants

Individual plants may be impacted from vehicles including in areas of motorized off-road travel. By reducing places where vehicle are allowed, the quality of plant habitat would improve by keeping foliage intact, and reducing competition from invasive plants.

Currently, cross-country motorized use on the forests is considered to have moderate to high impacts in pinyon-juniper, ponderosa pine, and spruce-fir with wet mixed conifer habitats. Cross-country travel has the potential to influence behavior, survival, reproduction, and distribution of species reliant on these habitats, as well as alter the habitat. There are currently minimal impacts on species reliant on wetland and riparian habitats due to the fenced exclusion of many areas from motorized use. In areas where exclosures do not protect habitat, there is potential to adversely impact these species.

Direct and Indirect Effect Determination

Table 31 displays the miles of routes and acres of areas by species by alternative for sensitive species. Under all alternatives and for all 58 sensitive species, the proposed transportation system “may impact individuals or habitat, but will not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species” (MIIH).

Rationale for Effect Determination to Sensitive Species

Alternative A

Alternative A proposes to keep the existing system of roads and motorized trails and would allow continued cross-country travel forestwide. Motorized use within or adjacent to sensitive species habitats would have the potential to influence behavior, survival, reproduction, and distribution of these species, as well as to alter their habitat.

Currently, cross-country travel is considered to have minimal impacts to species in the wetland/cienega habitats due to the fenced exclusion of many areas from motorized travel. Cross-country travel is considered to have minimal impacts on cottonwood-willow and montane-willow riparian habitats due to difficult access from topography and exclusion of riparian habitats from motorized use in many areas due to exclosures. In areas where exclosures do not protect habitat, there is potential to adversely impact these species. The current level of impact on pinyon-juniper, ponderosa pine, spruce-fir with wet mixed conifer habitats is moderate to high from cross-country

motorized travel. In cliff habitats, habitat security and quality is expected to be high primarily due to the steep, inaccessible nature of this habitat type. However, if unauthorized roads or motorized trails are created providing access into these areas, the potential for impacts exists. Fragmentation of cliff habitats on the forests is not considered at risk due to the terrain making them largely inaccessible to motor vehicles. These levels of impact are expected and could possibly increase under alternative A.

Action Alternatives B, C, D, and E

Under the action alternatives (B, C, D and E), motorized cross-country travel would be eliminated on 1.6 million acres. This would be a significant reduction in areas open to motorized use on the forests and would be beneficial to all sensitive species.

Alternatives B, C, and D propose areas for MBGR (1 mile from roads in alternatives B and C, and ¼ mile from roads in alternative D). In wetland/cienega and riparian areas that are not fenced from motorized use, there would be a potential for impacts to these habitats and associated species. In all other habitat types, the direct and indirect effects would be minimal since this activity would occur seasonally and there is not likely to be repeated off-road motorized travel in the same location.

Alternatives B, D and E would result in a designated open road system with fewer miles of open roads than under current conditions. Alternative C would result in 28 miles of additional roads designated open. Overall, fewer open roads is expected to be beneficial to all sensitive species, while opening more roads to motorized travel is expected to have negative, localized impacts dependent on the proximity of roads to habitat types. Alternatives B, D and E would add miles of motorized trails, which is expected to have negative, localized impacts dependent on the proximity of roads to habitat types. The motorized trails would not change under alternative C.

Alternatives B and D propose five motorized use areas (459 acres) which are in 70 acres of Great Basin grassland, 4 acres of montane/subalpine grassland, 2 acres of pinyon juniper, and 383 acres of ponderosa pine habitat. Overall, there would be a positive change to sensitive species as compared to current conditions where motorized cross-country travel is allowed forestwide. However, there is still potential for adverse direct and indirect effects limited to the extent of the proposed areas. Compared to alternative A, designation of the motorized use areas would be beneficial to species dependent on these four habitat types.

Alternatives B, D and E propose to close roads to motorized travel. These closures would benefit sensitive species in associated habitat types by reducing the potential for mortality, injury and disturbance, reducing effects during dispersal, and preventing habitat modification.

All action alternatives propose either 300-foot-wide corridors for motorized dispersed camping (alternatives B, D and E) or routes for accessing dispersed camping sites with motor vehicles (alternative C). These areas would be within or adjacent to habitat for all sensitive species and would encompass between 1 and 5 percent of any one habitat type. Overall, there would be a positive change to sensitive species as compared to current conditions where motorized dispersed camping is allowed forestwide. On a localized scale, direct and indirect effects on sensitive species and habitats would be limited in size and extent.

Alternatives B, D and E propose to construct between 1 and 2 miles of new motorized trails, which would be located within existing roadbeds. Portions of these trails would be within pinyon-

juniper habitat and ponderosa pine habitat. Due to the limited acres impacted, direct and indirect effects are expected to be limited to negative effects to habitat security and quality adjacent to the trails, and fragmentation is expected to be increased in these localized areas.

Alternatives B, D and E propose to convert existing roads to permitted and administrative use only. By limiting the use of these roads, there would be impacts similar to those described for roads proposed to be closed. Sensitive species in associated habitat types would benefit by the reduced potential for mortality, injury and disturbance, reduced effects during dispersal, and little to no habitat modification.

Table 31. Comparison of miles of routes and acres of areas in sensitive species habitat by alternative

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
Amphibians									
Arizona Toad *(Bufo microscaphus)*	Mixed broadleaf deciduous riparian	7,631	unknown	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0
Lowland Leopard Frog *(Rana yavapaiensis)*	Wetland/cienega	12,483 wetland/cienega, 3,279 open water	unknown	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0
Northern Leopard Frog *(Rana pipiens)*	Wetland/cienega	12,483 wetland/cienega, 3,279 open water	unknown	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1672	0
				acres MBGR	9,274	9,225	9,225	6,277	0
Birds									
Bald Eagle *(Haliaeetus leucocephalus)*	Riparian, desert scrub, chaparral, mixed conifer, pinyon-juniper, ponderosa pine	41,278	year-round residents, 3 nest sites	miles roads/trails	68	85	70	90	75
				acres dispersed sites	0	1,158	0	5,362	0
				acres MBGR	34,120	32,491	32,491	21,922	0
Zone-tailed Hawk *(Buteo albonotatus)*	Pine-oak woodland, mixed broadleaf deciduous riparian	7,631	unknown	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0
Northern Goshawk *(Accipiter gentilis)*	Deciduous, mixed conifer, ponderosa pine	626,989	106 PFAs identified since 1984, decline in occupancy rates	miles roads/trails	1,347	1,294	1,359	1,344	1,187
				acres dispersed sites	0	28,702	0	63,135	2,768
				acres MBGR	525,057	501,620	501,620	291,891	0
				acres areas	0	383	0	383	0

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
Common Black-hawk *(Buteogallus anthracinus)*	Mixed broadleaf deciduous riparian	7,631	unknown	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0
American Peregrine Falcon *(Falco peregrines anatum)*	Cliffs	very limited	8 nest sites	miles roads/trails	routes adjacent to habitat				
Western Yellow-billed Cuckoo *(Coccyzus americanus occidentalis)*	Willow riparian, mixed broadleaf deciduous riparian, mesquite and hackberry	7,631	unknown	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0
Burrowing Owl (Western) *(Athene cunicularia hypugaea)*	Mixed broadleaf deciduous riparian, willow riparian, ponderosa pine, pinyon-juniper	192,642	unknown	miles roads/trails	361	357	363	361	340
				acres dispersed sites	0	1,978	0	20,424	1,457
				acres MBGR	174,023	170,691	170,691	95,768	0
				acres areas	0	70	0	70	0
Gray Catbird *(Dumetella carolinensis)*	Grassland, desert scrub	7,631	unknown	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0
Abert's Towhee *(Pipilo aberti)*	Cottonwood-willow riparian	6,274	unknown	miles roads/trails	17	17	17	19	12
				acres dispersed sites	0	299	0	365	132
				acres MBGR	4,509	4,449	4,449	2,754	0

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
Baird's Sparrow *(Ammodramus bairdii)*	Grassland, wet meadows	192,642	unknown	miles roads/trails	361	357	363	361	340
				acres dispersed sites	0	1,978	0	20,424	1,457
				acres MBGR	174,023	170,691	170,691	95,768	0
				acres areas	0	70	0	70	0
Arizona Bell's Vireo *(Vireo bellii arizonae)*	Willow riparian, desert riparian	7,197	trends stable to declining	miles roads/trails	13	13	13	12	10
				acres dispersed sites	0	149	0	290	108
				acres MBGR	3,447	2,983	2,983	2,078	0
Gray Vireo *(Vireo vicinior)*	Pinyon-juniper woodland, chaparral, desert scrub	240,772	unknown	miles roads/trails	348	328	349	332	312
				acres dispersed sites	0	1,693	0	9,500	1,059
				acres MBGR	210,965	196,331	196,331	89,709	0
				acres areas	0	2	0	2	0
Invertebrates									
California Floater *(Anodonta californiensis)*	Wetland/cienega	12,483 wetland/cienega, 3,279 open water	few, isolated locations, declining	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0
Ferris' Copper *(Lycaena ferrisi)*	Wet meadow, cienega	12,483 wetland/cienega, 3,279 open water	stable trend	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0
Three Forks Springsnail *(Pyrgulopsis trivialis)*	Wetland/cienega	12,483 wetland/cienega, 3,279 open water	2 individuals in 2005 and none since	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
Mammals									
Merriam's Shrew *(Sorex merriami leucogenys)*	Grassland, mixed conifer, pinyon-juniper woodland	59,627	one documented occurrence	miles roads/trails	113	130	115	136	124
				acres dispersed sites	0	1,330	0	7,775	0
				acres MBGR	47,576	46,957	46,957	28,734	0
				acres areas	0	4	0	4	0
Dwarf Shrew *(Sorex Nanus)*	Alpine and subalpine tundra, mixed conifer, spruce-fir, wetland/cienega, montane/subalpine grassland, pinyon-juniper woodland	59,627	one documented occurrence	miles roads/trails	113	130	115	136	124
				acres dispersed sites	0	1,330	0	7,775	0
				acres MBGR	47,576	46,957	46,957	28,734	0
				acres areas	0	4	0	4	0
Water Shrew *(Sorex palustris navigator)*	Boreal and montane riparian, wetland/cienega	12,483 wetland/cienega, 3,279 open water	unknown	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0
Western Red Bat *(Lasiurus blossevillii)*	Mixed broadleaf deciduous riparian, sonoran desert scrub	7,631	no documented occurrences	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0
Spotted Bat *(Euderma maculatum)*	Sonorant desert scrub, riparian, pinyon-juniper, mixed conifer, spruce-fir, cliffs	7,631	no documented occurrences	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
Allen's Lappet-browed Bat *(Idionycteris phyllotis)*	Ponderosa pine, pinyon-juniper, Mexican woodland, mixed deciduous broadleaf riparian, mixed conifer, cliffs	626,989	no documented occurrences	miles roads/trails	1,347	1,294	1,359	1,344	1,187
				acres dispersed sites	0	28,702	0	63,135	2,768
				acres MBGR	525,057	501,620	501,620	291,891	0
				acres areas	0	383	0	383	0
Pale Townsend's Big-eared Bat *(Corynorhinus townsendii pallescens)*	Upper and lower Sonoran desert scrub, cliffs	399,557	one occurrence adjacent to forest, declining	miles roads/trails	125	128	126	127	120
				acres dispersed sites	0	3,016	0	7,247	1,430
				acres MBGR	265,180	68,415	68,415	28,650	0
Greater Western Mastiff Bat *(Eumops perotis californicus)*	Desert scrub, oak woodland, pine-oak woodland, pinyon-juniper, mixed conifer	very limited	one occurrence documented	miles roads/trails	routes adjacent to habitat				
White Mountains Chipmunk *(Tamias minimus arizonensis)*	Montane/subalpine grassland	59,627	several documented occurrences	miles roads/trails	113	130	115	136	124
				acres dispersed sites	0	1,330	0	7,775	0
				acres areas	0	4	0	4	0
				acres MBGR	47,576	46,957	46,957	28,734	0
White Mountains Ground Squirrel *(Speprmophilus tridecemlineatus monticola)*	Montane/subalpine grassland	59,627	several documented occurrences	miles roads/trails	113	130	115	136	124
				acres dispersed sites	0	1,330	0	7,775	0
				acres MBGR	47,576	46,957	46,957	28,734	0
				acres areas	0	4	0	4	0
Arizona Gray Squirrel *(Sciurus arizonensis arizonensis)*	Mixed broadleaf forest, mixed deciduous broadleaf riparian	7,631	several documented occurrences	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
Springerville Silky Pocket Mouse *(Perognathus flavus goodpasteri)*	Montane/subalpine grassland	59,627	several documented occurrences	miles roads/trails	113	130	115	136	124
				acres dispersed sites	0	1,330	0	7,775	0
				acres MBGR	47,576	46,957	46,957	28,734	0
				acres areas	0	4	0	4	0
Southern Red-backed Vole *(Clethrionomys gapperi)*	Montane/subalpine forest, mixed conifer	41,278	several documented occurrences	miles roads/trails	68	85	70	90	75
				acres dispersed sites	0	1,158	0	5,362	0
				acres MBGR	34,120	32,491	32,491	21,922	0
Arizona Montane Vole *(Microtus montanus arizonensis)*	Montane/subalpine grassland, mixed conifer	59,627	several documented occurrences	miles roads/trails	113	130	115	136	124
				acres dispersed sites	0	1,330	0	7,775	0
				acres MBGR	47,576	46,957	46,957	28,734	0
				acres areas	0	4	0	4	0
Navajo Mogollon Vole *(Microtus mogollonensis navaho)*	Grassland, ponderosa pine, pinyon-juniper, sagebrush, spruce-fir	unknown since not inhabited	only known to exist adjacent to the forests		unk	unk	unk	unk	unk
Long-tailed Vole *(Microtus longicaudus)*	Grassland, wetland/cienega, mixed conifer	12,483 acres wetland/cienega	several documented occurrences, declining	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0
Meadow (New Mexico) Jumping Mouse *(Zapus hudsonius luteus)*	Grassland, willow riparian	7,197	several documented occurrences	miles roads/trails	13	13	13	12	10
				acres dispersed sites	0	149	0	290	108
				acres MBGR	3,447	2,983	2,983	2,078	0

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
Reptiles									
Mexican Gartersnake *(Thamnophis eques megalops)*	Wetland/cienega, oak woodland, desert	7,631	declining	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0
Narrow-headed Gartersnake *(Thamnophis rufipunctatus)*	Pinyon-juniper, pine-oak woodland, ponderosa pine, mixed broadleaf deciduous riparian	7,631	declining	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0
Rare Plants									
Goodding's Onion *(Allium gooddingii)*	Wetland/cienega	41,278	declining to extirpated	miles roads/trails	68	85	70	90	75
				acres dispersed sites	0	1,158	0	5,362	0
				acres MBGR	34,120	32,491	32,491	21,922	0
Greene Milkweed *(Asclepias uncialis ssp. Uncialis)*	Wetland/cienega	192,642	No documented occurrences	miles roads/trails	361	357	363	361	340
				acres dispersed sites	0	1,978	0	20,424	1,457
				acres MBGR	174,023	170,691	170,691	95,768	0
				acres areas	0	70	0	70	0
Villous Groundcover Milkvetch *(Astragalus humistatus var. crispulus)*	Wetland/cienega	626,989	one documented occurrence	miles roads/trails	1,347	1,294	1,359	1,344	1,187
				acres dispersed sites	0	28,702	0	63,135	2,768
				acres MBGR	525,057	501,620	501,620	291,891	0
				acres areas	0	383	0	383	0

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
White Mountains Paintbrush *(Castilleja mogollonica)*	Wetland/cienega	12,483 acres wetland/cienega, 3,279 acres open water	24 percent historic habitat extirpated, found over 11 miles of streams	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0
Gila Thistle *(Cirsium gilense)*	Wetland/cienega	41,278	unknown	miles roads/trails	68	85	70	90	75
				acres dispersed sites	0	1,158	0	5,362	0
				acres MBGR	34,120	32,491	32,491	21,922	0
Yellow Ladys slipper *(Cypripedium parviflorum var. pubescens (=C. calceolus var. pubesens, C. pubescens)*	Great Basin grassland; Madrean pine-oak woodland; pinyon-juniper woodland	12,483 wetland/cienega, 3,279 open water	declining	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0
Heathleaf Wild Buckwheat *(Eriogonum ericifolium var. ericifolium)*	Ponderosa pine forest; mixed conifer with frequent fire forest; pinyon-juniper woodland	399,557	rare on forests	miles roads/trails	125	128	126	127	120
				acres dispersed sites	0	3,016	0	7,247	1,430
				acres MBGR	265,180	68,415	68,415	28,650	0
Wislizeni Gentian *(Gentianella wislizeni)*	Ponderosa pine forest	626,989	few documented occurrences	miles roads/trails	1,347	1,294	1,359	1,344	1,187
				acres dispersed sites	0	28,702	0	63,135	2,768
				acres MBGR	525,057	501,620	501,620	291,891	0
				acres areas	0	383	0	383	0

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
Arizona Sneezeweed *(Helenium arizonicum)*	Ponderosa pine forest; Madrean pine-oak woodland; pinyon-juniper woodland; Great Basin grassland; semidesert grassland; interior chaparral	626,989	unknown	miles roads/trails	1,347	1,294	1,359	1,344	1,187
				acres dispersed sites	0	28,702	0	63,135	2,768
				acres MBGR	525,057	501,620	501,620	291,891	0
				acres areas	0	383	0	383	0
Arizona Sunflower *(Helianthus arizonensis)*	Madrean pine-oak woodland; pinyon-juniper woodland; Great Basin grassland; semidesert grassland	626,989	unknown	miles roads/trails	1,347	1,294	1,359	1,344	1,187
				acres dispersed sites	0	28,702	0	63,135	2,768
				acres MBGR	525,057	501,620	501,620	291,891	0
				acres areas	0	383	0	383	0
Eastwood Alum Root *(Heuchera eastwoodiae)*	Interior chaparral; Madrean pine-oak woodland; pinyon-juniper woodland; ponderosa pine forest	very limited	few documented occurrences, locally common	miles roads/trails	routes adjacent to habitat				
Arizona Alum Root *(Heuchera glomerulata)*	Ponderosa pine forest; mixed conifer with frequent fire forest; Montane/subalpine grasslands	7,631	unknown	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0
Mogollon Hawkweed *(Hieracium brevipilum (=H. fendleri var. mogollense))*	Mixed conifer with frequent fire forest; Spruce-fir with wet mixed conifer forest	41,278	unknown	miles roads/trails	68	85	70	90	75
				acres dispersed sites	0	1,158	0	5,362	0
				acres MBGR	34,120	32,491	32,491	21,922	0

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
Heartleaf Groundsel *(Packera cardamine (=Senecio cardamine))*	Mixed broadleaf deciduous riparian forest; Montane willow riparian area; cottonwood-willow riparian area	41,278	unknown	miles roads/trails	68	85	70	90	75
				acres dispersed sites	0	1,158	0	5,362	0
				acres MBGR	34,120	32,491	32,491	21,922	0
Maguire's Beardtongue *(Penstemon linarioides ssp. Maguirei)*	Spruce-fir with wet mixed conifer forest; Montane/subalpine grassland	240,772	unknown	miles roads/trails	348	328	349	332	312
				acres dispersed sites	0	1,693	0	9,500	1,059
				acres MBGR	210,965	196,331	196,331	89,709	0
				acres areas	0	2	0	2	0
Davidson's Cliff Carrot *(Pteryxia davidsonii)*	Mixed conifer with frequent fire forest; Spruce-fir with wet mixed conifer forest	240,772	stable trend	miles roads/trails	348	328	349	332	312
				acres dispersed sites	0	1,693	0	9,500	1,059
				acres MBGR	210,965	196,331	196,331	89,709	0
				acres areas	0	2	0	2	0
Parish's Alkali Grass *(Pucinellia parishii)*	Spruce-fir with wet mixed conifer forest	12,483 wetland/cienega, 3,279 open water	unknown	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0
Blumer's Dock *(Rumex orthoneurus)*	Pinyon-juniper woodland	12,483 wetland/cienega, 3,279 open water	declining	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0
Arizona Willow *(Salix arizonica)*	Wetland/cienega; mixed broadleaf deciduous riparian forest; Montane willow riparian area	12,483 wetland/cienega, 3,279 open water	18 known sites	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0

Species	Habitat Type	Potential Habitat (acres)	Population Status on Forests	Routes and Areas in Potential Habitat	Alternative				
					A	B	C	D	E
Bebb's Willow *(Salix bebbiana)*	Pinyon-juniper woodland; ponderosa pine forest; mixed conifer with frequent fire forest	7,631	few documented occurrences, declining	miles roads/trails	19	19	19	19	14
				acres dispersed sites	0	60	0	776	49
				acres MBGR	3,823	2,262	2,262	1,837	0
Mogollon Clover *(Trigolium longipes ssp. Neurophyllum (=T. neurophyllum))*	Mixed broadleaf deciduous riparian forest; Montane willow riparian area; cottonwood-willow riparian area	12,483 wetland/cienega, 3,279 open water	up to 19 known sites	miles roads/trails	24	31	25	33	28
				acres dispersed sites	0	379	0	1,672	0
				acres MBGR	9,274	9,225	9,225	6,277	0

Management Indicator Species

The Apache-Sitgreaves forest plan (as amended) identifies wildlife species as management indicator species (MIS) to monitor the health of the forests' ecosystems (USDA FS 1987a). The forest plan provides direction on managing quality habitat for MIS by management area (MA). Table 32 displays the 17 MIS analyzed for this project and describes their habitats and population trends. All of these MIS have confirmed presence on the forests.

Table 32. Management indicator species for the forests and affected environments

Species	Habitat Type	MA	Acres Habitat (MA acres from forest plan)	Habitat Trend	Population Trend
Abert's Squirrel *(Sciurus aberti)*	Early succession (ponderosa pine interlocking canopies)	MA1	626,989	Upward	Stable
Elk *(Cervus elaphis nelson)*	Early succession (grassland, deciduous riparian, ponderosa pine, spruce fir wet mixed conifer)	MA 1, 2, 4	1,577,778	Upward, but declining in open grasslands	Stable to slightly decreasing
Aquatic Macroinvertebrates	Riparian (wetland/cienega)	MA3	12,483 wetland cienega, 3,279 water	Declining	Declining
Mule Deer *(Odocoileus hemionus)*	Early succession (spruce fir wet mixed conifer, ponderosa pine and pinyon juniper habitat components)	MA 1, 2	1,577,778	Upward	Declining
Antelope *(Antilocapra Americana)*	Early succession (woodland, grasslands, deciduous riparian)	MA 2, 4	252,269	Upward	Stable
Northern Goshawk *(Accipiter gentilis)*	Late succession (old growth)	MA1	626,989	Stable, but declining	Stable
Pygmy Nuthatch *(Sitta pygmaea)*	Late succession (snags in old growth ponderosa pine)	MA1	626,989	Stable, upward	Stable
Wild Turkey *(Meleagris gallopavo)*	Late succession (wetland/cienega, ponderosa pine, riparian areas, and grasslands)	MA1	989,516	Upward	Stable
Red Squirrel *(Tamiasciurus hudsonicus)*	Late succession (spruce-fir and wet mixed conifer)	MA1	349,056	Stable, upward	Stable
Mexican Spotted Owl *(Strix occidentalis)*	Late succession (snags and mature forests)	MA1	1,004,019	Declining	Stable

Species	Habitat Type	MA	Acres Habitat (MA acres from forest plan)	Habitat Trend	Population Trend
Yellow-Bellied Sapsucker (red-naped sapsucker) *(Sphyrapicus nuchalis)*	Aspen snags (mixed broadleaf deciduous)	MA1	997,147	Stable	Stable
Plain Titmouse *(Baeolophus (Parus) ridgwayi)*	Snags (pinyon-juniper)	MA2	640,329	Upward	Stable
Hairy Woodpecker *(Picoides villosus)*	Snags (all forest habitat types)	MA1	1,216,817	Stable, upward	Stable
Lincoln's Sparrow *(Melospiza lincolnii)*	High elevation riparian (montane willow)	MA3	19,680	Declining	Stable, but low
Lucy's Warbler *(Vermivora luciae)*	Low elevation riparian (mixed broadleaf deciduous)	MA3	7,631	Upward	Stable
Yellow-Breasted Chat *(Icteria virens)*	Low elevation riparian (cottonwood-willow)	MA3	13,905	Upward	Stable
Cinnamon Teal *(Anas cyanoptera)*	Wetlands (wetland/cienega)	MA 11	12,483 wetland cienega, 3,279 water	Upward	Stable

Environmental Consequences for MIS

Direct and indirect effects are provided here by alternative, and cumulative effects are found for all wildlife at the end of the section. Effects to the Mexican spotted owl were covered in the "Federally Listed Threatened, Endangered, and Proposed Candidate Species and Designated Critical Habitat" section. Effects to the northern goshawk were covered in the "Forest Service Sensitive Species" section.

Descriptions of vulnerabilities due to changes in the forests' transportation system to the MIS species would be similar to descriptions found under the "Forest Service Sensitive Species" section, covering mammals, birds and invertebrates. This includes loss of habitat, habitat fragmentation, human disturbance, mortality from vehicles, and alterations in habitat quality. Table 33 displays the miles of routes and acres of areas by species by alternative for MIS species.

Effect Determination

For all MIS species, under alternative A, based on existing trends, this alternative would achieve forest plan objectives for habitat and population trends. For all MIS species, under alternatives B, C, D and E, the reduction in cross-country travel and designation of routes as proposed would improve habitat and population trends from that shown in table 32. These improvements would result in achieving forest plan objectives for habitat and population trends.

Rationale for Effect Determination to MIS

Alternative A

Alternative A proposes to keep the existing system of roads and motorized trails and would allow continued cross-country travel forestwide. Motorized use within or adjacent to any MIS habitats could include disturbance, habitat fragmentation, and impacts to habitat security and habitat quality varying by magnitude, frequency, and times of use. Some MIS species may experience a change in habitat quality, however, forestwide population and habitat trends would not change. Descriptions are provided here of some potential habitat quality impacts:

- For elk and mule deer, the majority of habitat would continue to be open to cross-country motorized travel and motorized big game retrieval under alternative A. Due to the large area providing habitat and the level of current motorized use, current impacts on habitat quality are expected to be spread out and vary in intensity.
- For macroinvertebrates, motorized use within or adjacent to habitat has the potential to negatively influence these species, primarily through habitat modification. Currently, cross-country motorized use on the forests is considered to have minimal impacts on macroinvertebrates due to fenced exclusion of many of the habitats. In areas where exclosures do not protect habitat, there would be potential to negatively impact these species' habitat quality. Forestwide, direct and indirect effects from roads and trails open to motorized travel are considered to be low to moderate.
- For antelope, only 0.2 percent of grassland habitat types include roads and trails designated as open to motor vehicles. Although this is small, there is a potential for negative effects to habitat quality for antelope.
- For the yellow-bellied sapsucker and hairy woodpecker, cross-country motorized use has the potential to impact snag habitats during the breeding season through disturbance.

Action Alternatives B, C, D, and E

Under all action alternatives some MIS species may experience a change in habitat quality, however, forestwide population and habitat trends would not be expected to change. Under the action alternatives, motorized cross-country travel would be eliminated on 1.6 million acres. This would be a significant reduction in areas open to motorized use on the forests and would be beneficial to all MIS species.

Alternatives B, C, and D propose areas for MBGR (1 mile from roads in alternatives B and C, and ¼ mile from roads in alternative D). In wetland and riparian areas that are not fenced from motorized use, there would be a potential for impacts to these habitats and associated species. In all other habitat types, the direct and indirect effects to habitat quality would be minimal since this activity would occur seasonally and there is not likely to be repeated off-road motorized travel in the same location.

Alternatives B, D and E would result in a designated open road system with fewer miles of open roads than under current conditions. Alternative C would result in 28 miles of additional roads designated open. Overall, fewer open roads are expected to be beneficial to all MIS species, while opening more roads to motorized travel is expected to have negative localized impacts dependent on the proximity of roads to habitat types. Alternatives B, D and E would add miles of motorized

trails, which is expected to have negative localized impacts dependent on the proximity of roads to habitat types. The motorized trails would not change under alternative C.

Alternatives B and D propose five motorized use areas (459 acres) which are in 70 acres of Great Basin grassland, 4 acres of montane/subalpine grassland, 2 acres of pinyon juniper, and 383 acres of ponderosa pine habitat. Overall, there would be a positive change to MIS species as compared to current conditions where motorized cross-country travel is allowed forestwide. However, there is still potential for adverse direct and indirect effects limited to the extent of the proposed areas. Compared to alternative A, designation of the motorized use areas would be beneficial to species dependent on these four habitat types.

Alternatives B, D and E propose to close roads to motorized travel. These closures would benefit MIS species in associated habitat types by reducing the potential for mortality, injury and disturbance, reducing effects during dispersal, and preventing habitat modification.

All action alternatives propose either 300-foot-wide corridors for motorized dispersed camping (alternatives B, D and E) or routes for accessing dispersed camping sites with motor vehicles (alternative C). These areas would be within or adjacent to habitat for all MIS species. Overall, there would be a positive change to MIS species as compared to current conditions where motorized dispersed camping is allowed forestwide. The effects to MIS species and habitat quality are expected to be limited in size and extent and would occur in localized areas. Effects could include disturbance to individuals, reduced habitat security and quality, and fragmentation of habitat blocks where corridors are located.

Alternatives B, D and E propose to construct between 1 and 2 miles of new motorized trails which would be located within existing roadbeds. Portions of these trails would be within pinyon-juniper habitat and ponderosa pine habitat. Due to the limited acres impacted, direct and indirect effects are expected to be limited to negative effects to habitat security and quality adjacent to the trails, and fragmentation is expected to be increased in these localized areas.

Alternatives B, D and E propose to convert existing roads to permitted and administrative use only. By limiting the use of these roads, there would be impacts similar to those described for roads proposed to be closed.

Table 33. Comparison of miles of routes and acres of areas for MIS species by alternative

Species	Vegetation Communities	Routes and Areas in Potential Habitat	Alternative				
			A	B	C	D	E
Abert's squirrel and Pygmy nuthatch	Ponderosa pine	miles roads/trails	1,347	1,294	1,359	1,344	1,187
		acres dispersed sites	0	28,702	0	63,135	2,768
		acres MBGR	525,057	501,620	501,620	291,891	0
		acres areas	0	383	0	383	0
Elk and mule deer	Forests, grasslands, pinyon juniper	miles roads/trails	2,237	2,194	2,256	2,263	2,038
		acres dispersed sites	n/a	34,861	0	106,196	5,314
		acres MBGR	991,741	948,090	948,090	528,024	0
		acres areas	0	459	0	459	0

Species	Vegetation Communities	Routes and Areas in Potential Habitat	Alternative				
			A	B	C	D	E
Aquatic macroin-vertebrates and cinnamon teal	Wetland/ cienega and water	miles roads/trails	24	31	25	33	28
		acres dispersed sites	0	379	0	1,672	0
		acres MBGR	9,274	9,225	9,225	6,277	0
Antelope	Great Basin grasslands, subalpine grasslands	miles roads/trails	474	487	478	497	464
		acres dispersed sites	n/a	3,308	0	28,199	1,457
		acres MBGR	221,599	217,648	217,648	124,502	0
		acres areas	0	70	0	70	0
Wild turkey	Forests, montane willow, cottonwood willow	miles roads/trails	1,545	1,526	1,561	1,589	1,398
		acres dispersed sites	n/a	30,308	0	69,152	3,038
		acres MBGR	567,133	541,543	541,543	318,645	0
		acres areas	0	383	0	383	0
Red squirrel	Dry mixed conifer and spruce fir with wet mixed conifer	miles roads/trails	68	85	70	90	75
		acres dispersed sites	0	1,158	0	5,362	0
		acres MBGR	34,120	32,491	32,491	21,922	0
Yellow-bellied sapsucker	Forests, mixed broadleaf deciduous, montane willow, cottonwood willow	miles roads/trails	1,564	1,545	1,580	1,608	1,412
		acres dispersed sites	n/a	30,368	0	69,928	3,087
		acres MBGR	570,956	543,805	543,805	320,482	0
		acres areas	0	383	0	383	0
Plain titmouse	Woodlands	miles roads/trails	473	456	475	459	441
		acres dispersed sites	n/a	4,709	0	16,747	2,489
		acres MBGR	476,145	264,746	264,746	118,359	0
		acres areas	0	5	0	5	0
Hairy wood-pecker	Forests, pinyon juniper	miles roads/trails	1,763	1,707	1,478	1,766	1,574
		acres dispersed sites	n/a	31,553	0	77,997	3,857
		acres MBGR	770,142	730,442	730,442	403,522	0
		acres areas	0	388	0	388	0
Lincoln's sparrow	Wetland/ cienega and montane willow riparian	miles roads/trails	137	161	140	169	152
		acres dispersed sites	n/a	528	0	1,962	108
		acres MBGR	12,722	12,208	12,208	8,355	0

Species	Vegetation Communities	Routes and Areas in Potential Habitat	Alternative				
			A	B	C	D	E
Lucy's warbler	Mixed broadleaf deciduous riparian	miles roads/trails	19	19	19	19	14
		acres dispersed sites	0	60	0	776	49
		acres MBGR	3,823	2,262	2,262	1,837	0
Yellow-breasted chat	Mixed broadleaf deciduous and cottonwood willow riparian	miles roads/trails	36	36	36	38	26
		acres dispersed sites	n/a	359	0	1,141	181
		acres MBGR	5,332	6,711	6,711	4,591	0

Migratory Birds

Arizona Partners in Flight (APIF) identifies physiographic areas and high priority migratory bird species by broad habitat types. The forests are in Bird Conservation Regions 34 (Sierra Madre Occidental) and 16 (Southern Rockies/Colorado Plateau). The U.S. Fish and Wildlife Service released its "Birds of Conservation Concern Report" (BCC) in 2008 (USFWS 2008). This analysis considers birds from both the BCC report and PIF high priority species. There is one identified important bird area (IBA), the Blue River Complex designated by the National Audubon Society, and one recognized IBA, the Upper Little Colorado River Watershed.

A total of 46 species have been identified on the forests, and 12 of these are discussed in the "Threatened, Endangered, Sensitive Species" and "MIS" sections and will not be discussed further here. They are: Western yellow-billed cuckoo, Southwestern willow flycatcher, common black hawk, Mexican spotted owl, northern goshawk, bald eagle, peregrine falcon, burrowing owl, red-naped sapsucker, Bell's vireo and juniper titmouse, and Lucy's warbler. Table 34 summarizes the 34 migratory birds considered in this analysis with a description of their habitats. More detailed information is provided in the wildlife specialist report found in the project record.

Table 34. Migratory birds with habitat types

Habitat	Species	Habitat Component
Mixed conifer	Olive-sided Flycatcher	Forest openings and edges within mature ponderosa pine forests with snags
Ponderosa pine	Purple Martin	Uncommon summer resident in ponderosa pine
	Flammulated Owl	Old growth coniferous forests, nests in cavities of trees
	Lewis' Woodpecker	Nests in abandoned cavities and uses open areas for foraging
	Grace's Warbler	Occasionally found in mixed conifer and pinyon-juniper
	Cassin's Finch	Occur in open coniferous forests
	Olive Warbler	Prefer forests with a Gambel oak component
Spruce fir	Swainson's Thrush	Dense spruce fir where forest openings occur
	Pine Grosbeak	Prefer a mosaic of open areas, disturbed areas, and edges
	Golden-crowned Kinglet	Mature spruce fir forests with closed canopies

Habitat	Species	Habitat Component
Madrean pine oak woodland	Montezuma (Mearn's) Quail	Found where steep slopes support tall native perennial grasses
	Band-tailed Pigeon	Found in madrean oak woodlands within pinyon-juniper
	Canyon Towhee	In remote, rough, rocky terrain, with scattered dense shrubs
Pinyon-juniper woodland	Gray Flycatcher	Need some ground cover to support insect populations
	Pinyon Jay	In foothills and middle elevations
	Gray Vireo	Understory of broadleaf shrubs
	Black-throated Gray Warbler	Favors open woodlands
	Brewer's Sparrow	Breed in shrublands and areas dominated by big sagebrush
High elevation grassland	Swainson's Hawk	Nests in scattered trees
	Ferruginous Hawk	Occupy flat and rolling terrain
	Golden Eagle	Breed in open and semi-open habitats
	Prairie Falcon	Cliffs or bluffs are used for nesting sites
	Chestnut-collared Longspur	Arid, short- to mixed-grass prairie
Semi-desert Grasslands	Cassin's Sparrow	With scattered shrubs, yuccas, or low trees
	Bendire's Thrasher	Favor relatively open grassland, shrubland, or woodland
Interior chaparral	Black-chinned Sparrow	Arid brushlands on rugged mountain slopes
	Virginia's Warbler	Breed in pinyon-juniper and oak woodlands
Low elevation riparian	Veery	Inhabit damp, deciduous forests
	Elf Owl	Occupy subtropical thorn woodland and riparian forest
	Yellow Warbler	Breed most commonly in wet, deciduous thickets
High elevation riparian	Common Black-hawk	Obligate riparian nesters
	MacGillivray's Warbler	Primarily in coniferous forest clearcuts
	Red-faced Warbler	Abundant in steep canyons
Wetlands	American Bittern	Freshwater wetlands with tall, emergent vegetation

Environmental Consequences for Migratory Birds

Under all alternatives, there would be no direct or indirect effect to rangewide populations of any migratory bird species. Some improvement to habitats would be expected under the action alternatives from reduced motorized cross-country travel. No intentional take would result from actions proposed in this alternative. Unintentional take of individual birds may occur, but will not result in changes to the rangewide populations.

Cumulative Effects for All Wildlife and Rare Plant Species

The cumulative effects analysis area is the forests boundary which is of sufficient size to encompass impacts on wildlife, rare plants and habitats. Since the analysis is forestwide, the activities are discussed generally. Appendix E lists the specific past, present, and reasonably foreseeable future projects identified during this analysis. The types of projects listed here could

add cumulatively to the direct and indirect effects described for federally listed species, sensitive species, MIS species, and migratory birds. In combination with this proposal, past, ongoing, and reasonably foreseeable future projects would have cumulative impacts on wildlife and rare plant habitats on a scale that is small relative to this forestwide analysis.

- **Vegetation Management:** The majority of projects are for riparian restoration and have potential to stabilize vegetation in the long term which would improve wildlife habitat quality.
- **Fuels Management/Reduction:** These projects could increase soil erosion in the short term before understories reestablish. However, in the long term, they could reduce wildfire intensity and decrease soil erosion. These projects are on a small scale and would have minimal cumulative impacts at a forestwide scale.
- **Prescribed Burns:** These prescribed burns have potential to increase soil erosion because the understory layer of vegetation would be removed for a short time. Overall, there would be beneficial impacts from the reduction in large, intense wildfires that greatly impact wildlife habitat.
- **Livestock Grazing:** Impacts occur on riparian areas if not managed properly. The forests permit livestock grazing on all ranger districts. Planned revisions to allotment management plans have potential to better manage livestock grazing and reduce impacts on riparian areas. On a forestwide scale, these projects would have minimal cumulative impacts on wildlife habitat.
- Community development is expected to increase and will include home construction and infrastructure improvements which could cumulatively result in a loss of suitable habitat.

Alternative B would have beneficial cumulative impacts as off-road travel would be reduced to areas and corridors, resulting in greater habitat security and less adverse physical effects to habitat. Alternative E would have the greatest beneficial cumulative impacts as off-road travel would be prohibited outside designated corridors. Alternatives C, D, and F would have similar cumulative effects and these effects would be greater than those of alternatives B and E. However, there would still be beneficial effects from the elimination of cross-country travel and minimal change to the existing transportation system.

Fisheries

This section describes the existing fisheries and aquatic habitat on the forests. The effects of each alternative on both fish and habitats are included. “Issue 3, Impacts to Resources from Motorized Use” is addressed in this analysis. The analysis area includes the extent of the forests and areas adjacent that could be impacted downstream from activities occurring on the forests. This analysis area varies by species present within and downstream of the forests, and the extent and location of actions within the various alternatives.

Affected Environment

Aquatic and riparian habitat on the forests is extremely limited (less than 1.5 percent of the forests), and has been subjected to significant alterations from past and current management practices. This is reflected in the historic and recent declines and fragmentation of fish species and populations. Twenty-four of the 33 fifth-code watersheds on the forests historically contained

one or more fish species. Currently only 16 of these 24 watersheds contain any native fish, and most have suffered losses of one to several species. There are presently 14 native fish species, and 25 nonnative fish species occurring throughout the forests.

Federally Listed Threatened, Endangered, and Proposed Species; Candidate and Designated Critical Habitat; and Forest Service Sensitive Species

The following threatened, endangered, proposed and candidate species are found on the forests:

- **Gila trout** (*Oncorhynchus gilae*) – Endangered – one existing population and six streams identified for recovery and reintroduction of the species; seven watersheds covering 51,686 acres; 33 percent currently open to cross-country travel.
- **Gila chub** (*Gila intermedia*) – Endangered and critical habitat – three populations; three watersheds covering 93,774 acres; 96 percent currently open to cross-country travel.
- **Razorback sucker** (*Xyrauchen texanus*) – Endangered and critical habitat – No populations on the forests, but critical habitat is downstream of the forests' boundary; two watersheds covering 528,470 acres; 62 percent currently open to cross-country travel.
- **Spikedace** (*Meda fulgida*) – Endangered and critical habitat – one existing population and one stream identified for recovery and reintroduction of the species; two watersheds covering 528,470 acres; 62 percent currently open to cross-country travel.
- **Apache trout** (*Oncorhynchus apache*) – Threatened – Approximately 5 existing populations and 19 streams identified for recovery and reintroduction of the species; 19 watersheds covering 145,591 acres; 70 percent currently open to cross-country travel.
- **Loach minnow** (*Tiaroga cobitis*) – Threatened and critical habitat – five populations; five watersheds covering 772,031 acres; 70 percent currently open to cross-country travel.
- **Little Colorado spinedace** *(Lepidomeda vittata)* – Threatened and critical habitat – three populations and two streams identified for recovery and reintroduction of the species; five watersheds covering 341,373 acres; 76 percent currently open to cross-country travel.
- **Roundtail chub** (*Gila robusta*) – Candidate – three populations; three watersheds covering 548,471 acres; 85 percent currently open to cross-country travel.

The following Forest Service sensitive species are found on the forests (USDA FS 2007d):

- **Roundtail chub** (see previous description)
- **Bluehead sucker (***Castostomus discobolus*) – five populations; five watersheds covering 390,752 acres; 73 percent currently open to cross-country travel.
- **Desert sucker** (*Castostomus clarki*) **and Sonora sucker** (*Catostomus insignis*) – six populations; six watersheds covering 853,944 acres; 73 percent currently open to cross-country travel.
- **Little Colorado River sucker** (*Catostomus sp.)* – three populations; three watersheds covering 242,462 acres; 75 percent currently open to cross-country travel.

- **Longfin dace** (*Agosia chrysogaster*) – five populations; five watersheds covering 639,090 acres; 68 percent currently open to cross-country travel.

Statewide and Basinwide Population and Distribution

Both historical and recent data are limited for fish species populations, abundances, and habitat conditions, and data that are available vary considerably in analysis approaches, scales, and other types of information gathered and analyzed. Olden and Poff (2005) characterized the temporal trends in native fish distributions within the Lower Colorado River Basin, including 13 of the 14 native fish species on the forests.

Ten of these 13 species have undergone declines in distribution across the basin, with the remaining 3 showing slight increases. The species that have declined are primarily threatened, endangered, and candidate species which include Apache trout, Gila chub, Gila trout, loach minnow, razorback sucker, roundtail chub, and spikedace. The three species that increased are the threatened Little Colorado spinedace; the Desert sucker, which is sensitive; and the speckled dace. The Alpine and Clifton Ranger Districts have significant lengths of streams with occurrences of five or more native fish species.

The recent report, "Ecological Assessment of Arizona's Streams and Rivers, 2000-2004" (Robinson et al. 2006) documents existing conditions for aquatic species. Most of Arizona's streams (70 percent) were determined to be in the most disturbed ecological condition. While this assessment did not specifically address any causative agents relative to these changes, it is likely that they have resulted from numerous changes and impacts that have occurred throughout the State's watersheds, along with past and ongoing introductions of nonnative species.

Population, Distribution, and Habitat

Native fish species occur on 477 miles (63 percent) of the 763 miles of perennial streams on the forests. The speckled dace, Sonora sucker, and desert sucker have the largest distributions, while the Gila trout, Gila chub, and spikedace have the smallest. Streams with occurrences of the loach minnow on national forests in Arizona only occur on the forests. In addition, within national forests in Arizona, over two-thirds of the stream reaches with occurrences of the bluehead sucker (95 percent), Apache trout (80 percent), Gila trout (71 percent), Little Colorado sucker (70 percent), and Little Colorado spinedace (66 percent) occur on the forests (Vander Lee et al. 2006).

No threatened, endangered, proposed, or candidate species occur on the Lakeside Ranger District. Approximately 40 percent of the Black Mesa Ranger District contains action areas for the threatened Little Colorado spinedace and several sensitive fish species. Approximately 50 percent of the Springerville Ranger District contains action areas for several threatened species and several sensitive fish species. Most of both the Alpine and Clifton Ranger Districts include action areas for most (12) of the threatened, endangered, candidate, and sensitive fish species: with listed species covering approximately 95 percent of each district, and sensitive fish covering 85 percent of the Alpine Ranger District and approximately 90 percent of the Clifton Ranger District.

Past and current management has resulted in Apache and Gila trout populations that either will provide for recovery or currently are occupied by these species. Most of the populations and their habitat are being managed above barriers that have been constructed to reduce and limit the ability of the fish downstream of the constructed barrier to gain access to the habitat above. Few

populations are above falls or natural barriers that currently reduce and limit movement of fish species above them. Other threatened, endangered, and sensitive fish species have not been intensively managed like the trout species, and occur across the forests where they have been capable of persisting with little or no active management of species or habitats.

Existing conditions are indicative of past and ongoing management actions. Historical impacts (e.g., grazing, water developments and diversions, timber harvest and roads, fire suppression) resulted in significant impacts to aquatic communities and their watersheds, and the species and habitats of today have not recovered from these prior actions and impacts. Fish populations have been reduced from large interconnected populations to isolated populations within severely altered and degraded habitats. Watershed and hydrologic conditions, along with riparian and aquatic conditions, no longer provide the resiliency and ecological processes and functions across multiple temporal and spatial scales.

The threats facing aquatic ecosystems and fish habitat include: water diversions and impoundments (e.g., lakes, reservoirs, stock ponds); degraded watershed and hydrologic conditions; highly altered infiltration rates associated with soil compaction and loss of vegetative ground cover; excessive sedimentation associated with roads and significantly increased drainage densities, loss of vegetative ground cover, and stream channel down cutting; large-scale stream channel down cutting and the lowering of the water table; the loss of perennial and intermittent streams and the conversion of perennial streams to perennially interrupted or intermittent streams; highly altered and degraded riparian conditions, and riparian vegetation and soil conditions; nonnative fish species and crayfish; and the lack of aquatic habitat diversity, productivity, and resiliency. Present aquatic species distributions and population conditions do not provide for the resiliency necessary for the long-term persistence of most native fish and their communities. Declining conditions are likely to continue from threats and risks at the watershed and landscape scale.

All fish species and their habitats have been impacted directly and indirectly from roads and cross-country travel. Past and ongoing timber harvest and vegetation management activities have resulted in the highest road densities in those watersheds. Apache trout and Little Colorado spinedace have likely been impacted the most by these activities and the associated transportation system. Roads along the Blue River, Eagle Creek, and San Francisco River have had considerable negative impacts to the fish species and populations within these drainages, along with the associated riparian habitat and corridors. The threatened loach minnow and spikedace populations have likely been impacted in these areas, along with the Gila and roundtail chubs.

Road crossings within the species habitats are important indicators of the potential extent of impacts to aquatic and riparian habitats. Where crossings occur upstream of occupied habitat, increased sedimentation rates can impact downstream reaches, both short and long term. The amounts and rates of additional sediment are dependent on several factors and will vary in intensity and duration. Table 35 displays the current number of stream crossings on the forests on both open and closed roads by fish species.

Table 35. Road/stream crossings for existing condition by fish species

Species	No. Open Road/stream Crossings	No. Closed Road/stream Crossings	Total No. Road/stream Crossings
Federally Listed Fish Species			
Apache trout	143	241	384
Gila chub	111	18	129
Gila trout	35	32	67
Loach minnow	699	428	1,127
Spikedace and razorback sucker	318	148	466
Roundtail chub	619	893	1,512
Little Colorado spinedace	392	556	948
Sensitive Fish Species			
Bluehead sucker	446	573	1,019
Desert and Sonora sucker	810	829	1,639
Little Colorado River sucker	238	382	620
Longfin dace	507	162	669

Environmental Consequences

This section includes the direct and indirect effects by alternative and concludes with the cumulative effects. The fisheries specialist report contains detailed information on the effects analysis and is found in the project record. A biological assessment (BA) was prepared for the preferred alternative for fisheries and is in the project record.

Analysis Methods

Analysis areas were defined for the native fish species and included all of the portions of watersheds that drain into habitat occupied by the species or areas identified as recovery habitat for reintroduction of the species. The approach by analyses area was to quantify the components for each alternative based on three parameters: (1) if proposed activity would occur within 250 meters of the species habitat, (2) if proposed activity would occur within 250 meters of any upstream drainage, and (3) the remaining proposed activities that would occur outside the areas associated with the first two parameters (i.e., all upland areas that drain into ephemeral, intermittent, and perennial drainages within the analysis area). For the threatened, endangered, and candidate species, population mapping resulted in 47 analyses areas. For the sensitive species, population mapping resulted in 25 analyses areas. Maps of these analysis areas can be found with the specialist report in the project record. Impacts were evaluated for each alternative.

The following assumptions were used in analysis of the effects on fisheries:

- ML 3-5 roads receive some level of maintenance activity every year such as grading, culvert cleaning, etc.

- Approximately 20 to 25 percent of ML2 roads are maintained every year. This typically results in maintenance that occurs once every 5 years.
- Direct effects are considered to be everything within 250 meters of occupied habitat.
- Indirect effects are considered to be everything outside 250 meters of occupied habitat.
- Although proposed actions have been designated on project maps, they are spatially discontinuous across the forests and are too numerous to analyze site specifically. Therefore, the meaningful comparison of alternatives is limited to changes relative to the existing conditions for the transportation system and off-road travel.
- Roads and their drainage crossings within areas of fish habitat are a source of increased sedimentation that can impact downstream reaches, both short and long term. No site specific information regarding conditions and potential impacts to fish and their habitats directly resulting from road/stream crossings by alternative was available other than the location and count of existing crossings.
- No ground-disturbing actions are associated, authorized, or evaluated with any of the proposed actions within the alternatives, with the exception of the new motorized trails.

Direct and Indirect Effects Common to All Alternatives

- Activities associated with off-road motor vehicle use would accelerate erosion and sediment beyond the historic range of variation and natural geologic rate (Satterlund and Adams 1992). Without disturbances caused by roads and associated activities, stream channel characteristics are less likely to be altered (Furniss et al. 1991).
- Direct impacts are associated with road/stream crossings and where roads are located within or in close proximity to drainages. Sediment and chemicals enter streams at road crossings. Road surfaces, cut banks, fill slopes, bridge/culvert sites, and ditches are all sources of sediment associated with roads. The exposed soil surfaces, as well as the greater sediment transport capacity of increased hydrologic flows, result in higher erosion rates and sediment yields. These impacts include alterations of riparian vegetation, channel morphology, and water quality, resulting in negative impacts to fish and stream habitats.
- During low flow periods, fine sediment deposits fill pools and embed gravel beds, degrading habitats and spawning sites for some fish. During high discharge events, accumulated sediment flushes out and deposits downstream. These impacts include alterations of riparian vegetation, channel morphology, and water quality resulting in negative impacts to fish and their habitats. Road crossings associated with the existing transportation system and continued off-road travel would increase these impacts.
- Where roads and drainages occur upstream of occupied fish habitat, increased sedimentation rates can impact downstream reaches in both the short and long term. Amounts and rates of additional sediment are dependent on several factors and vary in intensity and duration.
- Road density in a watershed affects the collection and transport of water out of the watershed (Burroughs and King 1989). The potential for increases in runoff rates increases with more miles of road. Road closures would be beneficial to water quality if the roads were properly decommissioned and well maintained after closure. A well

maintained, closed road system would result in less sediment from road surface erosion. Roads not proposed for designation to the system may have long-term adverse effects on water quality if they are not properly maintained.

- Direct negative impacts to fish populations include impacts to individuals, changes in channel morphology, loss and alteration of riparian vegetation, and degraded habitat and water quality. Indirect impacts include changes in habitat conditions and impacts to species from increased sedimentation and alterations in water quality.
- The environmental consequences associated with all alternatives fall within forest plan standards and guidelines.

Table 36. Summary of routes and areas within fish habitat by alternative

Species	Routes and Areas in Fish Habitat	Alternative				
		A	B	C*	D	E
Federally Listed Fish Species						
Apache trout	miles open roads	244	310	249	327	271
	miles closed roads	389	399	389	397	407
	acres MBGR	145,591	94,564	94,374	61,478	0
	acres dispersed sites		1,853	4.5 mi	14,975	0
Gila chub	miles open roads	81	98	81	98	94
	miles closed roads	27	27	27	28	32
	acres MBGR	90,155	38,813	37,054	18,406	0
	acres dispersed sites		788	0.4 mi	3,259	880
Gila trout	miles open roads	41	50	42	51	43
	miles closed roads	57	57	57	58	58
	acres MBGR	17,192	14,518	14,386	10,511	0
	acres dispersed sites		18	1.1	2,778	0
Loach minnow	miles open roads	652	767	660	780	720
	miles closed roads	548	576	548	577	594
	acres MBGR	541,519	246,888	240,796	137,247	0
	acres dispersed sites		8,064	8.4 mi	33,033	3,152
Spikedace and razorback sucker	miles open roads	347	383	351	387	365
	miles closed roads	191	204	191	204	219
	acres MBGR	327,513	115,989	113,688	63,422	0
	acres dispersed sites		6,863	4 mi	15,436	2,344
Roundtail chub	miles open roads	950	1,105	966	1,144	1,034
	miles closed roads	1,261	1,381	1,261	1,377	1,417
	acres MBGR	467,625	352,253	343,994	199,847	0
	acres dispersed sites		19,049	11 mi	46,450	3,137

Species	Routes and Areas in Fish Habitat	Alternative				
		A	B	C*	D	E
Little Colorado spinedace	miles open roads	784	881	788	885	837
	miles closed roads	1,039	1,203	1,039	1,206	1,232
	acres MBGR	258,753	250,325	248,241	137,069	0
	acres dispersed sites		19,281	4.4 mi	32,487	2,478
Sensitive Fish Species						
Bluehead sucker	miles open roads	870	969	875	997	930
	miles closed roads	1,125	1,304	1,125	1,293	1,325
	acres MBGR	283,897	274,903	272,291	153,692	0
	acres dispersed sites		20,776	5.5 mi	37,159	2,478
Desert and Sonora sucker	miles open roads	846	1,014	859	1,034	932
	miles closed roads	974	1,011	974	1,009	1,051
	acres MBGR	619,558	333,683	324,802	187,857	0
	acres dispersed sites		9,430	13.4 mi	44,597	3,152
Little Colorado River sucker	miles open roads	616	662	619	664	651
	miles closed roads	837	998	837	996	1,021
	acres MBGR	180,951	175,621	175,621	97,616	0
	acres dispersed sites		18,590	2.8 mi	24,610	2,478
Longfin dace	miles open roads	442	481	447	485	469
	miles closed roads	201	219	201	219	246
	acres MBGR	434,912	158,126	158,126	81,461	0
	acres dispersed sites		6,674	5.1 mi	20,080	3,152

* Under alternative C, there are no dispersed camping corridors designated, rather there are designated camping sites accessible off the 28 miles proposed for addition to the road system. Proportions of those miles are displayed here.

Alternative A

Overall, maintaining existing management under alternative A would have negative effects to fish and their habitats. Table 36 displays the routes and areas within fish species habitat.

Apache trout and Little Colorado spinedace would be impacted the most by road stream crossings and the associated transportation system. These impacts include alterations of riparian vegetation, channel morphology, and water quality resulting in impacts to fish. Roads along the Blue River, Eagle Creek, and San Francisco River would have negative impacts to the fish species and populations within these drainages, along with the associated riparian habitat and corridors. The threatened loach minnow and spikedace populations would be impacted in these areas, along with the Gila and roundtail chub.

Motorized cross-country use is disparately concentrated within riparian areas and areas where water is present. Topography and vegetative conditions limit or preclude accessibility to some

areas. Increasing motorized recreational use increases the potential for impacts to streams and fish from sediment. This use directly damages riparian and aquatic habitat, and certain life stages of fish with no or limited mobility. These same impacts indirectly impact downstream habitat primarily through increased sediment and water quality, as well as other changes in hydrologic conditions.

Determination of Effect for Threatened, Endangered and Candidate Species

- Alternative A, “may affect, likely to adversely affect” (LAA) the following seven species: Apache trout, Gila chub, Gila trout, Little Colorado spinedace, loach minnow, roundtail chub, and spikedace.
- Alternative A, “may affect, not likely to adversely affect” (NLAA) the following species: razorback sucker.
- Alternative A, “may affect, likely to adversely affect” (LAA) critical habitat for the following three species: Gila chub, Little Colorado spinedace, and loach minnow.
- Alternative A, “may affect, not likely to adversely affect” (NLAA) critical habitat for the following species: razorback sucker.

Determination of Effect for Forest Service Sensitive Species

For alternative A, a determination of “may impact individuals or habitat, but will not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species” was found for the bluehead sucker, desert sucker, longfin dace, Little Colorado River sucker, and Sonora sucker and their habitat.

Alternative B

For all species, there would be an increase in the percentage of open and closed roads as shown in table 36 which displays the routes and areas within fish species habitat. Increases in miles of roads for motor vehicle use within action areas would range from 11 to 27 percent for threatened, endangered and candidate species, and between 8 and 20 percent for Forest Service sensitive species (see specialist report for additional information). The percentage of closed roads for all species would increase/range from 1 to 19 percent for all species.

This alternative would result in effects to all 13 fish species analyzed except there would be no direct effects to the Little Colorado River sucker. Both short- and long-term impacts from adding roads to the existing transportation system could result in negative effects to Apache trout, Gila chub, Gila trout, loach minnow, roundtail chub, spikedace, and Little Colorado spinedace. Beneficial effects to these same species could result from roads being closed, the elimination of cross-country travel, and reductions in the acres available for MBGR and motorized dispersed camping. Given the substantial reductions in acres of off-road travel, potential impacts and disturbance to fish species, riparian and aquatic habitat and hydrologic conditions would be reduced.

All the sensitive fish species would be similarly impacted by this alternative as described for the threatened, endangered, and candidate species. The current population and habitat conditions for these species are largely unknown. Impacts would be primarily indirect and associated with increased sedimentation to the species habitat. Most impacts would be within the uplands, occur

throughout the watersheds, and would not be concentrated within the species habitats or drainages upstream of habitats.

Given the distances from motorized use areas, only 45 acres are within fish habitat and there would be no potential direct or indirect impacts to any fish species downstream. The addition of the areas would potentially contribute only a very small impact.

In comparing the overall effects to fish and their habitats, alternative B provides fewer benefits than alternatives C and E, and greater benefits than alternatives A and D.

Determination of Effect for Threatened, Endangered and Candidate Species

- Alternative B, “may affect, likely to adversely affect” (LAA) the following seven species: Apache trout, Gila chub, Gila trout, Little Colorado spinedace, loach minnow, roundtail chub, and spikedace.
- Alternative B, “may affect, not likely to adversely affect” (NLAA) the following species: razorback sucker.
- Alternative B, “may affect, likely to adversely affect” (LAA) critical habitat for the following three species: Gila chub, Little Colorado spinedace, and loach minnow.
- Alternative B, “may affect, not likely to adversely affect” (NLAA) critical habitat for the following species: razorback sucker.

Determination of Effect for Forest Service Sensitive Species

For alternative B, a determination of “may impact individuals or habitat, but will not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species” was found for the bluehead sucker, desert sucker, longfin dace, Little Colorado River sucker, and Sonora sucker and their habitat.

Alternative C

For all species, there would be an increase in the percentage of open and closed roads as shown in table 36 which displays the routes and areas within fish species habitat. Increases in miles of roads for motor vehicle use within action areas would range from 0.5 to 3 percent for threatened, endangered and candidate species and between 0.5 and 2 percent for Forest Service sensitive species (see specialist report for additional information). There would be no change in the percentage of closed roads for all fish species.

This alternative would result in effects to all 13 fish species analyzed, with the exceptions that there would be no direct effects to the Little Colorado River sucker, bluehead sucker, and Little Colorado spinedace. Both short- and long-term impacts from adding roads to the existing transportation system could result in negative effects to Apache trout, Gila chub, Gila trout, loach minnow, razorback sucker, roundtail chub, spikedace, and Little Colorado spinedace. Beneficial effects to these same species could result from the elimination of cross-country travel and reductions in acres available for MBGR. Given the substantial reductions in acres of off-road travel, potential impacts and disturbance to fish species, riparian and aquatic habitat and hydrologic conditions would be reduced.

All the sensitive fish species would be similarly impacted by this alternative as described for the threatened, endangered, and candidate species above. The current population and habitat conditions for these species are largely unknown. Impacts would be primarily indirect and associated with increased sedimentation to the species habitat. Most impacts would be within the uplands, occur throughout the watersheds, and would not be concentrated within the species habitats or drainages upstream of habitats.

Overall, in comparing effects to fish and their habitats, alternative C provides the greatest benefits, relative to alternatives A, B, D, and E.

Determination of Effect for Threatened, Endangered and Candidate Species

- Alternative C, “may affect, likely to adversely affect” (LAA) the following seven species: Apache trout, Gila chub, Gila trout, Little Colorado spinedace, loach minnow, roundtail chub, and spikedace.
- Alternative C, “may affect, not likely to adversely affect” (NLAA) the following species: razorback sucker.
- Alternative C, “may affect, likely to adversely affect” (LAA) critical habitat for the following three species: Gila chub, Little Colorado spinedace, and loach minnow.
- Alternative C, “may affect, not likely to adversely affect” (NLAA) critical habitat for the following species: razorback sucker.

Determination of Effect for Forest Service Sensitive Species

For alternative C, a determination of “may impact individuals or habitat, but will not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species” was found for the bluehead sucker, desert sucker, longfin dace, Little Colorado River sucker, and Sonora sucker and their habitat.

Alternative D

For all species, there would be an increase in the percentage of open and closed roads as shown in table 36 which displays the routes and areas within fish species habitat. Increases in miles of roads for motor vehicle use within action areas would range from 13 to 34 percent for threatened, endangered and candidate species, and between 8 and 22 percent for Forest Service sensitive species (see specialist report for additional information). The change in closed roads would range from 2 to 19 percent for all species.

This alternative would result in effects to all 13 fish species analyzed, with the exception that there would be no direct effects to the Little Colorado River sucker. Both short and long-term impacts from adding roads to the existing transportation system could result in negative effects to Apache trout, Gila chub, Gila trout, loach minnow, roundtail chub, spikedace, and Little Colorado spinedace. Beneficial effects to these same species could result from roads being closed, the elimination of cross-country travel, and reductions in the acres available for MBGR and motorized dispersed camping. Given the substantial reductions in acres of off-road travel, potential impacts and disturbance to fish species, riparian and aquatic habitat, and hydrologic conditions would be reduced.

All the sensitive fish species would be similarly impacted by this alternative as described for the threatened, endangered, and candidate species above. The current population and habitat conditions for these species are largely unknown. Impacts would be primarily indirect and associated with increased sedimentation to the species habitat. Most impacts are within the uplands, occur throughout the watersheds, and would not be concentrated within the species habitats or drainages upstream of habitats.

Given the distances from motorized use areas, only 45 acres are within fish habitat and there are no potential direct or indirect impacts to any fish species downstream. The addition of the areas would potentially contribute only a very small impact to cumulative effects.

Overall, in comparing effects to fish and their habitats, alternative D provides the least benefits, relative to alternatives B, C, and E.

Determination of Effect for Threatened, Endangered and Candidate Species

- Alternative D, “may affect, likely to adversely affect” (LAA) the following seven species: Apache trout, Gila chub, Gila trout, Little Colorado spinedace, loach minnow, roundtail chub, and spikedace.
- Alternative D, “may affect, not likely to adversely affect” (NLAA) the following species: razorback sucker.
- Alternative D, “may affect, likely to adversely affect” (LAA) critical habitat for the following three species: Gila chub, Little Colorado spinedace, and loach minnow.
- Alternative D, “may affect, not likely to adversely affect” (NLAA) critical habitat for the following species: razorback sucker.

Determination of Effect for Forest Service Sensitive Species

For alternative D, a determination of “may impact individuals or habitat, but will not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species was found for the bluehead sucker, desert sucker, longfin dace, Little Colorado River sucker, and Sonora sucker and their habitat.

Alternative E

For all species, there would be an increase in the percentage of open and closed roads as shown in table 36 which displays the routes and areas within fish species habitat. Increases in miles of roads for motor vehicle use within action areas would range from 5 to 15 percent for threatened, endangered and candidate species, and between 6 and 10 percent for Forest Service sensitive species (see specialist report for additional information). The change in closed roads would range from 2 to 22 percent for all species.

This alternative would result in effects to all 13 fish species analyzed, with the exception that there would be no direct effects to the Little Colorado River sucker. Both short- and long-term impacts from adding roads to the existing transportation system could result in negative effects to Apache trout, Gila chub, Gila trout, loach minnow, roundtail chub, spikedace, and Little Colorado spinedace. Beneficial effects to these same species could result from roads being closed, the

elimination of cross-country travel, which includes no provisions for MBGR and provides a minimal (118 miles) amount of roads for general access and for motorized dispersed camping.

All the sensitive fish species would be similarly impacted by this alternative as described for the threatened, endangered, and candidate species above. The current population and habitat conditions for these species are largely unknown. Impacts will be primarily indirect and associated with increased sedimentation to the species habitat. Most impacts would be within the uplands, occur throughout the watersheds, and would not be concentrated within the species habitats or drainages upstream of habitats.

Overall, in comparing effects to fish and their habitats, alternative E provides greater benefits than alternatives A, B and D, and is less beneficial than alternative C.

Determination of Effect for Threatened, Endangered and Candidate Species

- Alternative E, “may affect, likely to adversely affect” (LAA) the following seven species: Apache trout, Gila chub, Gila trout, Little Colorado spinedace, loach minnow, roundtail chub, and spikedace.
- Alternative E, “may affect, not likely to adversely affect” (NLAA) the following species: razorback sucker.
- Alternative E, “may affect, likely to adversely affect” (LAA) critical habitat for the following three species: Gila chub, Little Colorado spinedace, and loach minnow.
- Alternative E, “may affect, not likely to adversely affect” (NLAA) critical habitat for the following species: razorback sucker.

Determination of Effect for Forest Service Sensitive Species

For alternative E, a determination of “may impact individuals or habitat, but will not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species was found for the bluehead sucker, desert sucker, longfin dace, Little Colorado River sucker, and Sonora sucker and their habitat.

Cumulative Effects on Fisheries

Effects of past projects were incorporated into the description of the affected environment. Present and foreseeable future activities on the forests were determined from the SOPA, which can be found in the project record. As specific impacts are unknown and implementation is on a forestwide scale, cumulative effects are described generally to give an idea of the significance of the activity. The project types listed here summarizes the past, present, and future activities that would add cumulative effects, and the specific projects are listed in appendix E. These particular types of projects were determined to potentially provide cumulative impacts to fish species and habitats in addition to direct and indirect effects described above.

Timber Harvest and Vegetation Management: These projects include timber harvest, vegetation treatments, fuel reductions, wildland-urban interface treatments, forest restoration, and firewood harvesting. Past timber harvests have resulted in substantial impacts to watersheds, hydrologic conditions, riparian and aquatic habitat, and fish species (especially in vegetated areas with high timber resources: ponderosa pine, mixed conifer, spruce-fir, etc.). This activity has

resulted in most of the existing transportation system present today, especially ML1 and ML2 roads. More recent vegetation treatments have had fewer impacts, but still contribute cumulative effects, especially given resource conditions and ecological processes highly altered from legacy impacts. Firewood collecting and harvesting is a widespread activity. It occurs extensively within timber harvest areas, but also occurs as part of or within vegetation treatments in woodland areas.

Fire Management: Prescribed burning has been used for managing fuels for the last 10 to 20 years. Fire management has both short- and long-term impacts that are positive and negative for fisheries, and cumulatively these impacts are dependent on existing resource conditions. There are two prescribed fires in the SOPA, listed in appendix E.

Livestock Grazing: Grazing livestock has occurred for over a century across the forests, resulting in overgrazing—especially within riparian areas—and has contributed to degraded riparian and aquatic habitats. Livestock grazing is continuing over most of the forests, although some areas are excluded for resource recovery reasons. Infrastructure development and maintenance of grazing allotments is substantial. Impacts to aquatic habitat and species, hydrologic conditions and processes, and riparian and upland conditions have occurred, and would continue.

Road and Trail Construction and Maintenance: While roads and trails are necessary for management of the forests, they are responsible for considerable landscape scale changes to the functioning and maintaining of ecological processes. Maintenance activities for roads and trails result in positive and negative benefits, depending on timing and frequency. These impacts are ongoing and are a major contributor to cumulative effects to fish and their habitats from resulting sedimentation deposited into drainageways and streams.

Special Uses and Permits/Minerals Management/Land Exchanges: Hundreds of permits have been issued including permits for outfitter and guiding activities, firewood, road easements, plant and minerals collection, gravel and cinder pits, and ditch bill easements. All of these activities can result in impacts to watersheds, riparian areas, and aquatic habitat and species, and contribute to cumulative effects, especially water development and diversion projects. Land exchanges have resulted in acquisition of riparian habitat (and in some cases associated water rights) that could help improve or maintain the status of some aquatic species.

Dam and Reservoir Development/Water Developments and Diversions: These projects have resulted in considerable impacts to aquatic habitat and species, directly and indirectly. Dam and reservoir development occurred from the late 1800s to the 1950s. Most activity was to provide for downstream water use and recreational opportunities. Most dams and water diversions have detrimental cumulative impacts to aquatic species and habitats, have isolated or separated populations, and dewatered or introduced nonnative species upstream and downstream.

Fisheries and Wildlife: Fisheries habitat improvement in streams began in the 1930s on the forests. These efforts were in response to degraded habitats and were focused on higher elevation trout streams, intended to stabilize streams and provide pool habitat that had been reduced. Considerable efforts in the 1990s improved habitat conditions for Apache trout recovery through habitat improvement structures within streams, primarily on the Springerville Ranger District.

Cultural Resources

Cultural resources represent the tangible and intangible evidence of human behavior and past human occupation. Cultural resources may consist of archaeological sites, historic age buildings and structures, and traditional use areas and cultural places that are important to a group's traditional beliefs, religion or cultural practices. These types of resources are finite and nonrenewable. This section describes a summary of the existing condition of cultural resources and the effects analysis in regards to "Issue 3, Impacts to Resources from Motorized Use." Please refer to the full cultural resource specialist report found in the project record. The criteria used for comparing the existing condition to the alternatives are based on the following:

- Number of cultural resources (sites) eligible or listed on the National Register of Historic Places that would potentially be impacted by motorized use.
- Potential impacts to contemporary tribal uses, including traditional cultural properties, from designating a road and motorized trail system.

The National Historic Preservation Act (NHPA), as amended, and its implementing regulations require that Federal agencies consider the effects of their undertakings on "historic properties." The term "historic properties" refers to cultural resources, both prehistoric and historic, that are listed or eligible for listing in the National Register of Historic Places (NRHP). Cultural resources that have not been evaluated for the register are treated as if eligible and are afforded the same consideration as historic properties.

The Southwestern Region has a programmatic memorandum of agreement (PA) with the Advisory Council on Historic Preservation (ACHP) and State Historic Preservation Officers (SHPOs) that stipulates the Forest Service's responsibilities for complying with NHPA (USDA FS 2003). This agreement provides for the development of standard consultation protocols for common or special undertakings such as the Travel Management Rule. The Southwestern Region has developed a standard consultation protocol for travel management route designation as appendix I of the PA which outlines the process for compliance with Section 106 of the NHPA (USDA FS 2007c). By following the procedures of the protocol, the ACHP and the SHPOs have agreed that the Forest Service will satisfy legal requirements for the identification, evaluation, and treatment of historic properties. The Apache-Sitgreaves National Forests are complying with the protocol for designating roads, trails and areas in lieu of standard consultation in the PA and the council's regulations (36 CFR 800).

Existing system roads and trails and their associated constructed features already open for motorized use are exempt from further Section 106 review or consultation. The Southwestern Region, ACHP and SHPOs agree that if cultural resources are present on these roads and motorized trails, they were likely impacted by the original construction, maintenance, and use. Some level of disturbance from continued motorized use on these existing routes can be accepted.

Affected Environment

Currently, 1.6 million acres of the forests' 2.1 million acres are open to motorized use. However, not all of the 1.6 million acres are accessible by motorized cross-country travel; approximately 248,000 acres have a slope greater than 40 percent, and in other areas some types of vegetation limit cross-country travel. Cultural resources on the forests indicate human presence beginning in the late Paleoindian period and continuing into the present (table 37). Specific Paleoindian sites

have not been recorded, but projectile points such as Folsom and Clovis have been documented as isolated surface artifacts on the forests. The Archaic period sites are represented by dispersed artifact scatters, bedrock mortars, rock-filled roasting pits, rock shelters, and a variety of dart points such as Pinto, Jay, Elko, and Gypsum. In general, sites dating to this period are located in all vegetation types. Basketmaker II-III period sites are sparser on the forests. Most sites with pithouses are found within pinyon-juniper woodlands. Pueblo I period sites include pithouse villages, above ground habitation structures, and artifact scatters and are generally located within pinyon-juniper woodlands and pine-oak forests.

Habitation of the forests dramatically increased during the Pueblo II - early Pueblo III period. Approximately 70 percent of all documented sites date to this period and are associated with archaeological cultures identified as the Mogollon and Anasazi. The most numerous sites from this period are 1- to 2-room masonry structures. Some sites consist of multiple roomblocks of around 40 rooms with features and artifacts, and several large sites include great kivas.

Table 37. Temporal periods and cultural phases on the forests

Temporal Periods/Cultural Phases			Calendar Years
	Anasazi (Pecos)	Highland Mogollon (Haury)	
Paleoindian			9500 – 6500 BC
Archaic			6500 – 400 BC
Early Agriculture	Basketmaker II- III	Hilltop	400 BC – AD 800
Formative	Pueblo I	Corduroy	AD 800 – 1000
	Pueblo II	Carrizo	AD 1000 – 1150
	Pueblo III	Pinedale	AD 1150 – 1300
Proto-historic	Pueblo IV		AD 1300 – 1540
Historic	Pueblo V		AD 1540 – Present
			AD 1600 – Present

During the Pueblo III period, there was a steep decline in the number of sites on the forests but an increase in the number of rooms per site (Donaldson n.d.). Water and soil control features are widespread and far more common than in previous times, particularly along the Little Colorado River. Shortly after the beginning of the Pueblo IV period, Bailey Ruin—a large 200 to 250 room pueblo—appears to have been inhabited no later than A.D. 1325 (Mills et al. 1999). Nearby sites, such as Fourmile Ruin, continue to be occupied at least into the mid-1300s. By the mid-1400s, the forests were no longer used for permanent habitation but continued to be used on a temporary basis by the Zuni, Hopi and Acoma, descendants of the Mogollon and Anasazi.

Evidence of various Apache tribes using the area suggests that they arrived in the 1600s. However, the Apache themselves believe that they have always been in what is now Arizona. Apache use generally appears to have been seasonal and evidence of their presence includes artifact assemblages, temporary brush structures, and limited activity areas for processing and collecting resources. Areas along Show Low and Eagle Creeks show evidence for relatively long-term intensive use (Donaldson n.d.). Other known sites occur in the pine-oak forests.

Historic Euro-American use begins in the 1860s and continues to the present. Two military forts were founded in the area, Milligan Fort (Springerville) and Camp Mogollon (Fort Apache) in 1870 (Plog 1981b). General George Crook established a supply and transportation route along the Mogollon Rim between Camp Verde and Camp Mogollon (later Fort Apache) (Jacobs 1980). This transportation and supply route became known as Crook's Road and was used into the early 1900s and is now a designated national recreation trail.

More Euro-American settlers came to the area after the establishment of reservations in the 1870s. These settlers developed an extensive irrigation ditch system for farming in the surrounding valley (Plog 1981b), and some of these irrigation ditches are located on the forests and are still in use today. The Atlantic and Pacific Railroad reached Holbrook in 1880 and resulted in an economic boom for the region (Lightfoot 1978). After the arrival of the railroad, sheep and cattle grazing became widespread throughout the Mogollon Plateau. Lightfoot (1978) notes that populations near the settlements of Pinedale, Heber, and Taylor continued to grow until 1900, along with increased tensions between the cowboy and Mormon factions. Remains of homesteads, cabins, and improvements for ranching and farming dating to this period are found across the forests, primarily near communities.

The Black Mesa Forest Reserve was established in 1898, of which a part became the Apache National Forest in 1908. The Sitgreaves National Forest was established in 1908. By 1917 the commercial logging industry was established. During the 1920s, an extensive network of logging railroads were constructed, primarily on the Sitgreaves forest. By the time the depression was over, logging trucks had replaced railroads as the primary means of transporting timber. Most logging railroads in the forests were not used after 1939 and were dismantled in 1944 (Lightfoot 1978). The remains of logging railroad features with associated camps dating from the 1920s to 1940s are found today throughout the forests.

Other historic transportation routes are found within the forests. A 1912 map of Arizona shows several wagon routes passing through the forests between towns (Keane and Bruder 2003). By the 1920s, most roads through the forests still had not been graded or paved, but by the 1930s several roads had been graveled and U.S. 60, State Route 77, and portions of State Route 260 had been constructed (Keane and Bruder 2003). During the 1930s, the Civilian Conservation Corp (CCC) made improvements along the Blue Road and constructed other roads within the forests. Some of these roads are linear historic properties that may be eligible for the NRHP.

Between 1933 and 1942, several CCC camps were established on the forests where employees of the CCC performed innumerable outdoor conservation projects under the guidance of other Federal agencies (Collins 1999). Included in these projects were the construction of campsites and shelters, installation of telephone lines, boundary fencing, trail, road, and bridge building, the construction of numerous other buildings, and various forestry endeavors across the forests (Moore 2006). The CCC also erected seven fire lookout towers. Two administrative sites were built at Water Canyon and Pinedale, both are still used today. Remnants of all these activities can be found throughout the forests.

Site Types, Distribution and Probability Areas

At present, a total of 6,314 archaeological sites are recorded on the forests. Many sites are eligible for listing on the NRHP. According to current forest GIS data, as many as 2,107 previously identified sites are within 300 feet of forest roads and trails (open and closed), and as many as

5,228 sites are within 1 mile of proposed open system roads and trails. As of 2010, approximately 1,091,498 acres of the forests have been sample surveyed, of which 376,863 acres have been intensively surveyed for cultural resources (ASNF heritage GIS and INFRA databases).The following provides information on site types and densities within the area of potential effect (APE) for the alternatives.

Prehistoric sites include (summarized from Plog 1978, 1981a, 1981b), but are not limited to, artifact scatters, shrines, rock shelters, pithouses, pueblo sites and great kivas. Plog (1981a) also discusses historic age sites found on the forests that include, but are not limited to, Apache temporary camps and sweat lodges, military trails and roads, battlefields, ranch and farm homesteads, logging camps and railroads, sawmills, and temporary ranch activity camps. A detailed list of site types can be found in the cultural resources specialist report in the project record.

Donaldson (n.d.) found that within natural drainage basins there is a strong correlation of prehistoric site frequency and elevation. The majority of sites are found within the middle and upper Little Colorado drainage basins between 6,000 and 7,000 feet. Around 75 percent of sites are found at these elevations. The next largest percentage (13 percent) of sites falls between 7,000 and 8,000 feet in elevation. Very few sites are found below 6,000 feet and above 8,000 feet within the APE. Donaldson also found that corresponding to the 6,000 to 8,000 foot elevation, sites predominantly fall into either pinyon-juniper woodlands (41 percent) or ponderosa pine-oak forests (13 percent). The majority of sites within the Salt-Gila drainage basin are found below 7,200 feet.

A 2003 study found that a majority of prehistoric sites on the Sitgreaves National Forest were found below 6,800 feet, often on ridges or hills and not as often on flood plains, as opposed to historic sites which are most often found on flood plains (North 2003). Fifty-eight percent of the prehistoric sites were located in ponderosa pine forests, a much higher percentage than Donaldson's results.

Recent analysis of site location data in relation to terrestrial ecosystem system (TES) units has also revealed patterns that can be used to predict where sites are most likely to be located, in order to understand potential impacts to cultural resources. Based on heritage GIS data, 15 TES units have areas of high site density (greater than or equal to 1 site per 20 acres). This data can be used to determine where previously unrecorded sites may be located within the APE.

Traditional Cultural Properties

TCPs are properties associated "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 identify of the community" (National Park Service, 1998). TCPs range from mountains and other landforms to plant gathering locations to communities. Five American Indian tribes represented by nine separate tribal governments have traditional ties to lands within the forests: Western Apache, Zuni, Hopi, Navajo and Yavapai. The lands, resources, and sites within the forests are considered traditionally significant to all affiliated tribes and, in some cases, certain resources or areas are considered sacred to a specific tribe. There are known traditional use areas and cultural places located within the forests. For the effect to TCPs and further discussion, see the "Contemporary Tribal Uses" section of this chapter.

Existing Impacts to Sites

Forest use has impacted cultural resources as displayed in table 38. Of the 6,255 recorded sites on the forests, 5,324 have the potential to be impacted by the alternatives. To assess the existing condition of known cultural resources, site records for 2,107 of the 5,324 sites were reviewed to determine the existing condition of sites. The list of sites was selected by overlaying the forests' heritage GIS site location data with a 300-foot buffer over the forests' GIS transportation system. This created a list of known sites within a 600-foot corridor along roads and motorized trails. Accurate electronic data for NRHP eligibility status for all 5,324 sites was unavailable. However, NRHP eligibility status for the 2,107 sites for which records were reviewed indicate that many sites are eligible for NRHP listing, 6 are listed on the NRHP, and 38 have been determined ineligible for the NRHP.

Table 38. Summary of previous impacts to archaeological sites

Type of Activity	Direct and Indirect Effects	Number of Sites Affected
System roads (most constructed for timber harvest)	Displacement, alteration and damage to features and artifacts. Compaction Erosion	626
Grazing	Disturbance by cattle or sheep Trampling, crushing, compaction Pushing and chaining damage to features and artifacts. Erosion	112
Fire and fire related activities	Destruction, alteration and damage to features and artifacts. Re-firing, melting, spalling Erosion	198
Timber harvest (sawtimber, pulpwood, firewood, temporary roads)	Displacement, alteration and damage to features and artifacts. Removal of artifacts Erosion	191
Recreational activities	Unintentional vandalism (clearing features and artifacts for camping, reuse of features and masonry for camping).	44
Looting and vandalism	Removal of artifacts, displacement, alteration and damage of features and artifacts. Destruction of features	98
Motorized big game retrieval	None noted	Unknown

Roads have partially damaged or completely destroyed sites and cultural materials by excavation or grading away of soil. Of the 2,107 site records and heritage GIS data, 626 sites have been impacted by road construction. Over 100 sites have been impacted by non-forest system roads (temporary logging roads, unclassified roads, or unauthorized roads). While the construction and use of roads (both official and user created) in and near sites have directly impacted sites, the presence of roads in and near sites also can indirectly affect site condition, primarily from intentional vandalism (looting).

As transportation technology has advanced (i.e. 4-wheel drive) a greater number of roads have provided access to remote areas. Studies conducted in the late 1970s and early 1980s on the behavior and impacts by looters documented that these individuals prefer small to large prehistoric masonry sites accessible by maintained roads, within a driving distance of 1 to 20 miles, and that do not require walking more than a few hundred yards (Nickens, Larralde and Tucker 1981). Lightfoot and Francis (1978) conducted studies on the forests. They documented that unimproved jeep roads and trails within the Little Colorado Planning Unit appeared to have no other purpose than to provide access directly to sites. Lightfoot (1978) found there is a correlation between the amount of illegal surface collecting of artifacts from sites, and the distance and visibility of the site from a road. Of the 98 sites that have been looted within the APE, 38 sites are within 30 feet of roads, and 63 are within 100 feet of roads. Almost all looted sites are located along unmaintained (ML1) and high-clearance roads (ML2). Records document additional sites farther than 300 feet from a system road that have been looted and accessed by unauthorized roads (Taylor 2006; Mahalic 2006; Schroeder 2009). Most of the looted sites are near communities.

Impacts to sites from logging sawtimber, commercial and noncommercial firewood harvests, livestock grazing, past wildfires, and recreation uses have occurred. Impacts from livestock have occurred to 112 sites. In 2002, the Rodeo-Chediski Fire impacted 128 sites. Cross-country OHV use and camping have impacted sites by unauthorized roads, or in areas where there are no roads. Fifteen of the 2,107 sites are on or near forest trails. Hiking trails do not themselves pose a large threat to sites; it is more likely that, like roads, easy access to sites facilitates vandalism, casual surface collection, and looting. The majority of sites on the forests are located within the pinyon-juniper woodlands which have less intensive recreational use.

There is no existing quantifiable data for impacts to sites caused from MBGR, but information is available from the Arizona Game and Fish Department about permits and successful hunts. Data from 2005-2009 were available for several species, but only the data for species being considered for MBGR in the alternatives was analyzed. Site densities within game management units (GMU) vary from 0.45 to 4.74 sites per square mile. The GMUs with the highest site densities—3C, 4A, and 4B—are all within the Black Mesa and Lakeside Ranger Districts. These GMUs are the most vulnerable to OHV impacts from MBGR. Thousands of acres have been surveyed for cultural resources and no adverse impacts specific to MBGR have been documented to sites. The impacts from cross-country motorized travel specifically for MBGR have been negligible and are not known to have caused adverse effects to the character and use of cultural resources.

Environmental Consequences

This section includes the direct and indirect effects by alternative and concludes with the cumulative effects. The criteria used for establishing the APE was based on:

- Miles of new roads to be opened with a 30-meter buffer.
- Miles of fixed width corridors for motorized access to dispersed camping (600-foot total width).
- Number of acres open for proposed MBGR (¼ mile or 1 mile).
- Acreage of open areas designated for cross-country motorized use.

Before implementation of the selected alternative, the forests will comply with the procedures stated in the protocol. Until the necessary surveys or analysis are completed and the SHPO has concurred with the determination that the action would have no adverse effect on cultural resources, the proposed routes, corridors or areas would not be published on the MVUM. If the proposed activity has the potential to adversely affect cultural resources, protection measures (including but not limited to rerouting, barriers, temporary closures, eliminating the route, monitoring) would be required prior to the route, corridor or area being open for motorized use and published on the MVUM (see appendix D for mitigation).

An adverse effect is when an undertaking may alter, directly or indirectly, any characteristics of a historic property that qualify it for inclusion in the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Specific examples of adverse effects cited in statute include (36 CFR 800.5):

- Physical destruction of or damage to all or part of the property.
- Removal of the property from its historic location.
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance.
- Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features.

Direct and Indirect Effects Common to All Alternatives

Under all alternatives, motorized use on roads, trails and areas could directly impact archaeological sites by displacing and rutting soil which could alter and damage artifacts and features; removing or changing the context of artifacts; and crushing artifacts. It is assumed that some roads and trails currently open to motorized use have already had impacts to cultural uses, and continued use of those roads and trails would not substantially increase the level of effects. The potential for these impacts to occur increases depending on site type, soils, and season of travel (wet vs. dry). Sites located on non-sensitive soils are less likely to be impacted from motor vehicles. Generally the forests restrict motorized travel during the winter and early spring to prevent damage to roads, which also minimized damage to artifacts.

Motorized use within and on travel routes and corridors can cause indirect impacts to archaeological sites by creating ruts and compaction resulting in changes to the waterflow that may create rills and gullies, accelerating the removal of soil, and displacement of cultural materials. Sites located on routes, corridors or in open areas that include sensitive soils would have a higher potential to be indirectly impacted by erosion. Increasing motorized access also increases the potential of indirect adverse effects to remote sites by vandalism. Vandalism of sites includes intentional activities like illegal excavation (looting), damage or destruction to extant standing architecture or rock art, and collection of surface artifacts. Motorized use may remove vegetation that protects and covers archaeological materials. When these materials are exposed and visible on the surface of visited sites, the more decorative artifacts and collectable historic objects disappear from illegal collecting. When a site is looted, significant contextual information is stolen and destroyed.

Table 39. Number of known heritage sites potentially impacted by alternative by proposed activity

Activity Description	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Adding unauthorized roads to the system	No change	45	10	0	57
Opening closed roads	No change	45	No change	60	45
Dispersed camping corridors and areas	No change	153	0	386	35
Motorized trails (converted from closed or open roads)	No change	3	No change	8	1
Motorized trails (converted from unauthorized routes)	No change	3	No change	18	3
Motorized use areas	No change	0	No change	0	No change

Table 40. Number of known heritage sites within game management units that are open to MBGR by alternative

GMU	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
1	506	368	350	211	NA
3A	46	47	47	27	NA
3B	301	177	177	101	NA
3C	2,377	2,252	2,256	1,336	NA
4A	1,047	974	1,017	458	NA
4B	1,261	1,192	1,162	641	NA
27	555	312	309	268	NA
28	16	2	2	2	NA
Total	**6,109**	**5,324**	**5,320**	**3,044**	NA

Alternative A

Per the protocol, the existing designated road and trail system open to motor vehicle travel need not be re-evaluated for the TMR. Under this alternative, designation on the MVUM for existing roads and trails will not be considered an undertaking subject to Section 106 review. However, sites on or near unauthorized roads have the potential to be impacted by motor vehicles.

Motorized cross-country travel is used to access dispersed campsites. Dispersed camping activities may cause unintentional vandalism to cultural sites. Campers have taken rocks from prehistoric structures to build campfire rings and wind breaks; used rocks from features as tent weights; dug holes for latrines or buried garbage; collected pieces of wood from collapsed wooden structures for campfires; and rearranged artifacts into piles. In areas where previous disturbance has occurred, motorized dispersed camping is not expected to cause additional impacts that could change the characteristics and integrity that make the site eligible for the National Register. In areas not previously disturbed, direct effects from motor vehicles in dispersed camping corridors could occur. In is expected that motorized dispersed camping would

not cause adverse effects to cultural sites as most corridors are located in areas of low site density. To minimize or prevent indirect adverse impacts, protection measures may be implemented.

Cross-country motorized travel would be allowed, increasing the potential to adversely impact sites. In addition, since no restrictions are placed on MBGR, sites have the potential to be impacted (table 40). However, no adverse impacts have been documented to sites from MBGR and any potential impacts are not expected to be adverse. Alternative A would have no adverse effect to cultural resource sites with the applicable mitigation measures in place (table 39).

Alternative B

Alternative B has the potential to impact cultural resources (table 39). As proposed under this alternative, converting closed roads to open, adding unauthorized routes to the system, and fixed width corridors could have direct and indirect impacts to sites. There are 46 miles of closed roads proposed to be converted to open roads which would be surveyed. Surveys have been completed for the Alpine, Clifton, and Springerville Ranger Districts. Trails and roads still need to be surveyed on the Lakeside and Black Mesa Ranger Districts.

The designation of 1 mile from either side of designated roads for MGBR could impact sites (table 40). The number of trips are expected to be limited for MBGR and would be spread across the forests in various locations. Due to this expected low level of use in any one area, there would be low potential for any adverse impacts to sites. There have been no documented adverse affects to any known sites as a result of MBGR to date on the forests. There are three game management units (GMUs) that have a higher site density than other units: 3C, 4A, and 4B. Within these three GMUs, MBGR would have a higher potential for motorized users to come in contact with cultural sites, however, the impacts are not expected to be adverse.

Most of the sites (153 sites) are located within the dispersed camping corridors. Approximately 402 miles of the dispersed camping corridors are adequately surveyed. The remaining 256 miles of corridors would be surveyed within the next year following the travel management survey strategy. All proposed new ATV trails and identification of new routes used to access dispersed camping would be surveyed by the end of the calendar year. The effects from dispersed camping would be similar to that described under alternative A, however, the number of acres for dispersed camping would be less under this alternative (48,000 acres).

The proposed motorized use areas (459 acres) are expected to have no direct or indirect impacts on cultural resources. Of the five areas proposed open for motorized use, three have been completely surveyed and no known sites are located in these areas. The remaining two to be surveyed are on the Black Mesa Ranger District and are in low site density areas.

Mitigation measures may need to be implemented on sites located along some proposed roads and motorized trails. There are known sites that are being impacted or at risk of being adversely impacted by the proposed roads and motorized trails. For these areas, natural barriers (such as logs or cactus) will be installed to prevent current or future intrusions on the sites. In some cases, the non-system route would need to be relocated to avoid the impacted site.

Cultural resources have potential to be impacted by unintentional and intentional disturbance of sites from motorized vehicle activities, but these effects would likely be less than for alternatives that propose greater access (alternatives A and D). By eliminating motorized cross-country travel, the potential impacts to cultural resources would be reduced due to less area open to use by motor

vehicles, which would result in a beneficial effect to cultural resources. Alternative B would have no adverse effect to cultural resource sites with applicable mitigation measures in place.

Alternative C

Alternative C has the potential to impact cultural resources (table 39). This alternative is similar to alternative A, but eliminates cross-country travel and adds 28 miles of non-system roads for general access and motorized access to dispersed campsites. The effects from dispersed camping would be similar to that described under alternative A, however, the number of acres would be less (2,000 acres). No currently closed roads are proposed to be opened. By not opening currently closed roads, this could reduce the potential for additional impacts to cultural resources. There are no motorized use areas proposed.

The designation of 1 mile from either side of designated roads for MGBR, could impact sites (table 40). The number of trips are expected to be limited for MBGR and would be spread across the forests in various locations. Due to this expected low level of use in any one area, there would be low potential for any adverse impacts to sites. There have been no documented adverse affects to any known sites as a result of MBGR to date on the forests. There are three game management units (GMUs) that have a higher site density than other units: 3C, 4A, and 4B. Within these three GMUs, MBGR would have a higher potential for motorized users to come in contact with cultural sites, however, the impacts are not expected to be adverse.

Cultural resources have potential to be impacted by unintentional and intentional disturbance of sites from motorized vehicle activities, but these effects would likely be less than the other alternatives, which propose greater access. By eliminating motorized cross-country travel, the potential impacts to cultural resources would be reduced due to less area open to use by motor vehicles, which would result in a beneficial effect to cultural resources. Alternative C would have no adverse effect to cultural resource sites with applicable mitigation measures in place.

Alternative D

Alternative D has the potential to impact cultural resources (table 39). As proposed under this alternative, converting closed roads to open, adding unauthorized routes to the system, and fixed width corridors could have direct and indirect impacts to sites. There are 46 miles of closed roads proposed to be converted to open roads which would be surveyed.

The designation of one-quarter mile from either side of designated roads for MGBR could impact sites (table 40). The number of trips are expected to be limited for MBGR and would be spread across the forests in various locations. Due to this expected low level of use in any one area, there would be low potential for any adverse impacts to sites. This potential is less under this alternative than alternatives B and C since there is less area proposed for MBGR for alternative C. There have been no documented adverse affects to any known sites as a result of MBGR to date on the forests. There are three game management units (GMUs) that have a higher site density than other units: 3C, 4A, and 4B. Within these three GMUs, MBGR would have a higher potential for motorized users to come in contact with cultural sites, however, the impacts are not expected to be adverse.

Most of the sites (386 sites) are located within the dispersed camping corridors. Approximately 974 miles of the dispersed camping corridors are adequately surveyed. The remaining 1,059 miles of corridors would be surveyed following the travel management survey strategy. Based on the

forests current and future funding, it may not be possible to complete the necessary surveys within 3 years of the decision. The effects from dispersed camping would be similar to that described under alternative A, however, the number of acres for dispersed camping would be less under this alternative (148,000 acres).

The proposed motorized use areas (459 acres) are expected to have no direct or indirect impacts on cultural resources. Of the five areas proposed open for motorized use, three have been completely surveyed and no known sites are located in these areas. The remaining two to be surveyed are on the Black Mesa Ranger District and are in low site density areas.

Mitigation measures may need to be implemented on sites located along some proposed roads and motorized trails. There are known sites that are being impacted or at risk of being adversely impacted by the proposed roads and motorized trails. For these areas, natural barriers (such as logs or cactus) will be installed to prevent current or future intrusions on the sites. In some cases, the non-system route would need to be relocated to avoid the impacted site.

Alternative D proposes the largest amount of corridors resulting in the highest potential for intentional and unintentional vandalism, illegal collection of surface artifacts, and indirect impacts caused by motorized use near sites compared to alternatives B, C and E. By eliminating motorized cross-country travel, the potential impacts to cultural resources would be reduced due to less area open to use by motor vehicles which would result in a beneficial effect to cultural resources. Alternative D would have no adverse effect to cultural resource sites with applicable mitigation measures in place.

Alternative E

Alternative E has the potential to impact cultural resources (table 39). As proposed under this alternative, converting closed roads to open, adding unauthorized routes to the system, and fixed width corridors could have direct and indirect impacts to sites. There are 4.5 miles of closed roads proposed to be converted to open roads which would be surveyed. There are no motorized use areas or MBGR proposed under this alternative.

Approximately 50 miles of the dispersed camping corridors are adequately surveyed. The remaining 68 miles of corridors would be surveyed within the next year following the travel management survey strategy. The effects from dispersed camping would be similar to that described under alternative A, however, the number of acres for dispersed camping would be less under this alternative (8,500 acres). This alternative has fewer corridors than alternatives B and D, thus reducing the potential of inadvertent vandalism to sites.

Mitigation measures may need to be implemented on sites located along some proposed roads and motorized trails. There are known sites that are being impacted or at risk of being adversely impacted by the proposed roads and motorized trails. For these areas, natural barriers (such as logs or cactus) will be installed to prevent current or future intrusions on the sites. In some cases, the non-system route would need to be relocated to avoid the impacted site.

Cultural resources have potential to be impacted by unintentional and intentional disturbance of sites from motorized vehicle activities. By eliminating motorized cross-country travel, the potential impacts to cultural resources would be reduced due to less area open to use by motor vehicles, which would result in a beneficial effect to cultural resources. The frequency and severity of current and potential adverse effects to remote cultural sites from motorized cross-

country travel would be reduced and, in some areas, stopped. Alternative E has the least potential to have direct and indirect impacts to cultural resources and would have no adverse effect to cultural resource sites with applicable mitigation measures in place.

Cumulative Effects on Cultural Resources

Other planned or reasonably foreseeable activities that may cumulatively affect cultural resources were considered. Present and reasonably foreseeable activities within the analysis area are listed in appendix E. The existing conditions described in the affected environment reflect the actions of past activities and the effects on heritage sites. Management activities on the forests over the past 30 to 35 years were subject to Section 106 consultation, and adverse effects were minimized by cultural site avoidance or mitigation and protection measures. Future projects will be subject to the same requirements.

Grazing activity has occurred on the forests since the late 1800s. Direct and indirect impacts from livestock grazing have occurred to sites on the forests. In the past, forest managers noted direct impacts to sites accessible by cattle from trampling, soil removal, and rubbing where large numbers of livestock were grazed in constricted areas with high densities of sensitive prehistoric sites. Current grazing management practices and allotment management plans have minimized these types of impacts so they would not have an adverse cumulative effect on cultural resources.

Most of the lands within the forests are located in a fire-adapted ecosystem. Evidence that prehistoric sites and TCPs have been repeatedly burned (prior to active fire suppression) is demonstrated by fire scarred trees and fire altered masonry structures and artifacts. From the 1930s to the 1970s, public land managers aggressively attempted to suppress all wildland fires and reduce the geographic spread of fires by creating roads and fire breaks. Until the fuel loading and forests are restored to a more natural condition, archaeological sites could be exposed to high intensity fires and may be adversely affected. In general, low to moderate intensity fires, such as prescribed burning would not have an adverse cumulative effect on cultural resources.

Contemporary Tribal Uses

American Indian tribes are sovereign nations. They are government entities with which the Forest Service establishes and maintains government-to-government relationships. Through treaties and statutes, the Federal Government has a trust responsibility to each tribal government. When American Indian tribes ceded lands to the United States government, rights and privileges to off-reservation lands were reserved for tribal members. Therefore, the Forest Service has certain legal responsibilities to American Indian tribes. These legal responsibilities are clarified in statutes, executive orders, and case law enacted and interpreted for the protection and benefit of federally recognized American Indian tribes. Some of those laws include the National Historic Preservation Act and subsequent amendments, Archaeological Resources Protection Act, American Indian Religious Freedom Act, National Environmental Policy Act, and the National Forest Management Act. Executive Orders (E.O.) and Memorandum include, 1994 Government-to-Government Relations with Native American Tribal Governments, E.O. 13007 Accommodation of Sacred Sites, E.O. 13175 Consultation and Coordination with Indian Tribal Governments and E.O. 12898 Environmental Justice.

In meeting these responsibilities, forest managers are required to consult tribes when proposed policies or management actions may affect their interests. Nine federally recognized tribal

governments, representing five American Indian tribes, have aboriginal territories and traditional ties to the lands now administered by the ASNFs. They are the San Carlos Apache Tribe, White Mountain Apache Tribe, Pueblo of Zuni, Hopi Tribe, Navajo Nation, Tonto Apache Tribe, Yavapai-Apache Nation, Fort McDowell Yavapai Nation, and the Yavapai-Prescott Tribe. Consultations with the tribes have identified the tribes' historic and present day traditional use areas and sacred places.

Affected Environment

Each tribe has their own history, traditions, and relationship to the land and other groups. The lands and resources of the forests have been used and continue to be used by many of the tribes for a variety of traditional cultural and religious activities. These activities include, but are not limited to, collection of plants, boughs, teepee poles, pigments, feathers and pollen, hunting, religious pilgrimages, accessing springs, and making special offerings. Past and current consultations with tribes have identified places and properties of religious and cultural significance. These places are ethnographically important to tribal values and are inseparable from their cultures.

None of the tribes consulted have identified any issues or impacts that would affect important cultural and religious places, traditional activities or resources resulting from eliminating motorized cross-country travel and designating roads, trails, corridors, and areas for motorized use. The White Mountain Apache Tribe did not identify any trespass or land management issues that could result from implementing any of the alternatives. The San Carlos Apache Tribe has not provided comments or raised any issues or concerns. The Navajo Nation stated that there would be no impact to Navajo traditional cultural places. At present, the only tribal concerns regarding travel management were expressed by the White Mountain Apache Tribe and the Hopi Tribe: (1) the continued looting and damage to archaeological sites; and (2) have the forests taken into consideration the protection of cultural resources in developing the alternatives.

During the development of the alternatives, the forests removed from consideration approximately 944 miles of corridors for cultural resource concerns and over 5,000 acres considered for areas open to motorized use. Some of the corridors eliminated from consideration were located on or near known shrines. The open areas removed from consideration were located within lands with a high density of archaeological sites.

Environmental Consequences

There would be no adverse effect to places or properties of cultural and religious significance or to traditional uses of the area by practitioners as a result of the alternatives. No tribe has indicated that the current road system is inadequate for their continued use for cultural and religious activities. The potential to adversely impact the use and characteristics of culturally sensitive sites and resources would be reduced by the action alternatives which prohibit motorized cross-country travel and limit motorized travel to designated roads and trails. Designating roads, trails, corridors and areas for motorized use has the effect of reducing the potential disruption of traditional cultural and religious activities by concentrating use near roads and trails. Traditional cultural and religious activities generally occur further away from roads to ensure privacy. All lands and resources of the forests would still be accessible through non-motorized means of transportation. Since there would be no adverse effects, there would be no cumulative effects to contemporary tribal uses.

Chapter 4 – List of Preparers; Consultation and Coordination

List of Preparers

The following Apache-Sitgreaves National Forests staff were directly involved with the preparation of this draft environmental impact statement (DEIS).

Name	Title	DEIS Contribution
Conner, Tami	Environmental Coordinator	NEPA, Team Leader, writer/editor
Cote, Paula	Previous NEPA Coordinator	NEPA, Team Leader, writer/editor, Scenery Management, Socioeconomics
Domsalla, Ryan	Recreation, Lands, Special Uses Program Manager	Recreation
Humphrey, Beth	Wildlife Biologist	Wildlife and Rare Plants
Loving, Nancy	GIS Specialist	GIS Data Analysis and Maps
MacIvor, Deborah	Forest Engineer	Travel Management, Roads and Trails
Schroeder, Melissa	Forest Archaeologist, Heritage Program Manager	Cultural Resources
Subirge, Tom	Soil Scientist	Soils and Watershed, Vegetation, Air Quality
Ward, Jerry	Fisheries Biologist	Fisheries and Aquatics

Ecosphere Environmental Services, on contract with the Apache-Sitgreaves National Forests, prepared draft specialist reports for most resource areas which were used as a base, but were updated and revised by the Forest Service specialists listed above. RecSolutions, a Forest Service Enterprise Team, provided some initial writer/editor assistance as well as content analysis of public comments received during scoping.

Consultation and Coordination

Tribal Consultation

The following nine tribes were consulted: White Mountain Apache Tribe, San Carlos Apache Tribe, Hopi Nation, Navajo Nation, Pueblo of Zuni, Yavapai-Apache Tribe, Tonto Apache Tribe, Fort McDowell Yavapai Nation, Yavapai-Prescott Indian Tribe, and the Ramah Chapter of the Navajo Nation.

Federal, State, and Local Agency Consultation

Due to the number of Federal, State, and local agencies, a complete list is not included here. However, a list is available in the project record. Mailing lists are available for the scoping periods and for the DEIS. A list of agencies who commented during the scoping period is also available. Briefly, some agencies consulted included the U.S. Environmental Protection Agency, BLM, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Natural Resources Conservation Service, Arizona Game and Fish Department, University of Arizona, U.S. Senators, Arizona State Representatives, County Board of Supervisors, local fire and police departments, and local mayors.

Coordination with Groups and Individuals

Numerous individuals participated in the process through written comments and by attending public meetings. A list of those who provided comments as well as mailing lists are available in the project record. Following is a subset of groups that were consulted: White Mountain Open Trails Association, TRACKS, White Mountain Conservation League, Citizens for Multiple Land Use and Access (CMLUA), Center for Biological Diversity (CBD), Grand Canyon Wildlands Council, National Wildlife Federation, Arizona Nature Conservancy, Apache County ATV Roughriders, Wilderness Society, Rocky Mountain Elk Foundation, the Audubon Society, and local chambers of commerce.

List of Agencies, Organizations, and Individuals to Whom Copies of the DEIS were Sent

In the letter accompanying the proposed action, we let people know that they would receive a copy of the DEIS if they commented or if they specifically requested it. We also sent postcards to the public requesting they return the card if they wanted a copy of the DEIS sent to them, and to specify what format they would like it in. We sent the DEIS to everyone who commented during the scoping period, and those who asked to receive a copy of it. In addition, copies have been sent (or in some cases made electronically available) to Federal agencies, federally recognized tribes, State and local governments, and organizations that have requested to be involved in the development of this analysis.

These entities include the U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Department of the Interior, Federal Highway Administration, Advisory Council on Historic Preservation, USDA National Agricultural Library, State wildlife and fisheries management agencies, County Board of Supervisors, and local community governments. Due to the number of people, agencies and organizations, a complete listing is not provided here, but is available upon request.

Glossary

Area: A discrete, specifically delineated space that is smaller, and in most cases much smaller, than a ranger district (36 CFR 212 and 36 CFR 261). Also see corridor definition.

Camping: The temporary use of National Forest System (NFS) lands for the purpose of overnight occupancy without a permanently fixed structure (36 CFR 261).

Closed road: Also referred to as maintenance level (ML) 1 roads. Intermittent service roads that are closed to vehicular traffic but may be available and suitable for non-motorized uses. The closure period must exceed 1 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 maintenance level. A closed road is not the same as an obliterated or decommissioned road. These roads are not shown on motor vehicle use maps (MVUM).

Closure: As specified in 36 CFR 261.53-57, when provided by an order, it is prohibited to go into or be upon a closed road, trail, wilderness, or other specified area.

Corridor: A specified area that occurs from the centerline of a road or trail in which camping and/or game retrieval is allowed.

Cross-country travel: Used in this document to refer to motorized travel off of the designated system of roads or motorized trails, primarily referring to the existing condition where the forests are open to forestwide motorized cross-country travel. The travel within the proposed designated camping corridors, within the proposed MBGR distances, and within the proposed motorized use areas is primarily referred to as off-road travel in this document.

Designated road, trail, or area: A NFS road, a NFS trail, or an area on NFS lands designated for motor vehicle use pursuant to 36 CFR 212.51 on a motor vehicle use map.

Dispersed campsite: An identified location where camping is occurring outside of developed recreation sites or recreation areas.

Forest transportation atlas: A display of the system of roads and trails of an administrative unit (36 CFR 212).

Inventoried roadless area (IRA) : Areas identified in a set of inventoried roadless area maps, contained in the Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2, dated November 2000, and any subsequent update or revision of those maps through the land management planning process (36 CFR 294).

Maintenance: The upkeep of the entire forest transportation facility including surface and shoulders, parking and side areas, structures, and such traffic control devices as are necessary for its safe and efficient utilization (36 CFR 212).

Motorized trail: A route 50 inches or less in width or a route over 50 inches wide that is identified and managed for motorized use.

Motor vehicle: Any vehicle which is self-propelled, other than: (1) a vehicle operated on rails; and (2) any wheelchair or mobility device, including one that is battery powered, that is designed

solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area (36 CFR 212 and 36 CFR 261).

Motor vehicle use map (MVUM): A map reflecting designated roads, trails, and areas on an administrative unit or a ranger district of the National Forest System (36 CFR 212).

National Forest System (NFS): As defined in the Forest Rangeland Renewable Resources Planning Act, the NFS includes all lands reserved or withdrawn from the public domain of the United States, all NFS lands acquired through purchase, exchange, donation, or other means, the national grasslands and land utilization projects administered under title III of the Bankhead-Jones Farm Tennant Act (50 Stat. 525, 7 U.S.C. 1010–1012), and other lands, waters or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system (36 CFR 212).

National Forest System road (NFS road): A forest road other than a road which has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority (36 CFR 212, 36 CFR 251, and 36 CFR 261). Motor vehicle route over 50 inches wide, unless identified and managed as a trail (36 CFR 212).

National Forest System trail (NFS 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 other local public road authority (36 CFR 212 and 36 CFR 261). Trails are 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail (36 CFR 212).

National forest wilderness: Those parts of the NFS which were designated units of the National Wilderness Preservation System by the Wilderness Act of September 3, 1964, and such other areas of the NFS as are added to the wilderness system by an act of Congress (36 CFR 261).

Non-motorized trail: A NFS trail that is managed for non-motorized uses, including, but not limited to: hiking, equestrian, bicycling activities, hunting, etc.

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).

Off-road travel: Used in this document to primarily refer to motorized travel off the system of designated roads and motorized trails, proposed only under the action alternatives (B, C, D, and E), that would be within the 300-foot-wide dispersed camping corridors, within MBGR distances for the purpose of retrieving downed animals, and within the proposed motorized use areas.

Off-road vehicle (ORV): Includes all mechanical means of transportation; passenger cars, 4-wheel drive pickups, trail bikes, snowmobiles or other ground transportation vehicles that are capable of traveling overland where no roads exist (Forest Service 1987).

Primitive Area: Those areas within the NFS classified as “primitive” on the effective date of the Wilderness Act, September 3, 1964 (36 CFR 261).

Primitive setting: A term associated with the Recreation Opportunity Spectrum (ROS) framework, which is primarily characterized as an unmodified natural environment of fairly large size where interaction between users is low and evidence of others is minimal. The area is

managed to be essentially free of manmade “improvements” and facilities. Motor vehicles and other motorized equipment are not permitted.

Recreational river: Those rivers or sections of rivers readily accessible by road or railroad, that may have some development along their shorelines and that may have undergone some impoundment or diversion in the past.

Scenic river: Those rivers or sections of rivers free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Semiprimitive nonmotorized setting: A term associated with the Recreation Opportunity Spectrum (ROS) framework, which is primarily characterized as a natural environment of moderate to large size where interaction between visitors is low but there is often evidence of other humans. Motor vehicle use in this setting is generally prohibited. Moderate to high probability exists for isolation from the sights and sounds of humans.

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 trail and that is not included in a forest transportation atlas (36 CFR 212).

Unauthorized road or trail: A road or trail 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). User-created routes are referred to as unauthorized roads or trails in this document.

Vehicle: Any device in, upon, or by which any person or property is or may be transported, including any frame, chassis, or body of any motor vehicle, except devices used exclusively upon stationary rails or tracks (36 CFR 261).

Wild river: Those rivers or sections of rivers free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

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Appendix A – Maps

The maps included in this section are intended to show a general representation of the activities proposed by alternative. Due to the forestwide scale of this project, it is not possible to show the site specific changes of the road and trail system as well as dispersed camping corridors, MBGR areas, and areas for motorized travel. As a result, not all proposed activities are labeled on these maps. Due to the scale, maps in this section have been broken into two parts: roads and trails on the Apache side of the forests, and roads and trails on the Sitgreaves side of the forests. Large maps are available upon request and are located in the project record. The large maps will be provided on the forests' Web site available to the public for viewing and will be displayed at all public meetings. Note that motorized use areas are only proposed for the Sitgreaves side of the forests under alternatives B and D. There is no MBGR allowed under alternative E, so maps are not included here.

The maps found in this section are:

- Figure 4. Alternative A roads and trails proposed for the Apache National Forest.
- Figure 5. Alternative A roads and trails proposed for the Sitgreaves National Forest.
- Figure 6. Alternative B roads and trails proposed for the Apache National Forest.
- Figure 7. Alternative B roads and trails proposed for the Sitgreaves National Forest.
- Figure 8. Alternative C roads and trails proposed for the Apache National Forest.
- Figure 9. Alternative C roads and trails proposed for the Sitgreaves National Forest.
- Figure 10. Alternative D roads and trails proposed for the Apache National Forest.
- Figure 11. Alternative D roads and trails proposed for the Sitgreaves National Forest.
- Figure 12. Alternative E roads and trails proposed for the Apache National Forest.
- Figure 13. Alternative E roads and trails proposed for the Sitgreaves National Forest.
- Figure 14. Alternatives B and D motorized use areas proposed for the Sitgreaves National Forest.
- Figure 15. Alternative A areas open to motorized big game retrieval for the Apache National Forest.
- Figure 16. Alternative A areas open to motorized big game retrieval for the Sitgreaves National Forest.
- Figure 17. Alternative B areas open to motorized big game retrieval for the Apache National Forest.
- Figure 18. Alternative B areas open to motorized big game retrieval for the Sitgreaves National Forest.
- Figure 19. Alternative C areas open to motorized big game retrieval for the Apache National Forest.
- Figure 20. Alternative C areas open to motorized big game retrieval for the Sitgreaves National Forest.
- Figure 21. Alternative D areas open to motorized big game retrieval for the Apache National Forest.
- Figure 22. Alternative D areas open to motorized big game retrieval for the Sitgreaves National Forest.

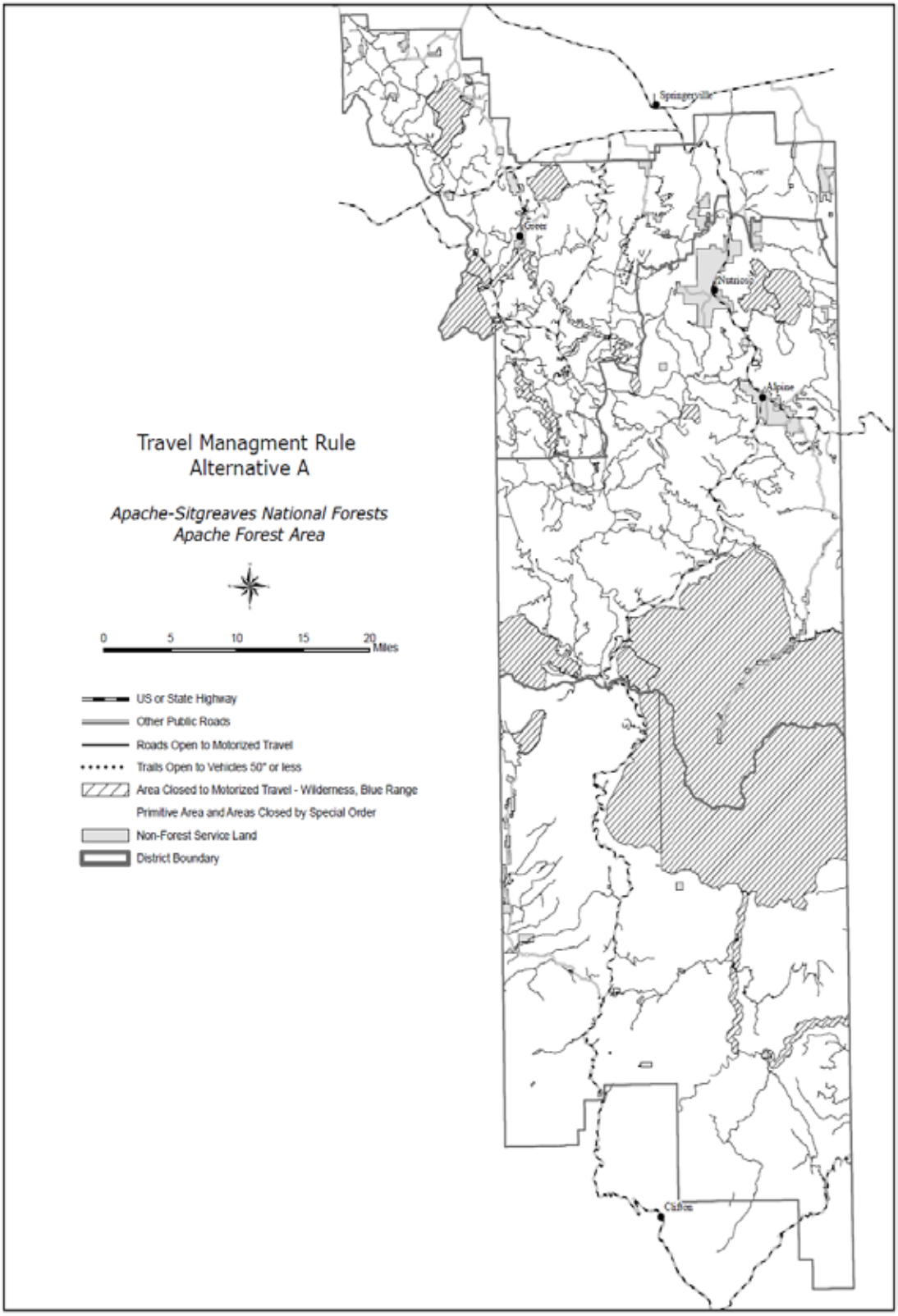

Figure 4. Roads and trails under alternative A for the Apache National Forest

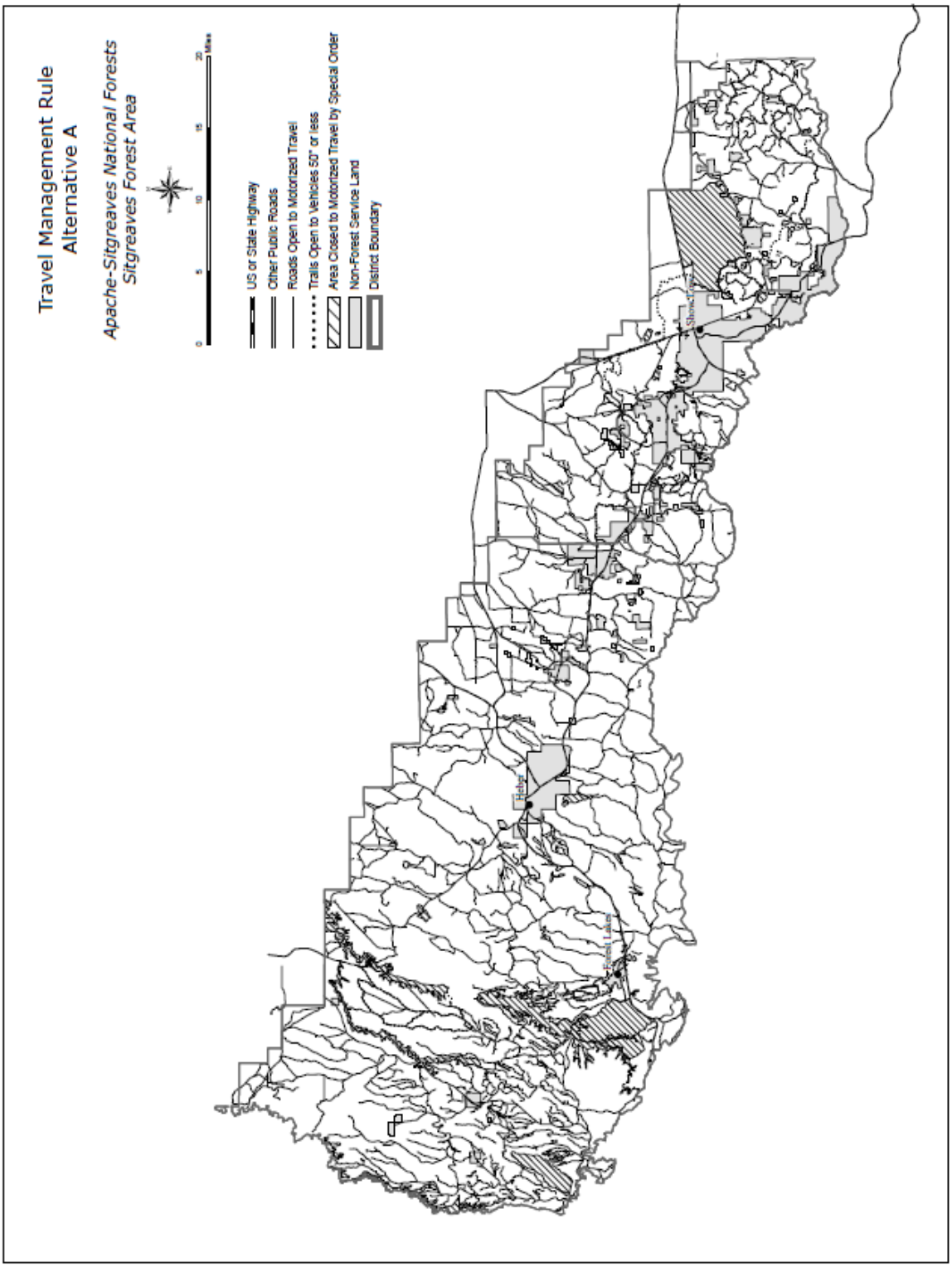

Figure 5. Roads and trails under alternative A for the Sitgreaves National Forest

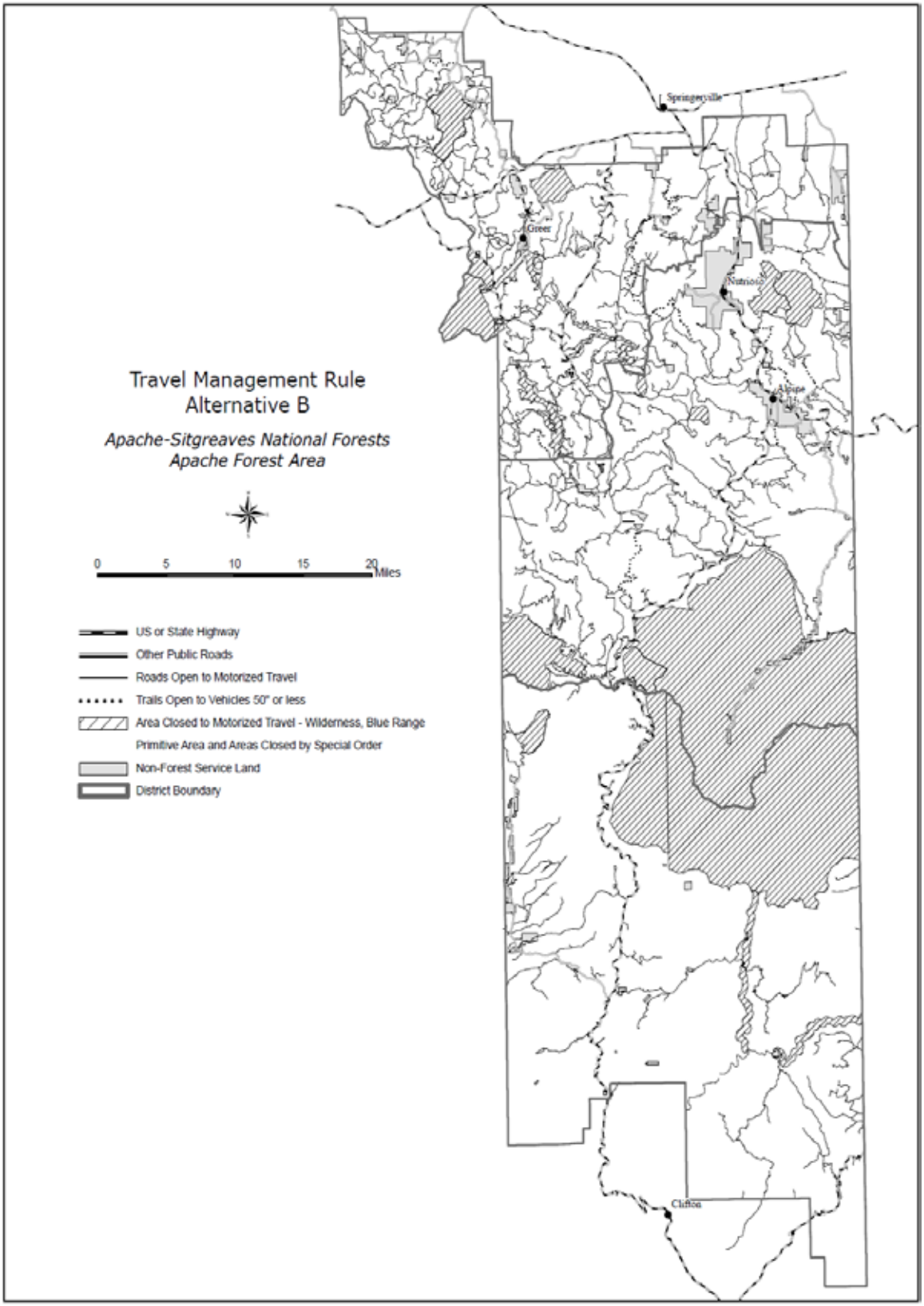

Figure 6. Roads and trails under alternative B for the Apache National Forest

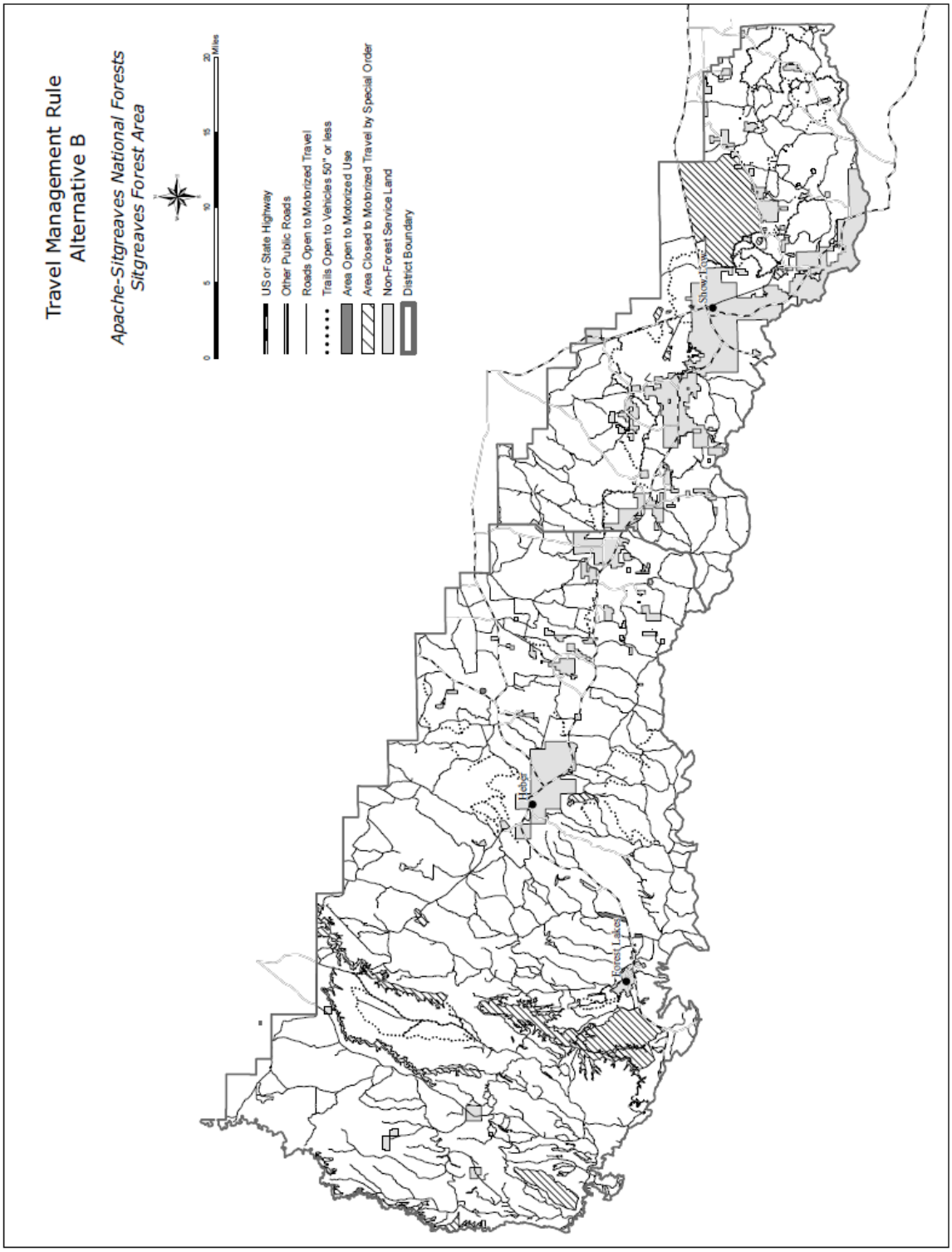

Figure 7. Roads and trails under alternative B for the Sitgreaves National Forest

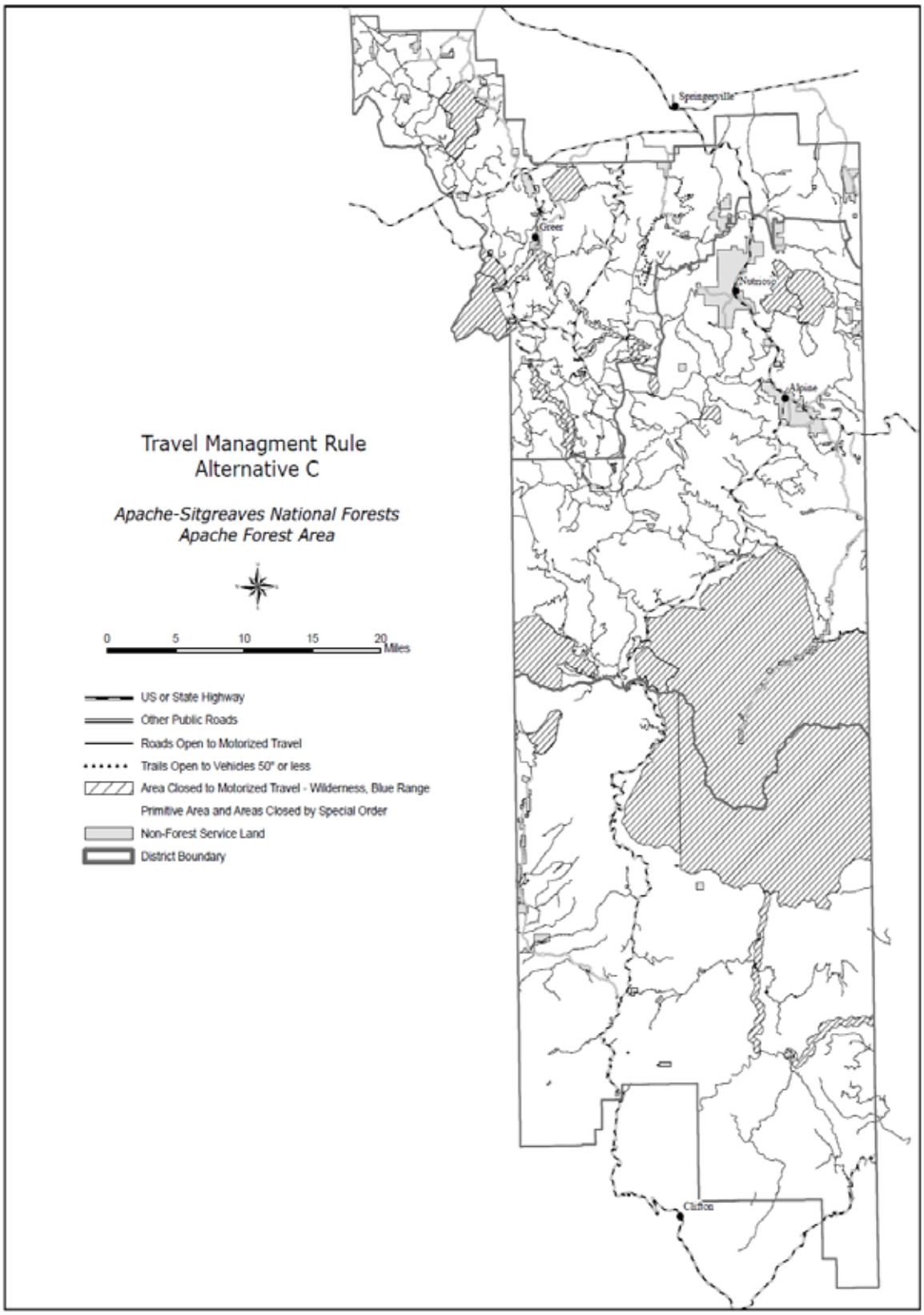

Figure 8. Roads and trails under alternative C for the Apache National Forest

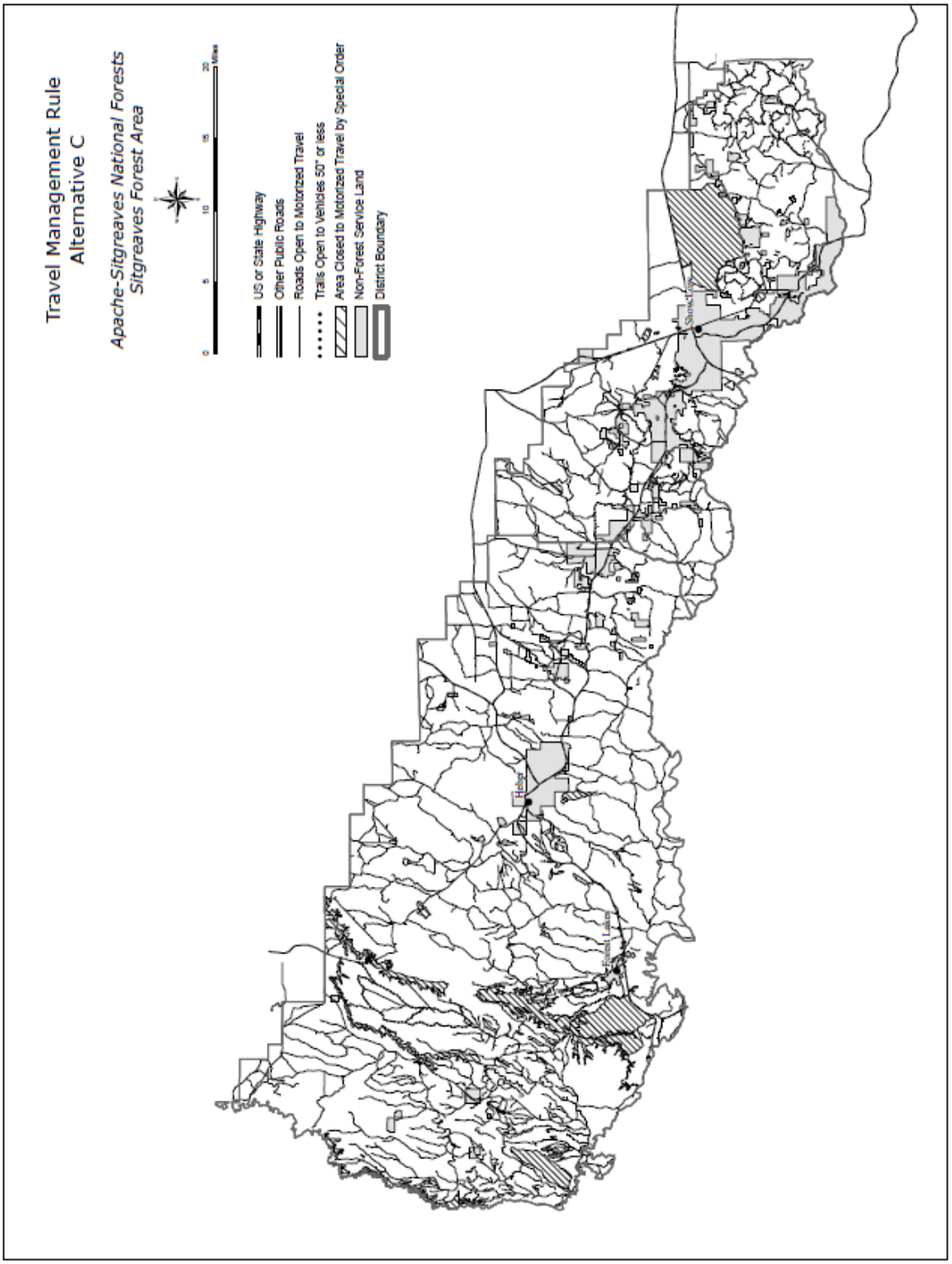

Figure 9. Roads and trails under alternative C for the Sitgreaves National Forest

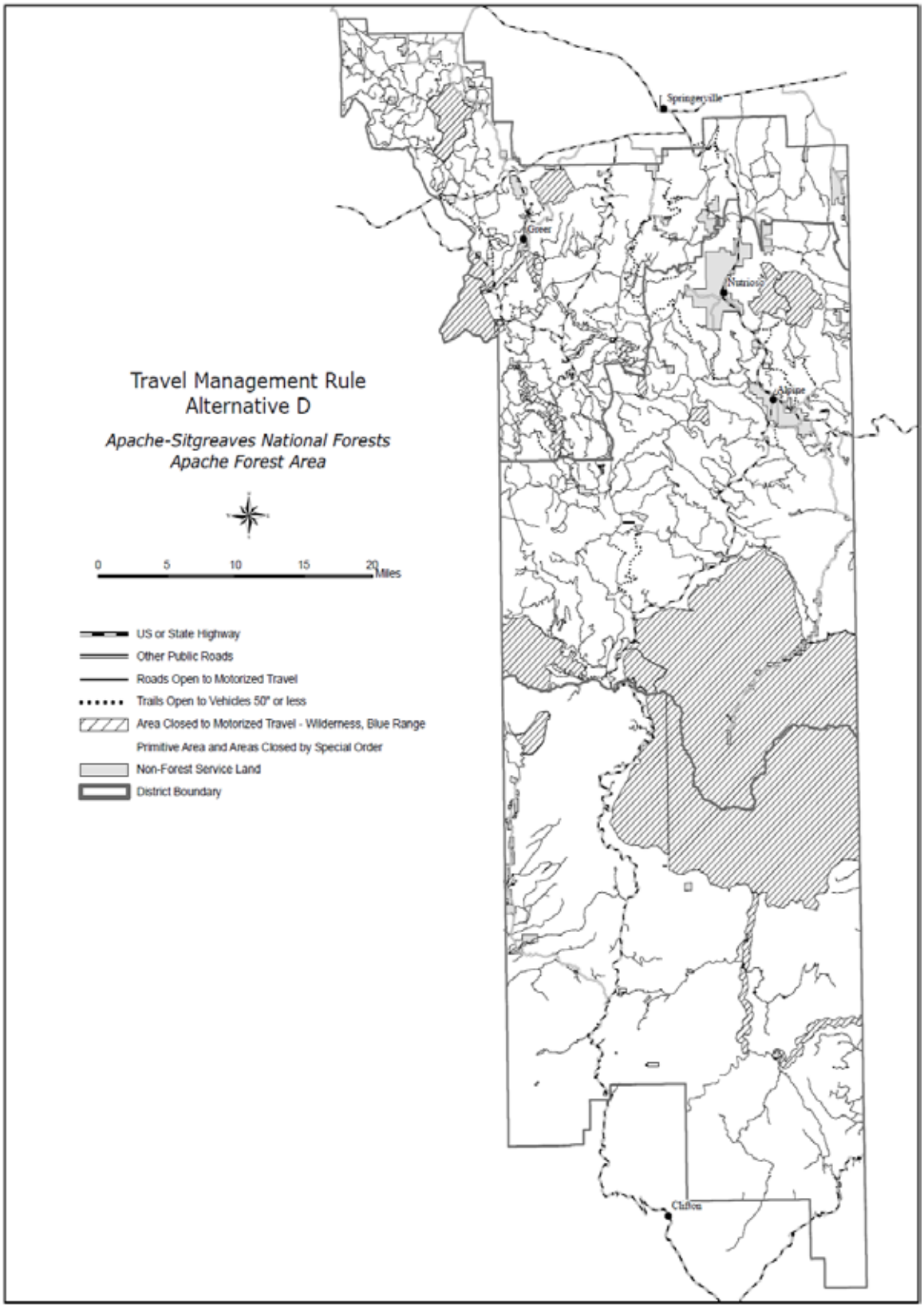

Figure 10. Roads and trails under alternative D for the Apache National Forest

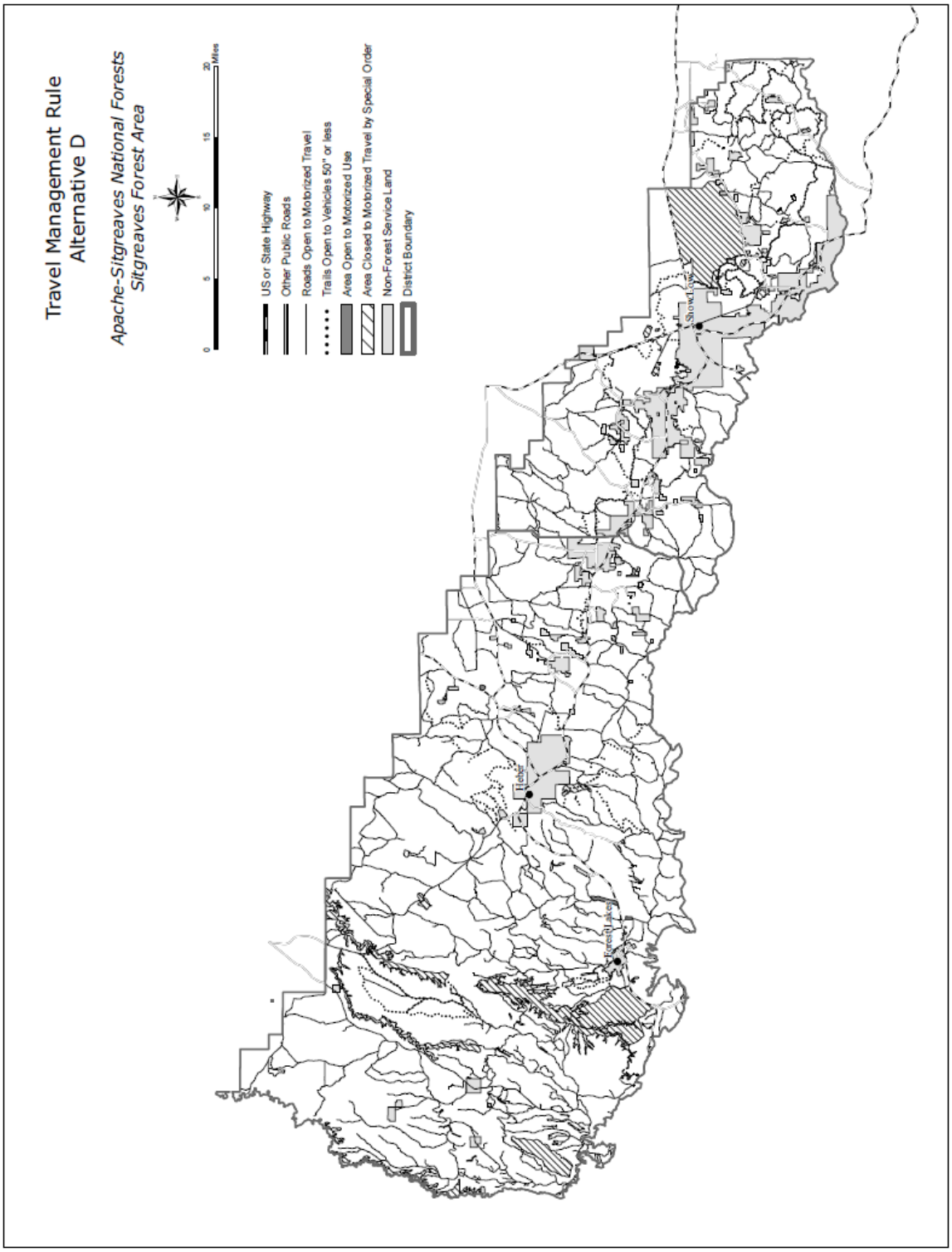

Figure 11. Roads and trails under alternative D for the Sitgreaves National Forest

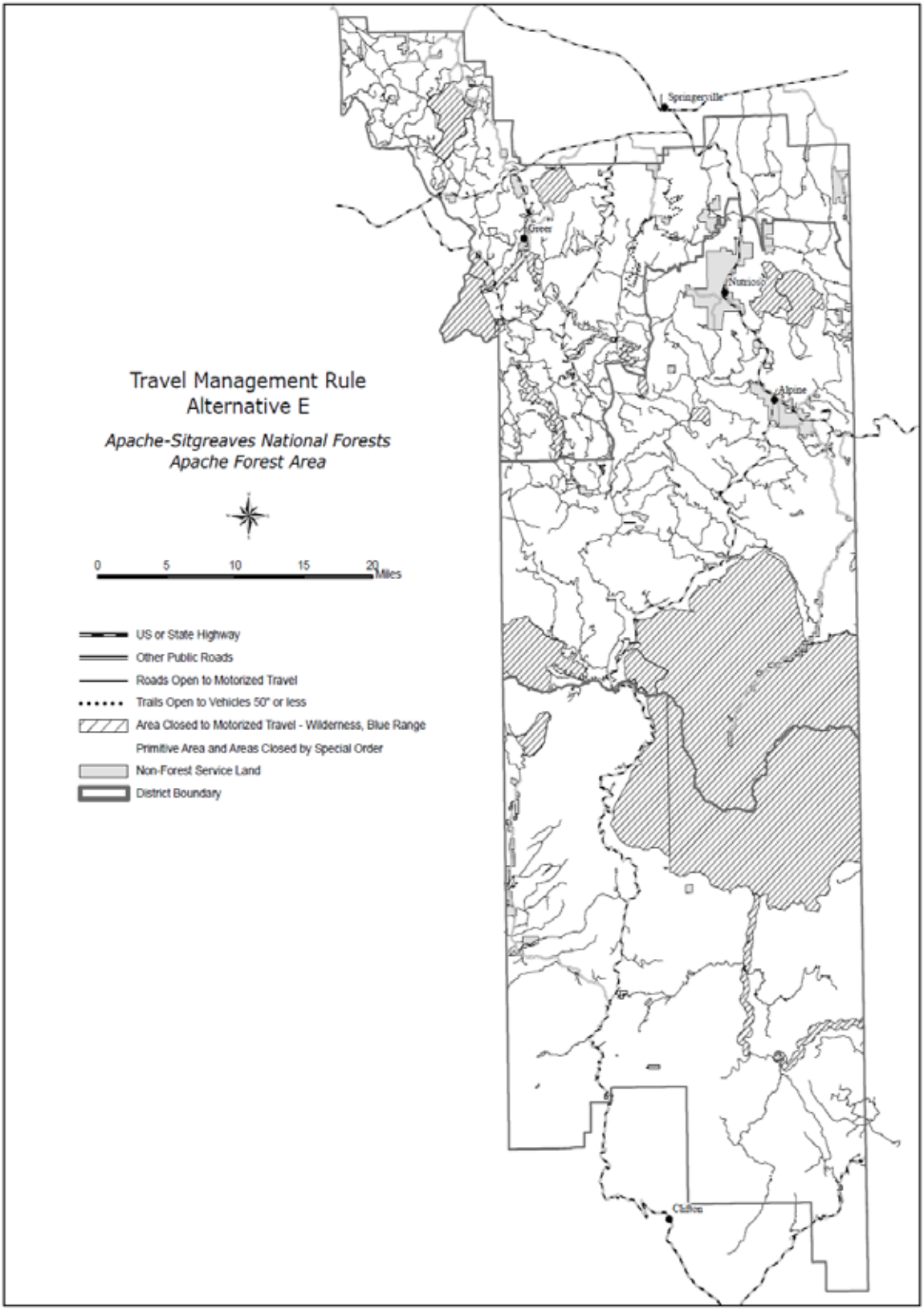

Figure 12. Roads and trails under alternative E for the Apache National Forest

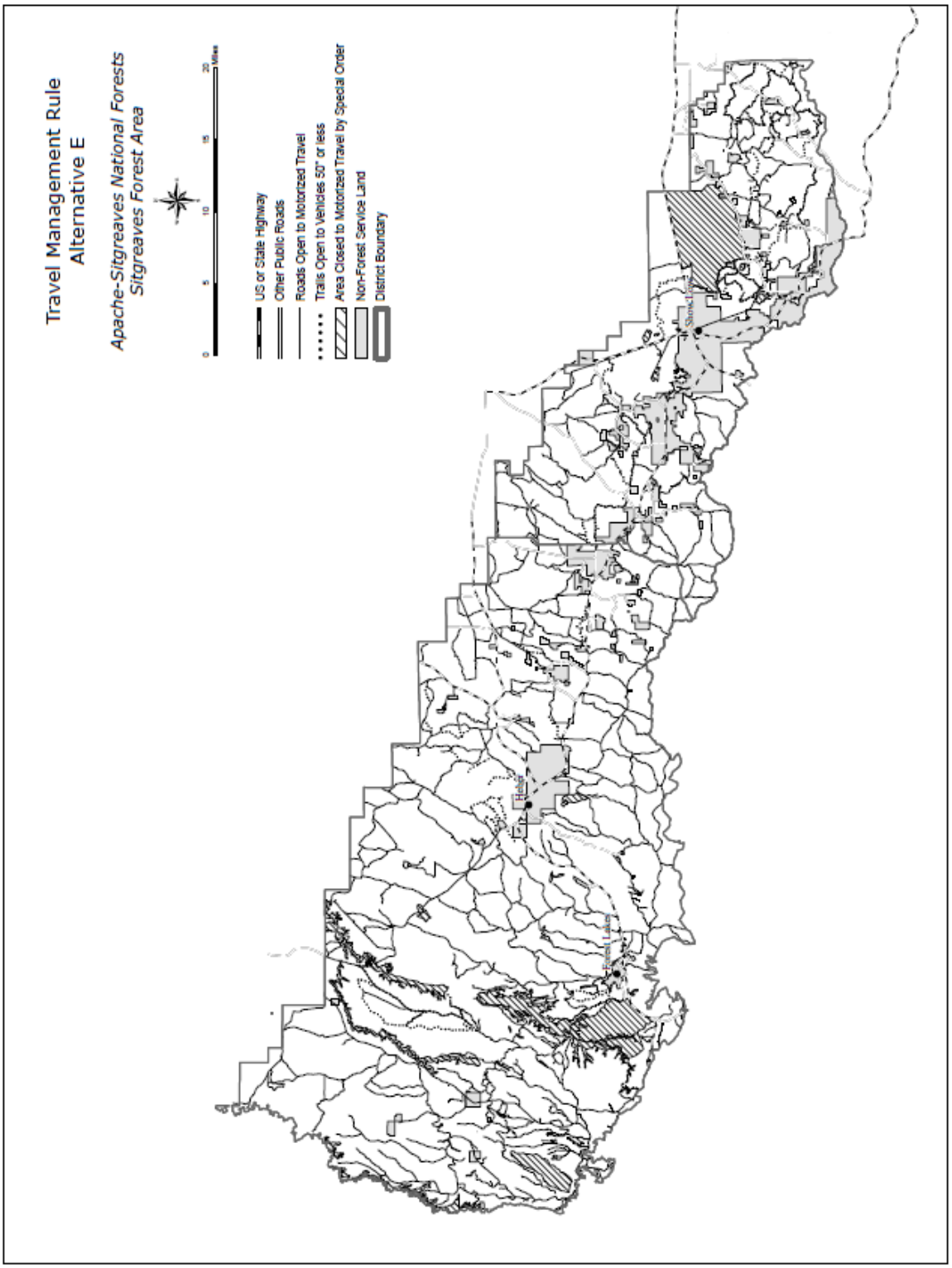

Figure 13. Roads and trails under alternative E for the Sitgreaves National Forest

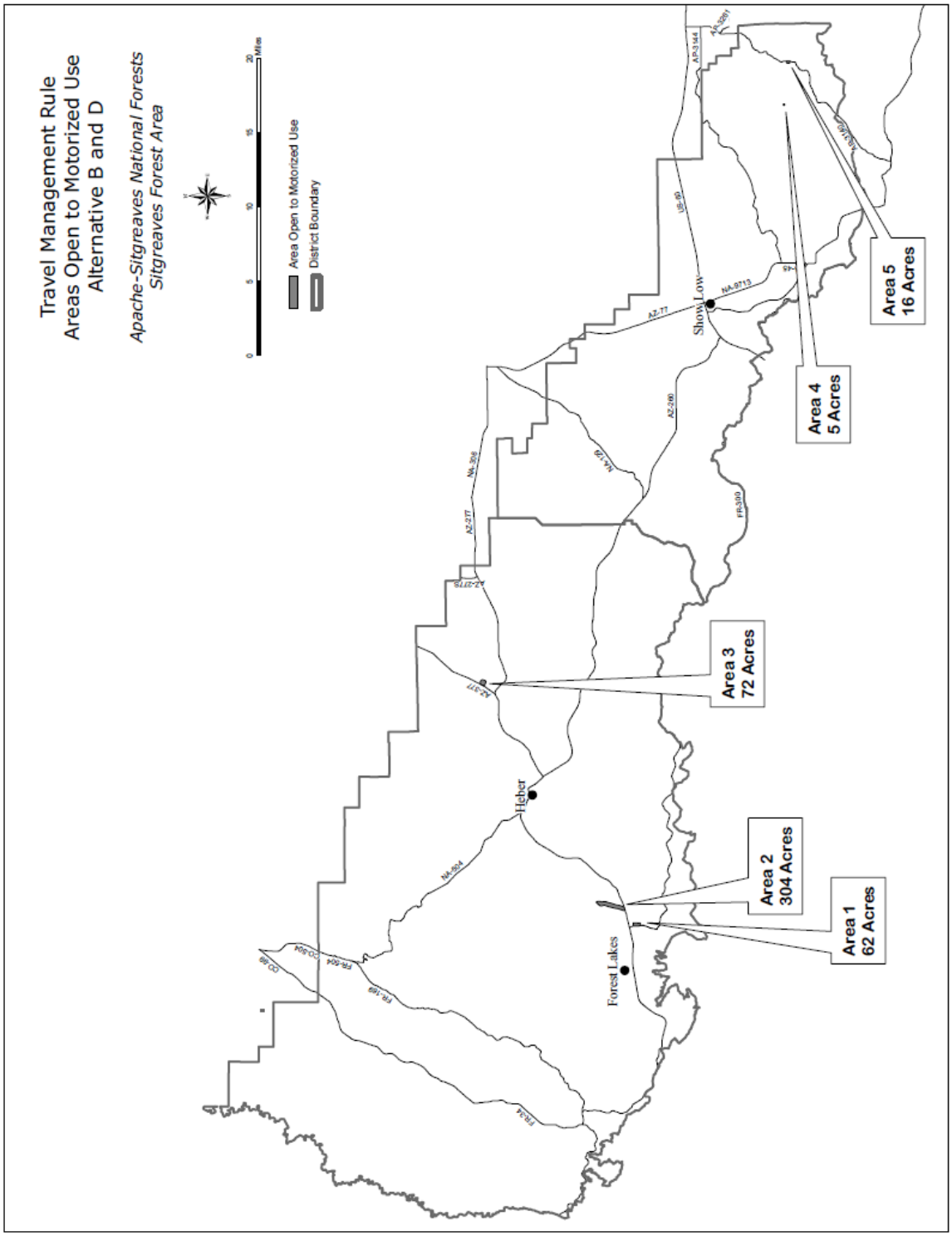

Figure 14. Motorized use areas under alternatives B and D for the Sitgreaves National Forest

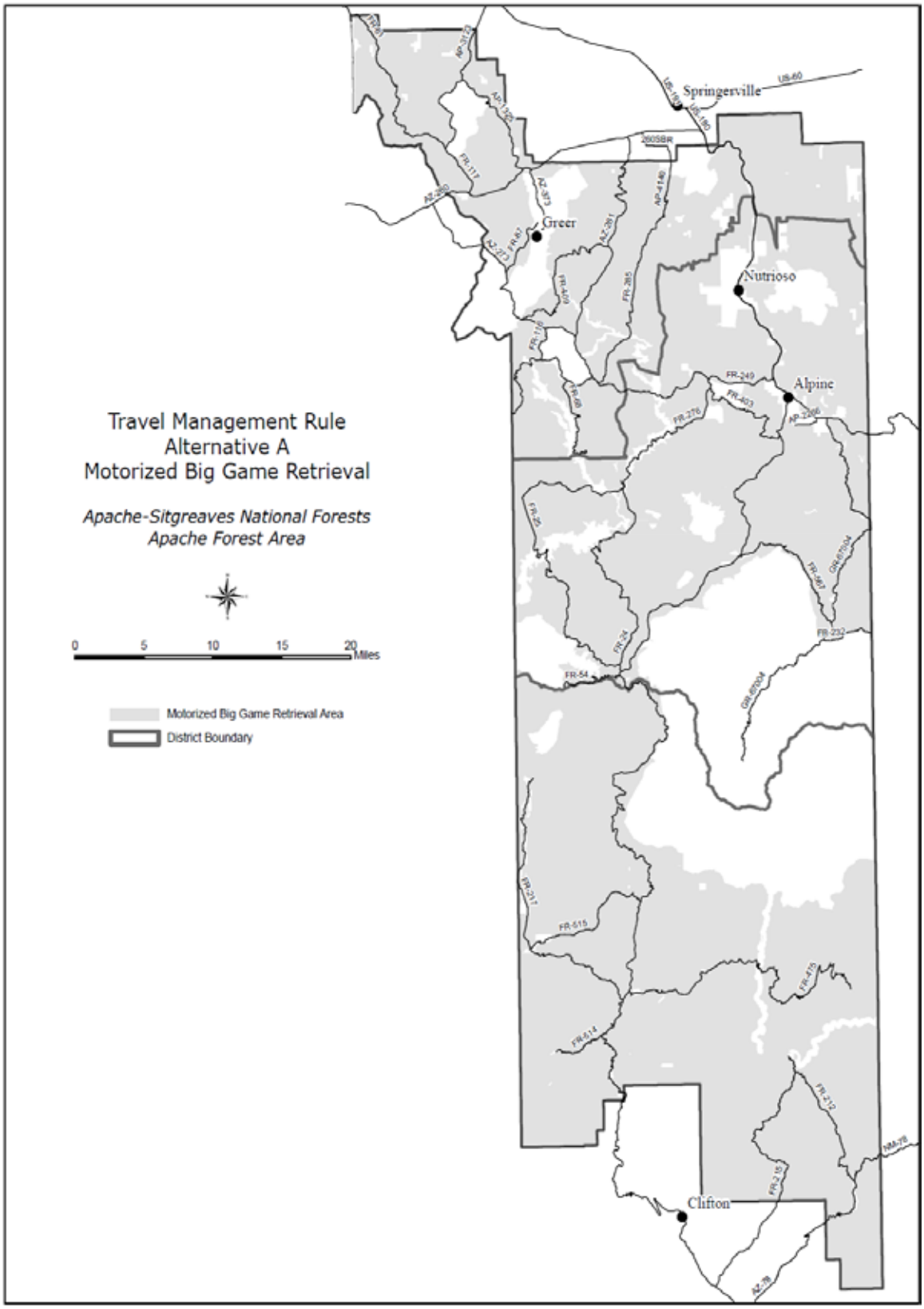

Figure 15. MBGR under alternative A for the Apache National Forest

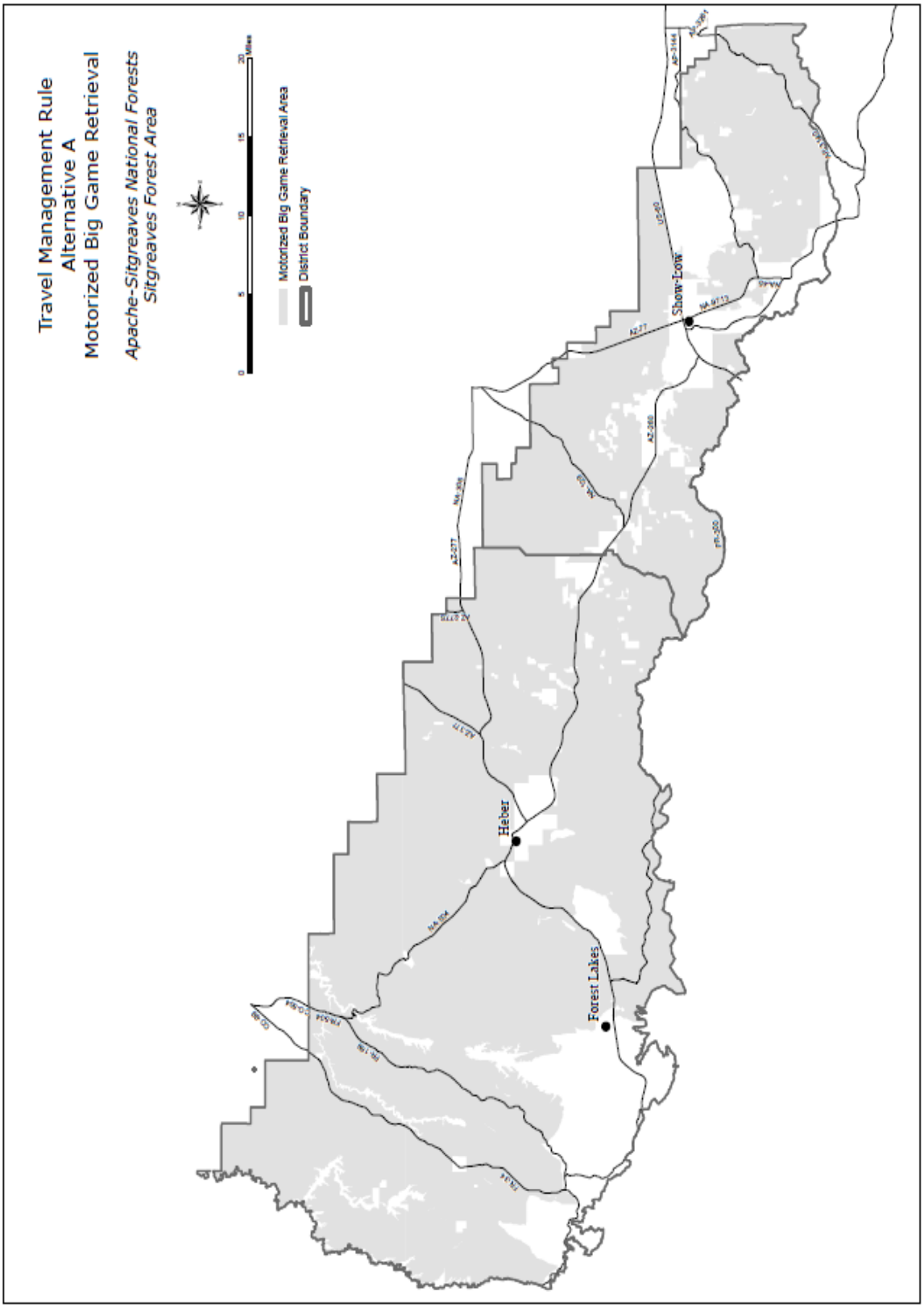

Figure 16. MBGR under alternative A for the Sitgreaves National Forest

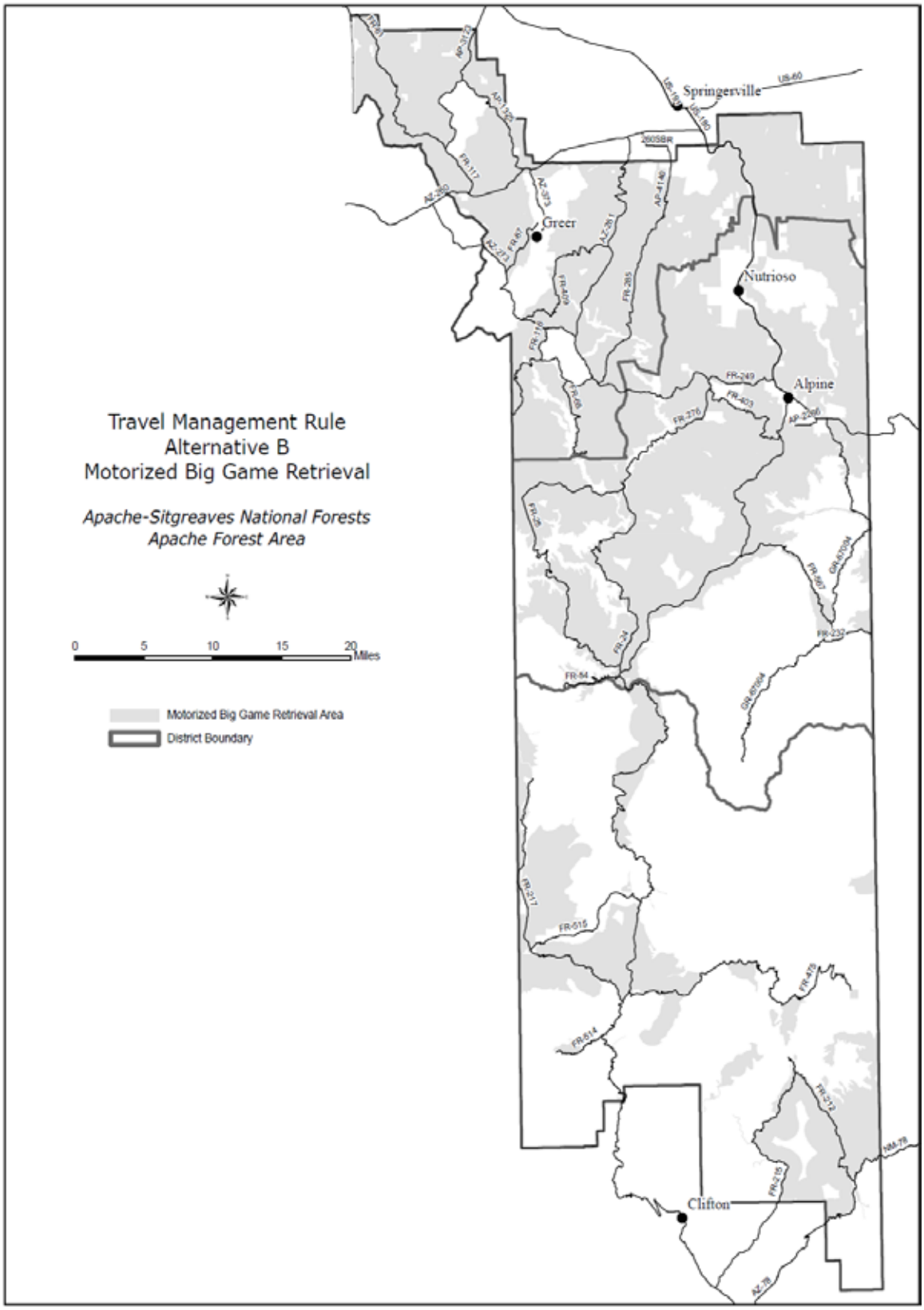

Figure 17. MBGR under alternative B for the Apache National Forest

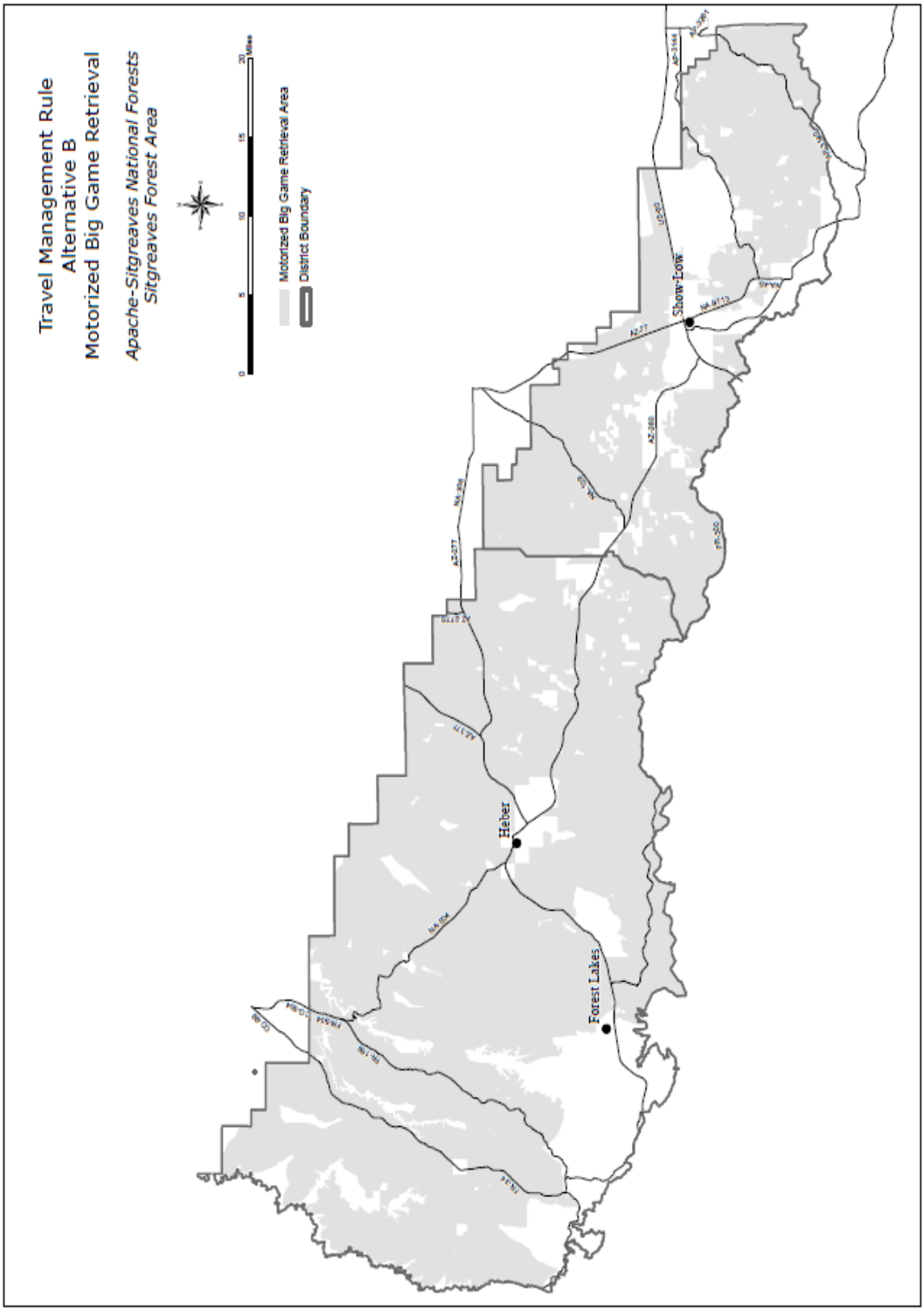

Figure 18. MBGR under alternative B for the Sitgreaves National Forest

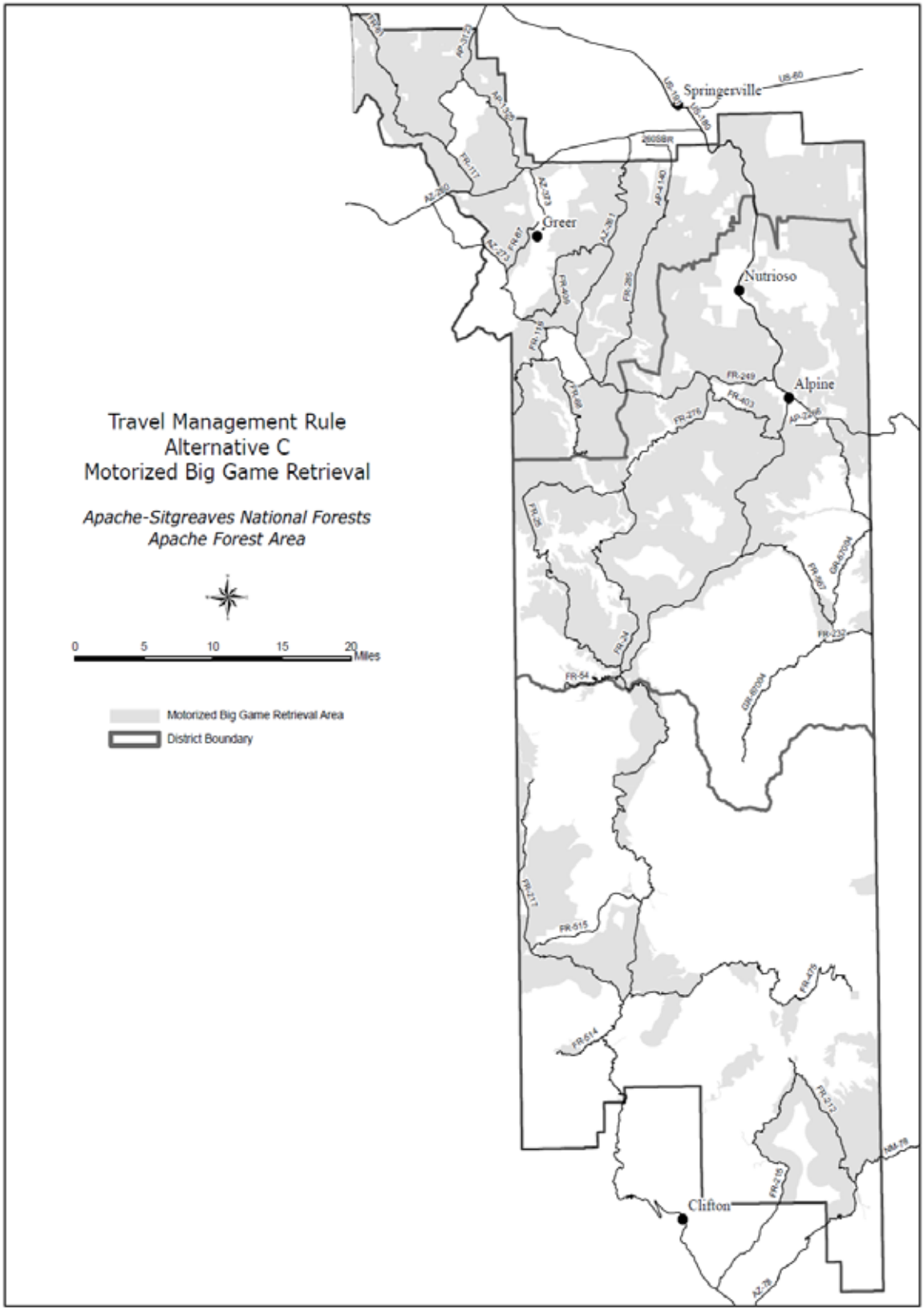

Figure 19. MBGR under alternative C for the Apache National Forest

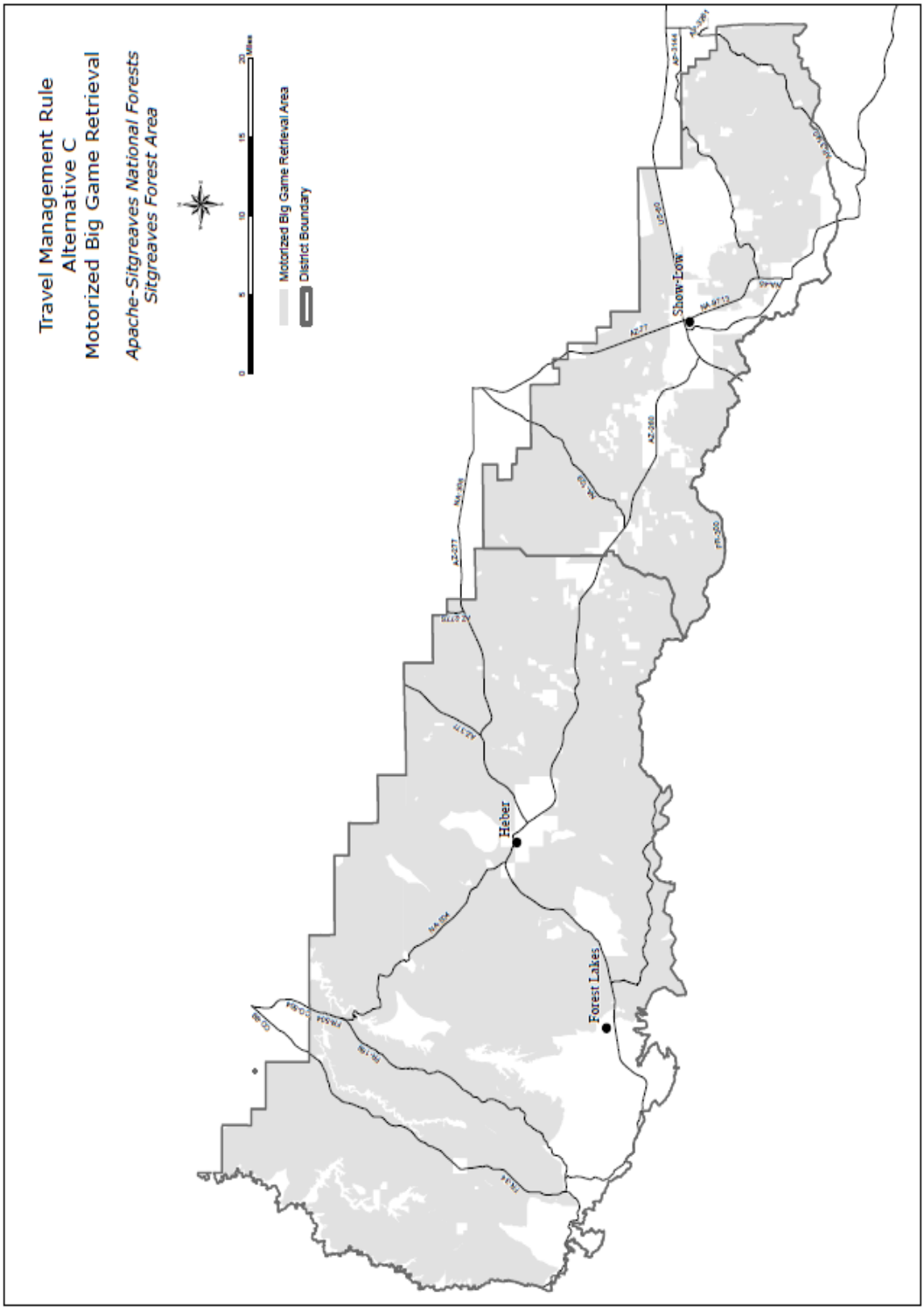

Figure 20. MBGR under alternative C for the Sitgreaves National Forest

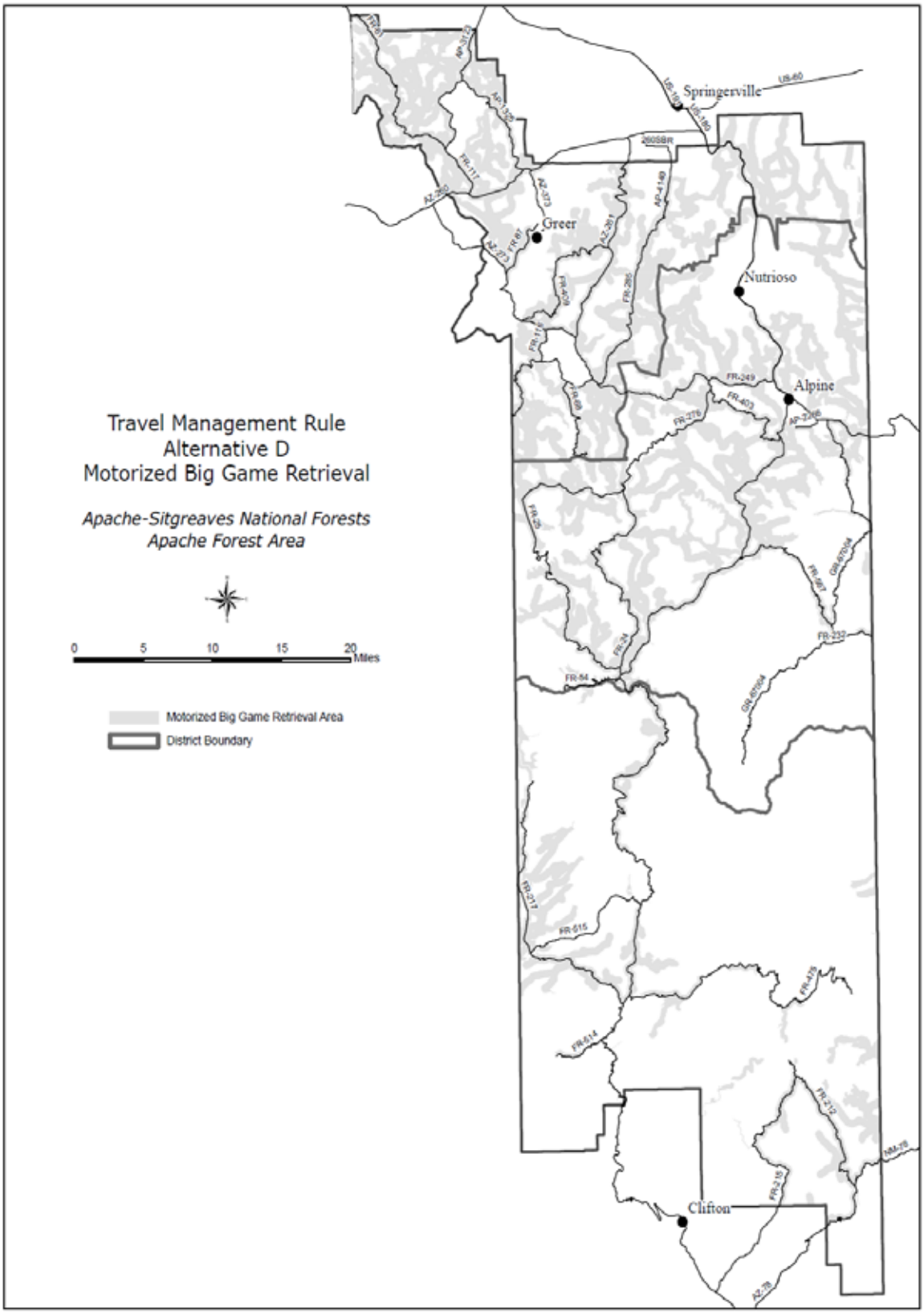

Figure 21. MBGR under alternative D for the Apache National Forest

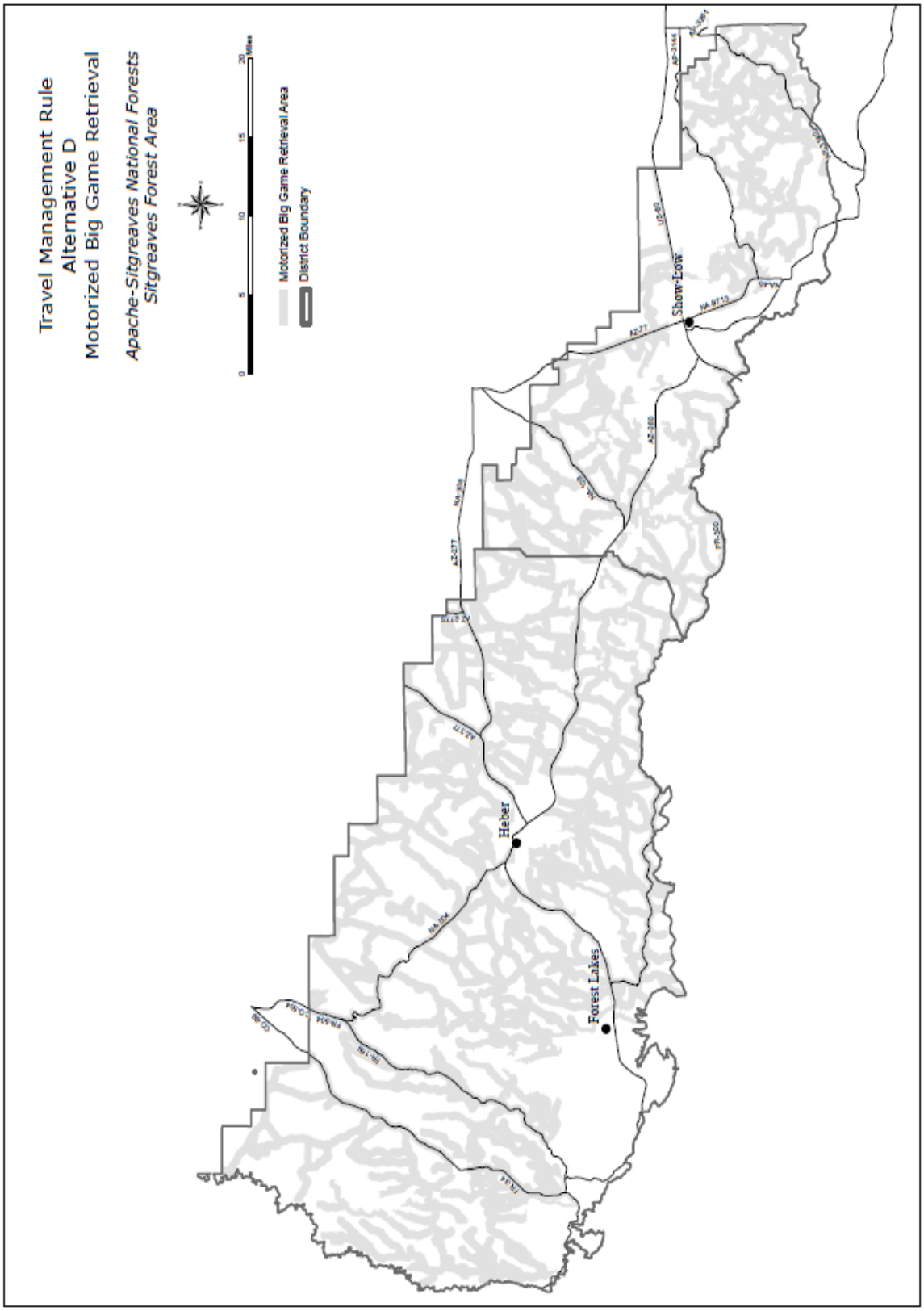

Figure 22. MBGR under alternative D for the Sitgreaves National Forest

Appendix B – Proposed Forest Plan Amendments for Alternatives B, C, D and E

Table 41. Summary of the proposed forest plan amendments

Chapter/ Section	Page	Current Plan Direction	Proposed Plan Amendment Direction
Forest-Wide Standards and Guidelines	34	Off-Road Vehicle Management The Resource and Travel Management (RATM) process will be used to determine the management strategies for all existing roads, trails and areas. RATM will also consider the management of off-road and off-trail use by motor vehicles with the objective of resolving user conflicts, eliminating wildlife harassment and resource damage. Make ORV closure areas available to the public.	**Delete text:** superseded by the final Travel Management Rule (TMR) amended regulations located in 36 CFR (Code of Federal Regulations), Parts 212, 251(b) and 261(a) **Replace with:** Motor vehicle use is limited to designated roads, trails, and areas on the forest. Motor vehicle use off designated roads and trails and outside of designated areas is prohibited, except as identified on the motor vehicle use map (MVUM) and except where exempted under 36 CFR 212.51. **Delete text. Replace with:** Motorized roads, trails, and areas will be displayed on a motor vehicle use map (MVUM) and provided to the public. The motor vehicle use map shall specify the classes of vehicles and, if appropriate, the times of year for which use is designated, per 36 CFR 212.56.

Appendix C – ASNFs Motorized Restrictions and Seasonal Closures

Table 42. Current motorized restrictions on the forests

Description	Forest Plan Management Area or Forest Order No.	Acres
Forested Land: Portions managed for ROS classes primitive and semiprimitive nonmotorized	Management Area 1	93,970
Woodland: Portions managed for ROS primitive and semiprimitive nonmotorized	Management Area 2	143,652
Riparian: Portions managed for ROS primitive and semiprimitive nonmotorized	Management Area 3	2,490
Grasslands	Management Area 4	16,630
Mount Baldy Wilderness	Management Area 7	7,079
Blue Range Primitive Area and Additions	Management Area 8	187,410
Escudilla Demonstration Area: Portions managed for ROS primitive and semiprimitive nonmotorized	Management Area 9	1,551
Research Natural Areas: Phelps Cabin (existing) Thomas Creek (recommended) Escudilla Mountain (recommended) Wildcat (recommended) Hayground (recommended)	Management Area 10	2,550
Water: Portions managed for ROS primitive and semiprimitive nonmotorized	Management Area 11	9
Bear Wallow Wilderness	Management Area 12	11,080
Escudilla Mountain Wilderness	Management Area 13	5,200
Chevelon Canyon: Portions managed for ROS primitive and semiprimitive nonmotorized	Management Area 16	4,785
Sandrock: Portions managed for ROS primitive and semiprimitive nonmotorized	Management Area 18	17,637
Motor Vehicle Restriction:	Forests Order 01-401 36 CFR 261.56	
Alpine Divide 01-01		80
Black River 01-02		6,983
Blue Crossing 01-03		80
East and West Fork Black River 01-04		4,545
Hannagan 01-05		24
Hulsey Lake 01-06		49
KP Cienega 01-07		35
Luna Lake 01-08		393
Sierra Blanca 01-09		109
Thomas Creek 01-10		499
Upper Blue 01-11		61
Williams Valley 01-12		1,620
Acker Lake 01-13		9
Black Canyon Lake 02-01		5,928
Forest Lakes 02-02		2,605
Rim Recreation Area 02-03		50,371
Willow Creek 02-04		4,075
Black Jack 03-01		80

Description	Forest Plan Management Area or Forest Order No.	Acres
Coal Creek 03-02		23
Granville 03-03		98
Honeymoon 03-04		7
Juan Miller 03-05		38
Strayhorse 03-06		22
Big Lake 06-01		5,520
Greer Basin 06-02		5,854
Lee Valley 06-03		6,521
Nelson Reservoir 06-04		186
Saffel/Murray Basin 06-05		5,125
South Fork 06-06		38
Fool Hollow 07-01		680
Lakeside 07-02		17
Lewis Canyon 07-03		50
Los Burros 07-04		57
Scott Reservoir 07-05		29
Woodland Reservoir 07-06		603
Mogollon Rim 07-07		341
Brown Creek 07-08		NA
Wildlife Habitat Areas	Forest Order 01-402	
Hulsey Bench 01-01	36 CFR 261.54(a)	3,136
Middle Mountain 01-02 (8/15-12/31)	36 CFR 261.54 (e)	3,614
Open Draw 01-03 (5/1 – 8/15)	36 CFR 261.54(a)	310
Blue Range Administration Area 01-04 (acreage included in other category)	36 CFR 261.56	
Upper Coyote 01-05		632
Alpine RD Three Forks 01-06		494
Beaver Turkey Ridge 02-01		2,925
Buckskin 02-02		502
Chevelon Canyon 02-03		13,196
Leonard Canyon 02-04		2,529
Wildcat 02-05		526
Willow Springs 02-062		8,602
Blue River Buffer 03-01		3,453
Dry Prong 03-02		2,363
Blue Range Addition 03-03		16,922
San Francisco River Buffer 03-04		2,603
Amberon Point 06-01		624
Big Cienega 06-02		47
North, East, West Fork Black River 06-03		4,668
East and West Forks Little Colorado River 06-04		1,927
Hidden Lake 06-05		3,265
Phelps Cabin Botanical 06-06		97
Phelps Cabin RNA 06-07		286
Saint Peters Dome 06-08		5,752
Three Forks 06-09		22
Upper Hall Creek 06-10		1,723
Haygrounds RNA 06-11		331
Woolhouse 07-01		17,368
South Marsh 07-02		29
Red Head Marsh 07-03		144
Jaques Marsh 07-04		220
Airport March 07-07		29
Bosque Majado 07-06		17
Porter Mountain 07-07		81
Billy Creek 07-08		191

Description	Forest Plan Management Area or Forest Order No.	Acres
Los Burros Meadow 07-09 Pintail Marsh 07-10		104 189
Seasonal Restrictions Forest Service DFR 515 03-01 (variable, check with district) Upper Eagle Creek 03-02 (variable, check with district) Telephone Lake 07-01 (4/1 – 7/15)	Forest Order 01-403 36 CFR 261.54 (a) 36 CFR 261.54 (e) 36 CFR 261.55 (a) 36 CFR 261.56	 5,836 424 161
Threatened and Endangered Species Travel Management Luna Lake Eagle Nesting 01-01 (1/1-6/30) Southwestern Willow Flycatcher 01-02 (5/1-7/31) Three Forks Wildlife (yearlong) Luna Lake Waterfowl Nesting (4/1-8/1) Greenwood Road	Forest Order 01-09-506 36 CFR 261.53(e) Forest Order 01-405 (Greenwood Road)	 312 88 11 116 NA
Blue Range Primitive Area	Forest Order 01-408 36 CFR 261.55(b)	180,000
Rim Road – Travel Restrictions	Forest Order 01-419	50,371
Public Health or Safety Alpine Pit	Forest Order 01-448 36 CFR 261.53(e)	9
Public Health or Safety Hoyer Sewer Pond	Forest Order 01-452 36 CFR 261.53(e)	7
Public Health or Safety Porter Mountain Cinder Pit Closure	Forest Order 01-477 36 CFR 261.53(e)	10
Beehive Wildlife Area Closure	Forest Closure 01-488 Expired in 2007	
Total acres currently closed to motor vehicles or restricting off-road motor vehicle use		**383,907**

Table 43. Seasonal road closures by alternative

Route	Dates Closed	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
143A	August 1 - April 30	X	X	X	X	X
187A	August 1 - April 30	X	X	X	X	X
24U	March 1 - September 30		X		X	
269	August 1 - April 30	X	X	X	X	X
37B-T1	August 15 - December 31		X	X		X
37C	August 15 - December 31	X	X	X	X	X
515	December 1 - March 31	X	X	X	X	X
570	January 1 - June 30	X	X	X	X	X
582	May 1 - August 15	X	X	X	X	X
701	March 1 - September 30		X		X	

Route	Dates Closed	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
704	February 1 - June 30	X	X	X	X	X
8080	March 1 - September 30		X		X	
8101	March 1 - September 30		X		X	
8214	March 1 - September 30		X		X	
8369	February 1 - June 30	X	X	X	X	X
8390	May 1 - August 15		X		X	X
8391	May 1 - August 15	X	X	X	X	X
8391D	May 1 - August 15	X	X	X	X	X
85	January 1 - May 31	X	X	X	X	X
8881	March 1 - September 30		X		X	
9701M	April 1 - July 15	X	X	X	X	X
9886	March 1 - September 30		X		X	

Appendix D – Law, Regulation, Mitigation Measures, and Forest Plan Direction

Laws and Regulations Applicable to this Travel Management Project

The management of timber resources on National Forest System (NFS) lands is based on several Federal and State laws and regulations. The following table displays some of the laws and regulations pertinent to the travel management analysis.

Table 44. Laws and regulations pertinent to travel management

Laws and Regulations	Description	Authority
Federal Land Management and Policy Act 1976	Public lands to be managed to preserve and protect certain lands in their natural condition.	BLM
National Forest Management Act, 1976	Requires development of land and resource management plans and governs administration on national forests.	Secretary of Agriculture
Multiple-Use Sustained Yield Act, 1960	National forests are to be administered for recreation, range, timber, watershed, wildlife, fish, and to develop renewable surface resources.	Secretary of Agriculture
Clean Air Act, 1990 as amended	To protect air quality and promote public health by regulating emissions and requiring permits.	Arizona Department of Environmental Quality
Clean Water Act, 1977, 1982 as amended	Restore and maintain integrity of surface waters by eliminating pollutant discharge into water and achieve water quality levels to be fishable and swimmable.	U.S. Army Corps of Engineers
Executive Order 11988, 1977 as amended	Restore and preserve beneficial values of flood plains.	All Agencies
Executive Order 11990, 1977	Protect wetlands from destruction or modification.	All Agencies
Wild and Scenic Rivers Act, 1968 as amended	System for designating wild and scenic rivers.	All Agencies
Wilderness Act, 1964	Establishes National Wilderness Preservation System administered to leave unimpaired for future use and enjoyment.	U.S. Congress
Arizona Wilderness Act, 1984	Resulted in designation of three wilderness areas on the Apache-Sitgreaves National Forests.	State of Arizona
National Trails System Act, 1968	Establishes national system of recreation, scenic, and historic trails.	All Agencies
Federal Noxious Weed Act 1974, as amended and Executive Order 13112.	Designated certain plants as noxious weeds.	All Agencies
Endangered Species Act, as amended 1973	Section 7 governs conservation of ecosystems and populations of threatened and endangered plant and animal species.	U.S. Fish and Wildlife Service (USFWS)
Bald and Golden Eagle Protection Act	Protection of bald eagles.	All Agencies

Laws and Regulations	Description	Authority
Migratory Bird Treaty Act, 1918 and Executive Order 13186, 2001	Protection of migratory birds, nests and eggs. E.O. requires environmental analysis of actions on migratory bird species of concern.	USFWS
American Indian Religious Freedom Act 1978	Considers impacts of actions on tribal cultural practices.	All Agencies
National Historic Preservation Act, 1966, 1976, 1980, 1992 as amended	Section 106 governs treatment of cultural resources during project planning and implementation.	All Agencies
Antiquities Act, 1906	Cultural resources.	All Agencies
Archaeological Resources Protection Act, 1979	Cultural resources.	All Agencies
Executive Orders 11593 (1971), 13007 (1996), 13175 (2000)	Protection of cultural resources, Indian sacred sites, consultation and coordination with Indian Tribal governments.	All Agencies
Executive Order 13443	Governs expansion and enhancement of hunting opportunities and management of game species and habitats.	All Agencies
Executive Order 11644, as amended by 11989	Governs the use of off-road vehicles on Federal lands to protect natural resources, promote public safety, and minimize conflicts among uses.	All Agencies
Executive Order 12898 (1994) and 13045 (1997)	Environmental justice for environmental and health conditions in minority and low-income communities, and children.	All Agencies
The Travel Management Rule (2005)	Directs national forests and grasslands to establish a system of roads, trails and areas designated for motor vehicle use and prohibits motor vehicle use off the designated system.	Forest Service

Mitigation Measures Applicable to Alternatives B, C, D and E

The Council on Environmental Quality's (CEQ) regulations for implementing NEPA define mitigation as measures that avoid, minimize, reduce, rectify, or compensate for impacts to the physical environment resulting from Federal actions (40 CFR 1508.20). Mitigation measures would be done as part of implementing the decision to lessen any potential damage to natural or cultural resources. In addition to the "Conditions Applicable to All Alternatives" section in chapter 2, forest plan requirements (standards and guidelines) as well as mitigation would be applied to all action alternatives. Mitigation measures applicable to alternatives B, C, D and E follow.

Cultural Resources Mitigation

The Apache-Sitgreaves National Forests would comply with the Standard Consultation Protocol developed by the USFS Southwestern Region identified as appendix I to the programmatic agreement with the SHPOs under any action alternative. This protocol provides a list of

protection measures the forests can draw from to ensure adverse effects to cultural resources are avoided or minimized. These measures include, but are not limited to:

- dropping proposed motorized road, trail or area designations to avoid or reduce direct or indirect effects on historic properties;
- re-routing or modifying designated roads or trails to protect historic properties. Rerouting or modifying roads will be subject to Section 106 compliance prior to ground disturbance, as provided for in the programmatic agreement;
- use of temporary emergency closures, if needed, while unacceptable effects on historic properties are addressed;
- revision of designations, if determined necessary to protect historic properties from adverse effects;
- monitoring to ensure that impacts to historic properties are not occurring or that protection measures are working; and
- leaving roads, trails, and/or areas off the MVUM map distributed to the public until after all Section 106 compliance needs are met.

Other protection measures effective to minimize impacts from motorized use to cultural resources include: plating the site surface with several feet of material or the intentional burying of sites; using barriers (boulders, vegetation, logs) or fencing and signage; patrolling; and public education.

General Crook National Trail: Use of motorized vehicles on any portion of the route not specifically designated and designed for motorized vehicle travel is prohibited. Emphasize protection for the historic value of the trail route. Manage a 200-foot corridor to preserve evidences of historic roadway and landscape character, including related historic trees, markers, gravesites, and water holes.

MVUM: The MVUM may not have all the roads, trails and areas shown in the record of decision. The cultural resource survey and clearance for roads and trails requiring review under appendix I of the “Programmatic Agreement: Standard Consultation Protocol for Travel Management Route Designation” in lieu of the council's regulations 36 CFR 800, may not be finished at the time a decision is made.

The cultural resource survey and clearance may determine that some proposed roads or trails would cause adverse affects to cultural resources. In such cases, the road, trail, or area would be closed to motorized travel and not be published on the map at all or until an acceptable strategy for mitigating the adverse effects (including but not limited to rerouting, barriers, temporary closures, eliminating the route, monitoring) was established. If protection measures cannot be applied or the proposed route, corridor or area will have an adverse effect on cultural resources, the forests will follow section VII of the programmatic agreement and will resolve adverse effects following the procedures in 36 CFR 800.6.

Wildlife Mitigation

All BAs/BEs will be completed prior to implementation on all site specific actions (gating or blocking roads or trails closed to motorized use) associated with this decision. There could be timing and season of use restrictions placed on site specific actions as a result of this review.

MVUM: Some proposed motorized routes and camping corridors on the Alpine, Springerville and Clifton Ranger Districts are located in threatened, endangered and sensitive fish and aquatic habitat. Prior to these routes being added to the MVUM, field review would be conducted and mitigation (including but not limited to timing and season of use restrictions) applied as needed.

Soils, Watershed, and Vegetation Mitigation

Under all action alternatives, the following standards and guidelines from the forest plan and best management practices (BMPs) from Forest Service Handbook (FSH) 2509.22, and Soil and Water Conservation Practices Handbook (USDA/USFS 1990), will be implemented.

1. Off-road vehicle (ORV) activities will be managed to minimize conflicts with other uses, prevent interference with the management of other resources, and prevent general environmental degradation while providing a range of ORV opportunities. The three wildernesses and the Blue Range Primitive Area are closed to ORV use. (forest plan)
2. Motorized roads and trails are closed to vehicle use unless signed open. (forest plan)
3. Motorized roads and trails will be closed to motorized use when damage from ORVs is likely to result in adverse effects and when one or more of the following situations or areas exist (forest plan and FSH):
   a. soil groups having a high sensitivity rating, slope, erosion hazards, and runoff potential;
   b. soils with surface textures of clay, clay loam, and heavy silt loam, or soils where such textures are within 6 to 8 inches of the surface;
   c. effects to water quality, such as increased sediment and turbidity. Also, bacteriological and chemical problems due to heavy concentration of users and types of use occurring (chances of vehicle related contamination);
   d. acres utilized for other recreation activities not compatible with ORV activities;
   e. recently rehabilitated or reseeded areas;
   f. areas where the forests have plantations with trees less than 4 inches diameter at breast height;
   g. watercourses and wetlands permanently or intermittently wet;
   h. municipal watersheds; and
   i. in areas with watershed restoration projects.
4. Sediment production from roads may be minimized by methods such as (FSH):
   a. out-sloping of road;
   b. lead-out ditches;
   c. energy dissipaters on culverts;
   d. grass seeding; and

   e. rock riprap.

5. Maintain suitable filter/buffer strips between stream courses and disturbed areas and/or road locations to (forest plan and FSH):
   a. maintain suitable stream temperature; and
   b. maintain water quality standards.
6. Effectively close or obliterate roads causing intolerable resource damage (relocate roads as needed) (FSH).
7. Enhance watershed condition by obliterating roads causing resource damage that are unneeded for forest management (FSH).
8. Only one access road is approved to a parcel of private property whether there are one or many owners (forest plan).
9. Complete road maintenance plans annually for each district. Maintain roads to the maintenance level prescribed in the maintenance plans (forest plan).
10. Seasonally or permanently close existing roads that prohibit cross-country vehicle use or manage use when conflicts occur with wildlife and soil resource objectives. Generally limit closures to local roads in erosive soil areas, riparian areas, or wildlife areas that require specific management practices (forest plan).
11. Roads not needed for industry, public, and/or administrative use, which are uneconomical to maintain or causing resource conflicts will be obliterated. Obliteration will be accomplished by mechanically destroying the facility or by implementing management strategies to discourage, eliminate, or prohibit traffic to allow natural vegetation to return to the site. The road or trail shall be removed from the inventory when obliteration is complete (forest plan).
12. Emphasize road management in areas where resource/wildlife protection is dominant forest policy (seasonal closure orders).
13. Implement best management practices to prevent water quality degradation. Implement improvement action where water quality degradation does occur, except for special cases where temporary or short-term degradation is occurring from road crossing construction or similar situations (FSH).
14. Access will be strictly managed within Chevelon Creek as follows:
    a. trails are closed to motorized use;
    b. off-road travel by motorized vehicles is prohibited; and
    c. motorized use within the corridor is restricted to the 504 Road. The road to Durfee Crossing will remain closed. Any vehicular access within the corridor other than the 504 Road must be authorized by the district ranger.
15. Roads will be located away from stream bottoms to minimize sediment delivery to the stream course whenever possible.
16. Erosion control measures will be included in road plans. Construct roads to keep sediment out of riparian and aquatic habitats. Minimize clearing widths and vegetative clearing. Permanent roads constructed/reconstructed in the critical wildlife habitat areas must meet the following criteria (forest plan):

a. There is no feasible alternative to build the road outside the area, and the road is essential to achieve priority goals and objectives of contiguous management areas, or to provide access to land administered by other government agencies or to contiguous private land.

b. Roads are constructed/reconstructed to the minimum standards necessary to provide safety for the road use purpose.

17. Road survey design and construction engineering efforts will be commensurate with the value of the road(s) being constructed. Construct roads to minimum economical standards. Revegetate cut and fill slopes where feasible. Relocate or remove roads occurring within riparian areas. Do not align roads to pass through the long axis of narrow riparian strips (forest plan and FSH).

Scenery Mitigation

Under alternatives B, D, and E, construction of motorized trails would not include removal of trees. However, any type of slash generated from trail improvement will be removed within 1 year if within view of roadways or use areas in VQO of retention and partial retention foregrounds (forest plan, MA 1, p. 111) and within 2 feet of ground in modification/maximum modification (forest plan, MA 1, p. 112).

Transportation Mitigation

While most of the forests' maintenance level 3-5 roads are designed primarily for use by highway legal vehicles, two roads—NFSR 504, Heber Mormon Crossing and NFSR 169, Deer Lake Road—provide recreational access for all-terrain vehicles and other non-highway legal OHVs. Designating NFS roads for motorized mixed use involves special safety and engineering considerations. A mixed use study was completed on these two roads with the following mitigations:

- implementing the universal mitigation measures, especially improved signing and better communication will reduce crash probability;
- road mitigation should be prioritized regardless of mixed use, along with implementing a comprehensive communication, management, and enforcement plan. Associated implementation costs will depend on the designated allowed use for the road; and
- risk without mitigation: NFSR 504 and NFSR 169, crash probability is low and crash severity is high.

For all alternatives, the following mitigation measures apply:

- Clear communication and education to visitors on allowed uses, safe motor vehicle use, and natural resources (informational signing and kiosks, maps, Web site, etc.).
- Reduce "sign pollution" and separate cluttered signing and avoid unnecessary items.
- Clear brush and shape cut slopes along NFSR 504 to improve sight.
- Upgrade all signing on NFSR 504 and NFSR 169 to MUTCD standards, including recreation signing placed along the roadways. (An engineered sign study was performed on both NFSR 504 and 169. NFSR 504 has been resigned per the sign study in FY2008.

NFSR 169 will be resigned per the sign study in FY2010. The sign study was in compliance with MUTCD and does not include recreation signing or additional signing requirements for OHVs).

- Cleanup and eliminate vandalism stickers that can confuse forest visitors.
- Combine the appropriate enforcement measures with the allowed uses for the road.
- Utilize a monitoring program to better determine the appropriate management strategy for the types of use, new technologies, changes in visitor demands, and resource protection measures.

Some Pertinent Forest Plan Standards and Guidelines Applicable to Some Resource Areas

The Apache-Sitgreaves National Forests' plan specifies the overall direction by which the forest resources are managed (USDA FS 1987). The forest plan consists of forestwide and area-specific goals, objectives, standards, and guidelines, which provide for land uses with anticipated resource outputs. There are many standards and guidelines pertaining to use of the forests' motorized routes. Included here is some of the pertinent direction available for the following resource areas: cultural resources, fisheries, wildlife, air quality, soils and watershed, vegetation, recreation, and scenery. Refer to the forest plan for complete standards and guidelines.

Cultural Resources

- Establish ORV use areas and closures as needed to meet demand and other resource objectives. Manage ORV use to provide opportunities while protecting resources and minimizing conflicts with other users.
- ORV activities will be managed to: minimize conflicts with other uses, prevent interference with the management of other resources, and prevent general environmental degradation while providing a range of ORV opportunities.
- Existing, as well as additional, ORV closures are implemented when one or more of the following situations or areas exist and ORV use is likely to occur that would result in significant adverse effects:
    - Areas of cultural or religious significance with proven historical significance to Native Americans.
    - Areas with a high concentration of archaeological and historical sites or areas with especially significant sites.
- The preferred management of sites eligible, or potentially eligible, for the National Register of Historic Places will be avoidance and protection.
- Significant or potentially significant inventoried sites will be managed to achieve a "No Effect" finding in consultation with the SHPO and ACHP (36 CFR 800). Where resource conflicts make this impossible, management will achieve a "No Adverse Effect" finding. (forest plan: pp. 15, 34-35, 37, 39, 40)

Recreation

Direction for guiding management activities for outdoor recreation including, but not limited to motorized travel (p. 14-15). Management directives for outdoor recreation that relate directly to travel and recreation management:

- Manage the recreation resource to provide opportunities for a wide variety of developed and dispersed recreation opportunities. Provide for developed site and dispersed visitor use.
- Maintain a variety of trails, considering people's needs. Includes foot, motorized, and challenge adventure opportunities, as well as opportunities for the handicapped.
- Continue to integrate the recreation opportunity spectrum (ROS) system into the forests planning process to quantify recreation opportunity changes, guide forest management, and coordinate recreation with other resources.
- Establish ORV use areas and closures as needed to meet demand and other resource objectives. Manage ORV use to provide ORV opportunities while protecting resources and minimizing conflicts with other users (p. 15).

Fisheries

- Maintain habitat for viable populations of wildlife and fish species, and improve habitat for selected species. This is accomplished directly through habitat management, and indirectly through coordination of habitat management in conjunction with other resource activities.
- Improve habitat for listed threatened, endangered, or sensitive species of plants and animals and other species as they become threatened or endangered. Work toward recovery and declassification of species.
- Improve vegetation in riparian areas. This is an emphasis area for the plan. Improvements will be accomplished by reducing or, in some cases, eliminating adverse impacts from grazing, vehicles, and overuse by man.

Management Area 3 (Riparian): Recognize the importance and distinctive values of riparian areas when implementing management activities. Give preferential consideration to riparian dependent resources in cases of unsolvable conflicts. Manage to maintain or improve riparian areas to satisfactory condition. Other resource activities may occur to the extent they support or do not adversely affect riparian dependent resources. Management emphasis will be directed at areas with riparian dependent resources in this order of priority: (1) threatened and endangered species; (2) cold water fisheries; (3) warm water fisheries; and (4) all other riparian areas.

Management Area 3 Standards and Guidelines: For priority 1 and priority riparian areas for aquatic resources: (1) manage for and maintain at least 80 percent of near natural shade over water surfaces; (2) manage for and maintain at least 80 percent of streambank total linear distance in stable condition; (3) prevent siltation not to exceed 20 percent fines (<855mm) in riffle areas; (4) maintain 80 percent of the spawning gravel surface free of inorganic sediment; (5) manage for stream temperatures not to exceed 68 degrees F, unless not technically feasible; and (6) manage for and maintain at least an 80 biotic condition index on all perennial streams.

For priority 1 and 2 riparian areas for vegetation resource (where the site is capable of supporting woody plants): (1) manage for and maintain at least 60 percent of the woody plant composition in three or more riparian species; (2) manage for and maintain at least three age classes of riparian woody plants, with at least 10 percent of the woody plant cover in sprouts, seedlings, and saplings; (3) manage for and maintain at least 60 percent near natural shrub and tree crown cover; and (4) determine need and rehabilitate riparian areas through seeding and planting woody species in areas that are in unsatisfactory condition.

Manage for or maintain at least 60 percent of potential habitat capability for Apache trout, rainbow trout, brook trout, brown trout, loach minnow, and Little Colorado Spinedace.

Wildlife

Elk: Standards and guidelines expected to maintain or improve elk habitat components in timberland, woodlands, riparian areas, and grasslands - Amendment 1. Total road densities should average 3.5 miles per square mile or less. Open road densities should average 2 miles per square mile or less.

Aquatic macroinvertebrates: For MA3 riparian areas, manage for several indicator species with one of these being aquatic macroinvertebrates. The standards and guidelines for aquatic macroinvertebrates for priority 1 and 2 riparian areas are to manage for and maintain at least an 80 biotic condition index on perennial streams.

Antelope: Standards and guidelines to maintain or improve antelope habitat components in woodlands and grasslands – MA 4 grasslands managed to maintain existing antelope range.

Wild turkey: Standards and guidelines exist to maintain or improve turkey habitat components in timberland, woodlands, riparian areas, and grasslands.

Air Quality

Standards and guidelines:

- Wilderness: In fire management activities, give preference to using methods and equipment that causes the least: (1) alteration of the wilderness landscape; (2) disturbance of the land surface; (3) disturbance to visitor solitude; (4) reduction of visibility during periods of visitor use; and (5) adverse effect on other air quality related values.
- Water Resource Improvement Maintenance Monitoring: Monitor specific air pollutant and meteorological parameters necessary for the determination of air quality in the Mt. Baldy Class 1 area.
- Air Management: Comply with State and Federal air quality standards.
- In the Class 1 air quality area (Mt. Baldy) maintain high quality visual conditions. The form, line, texture, and color characteristic landscape will be clearly distinguishable when viewed as middle ground.

Soils and Watershed

Standards, guidelines, and goals for soils, watershed, and riparian areas:

- Maintain, or where needed, enhance soil productivity and watershed condition by 2020. Maintain a high quality sustained water yield for forest users and others. Identify and protect wetlands and flood plains (p. 16).
- Ensure compliance with Public Law 92-500, Federal Water Pollution Control Act, and amendments including the Clean Water Act. Implement best management practices to prevent water quality degradation. Implement improvement action where water quality degradation does occur, except for special cases where temporary or short-term degradation is occurring from road crossing construction or similar situations (p. 81).
- Provide adequate drainage to prevent concentrated flow and sediment laden runoff from entering watercourses (p. 81).
- Conserve soil and water resources, avoid permanent impairment of site productivity, and ensure conservation of soil and water resources. The minimum soil and resource management requirement is to control surface water runoff and erosion at not less than tolerance conditions (36 CFR 218.23 and 27) (p. 81).
- Erosion control measures will be included in road plans. Construct roads to keep sediment out of riparian and aquatic habitats (p. 104).
- Management Area 2: Plan/accomplish erosion reduction projects on areas disturbed by project activities where the site is not expected to stabilize within 2 years or when water quality degradation will occur (p. 153).

Scenery

The following visual quality objectives variations are allowed for a management area (p. 35-36):

  - Preservation: No Change
  - Retention: +2 percent foreground, +5 percent background, middle ground.
  - Partial Retention: +5 percent foreground, +10 percent back and middle ground
  - Modification/maximum modification: +10 percent in all zones
- One classification movement downward is all that will be allowed. Even acceptable variations must be coordinated through the forest landscape architect to mitigate the variation when possible (p. 35-36).
- Proposed General Crook National Historic Trail – Manage all resource activities to meet VQO retention foreground requirements, considering the historic qualities of the characteristic landscape (p. 37).
- Wilderness and Blue Range Primitive Area – Visual quality objective is preservation (MA 7, MA 8, MA 12, MA 13).
- Road construction in semiprimitive motorized areas will take into consideration that a natural appearing environment will be maintained. Most new roads should be closed following project completion. Roads left open will be managed at maintenance class 2 (p. 33).

- Off-road vehicle activities will be managed to: minimize conflicts with other uses, prevent interference with the management of other resources, and prevent general environmental degradation while providing a range of ORV opportunities. The three wilderness areas and the Blue Range Primitive Area are closed to ORV use (p. 34).
- Existing, as well as additional, ORV closures are implemented when one or more of the following situations or areas exist, and ORV use is likely to occur that would result in significant adverse effects (full list on p. 34-35).
- The following management areas (with page number references) have specific direction for scenery: MA 1 – p. 97; MA 2 – p. 117; MA 3 – p. 125; MA 4 – p. 130; MA 9 – p. 146; MA 11 – p. 161; MA 14 – Black River main stem – p. 169-170; MA 15 – East and West Fork of Black River p. 172-173; MA 16 – Chevelon Canyon p. 175-176; MA 17 – East and West Forks of the Little Colorado River; and MA 18 – Sandrock.

Appendix E – Cumulative Effects

In their cumulative effects analyses, each specialist establishes which actions overlap in space and time with the changes proposed under the alternatives to the existing transportation system. Cumulative effects are determined by adding the effects of each alternative to the effects of past, present, and future activities. It is important to note the existing condition is the basis of an effects analysis, and the existing condition is the result of impacts from past and present activities. The cumulative effects analysis for each resource adds the impacts of the alternatives (which include impacts from past and present activities) to the impacts from the impacts of reasonably foreseeable future actions or events that have the potential to change the physical, social, economic, or biological nature of a specified area.

Past, present and reasonably foreseeable activities within the analysis area are listed in table 45. This table was developed from the schedule of proposed actions for the ASNFs and professional knowledge of the analysis area. It is not intended to be an exhaustive list of all past, present and reasonably foreseeable activities in the analysis area, but a thorough representation of known actions. For this analysis, the cumulative effects analysis area is 5th code watershed boundaries, the planning area (boundary of the Apache-Sitgreaves National Forests), or some larger area depending on the resource type and extent of impacts to the resource.

Table 45. Past, present, and reasonably foreseeable projects on the Apache-Sitgreaves National Forests

Activity	Type	Status	Ranger District
Prescribed Fire			
Campbell Flat RX Burn	Fuels reduction	Foreseeable	Alpine RD
R-C Prescribed Burn	Prescribed burn	Implementation Oct. 2010	Lakeside and Black Mesa RDs
Wildland-Urban Interface (WUI)			
Campbell Blue WUI	Wildlife habitat and riparian restoration	Implementation Oct. 2010	Alpine RD
Beaver Creek WUI Project	Fuels treatment	Foreseeable	Alpine RD
Rim Lakes Forest Health Project	Fuels reduction	Foreseeable	Black Mesa RD
Show Low South Fire Risk and Fuel Reduction	Fuels reduction	Implementation July 2011	Lakeside RD
Big Lake WUI Fuels Reduction Project	Fuels management	Foreseeable	Springerville RD
Greens Peak WUI Hazardous Fuels Reduction	Fuel treatment	Implementation Oct. 2010	Springerville RD
Wildfire			
Wildfire History	Unplanned ignitions	Past	Sunflower Fire (2005) 385 ac., KP Fire (2004) 16,092 ac., KP Fire (2003) 10 ac., KP Fire (2001) 17 ac., Thomas Fire (2003) 10,644 ac., Steeple Fire (2003) 6,009 ac.

Activity	Type	Status	Ranger District
Trail Construction, Reconstruction and Maintenance			
Bear Fire Trail Restoration	Trail realignment	Foreseeable	Alpine RD
Leopold Commemorative Trail/Green Fire Trail	Trail construction	Foreseeable	Alpine RD
OHV Trail Heber-Overgaard North	OHV trail maintenance and reconstruction	Foreseeable	Black Mesa RD
Rim Vista Trail 622 Paving Project	Trail maintenance and reconstruction	Foreseeable	Black Mesa RD
Snowmobile Trail Maintenance and Realignment	Snowmobile trail maintenance and reconstruction	Ongoing	Alpine, Black Mesa, and Springerville RDs
White Mountain Trail System Modifications	Trail maintenance and reconstruction	Foreseeable	Lakeside RD
Water Development			
Water diversions		Ongoing	Forestwide
Black Canyon Dam Improvement Project	Modifications to meet current dam safety requirements and recent reclassification of the dam to “High Hazard”.	Implementation Sept. 2010	Black Mesa RD
Land Exchanges			
Black River Land Exchange – Rancho Alegre (1 of 2 parcels)	Land exchange - 79.76 acres, 0.25 mile along west fork of the Blue River, 3 acres of wetland	Implementation Dec. 2011	Alpine RD
Black River Land Exchange – Blue River Ranch parcel (2 of 2 parcels)	Land exchange	Implementation Dec. 2011	Alpine RD
Camp Tatiyee Land Exchange	Land exchange	Implementation Dec. 2011	Lakeside RD
Show Low South Land Exchange	Land exchange	Implementation Dec. 2011	Lakeside RD
Fisheries Habitat Management			
Fish Barriers	Fish habitat improvement	Foreseeable	Clifton RD
Fish Barrier Maintenance, Repair, and Reconstruction	Improvement to existing fish barriers	Foreseeable	Alpine and Springerville RDs
Road and Trail Management			
Transportation System	Road maintenance	Ongoing	Forestwide
Road maintenance	Road Maintenance	Ongoing	Forestwide
Eagle Creek Road Maintenance	Road maintenance	Past	Clifton RD
Heber-Overgaard Nonmotorized Trail System	Trail construction	Foreseeable	Black Mesa RD

Activity	Type	Status	Ranger District
FR 129 Paving	Road paving project	Foreseeable	Lakeside RD
Minerals, Energy Development, Oil and Gas Leasing Activities			
Pueblo Park Mineral Materials Pit	Materials pit and special use permit	Implementation Oct. 2010	Alpine RD
Minerals Extraction	Special use permit	Ongoing	Forestwide
Other Jurisdictions			
Private property development in and adjacent to forests	Recent new home construction with associated road const.	Ongoing and foreseeable	Forestwide
Livestock Grazing Management			
Grazing Allotments	Livestock grazing management	Ongoing	Forestwide
Heber-Reno and Morgan Mountain Sheep Driveway	Grazing management	Ongoing	Black Mesa, Lakeside, and Springerville RDs
Heber Wild Horse Territory Plan	Grazing management	Foreseeable	Black Mesa RD
Copperas Allotment Management Analysis	Livestock grazing management	Foreseeable	Clifton RD
Wildbunch Allotment Management Plan	Livestock grazing management	Foreseeable	Clifton RD
Cerro Trigo Allotment	Livestock grazing management	Implementation Oct. 2010	Springerville RD
Greens Peak Allotment	Livestock grazing management	Implementation Oct. 2010	Springerville RD
Hall Allotment	Livestock grazing management	Implementation Oct. 2010	Springerville RD
Revised EA Molina Springs Allotment	Livestock grazing management	Implementation Oct. 2010	Springerville RD
Recreation Management			
Developed Recreation Use	Recreation management	Ongoing	Forestwide
General Recreation Use	Recreation management	Ongoing	Forestwide
Land Management Planning			
Apache-Sitgreaves NFs Forest Plan Revision	Land Management Planning	Foreseeable	Forestwide
Wild and Scenic Rivers			
Blue River and KP Creek Wild and Scenic Rivers Suitability Study	Wild and scenic river suitability study	Implementation Oct. 2010	Alpine and Clifton RDs
Special Uses Management/Road Easements			
ADOT Maintenance Yard	Special use permit	Foreseeable	Alpine RD
Blue River Gravel Pits	Special use permit	Sept. 2010	Alpine RD

Activity	Type	Status	Ranger District
Cottonwood Gulch Foundation Backpacking Expeditions	Special use authorization	Ongoing	Alpine RD
NRCS Weather Station	Assorted SnowTel and Snow Courses - 65 acres	Foreseeable	Alpine RD
Nutrioso Fire Department Communications Site	Special use permit	Foreseeable	Alpine RD
Salt River Project Weather Stations	Special use permit	Implementation Nov. 2010	Alpine RD
Heber Youth Group Camp Access	Road easement and special use permit	Sept. 2010	Black Mesa RD
Ditch Bill Easement - Little Mormon Lake and associated improvements	Irrigation and stock watering easement - with operating and maintenance conditions	Fall 2010	Lakeside RD
Ditch Bill Easement - Lakeside Ditch	Irrigation and stock watering easement - operating/maintenance	Foreseeable	Lakeside RD
Langkilde Road Easement	Road easement	Implementation Jan. 2011	Lakeside RD
Wildlife Habitat Management			
National Wildlife Turkey Federation Riparian Restoration Project	Riparian habitat restoration	Sept. 2010	Alpine RD
Mexican Wolf Blue Range Recovery Area Holding Pen	Construction of permanent pen for temporary holding of wolves up to 30 days	Foreseeable	Springerville RD
Other Vegetation Treatments			
Chitty Fire Salvage	Fuels treatment	Sept. 2010	Alpine and Clifton RDs
Hwy 191 Hazard Tree Removal	Hazard tree removal	Foreseeable	Alpine RD
Bruno Thinning and Slash Treatment	Fuels treatment	Past	Black Mesa RD
Integrated Forestwide Noxious, Terrestrial, and Aquatic Weed Management Plan	Invasive species management	Ongoing	Forestwide
Rodeo-Chediski Fire Reforestation	Reforestation	Ongoing	Black Mesa and Lakeside RDs
Timber Harvest	Tree removal	Past	Forestwide
Riparian Improvement			
Riparian Restoration Projects	Restoration treatment	Foreseeable	Forestwide

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