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Draft Environmental Impact Statement for Travel Management on the Gila National Forest

Silver City, New Mexico

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Cover Photo: Forest road accessing Pine Flat, Silver City Ranger District, Gila National Forest

Draft Environmental Impact Statement for Travel Management on the Gila National Forest

Silver City, New Mexico

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Abstract: The Gila National Forest (the forest) proposes to make changes to the current system of National Forest System roads, motorized trails, and areas. The result of these changes will be a system of roads, trails, and areas designated for motor vehicle use as required by the Travel Management Rule. Also proposed is an amendment to the "Gila National Forest Plan" to prohibit motor vehicle travel off the designated system once the motor vehicle use map is published. Some alternatives propose designated fixed-distance corridors solely for the purpose of motorized dispersed camping or motorized big game retrieval. Five action alternatives propose changes to National Forest System roads, trails, and areas in various combinations. The Gila National Forest has identified alternative G as the preferred alternative. A full description of the preferred alternative may be found in chapter 2 of this document.

Date Comments Must Be Received: The 60-day comment period begins the day after the notice of availability (NOA) is published in the Federal Register. Comments on this draft environmental impact statement must be received or postmarked before the end of the 60th calendar day following publication of the NOA to participate in the administrative appeal process (36 CFR 215.6(4). We will post the Federal Register NOA on the forest Web site at http://fs.usda.gov/goto/gila/travel.

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 review or judicial review.

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Summary

To comply with the Travel Management Rule, the Gila National Forest (the forest) proposes to provide for a system of roads, trails, and areas designated for motorized use by making changes to the current travel system. The proposed changes will reduce the places where people can drive in the Gila National Forest. The proposed changes do not restrict where people's nonmotorized activities—such as hiking, camping, bicycling, hunting, and others—may take place.

Background

To address the concern about unmanaged off-highway vehicle (OHV) use, the Forest Service published final travel management regulations for use of motor vehicles on National Forest System lands on November 9, 2005. The new regulations amended Title 36 of the Code of Federal Regulations, parts 212, 251, 261, and removed part 295. These regulations together are referred to as the Travel Management Rule throughout this document.

The Travel Management Rule requires that each national forest and grassland "provides for a system of National Forest System (NFS) roads, NFS trails, and areas on NFS lands that are designated for motor vehicle use. After these roads, trails, and areas are designated, motor vehicle use, including the class of vehicle and time of year, not in accordance with these designations, is prohibited. Motor vehicle use off designated roads and trails and outside designated areas is prohibited by 36 CFR 261.13 (36 CFR 212.50 (a))." Therefore, the Gila National Forest is presenting these alternatives to meet the Travel Management Rule requirements. The designated roads, trails, and areas will be published on a motor vehicle use map, which will be available free of charge to the public.

Motor vehicles will continue to be a legitimate and appropriate way for people to enjoy the Gila National Forest, and motor vehicle access opportunities are important. The Gila National Forest will continue to provide motor vehicle access to National Forest System lands for activities such as camping, fishing, hunting, hiking, mountain biking, wildlife viewing, horseback riding, and driving for pleasure on designated roads and trails.

Purpose and Need

- There is a need to comply with 36 CFR 212.51(a), which requires the forest to designate a system of roads, trails and areas for vehicle use by vehicle class and, if appropriate, by time of year.
- There is a need to manage motorized vehicle use on NFS lands on the Gila National Forest in accordance with the provisions of the Travel Management Rule and 36 CFR parts 212, 251, and 261.
- There is a need to comply with 36 CFR 261.13, which requires that forests prohibit motor vehicle use off the system of designated roads, trails, and areas (i.e., close the forest to motorized cross-country travel).
- There is a need to amend the forest plan to comply with the Travel Management Rule.

Public Involvement

From 2006 to 2007, Gila National Forest ranger districts held 46 public meetings and open houses across the national forest to introduce the Travel Management Rule and the forest travel

management process to over 900 participants. In the fall of 2008, more than 800 people attended an additional 18 workshops. These workshops generated over 2,000 public comments, and provided the public an opportunity to review maps and provide input. Over 380 individuals, including landowners, range permittees, and outfitters or guides, were contacted, and the forest met with local motorized user groups, conservation groups, various local organized groups, Federal and State agencies, and local county officials. Public input provided issues, opinions, opportunities, and general comments, which are listed in the travel analysis process report (USDA Forest Service 2010).

The forest supervisor published the proposed action on September 11, 2009. Publishing the proposed action marked the start of the scoping comment period, during which we asked the public for comments on the proposal. We mailed the proposed action to approximately 4,000 people and held 10 open houses. In response, we received almost 16,000 letters and emails. The content of the letters and emails formed the basis of the alternatives and environmental analysis.

Significant Issues

Significant issues form the basis of alternatives to the proposed action. These four significant issues were identified from the comment letters:

1. **Motorized Routes:** The proposed changes to motorized routes, specifically the type, extent, level of use, and location of motorized routes, may lead to resource, recreation, social, and economic effects.
2. **Motorized Dispersed Recreation:** The proposed change to motorized dispersed camping to limit it to proposed designated corridors and areas may lead to resource, recreation, social, and economic effects.
3. **Motorized Big Game Retrieval:** The proposed change to motorized big game retrieval may lead to resource, recreation, social, and economic effects.
4. **Areas:** The proposed change to designated areas specifically for OHV activities may lead to resource, recreation, social, and economic effects.

Alternatives

Alternative A is the proposed action alternative. This alternative has been modified as shown in alternative F. Alternative A was dropped from detailed analysis.

Alternative B is the no action alternative. It represents the existing condition, which is our best estimate of where people are driving now.

Alternative C provides the most motorized opportunities. Only those routes that are needed to meet laws, regulations, or policies would be closed.

Alternative D would provide for moderate motorized access with additional protection of sensitive resources, such as threatened, endangered, and sensitive species; high density cultural sites; riparian and wetland areas; low condition watersheds; and roadless areas.

Alternative E provides for the least motorized access, most resource protection, and emphasizes nonmotorized recreation.

Alternative F emphasizes motorized recreation opportunities while considering sensitive resources such as threatened, endangered, and sensitive species; high density cultural sites; riparian and wetland areas; low condition watersheds; and roadless areas.

Alternative G combines elements from other alternatives to provide a mix of motorized and nonmotorized opportunities.

Figure 1, figure 2, and table 1 (p. v) compare the resultant motorized system and change from alternative B for each alternative.

Conclusions About the Effects of the Alternatives

The effects of this project can be split roughly into two types: (1) effects to people and how they use the forest, called "social effects," and (2) effects to natural and cultural resources. Social effects include things like opportunities for motorized access and recreation and impacts on jobs and revenue associated with motorized use of the national forest. Natural and cultural resources include soil, water, fish, wildlife and plant species and habitat, nonnative invasive plants, cultural resource sites, and air quality. The draft environmental impact statement examines effects to these and other resources in detail in chapter 3. This summary highlights the change in motorized opportunities and effects to natural and cultural resources because the public indicated these things were the most important to them.

For motorized opportunities, choosing any of the action alternatives (C through G) reduces where people can drive in the Gila National Forest from the existing condition. The total amount of roads and trails open for motorized use would be reduced by 2 to 50 percent (table 1) depending on the alternative selected, and virtually no driving off roads or trails would be allowed. The ability to drive to a dispersed campsite or to retrieve game would be restricted to corridors designated for such use.

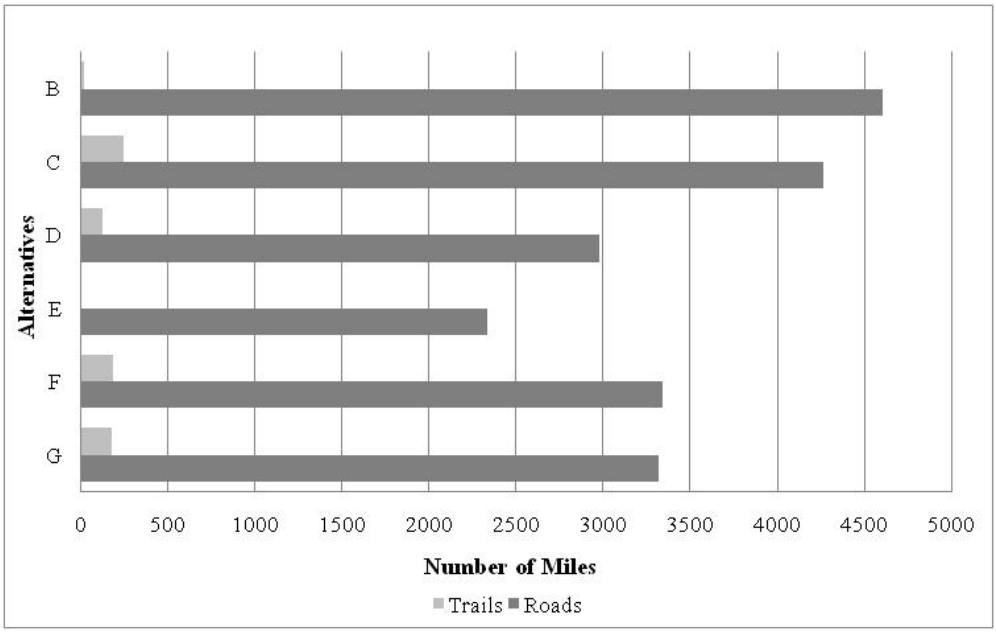

Figure 1. Summary of the roads and trails that would result from each alternative, and their overall change from alternative B, no action

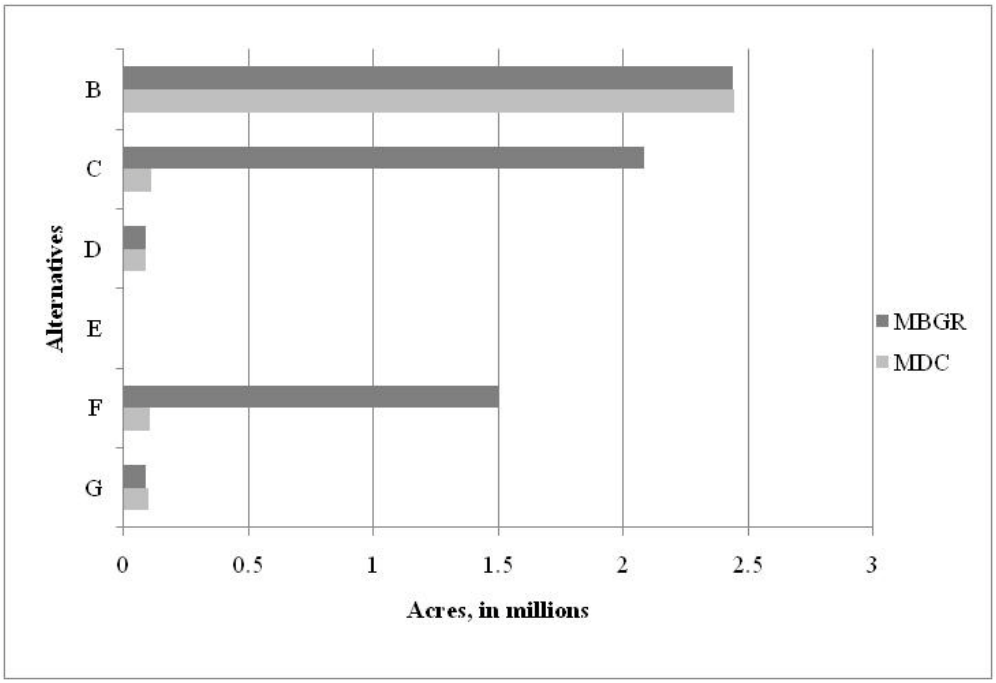

Figure 2. Comparison of acres available for driving off road, by alternative. Percent change is not depicted because the acres overlap in use. For instance, the corridors for motorized dispersed camping (MDC) and motorized big game retrieval (MBGR) are the same in alternative B.

Limiting where people can drive may alter some ability to enjoy the national forest in the manner they are accustomed to. Being able to drive on fewer roads and trails means people may not be able to drive to their favorite recreational destination, which applies to both motorized and nonmotorized uses. Therefore, some destinations would thus be rendered inaccessible by motor vehicles. Exploring or touring by driving off roads or trails (e.g., cross country) would no longer be allowed. Some trails would not be open to motorcycles or ATV use. Many comments indicated that curtailing motorized use of the national forest unacceptably limits their freedom.

Fewer open routes and the elimination of motorized cross-country travel tends to be more protective of natural and cultural resources. As a result, alternatives D through G tend to increase the protection of natural and cultural resources compared to no action. By comparison, alternative C does not greatly decrease road and motorized trail miles, and allows the most authorized off road uses (i.e., big game retrieval and motorized dispersed camping) so it does not greatly change from alternative B, no action. By these criteria, alternative E would best protect natural and cultural resources because it provides the fewest motorized opportunities. The difference in effects between alternatives D, F, and G, however, is not exceptionally pronounced for most resources.

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. The “record of decision,” which we will publish after analyzing the public’s comments on this draft environmental impact statement, documents the decision and the rationale for it.

Table 1. Compariso n of motorized system resulting from changes to alternative B, no action (asterisk means item will not be shown on the motor vehicle use map)

	Alternative B (No Action)	Alternative C	Alternative D	Alternative E	Alternative F (Modified Proposed Action)	Alternative G
Miles of roads designated open to the public for motor vehicle use	4,604	4,266	2,977	2,332	3,343	3,323
Miles of motorized trails (less than 50 inches in width)	16	204	125	0	182	182
Miles of single-track motorcycle trails	0	64	0	0	0	0
Miles of routes for administrative use or by written authorization only *	0	183	354	439	298	299
Total percent change in motorized roads and trails	0%	-2%	-33%	-50%	-24%	-24%
Miles open for motorized dispersed camping (300 feet on each side of the road)	5,197 (no distance limit, forest is open)	1,538	1,183	0	1,447	1,327
Motorized big game retrieval	No limit on distance or species. Forest is open.	1 mile from each side of designated open roads, county roads, and state and federal highways for retrieving elk, deer, bear, mountain lion, javelina, pronghorn	300 feet using same motorized dispersed camping corridors for retrieving elk and deer	No motorized big game retrieval allowed	1/2 mile from each side of designated open roads, county roads, and state and federal highways for retrieving elk only	300 feet using same motorized dispersed camping corridors for retrieving elk and deer
Number of areas (acres) open to all vehicles	No limit, forest is open	38 (29)	0 (0)	0 (0)	38 (29)	38 (29)
Number of areas (acres) restricted to ATV and motorcycles only	No limit, forest is open	1 (8)	0 (0)	0 (0)	1 (8)	1 (8)

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Acronyms

ARPA	Archaeological Resource Protection Act
ATV	all terrain vehicles
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
CDT	Continental Divide Trail
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DEIS	draft environmental impact statement
EIS	environmental impact statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEIS	final environmental impact statement
FOIA	Freedom of Information Act
FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	geographical information system
GMU	game management unit
GNFP	Gila National Forest Plan
MBGR	motorized big game retrieval
MDC	motorized dispersed camping
MIS	management indicator species
ML	maintenance level
OML	operational maintenance level
MOU	memorandum of understanding
MVUM	motor vehicle use map
NAGPRA	Native American Graves Protection Act
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest System
NFSR	National Forest System road
NFST	National Forest System trail
NHD	National Hydrological Database
NHPA	National Historic Preservation Act
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NOA	notice of availability
NOAA	National Oceanic and Atmospheric Administration
NVUM	national visitor use monitoring
OHV	off-highway vehicle
ORV	off-road vehicle
P.L.	Public Law
PILT	Payments in Lieu of Taxes
RAC	resource advisory committee
RASES	Riparian Area Survey and Evaluation System
RNA	research natural area
ROD	record of decision
ROS	recreation opportunity spectrum
SCS	Soil Conservation Service
SHPO	State Historic Preservation Office
SRS	Secure Rural Schools
TAP	travel analysis process
TCP	traditional cultural property
TMR	Travel Management Rule
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
UTV	utility terrain vehicle
VQO	visual quality objective

Chapter 1. Purpose of and Need for Action

Structure of this Document

The Gila National Forest (the forest) has prepared this draft environmental impact statement (DEIS) to analyze different ways of implementing the Travel Management Rule. This report describes the forest's proposed alternatives and their environmental effects. The analysis complies with the National Environmental Policy Act (NEPA) and other relevant Federal laws and regulations. The document consists of the following:

- **Chapter 1. Purpose of and Need for Action:** Chapter 1 briefly describes this project's background, its purpose and need, and our initial proposal for achieving the purpose and need. It then describes how we informed the public of the proposal and how they responded.
- **Chapter 2. Alternatives, including the Proposed Action:** This chapter describes the proposed action and alternatives—including no action—in detail. These alternatives were developed based on significant issues raised by the public and other agencies. The chapter ends with a summary of the environmental consequences for each alternative. This chapter provides the most complete picture of the project and its effects.
- **Chapter 3. Affected Environment and Environmental Consequences:** This chapter describes the environmental effects of each alternative in detail.
- **Chapter 4. Consultation and Coordination:** This chapter contains a list of preparers and the agencies we consulted with during its development. It also contains a list of agencies, organizations and persons to whom copies of the DEIS were sent.
- **Glossary**
- **References**
- **Index**

In addition to this document, there are six separate documents of maps. These documents are by alternative and each contains an index and 18 maps displaying how each alternative affects use.

The project record is located at the Gila National Forest Supervisor's Office, 3005 E. Camino del Bosque, Silver City, New Mexico 88061. Documents are available pursuant to the provisions of the Freedom of Information Act (FOIA).

Background

To address concerns about unmanaged off-highway vehicle (OHV) use, the Forest Service published final travel management regulations for use of motor vehicles on National Forest System lands on November 9, 2005. The new regulations amended Title 36 of the Code of Federal Regulations, parts 212, 251, 261, and removed part 295. These regulations together are referred to as the Travel Management Rule throughout this document.

The Travel Management Rule (36 CFR 212.50 (a)) requires that each national forest and grassland "provide for a system of National Forest System (NFS) roads, NFS trails, and areas on NFS lands that are designated for motor vehicle use. After these roads, trails, and areas are designated, motor vehicle use, including the class of vehicle and time of year, not in accordance with these designations, is prohibited. Motor vehicle use off designated roads and trails and

outside designated areas is prohibited by 36 CFR 261.13." Therefore, the Gila National Forest is presenting this proposal to meet the Travel Management Rule requirements.

The designated roads, trails, and areas will be published on a motor vehicle use map, which will be available to the public free of charge. In designating routes, the responsible official may include in the designation the limited use of motor vehicles within a specific distance of certain designated routes, and if appropriate, within a specified time period, solely for the purposes of dispersed camping or retrieval of a downed big game animal by an individual who has legally taken the animal (36 CFR 212.51(b)). Designations will be reviewed annually and updates made to the motor vehicle use map as needed.

Exemptions from these designations include: (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 regulation (36 CFR 212.51).

Motor vehicle use that is specifically authorized under a written authorization may include activities such as livestock operations, mining, logging, firewood collection, forest products, private land access, and maintenance of pipeline and utility corridors (36 CFR 212.51(a)(8) and 261.13(h). Written authorizations allow for continued multiple-use management on the forest in a manner that does not result in unnecessary resource impacts, and that meets the intent and purpose of the Travel Management Rule.

Motor vehicles will continue to be a legitimate and appropriate way for people to enjoy the Gila National Forest, and motor vehicle access opportunities are important for many reasons. The Gila National Forest will continue to provide motor vehicle access to National Forest System lands for activities like camping, fishing, hunting, hiking, mountain biking, wildlife viewing, horseback riding, and driving for pleasure on designated roads and trails.

Location

The analysis area is the Gila National Forest, located in southwestern New Mexico as shown in figure 3. The Gila National Forest has over 3.3 million acres of public land within its boundary with approximately 126,000 acres of other ownership, including private and National Park Service lands.

Existing Transportation System

In general terms, the existing direction includes the National Forest System roads, trails and areas currently managed for motor vehicle use, plus the restrictions, prohibitions and closures on motor vehicle use existing on a unit (Southwestern Region Travel Management Rule Guidelines, June 2008). This direction describes the existing system as that shown in the INFRA databases.

It is helpful to display the forest's current motorized system, because this project proposes to change it. The forest supervisor will use the effects analyses and public comments to decide what changes to make to the existing direction regarding motorized travel.

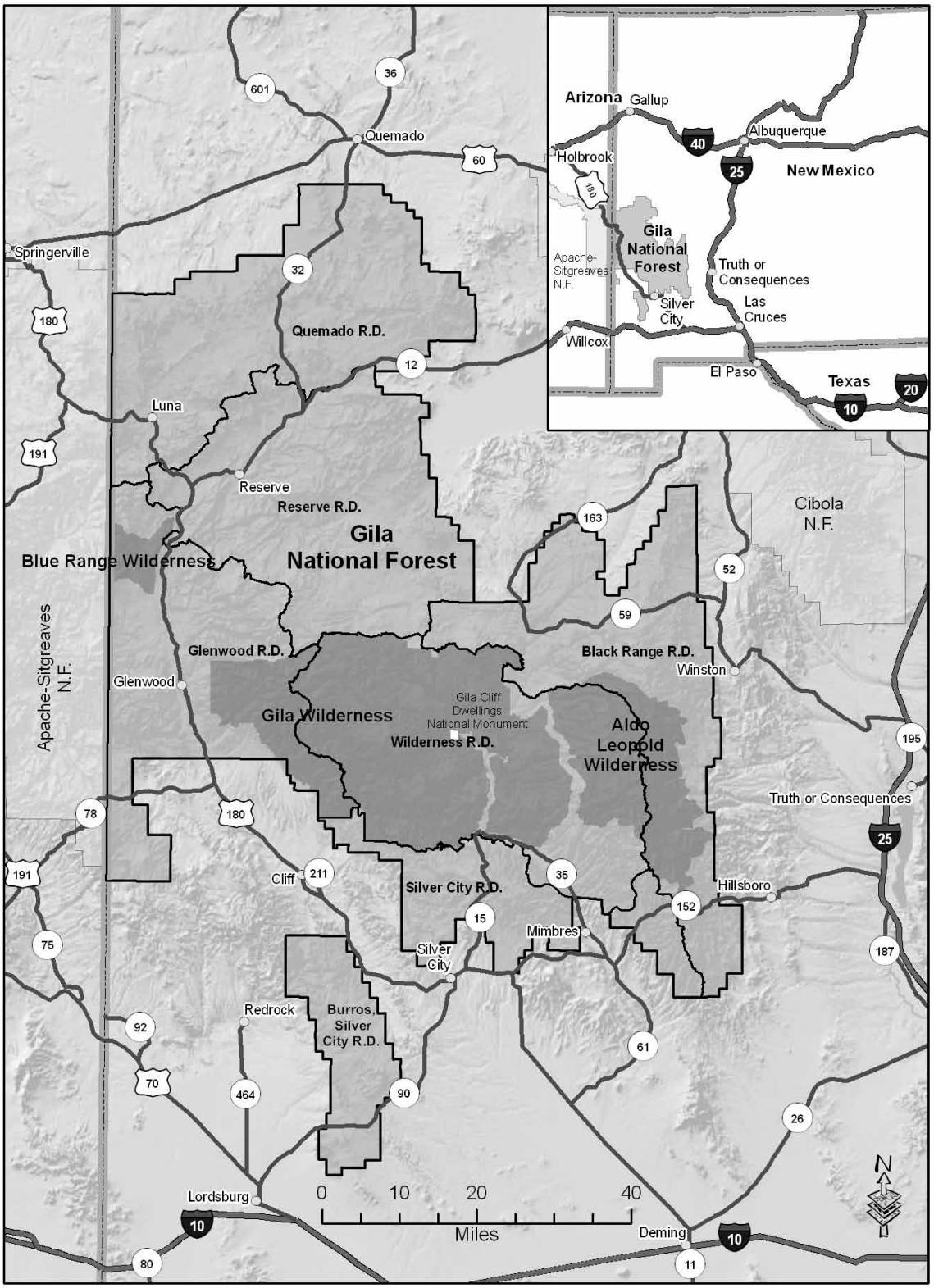

Figure 3. Location of Gila National Forest

Numerous sources depict the Gila National Forest's motorized system, including the forest visitor map, forest plan, closure orders, and databases. Some of these sources are inconsistent. For instance, the forest visitor map does not display all of the roads and motorized trails shown in the INFRA database. Other non-Forest Service publications exist and may not include Forest Service maps and information, further confusing the situation.

Since 2006, the database for roads and motorized trails (INFRA) has been updated using information received from the public, field verification, and database corrections. Several iterations of existing direction maps have been produced since 2006. These are all in the project record. The most recent is included in the map packet. This is the map depicting alternative B (no action) and summarized in table 1.

Cross-Country Travel

The Gila National Forest has approximately 3.3 million acres of National Forest System lands within its boundary. This acreage figure excludes land held privately, and includes all the acres of public land managed by the Gila National Forest.

Approximately 2.4 million acres are available for motorized cross-country travel. Even though these acres permit motorized cross-country travel, it may not be possible to drive on all of them due to slope, terrain, or thick vegetation.

The Gila National Forest does not currently have limits on places where people can drive to go camping in the forest outside of wilderness research natural areas (RNA) including proposed RNAs, and other areas restricted to motor vehicle use as shown on the forest visitor map. The forest's current direction allows people to drive and camp where off-road driving is allowed. Therefore, no special corridors are designated for motorized access to dispersed camping.

Under current direction, people can drive to retrieve downed game where off-road driving is allowed, on approximately 2.4 million acres. They can also scout for game by driving off roads except during the hunting season. More specifically, under New Mexico State Law, "It is illegal to drive a motor-driven vehicle off established roads or two-track roads in a hunting, trapping, or angling area if the vehicle bears a person licensed to hunt, trap, or fish for species on which season is open in that area" (New Mexico Department of Game and Fish 2010).

Purpose of 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 by class of vehicle and time of year on the Gila National Forest (36 CFR 212.50). On the Gila National Forest:

- There is a need to comply with 36 CFR 212.51(a), which requires the forest to designate a system of roads, trails, and areas for vehicle use by vehicle class and, if appropriate, by time of year.
- There is a need to manage motorized vehicle use on National Forest System lands on the Gila National Forest in accordance with the provisions of the Travel Management Rule and 36 CFR parts 212, 251, and 261.

- There is a need to comply with 36 CFR 261.13, which requires the forest to prohibit motor vehicle use off the system of designated roads, trails, and areas (close the forest to motorized cross-country travel).
- There is a need to amend the forest plan to comply with the Travel Management Rule.

Previous Decisions

The Travel Management Rule allows the responsible official to 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 on NFS lands for motor vehicle use (36 CFR 212.50(b)). Therefore, the existing miles of designated road system that are not being closed or changed are not included in the proposed action; only the changes to the transportation system are included. The motor vehicle use map will include the resulting road system, those roads where motorized dispersed camping would be allowed within a specific distance, and areas open to motor vehicle use. The nonsystem roads (i.e., decommissioned, unauthorized, etc.) will not be shown on the motor vehicle use map and may not be used for motorized travel.

Modified Proposed Action, Briefly Described

The proposed action for managing motorized vehicle travel was published on September 11, 2009. The proposed action has been modified. Alternative F is the modified proposed action. In it, we proposed adding approximately 7 miles to the open road system; adding approximately 166 miles to the motorized trail system; designating over 1,447 miles for motorized dispersed camping; allowing motorized big game retrieval up to ½ mile from open roads; and designating approximately 36 acres as areas open to motorized activity. The forest would be closed to cross-country motorized use. This proposal was based on analysis done in the “Travel Analysis Process” (USDA Forest Service 2010).

Decision Framework

The forest supervisor is the responsible official for this decision, which will apply only to NFS roads, trails and lands within the Gila National Forest. The forest supervisor will decide:

- Whether to select the modified proposed action or another alternative as described, or as modified in the final decision;
- What changes to make to the designated system of roads, trails, and areas;
- Whether to designate the limited use of motor vehicles within a specified distance of certain routes solely for the purposes of motorized dispersed camping or retrieval of a downed big game animal by an individual who has legally taken that animal;
- Which amendments to include in the final decision.

Public Involvement

Scoping

This project has been listed on the forest's schedule of proposed actions since April 2008.

Prior to scoping the proposed action, from 2006 to 2007, Gila National Forest ranger districts held 46 public meetings and open houses across the forest to introduce the Travel Management Rule and the forest travel management process to over 900 participants. In the fall of 2008, another 18 workshops were held and attended by more than 800 people. The workshops generated more than 2,000 public comments. These forums also provided an opportunity for the public to review maps and provide input. Over 380 individuals, including landowners, range permittees, outfitters, and guides were contacted, and we met with local motorized user groups, conservations groups, various local organized groups, Federal and State agencies, and local county officials.

Information from all of the public involvement meetings and comments were used to develop the proposed action. The forest supervisor published the proposed action on September 11, 2009. Publishing the proposed action marked the start of the scoping comment period, during which we asked the public for comments on the proposal. We mailed the proposed action to approximately 4,000 people and held 10 open houses. In response, we received almost 16,000 letters and emails. The content of the letters and emails formed the basis of the alternatives and environmental analysis.

Tribal Consultation

The Gila National Forest recognizes that certain tribes and chapters have cultural and geographical ties and knowledge about the lands now managed by the forest. Tribal members sometimes visit the Gila National Forest to gather traditional resources, hold ceremonies, and visit special locations. For these reasons, tribes share an interest in the management and protection of natural and cultural resources, including effects from motorized vehicle use.

The Gila National Forest is committed to, and has conducted tribal consultation and NEPA scoping during the travel management process. These are carried out at the government-to-government level under current laws, regulations and policies. This process is separate from other public scoping, due to the unique relationship between the U.S. Government and sovereign federally recognized tribes. It ensures that interested tribes are given the opportunity to participate in the planning process as required in NEPA and elsewhere. Prior to the Travel Management Rule in 2005, specific projects involving road access, obliteration, and maintenance were addressed with tribes on a case-by-case basis, as identified in the forest's quarterly schedule of proposed actions or other NEPA scoping.

The Gila National Forest does not manage and is not located adjacent to any tribal lands (trust, reserved, or allotted), nor are there any treaty rights. Instead, tribes with an interest in the forest are those having cultural affiliation with prehistoric occupants of National Forest System lands (USDA–FS Southwestern Region 1996, pp. 119–121), those who historically occupied lands now comprising the Gila National Forest (prior to establishment of the forest in 1905), or both.

The following 11 tribes or chapters were consulted regarding travel management:

- Pueblo of Acoma
- Alamo Navajo Chapter
- Ft. Sill Apache Tribe
- The Hopi Tribe
- Pueblo of Laguna
- Mescalero Apache
- The Navajo Nation
- Ramah Navajo Chapter
- San Carlos Apache
- Ysleta Del Sur Pueblo
- Pueblo of Zuni

Letters and face-to-face meetings at tribal offices were the primary methods of consultation. Tribes were provided with Travel Management Rule materials. These occurred in 2007 and 2008, as well as during the scoping period in 2009. Although all tribes on this list were contacted, not all were available or expressed an interest in consulting with the Gila National Forest on travel management at the time. Additional government-to-government tribal consultation continues in 2010.

Comments

We received over 16,000 emails and letters commenting on the proposed action during scoping. Of these, approximately 15,000 were “form letters,” and the other 1,000 were from individuals, organizations, and agencies. The project record contains all correspondence and the process used for evaluating comments.

The forest’s travel management interdisciplinary team (team) reviewed the general comments for significant issues about the effects of the proposed action. A significant issue is used to focus the analysis and develop alternatives to the proposed action.

We recognize that all comments provided by the public are important, however, some do not meet the definition of an issue or significant issue for a variety of reasons. The Council on Environmental Quality’s NEPA regulations direct interdisciplinary teams to “…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (40 CFR 1506.3)…” For example, a comment might suggest we analyze threatened species, which we are required to do by law.

The comments were reviewed and sorted into two categories: general comments (forestwide) and road- or site-specific comments. The road- or site-specific comments were considered by staff on the ranger districts to see whether suggestions could be incorporated into an alternative. Some suggestions were incorporated into one or more alternatives. The comments not categorized as an issue or incorporated into an alternative fell into one of the following categories:

- Already part of the proposed action;
- Addressed through implementation of standards, guidelines, or best management practices in the forest plan;
- Already decided by law, regulation, or policy;
- Beyond the scope of the project; or
- Conjectural or not supported by scientific evidence.

General Concerns

Many comments provided expressed concern about activities that are common on the forest that usually involve the use of a vehicle. These concerns are generally outside of the scope of the Travel Management Rule or addressed through existing law, regulation, and policy. These concerns include:

Aging and disabled populations—There is no legal requirement to allow people with disabilities to use motor vehicles on roads or trails, and in areas that are closed to motor vehicle use. Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory. Generally, granting an exemption from designations for people with disabilities would not be consistent with the resource protection and other management objectives of designation decisions and would fundamentally alter the nature of the Forest Service's travel management program (29 U.S.C. 794; 7 CFR 15e.103).

Firewood gathering—Upon implementation of the Travel Management Rule, the use of motorized vehicles off of the designated road system (i.e., cross-country) for the purpose of gathering firewood (dead down, live, or green tree) would be allowed in designated firewood areas, and described within the permit. Dead and down firewood gathering may occur along any designated open road, however, vehicle use would be limited to roadside parking.

Other forest product gathering such as piñon nuts—Personal use forest product gathering will continue, however, motor vehicle access will be limited to roadside parking.

Closing roads will make it difficult to get project work done—Project work will continue. If roads are needed, but are not designated, the opening or construction of the needed roads will be considered in the appropriate NEPA analysis at the time.

Enforcement—The motor vehicle use map is the source for determining what routes are open for vehicle use. It is the public's responsibility to obtain that map and stay on the designated routes. We will continue to work with partners such as State Police, sheriff departments, New Mexico Department of Game and Fish, and others to assist in enforcement.

Outreach, education, and time are fundamental for implementing change. Getting the proper message to the various audiences results in "buy in," which in turn, motivates the users to help spread the word. "Peer pressure" or fellow users spreading the word can also help in better compliance, but it takes time.

Decommissioning of routes to be closed—Decommissioning of routes may be considered in the future. These will be considered on a case-by-case basis with appropriate NEPA analysis at the time.

Access to private property—The Gila National Forest will continue to provide access to private inholdings, as required by the Alaska National Interest Lands Conservation Act (P. L. 96-487, Title XIII; 94 Stat. 2457; 16 U.S.C 3210).

Issues

The forest supervisor approved the significant issues used to develop the alternatives. The significant issues follow.

Motorized Routes

The proposed changes to motorized routes, specifically the type, extent, level of use and location of motorized routes, may lead to resource, recreation, social, and economic effects.

This issue includes the following concerns:

- Increasing motorized routes and road densities may adversely affect watershed, fisheries, wildlife, air quality, invasive plant and animal species, sensitive plants, and cultural resources.
- Decreased motorized routes may adversely affect motorized access to the forest, leading to fewer motorized recreational opportunities.
- Motorized routes may lead to conflicts with nonmotorized users or, conversely, the concentration of motorized use.
- The type, extent, and location of motorized routes could have social and economic effects by impacting tourism, traditional uses, and other recreational pursuits, both motorized and nonmotorized.

Motorized Dispersed Camping

The proposed change to motorized dispersed camping to limit it to proposed designated corridors and areas may lead to resource, recreation, social, and economic effects.

This issue includes the following concerns:

- Motorized dispersed camping corridors may adversely affect watershed, fisheries, wildlife, air quality, invasive plant and animal species, sensitive plants, and cultural resources.
- Limiting motorized dispersed camping corridors may result in reduced motorized recreation opportunities.

Motorized Big Game Retrieval

The proposed change to motorized big game retrieval may lead to resource, recreation, social, and economic effects.

This issue includes the following concerns:

- Allowing motorized big game retrieval off designated roads and motorized trails may have adverse effects to watershed, fisheries, wildlife, air quality, invasive plant and animal species, sensitive plants, and cultural resources.
- Restricting motorized big game retrieval may have adverse effects on the tourism and related employment of local communities.

- Motorized big game retrieval should be restricted to the same corridors as motorized dispersed camping to reduce creation of additional routes and potential habitat degradation.

Areas

The proposed change to designated areas specifically for OHV activities may lead to resource, recreation, social, and economic effects.

This issue includes the following concerns:

- Designating areas may adversely affect watershed, fisheries, wildlife, sensitive plants, invasive plant and animal species, and air quality.
- Designating areas may lead to uncontrolled OHV activity within the area, leading to conflicts with other users.

Important Notes

The Decision Will Change Where People Can Drive in the Forest

Currently, the Gila National Forest is open to motorized use unless marked “restricted to motor vehicle use.” The Travel Management Rule switches that around: the forest is closed to motorized use unless specifically designated for motor vehicle use as displayed on the motor vehicle use map. Driving off of designated routes will no longer be allowed unless it is in a designated area or fixed-distance corridor solely for the purposes of motorized dispersed camping or motorized big game retrieval. Use of motor vehicles on roads, trails, and areas not shown on the motor vehicle use map would be illegal and subject to a fine.

The First Motor Vehicle Use Map

The first motor vehicle use map may not have all the roads, trails, and areas shown in the record of decision for two reasons. First, the cultural resource survey and clearance for routes and areas requiring review under Section 106 of the National Historic Preservation Act may not be finished at the time the decision is made. Second, the cultural resource survey and clearance may determine that some proposed routes and areas would cause adverse effects. In such cases, we would close the route or area to vehicles, and the routes and areas would not be shown on the map at all, or until an acceptable strategy for mitigating the adverse effects was developed as required by Section 106.

It could take the Forest Service up to 3 years to phase in all the cultural resource surveys and clearances needed to implement the decision. Until then, not all the routes and areas depicted in the record of decision would be on the motor vehicle use map.

Subsequent Motor Vehicle Use Maps

We emphasize that the motor vehicle use map will be published annually, even if there are no changes to the system. If a road, trail, or area is not included in the first map, it may be included in subsequent maps, as long as the proper environmental analysis and surveys are completed. The annual publication of the motor vehicle use map means the public can continue to work with forest staff to add or remove roads, trails, and areas as appropriate.

What Happens Next

The interdisciplinary team will read and consider the comments received on this draft environmental impact statement. Based on comments received, the team may make changes to their analysis or modify alternatives as needed. For example, if a comment points out key facts—such as landownership, presence of wildlife species, mapping errors, or relevant scientific evidence not considered—that were not considered in the analysis, the team could modify its analysis. Comments that "vote" for an alternative, or form letters that repeat the same comments, do not carry any more weight than a comment submitted only once.

We will publish these changes in a final environmental impact statement (FEIS). The forest supervisor will make a decision that is documented in a record of decision (ROD). The FEIS and the ROD will be published at the same time. The ROD marks the beginning of the 45-day appeal period; the decision cannot be implemented until any appeals are resolved.

Chapter 2. Alternatives, Including the Proposed Action

Introduction

The interdisciplinary team used the significant issues listed in chapter 1 to develop alternatives to the proposed action, as modified. Summarized briefly, the four significant issues are: amount and type of motorized access, motorized access for retrieving big game, motorized access for dispersed camping, and motorized areas. The alternatives approach the purpose and need—to provide for a designated system of roads, trails, and areas—differently. The alternatives respond to the significant issues.

In addition to the issues raised during the scoping period, the public provided an alternative for the forest staff to consider. The alternative provided was for only one district and reflected no change to the current motorized system displayed in alternative B. The action alternatives presented in this draft environmental impact statement incorporate elements of the proposal as well as other comments made by the public. The interdisciplinary team also used information from other agencies to develop and refine the alternatives.

Some people requested that the alternatives provide loops and/or trail systems for both single-track and ATV riding. Some of the alternatives incorporate aspects of this request, however, the purpose of this travel management plan is to designate a system of roads, trails, and areas open for motorized use, not to develop a comprehensive off-highway vehicle plan for ATV and single-track recreational experiences. An effort could be considered in the future, with appropriate NEPA analysis that would consider a plan for those specific types of activities.

No alternative curtails any nonmotorized activities; the change is where people can drive to get to places in the forest to do these activities. System roads and motorized trails would also be open for people to walk, hike, bike, or ride horses.

Development of the Alternatives

The interdisciplinary team developed alternatives to the proposed action to address the significant issues identified from public comments. The range of alternatives includes the modified proposed action (alternative F), no action (alternative B), all action alternatives, and alternatives considered but eliminated from detailed study. A decision can be made anywhere within the range.

Alternatives Considered in Detail

Alternative B – No Action

The no action alternative is required by 40 CFR 1502.14(d). No changes to the motorized system would occur and cross-country travel would continue to be permitted. This alternative would not meet the requirements of the Travel Management Rule to prohibit motor vehicle use off the designated system; however, it provides a baseline for comparison of effects of the alternatives. In this alternative the Gila National Forest would:

- remain open to cross-country motorized travel (except in off-road vehicle restricted areas such as wilderness and research natural areas);
- continue to keep 4,604 miles of roads and 16 miles of motorized trails (less than 50 inches wide) open to motorized vehicles and uses;

- continue to keep 3 miles of roads open seasonally from approximately April 1 to September 1 (table 5, p. 24);
- continue to allow motorized dispersed camping throughout the forest (except in off-road vehicle restricted areas such as wilderness and research natural areas (tables 9 and 11, p. 27);
- continue to allow motorized big game retrieval throughout the forest, (except in off-road vehicle restricted areas such as wilderness and research natural areas (tables 10 and 11, p. 27); and
- not amend the forest plan to prohibit motorized cross-country travel or to be made consistent with the Travel Management Rule.

Features Common to Two or More Alternatives

In alternatives that propose converting roads to motorized trails, reopening roads, changing roads from open to all vehicles to open to highway legal vehicles only, designating motorized dispersed camping corridors, or providing for motorized big game retrieval, the following definitions and methods would apply:

Converting roads to motorized trails: The conversion of roads to motorized trails would entail such things as signing or restricting access based on vehicle type.

Reopening roads: Reopening of roads includes both closed and decommissioned roads. Due to the forest being open to cross-country motorized travel, unauthorized motorized use has led to their continuous use. Most do not need any work to allow passage except for NFS Road 3050 (0.2 mile) where existing berms would be removed or reworked to allow passage and maintain drainage features.

Changing roads from open to all vehicles to open to highway legal vehicles only: The prohibition of vehicle types would be displayed on the motor vehicle use map and through signing. For all action alternatives, this would apply to roads shown in table 2.

Designating Motorized Dispersed Camping Corridors: On the Gila National Forest, motorized dispersed camping is primarily characterized as vehicles towing travel trailers or other types of trailers and driving off of roads some distance and setting up camp. Activities or the makeup of the camp often center around the vehicle or trailers. The Travel Management Rule allows for the route designations to include the limited use of motor vehicles within a specified distance of certain designated routes, solely for the purposes of dispersed camping (36 CFR 212.51 (b)).

Table 2. List of roads and location descriptions to be open to highway legal vehicles only

Road No.	Mile Post Begin	Mile Post End	Location Description	Ranger District
13	0.0	2.2	Within Quemado Lake Recreation Area boundary	Quemado
13 B	0.0	0.4	Within Quemado Lake Recreation Area boundary	Quemado
13 C	0.0	0.5	Within Quemado Lake Recreation Area boundary	Quemado
13 E	0.0	0.2	Within Quemado Lake Recreation Area boundary	Quemado
13 F	0.0	0.2	Within Quemado Lake Recreation Area boundary	Quemado
13 G	0.0	0.2	Within Quemado Lake Recreation Area boundary	Quemado
13 H	0.0	0.1	Within Quemado Lake Recreation Area boundary	Quemado
13 I	0.0	0.1	Within Quemado Lake Recreation Area boundary	Quemado
21 A	0.0	0.03	Ranger district office access	Reserve
21 B	0.0	0.1	Ranger district and facilities access	Reserve
40 D	0.0	0.2	Emory Pass Vista Point	Black Range
59	0.0	0.1	Ranger district office parking	Wilderness
95	0.0	0.1	Catwalk parking area	Glenwood
129	0.0	0.2	Ranger district office parking	Glenwood
141	0.0	19.0	State law prohibits off-highway (ATV) vehicles on paved roads	Reserve
319	0.0	0.2	Ranger district office parking	Quemado
363	0.0	0.2	Campground	Silver
506 A	0.0	0.3	Little Walnut Picnic Area	Silver
610	0.0	0.7	Campground	Wilderness
630	0.0	0.1	State law prohibits off-highway (ATV) vehicles on paved roads	Wilderness
819	0.0	0.8	Forest has right-of-way thru Oak Grove subdivision—no ATVs to reduce noise conflict	Silver
851	0.0	2.4	State law prohibits off-highway (ATV) vehicles on paved roads	Silver City
970	0.0	0.6	Gila Visitor Center access	Wilderness
970 B	0.0	0.1	Gila Visitors Center parking area	Wilderness
971	0.0	0.1	Vista Village Day Use and parking	Wilderness
973	0.0	0.04	Campground	Wilderness
973 A	0.0	0.1	Upper Scorpion Campground	Wilderness
973 B	0.0	0.1	Parking lot for Gila Cliff Dwellings and West Fork Trail Head	Wilderness
974	0.0	0.3	Campground	Wilderness
981	0.0	0.4	Aldo Leopold Picnic Area and Vista Point	Glenwood
4246 J	0.0	1.5	Reduce noise conflict; adjacent to private land	Silver
4318 K	0.0	0.04	Accesses airstrip	Reserve

To continue this type of camping opportunity in the forest, motor vehicles may be driven a specified distance off of each side of certain roads designated for motorized dispersed camping and these designations would be displayed on the motor vehicle use map. The total number of miles of forest and county roads from which motorized dispersed camping would be available varies among the action alternatives (see detailed alternative descriptions). Motor vehicle use within these motorized dispersed camping corridors would be limited to what is needed to provide access to and from the campsite off of the road and does not include general driving.

Cultural resource surveys and clearances may not be completed by the time of decision for all of the motorized dispersed camping corridors along designated motorized roads. Until surveys and clearances are completed, these corridors will not be shown on the motor vehicle use map. These surveys will be phased in over 3 years. If sites are found during the surveys, the designated corridor may be modified or eliminated. As clearances are completed, motorized dispersed camp corridors will appear on the motor vehicle use map, which will be republished annually.

Dispersed camping, such as tent camping, may occur anywhere on the forest. Riding horses and hiking to access a campsite is allowed anywhere on the forest. Parking for this type of dispersed camping may occur along any designated open road. Parking would be limited to one vehicle length, including any towed trailer, from the side of the road. Parking should occur where it is safe to park, does not cause resource damage (e.g., ruts), or is not already restricted.

Motorized Big Game Retrieval: The Travel Management Rule allows for route designations to include “the limited use of motor vehicles within a specified distance of certain designated routes, solely for the purposes of…retrieval of a downed big game animal by an individual who has legally taken that animal” (36 CFR 212.51 (b)).

Motorized big game retrieval would be implemented differently in each alternative (see detailed alternative descriptions). Hunters must possess a valid license for game management units within the Gila National Forest.

Motorized big game retrieval only applies to those portions of game management units within the Gila National Forest boundary. Use of motorized vehicles to retrieve a legally harvested and tagged big game animal would be limited to certain species and the specified distance on either side of the routes indicated in the alternative. The distance applies only to Gila National Forest lands. Motorized vehicles are prohibited within:

- National forest wilderness areas (36 CFR 261.18)
- National forest primitive areas (36 CFR 261.21)
- Restricted roads, trails, or areas specified in forest orders (36 CFR 261.50)

Hunters must follow all applicable New Mexico big game hunting regulations. To protect forest resources on forest designated open roads or off the designated road system (cross country), applicable laws or regulations must be followed, such as:

- Roads should not be damaged and left in a damaged condition (36 CFR 261.12 (c))
- Retrieval of big game should take a relatively direct and safe route (USDA Forest Service Southwestern Region Travel Management Rule Guidelines, June 2008)
- Motor vehicle use off road should not damage or unreasonably disturb the land, wildlife, or vegetative resources (36 CFR 261.15 (h))

- Use the minimum number of trips to retrieve a downed animal (USDA Forest Service Southwestern Region Travel Management Rule Guidelines, June 2008)
- Only one vehicle would be allowed for game retrieval per harvested animal (USDA Forest Service Southwestern Region Travel Management Rule Guidelines, June 2008)
- Motor vehicle use should not damage any natural feature or other property of the United States (36 CFR 261.9 (a))

Forest Plan Amendments

Seven "Gila National Forest Plan" amendments are needed to bring the forest plan up to date with current management of the forest, and to comply with the Travel Management Rule and proposal. The forest plan amendments (numbers 1 through 6) listed in table 3 would be implemented in all action alternatives.

Table 3. Land management plan amendments 1 through 6 that would be implemented in all action alternatives

Location and Management Area	Language to be Removed . . .	Will be Replaced with . . .
Mule Creek 4B (p. 131, Lands J11)	"Manage the areas above Mule Creek to remain open to all entry year-round"	Use of motor vehicles is managed by the travel management plan and displayed on the motor vehicle use map.
Mule Creek 4C (p. 139, Lands J11)	"..., and the portion above Mule Creek will remain open year-round"	Use of motor vehicles is managed by the travel management plan and displayed on the motor vehicle use map.
Hells Hole 4C (p. 139, Lands J11)	"Hells Hole will remain open to vehicle use, but because of topography, vehicle use will not occur in most portions of the area."	Hells Hole will be closed to all motorized use.
Gila Bird Area 7A (p. 201, Recreation A02)	"Maintain ORV (off-road vehicle) closure on the Gila River Bird Area."	Use of motor vehicles is managed by the travel management plan and displayed on the motor vehicle use map.
Silver City Watershed 7D (p. 216, Recreation A02)	"Maintain current ORV restrictions."	Use of motor vehicles is managed by the travel management plan and displayed on the motor vehicle use map.
Fort Bayard 7C (p. 212, Recreation A02)	"Maintain current ORV closure."	All alternatives: Motorized vehicle use access is limited to designated roads with parking allowed one vehicle length from the side of the road. No motorized big game retrieval is allowed.

Amendment No. 7

The “Gila National Forest Plan” needs to be amended to add and remove language from the recreation standards and guidelines related to the Off-Road Vehicle Policy (page 22 of the forest plan) so it is consistent with the Travel Management Rule and outdated schedules can be removed (table 4).

Table 4. Proposed Forest Plan Amendment No. 7 to change recreation standards and guidelines related to the off-road vehicle policy (language to be removed is indicated by a strikethrough and language to be added is in italics)

Management Prescription Applicable to all Areas except Wilderness	The Following Standards and Guidelines Will Apply Uniformly throughout the Gila National Forest	
Resource	**Activity**	**Standards and Guidelines**
Recreation	A01	~~ORV~~ ***OHV*** Policy: ***Prohibit motor vehicle use off the designated system of roads, trails, and areas, except as displayed on the motor vehicle use map.*** During the travel management process, forest personnel will determine which roads, trails and areas will be open to motorized vehicle use and which will be restricted or closed. The public will be involved in this process. ~~Priority areas will be identified and scheduled within one year and the travel management process completed on these areas within three years.~~In general, the forest will be closed to motorized vehicle travel off the designated road and trail system and outside of designated areas. ~~The following criteria below will be used.~~ Exceptions to motorized vehicle restrictions can be granted by ~~permit only~~ ***written authorization only***. These restrictions do not apply to emergency vehicle use. Restrictions and closures will be reviewed annually and the public will be notified of any change. Restricted (definition): Road, trail or area could be closed to motorized vehicle use. Could be restricted to certain types of vehicle, motorized use could be restricted to specific periods, etc. Criteria to be used in designating open, closed or restricted roads, trails and areas are: Management emphasis of a specified area; Level of conflict between existing types of use; Required resource protection; Seasonal constraints; Special needs of users and management.
	A01	~~Off-road vehicle~~ ***Travel management*** implementation plan will be updated whenever changes occur as a result of travel management planning.
	A01	Recreation use of riparian zones will be managed to minimize damage to riparian resources.

Alternative C

The Gila National Forest proposes to close the forest to motorized cross-country travel as stated in proposed plan amendment No. 7, except as described below:

- Add 8 miles of unauthorized routes and designate these routes as National Forest System (NFS) roads open to all vehicle types (table 5, p. 24).
- Reopen 4 miles of NFS maintenance level 1 roads and change to maintenance level 2 roads open to all vehicle types (table 5, p. 24).
- Change vehicle type on 28 miles of NFS roads from open to all motorized vehicles to open to highway legal vehicles only (table 2, p. 15 and table 5, p. 24). Highway legal vehicles are motor vehicles licensed under State law for general operation on all public roads within the state.
- Designate 1 mile of NFS roads to be open seasonally for all vehicle types from April 1 through September 1 (tables 5 and 6, p. 25).
- The following changes apply to motorized routes that will be open for the purpose of periodic administrative use or specific permitted uses only (table 7, p. 25):
    - Change the use on 170 miles of existing NFS roads currently open to all motorized uses.
    - Add 4 miles of unauthorized routes as roads.
    - Reopen 5 miles of maintenance level 1 roads and change to maintenance level 2.
    - Change 2 miles of NFS roads to NFS trails.
    - Add 2 miles of unauthorized ATV routes to the National Forest System.
- Close 143 miles of open NFS roads to all motorized vehicle uses (table 5, p. 24).
- Close 1 mile of open NFS motorized trails to all motorized uses (table 8, p. 26).
- Add 61 miles of unauthorized routes and designate as NFS trails for motorized vehicles less than 50 inches in width (table 8, p. 26).
- Open and convert 30 miles of NFS maintenance level 1 roads as NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).
- Convert 35 miles of NFS roads to NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).
- Add 13 miles of unauthorized routes and designate as NFS trails for single-track vehicles only (table 8, p. 26).
- Allow single-track vehicles (motorcycles) on 51 miles of previously nonmotorized NFS trails. Both motorized and nonmotorized uses would be allowed on the trails (table 8, p. 26).
- For the purpose of motorized dispersed camping, designate a specified distance of 300 feet on each side of (tables 9 and 11, p. 26):
    - 1,466 miles of specific designated open forest roads,
    - 0.2 mile of reopened maintenance level 1 roads,
    - 1 mile of unauthorized roads proposed to be added to the system, and
    - 71 miles of county roads.

- For the purpose of motorized big game retrieval, designate a specified distance of 1 mile on each side of open forest roads, county roads, and State and Federal highways located on National Forest System lands. Motorized big game retrieval would be limited to elk, deer, pronghorn, bear, javelina, and mountain lion (tables 10 and 11, p. 26).
- Areas:
  - Designate 38 small areas distributed over 29 acres open to all motorized vehicles. These areas have been traditionally used for motorized dispersed camping (table 12, p. 25 and table 14, p. 30).
  - Designate an area of 8 acres open to ATV and motorcycle use only (table 14, p. 30).

Alternative D

The Gila National Forest proposes to close the forest to motorized cross-country travel as stated in proposed plan amendment No. 7, except as described below:

- Add 6 miles of unauthorized routes and designate these routes as NFS roads open to all vehicle types (table 5, p. 24).
- Reopen 1 mile of NFS maintenance level 1 and change to maintenance level 2 roads open to all vehicle types (table 5, p. 24).
- Change vehicle type on 28 miles of NFS roads from open to all motorized vehicles to open to highway legal vehicles only (table 2, p. 15 and table 5, p. 24). Highway legal vehicles are motor vehicles licensed under State law for general operation on all public roads within the State.
- Designate 3 miles of NFS roads to be open seasonally for all vehicle types from April 1 through September 1 (tables 5 and 6, p. 24).
- Designate 8 miles of NFS roads to be open seasonally to all vehicle types from September 1 through February 28 (tables 5 and 6, p. 25).
- The following changes apply to motorized routes that will be open only for the purpose of periodic administrative use or specific permitted uses (table 7, p. 25):
  - Change the use on 337 miles of existing NFS roads currently open to all motorized uses.
  - Add 5 miles of unauthorized routes as roads.
  - Reopen 5 miles of maintenance level 1 roads and change to maintenance level 2.
  - Change 4 miles of NFS roads to NFS trail.
  - Add 2 miles of unauthorized ATV routes to the National Forest System.
  - Change the use on 1 mile of existing motorized NFS trails.
- Close 1,225 miles of open NFS roads to all motorized vehicle uses (table 5, p. 24).
- Close 7 miles of open NFS motorized trails to all motorized uses (table 8, p. 26).
- Add 34 miles of unauthorized routes and designate these as NFS trails for motorized vehicles less than 50 inches in width (table 8, p. 26).
- Open and convert 15 miles of NFS maintenance level 1 roads to NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).

- Convert 67 miles of NFS roads to NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).
- For the purpose of motorized dispersed camping, designate a specified distance of 300 feet on each side of (table 9 and table 11, p. 26):
    - 1,148 miles of specific designated open forest roads,
    - 0.2 mile of reopened maintenance level 1 roads,
    - 1 mile of unauthorized roads proposed to be added to the system, and
    - 34 miles of county roads.
- Motorized big game retrieval would be limited to the same corridors designated for motorized dispersed camping. Motorized big game retrieval would be limited to elk and deer (tables 10 and 11, p. 26).

Alternative E

The Gila National Forest proposes to close the forest to motorized cross-country travel, as stated in proposed plan amendment No. 7, except as described below:

- Add 2 miles of unauthorized routes and designate these routes as NFS roads open to all vehicle types (table 5, p. 24).
- Reopen 1 mile of NFS maintenance level 1 and change to maintenance level 2 roads open to all vehicle types (table 5, p. 24).
- Change vehicle type on 28 miles of NFS roads from open to all motorized vehicles to open to highway legal vehicles only (table 2, p. 15 and table 5, p. 24). Highway legal vehicles are motor vehicles licensed under State law for general operation on all public roads within the State.
- Designate 3 miles of NFS roads to be open seasonally for all vehicle types from April 1 through September 1 (tables 5 and 6, p. 24).
- The following changes apply to motorized routes that will open only for periodic administrative use or specific permitted uses only (table 7, p. 25):
    - Change the use on 423 miles of existing NFS roads currently open to all motorized uses.
    - Add 5 miles of unauthorized routes as roads.
    - Reopen 5 miles of maintenance level 1 roads and change to maintenance level 2.
    - Change 3 miles of NFS roads to NFS trails.
    - Add 2 miles of unauthorized ATV routes to the National Forest System.
    - Change the use on .6 mile of existing motorized NFS trails.
- Close 1,853 miles of open NFS roads to all motorized vehicle uses (table 5, p. 24).
- Close 15 miles of open NFS motorized trails to all motorized uses (table 8, p. 26).
- No motorized dispersed camping corridors would be designated (tables 9 and 11, p. 26).
- Motorized big game retrieval would not be allowed (tables 10 and 11, p. 26).

Alternatives F – Modified Proposed Action

The Gila National Forest proposes to close the forest to motorized cross-country travel as stated in proposed plan amendment No. 7, except as described below:

- Add 6 miles of unauthorized routes and designate these routes as NFS roads open to all vehicle types (table 5, p. 24).
- Reopen 1 mile of NFS maintenance level 1 roads and change to maintenance level 2 roads open to all vehicle types (table 5, p. 24).
- Change vehicle type on 28 miles of NFS roads from open to all motorized vehicles to open to highway legal vehicles only (table 2, p. 15 and table 5, p. 24). Highway legal vehicles are motor vehicles licensed under State law for general operation on all public roads within the State.
- Designate 3 miles of NFS roads to be open seasonally for all vehicle types from April 1 through September 1 (tables 5 and 6, p. 24).
- The following changes apply to motorized routes that will open for periodic administrative use or specific permitted uses only (table 7, p. 25):
    - Change the use on 286 miles of existing NFS roads currently open to all motorized uses.
    - Add 3 miles of unauthorized routes as roads.
    - Reopen 5 miles of maintenance level 1 roads and change to maintenance level 2.
    - Change 2 miles of NFS roads to NFS trails.
    - Add 2 miles of unauthorized ATV routes to the National Forest System.
- Close 889 miles of open NFS roads to all motorized vehicle uses (table 5, p. 24).
- Close 1 mile of open NFS motorized trails (table 8, p. 26).
- Add 53 miles of unauthorized routes and designate these routes as NFS trails open for motorized vehicles less than 50 inches in width (table 8, p. 26).
- Open and convert 23 miles of NFS maintenance level 1 roads to NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).
- Convert 90 miles of NFS roads to NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).
- For the purpose of motorized dispersed camping, designate a specified distance of 300 feet on each side of (tables 9 and 11, p. 26):
    - 1,383 miles of specific designated open forest roads,
    - 0.2 mile of reopened maintenance level 1 roads,
    - 0.2 mile of unauthorized roads proposed to be added to the system, and
    - 64 miles of county roads.
- Designate a specified distance of ½ mile on each side of open forest roads, county roads, and State and Federal highways on Gila NFS lands for motorized big game retrieval. Motorized big game retrieval would be limited to elk only (tables 10 and 11, p. 26).

- Areas:
  - Designate 38 small areas distributed over 28 acres open to all motorized vehicles. These areas have been traditionally used for motorized dispersed camping (table 12, p. 27 and table 13, p. 28).
  - Designate an area of 8 acres open to ATV and motorcycle use only (table 14, p. 30).

Alternative G – Preferred Alternative

The Gila National Forest proposes to close the forest to motorized cross-country travel as stated in proposed plan amendment No. 7, except as described below:

- Add 6 miles of unauthorized routes and designate these routes as NFS roads open to all vehicle types (table 5, p. 24).
- Reopen 1 mile of NFS maintenance level 1 roads and change to maintenance level 2 roads open to all vehicle types (table 5, p. 24).
- Change vehicle type on 28 miles of NFS roads from open to all motorized vehicles to open to highway legal vehicles only (table 2, p. 15 and table 5, p. 24). Highway legal vehicles are motor vehicles licensed under State law for general operation on all public roads within the State.
- Designate 3 miles of NFS roads to be open seasonally for all vehicle types from April 1 through September 1 (tables 5 and 6, p. 24).
- The following changes apply to motorized routes that will open for periodic administrative use or specific permitted uses only (table 7, p. 25):
  - Change the use on 286 miles of existing NFS roads currently open to all motorized uses.
  - Add 3 miles of unauthorized routes as roads.
  - Reopen 5 miles of maintenance level 1 roads and change to maintenance level 2.
  - Change 2 miles of NFS roads to NFS trails.
  - Add 2 miles of unauthorized ATV routes to the National Forest System.
- Close 909 miles of open NFS roads to all motorized vehicle uses (table 5, p. 24).
- Close 1 mile of open NFS motorized trails to all motorized uses (table 8, p. 26).
- Add 51 miles of unauthorized routes and designate these as NFS trails open to motorized vehicles less than 50 inches in width (table 8, p. 26).
- Open and convert 23 miles of NFS maintenance level 1 roads to NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).
- Convert 92 miles of NFS roads to NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).
- For the purpose of motorized dispersed camping, designate a specified distance of 300 feet on each side of (tables 9 and 11, p. 26):
  - 1,278 miles of specific designated open forest roads,
  - 0.2 mile of maintenance level 1 roads,

  - 1 mile of unauthorized roads proposed to be added to the system, and
  - 48 miles of county roads.
- Motorized big game retrieval would be limited to the same corridors designated for motorized dispersed camping. Motorized big game retrieval would be limited to elk and deer (tables 10 and 11, p. 26).
- Areas:
  - Designate 38 small areas distributed over 28 acres open to all motorized vehicles. These areas have been traditionally used for motorized dispersed camping (table 12, p. 27 and table 13, p. 28).
  - Designate an area of 8 acres open to ATV and motorcycle use only (table 14, p. 30).

Table 5. Changes to road system in miles

Features of the Alternatives	Alt. B*	Alt. C	Alt. D	Alt. E	Alt. F*	Alt. G
Add unauthorized routes to NFS roads open to all vehicle types	0	8	6	2	6	6
Reopen NFS maintenance level 1 closed or decommissioned roads to all vehicle types	0	4	1	1	1	1
Change vehicle type on NFS roads to highway legal vehicles only	0	28	28	28	28	28
Change time of year on NFS roads to be designated seasonally open for all vehicle types, April 1 through September 1	3	1	3	3	3	3
Change time of year on NFS roads to be designated seasonally open for all vehicle types, September 1 through February 28	0	0	8	0	0	0
Close open NFS roads to all motorized vehicle uses	0	143	1,225	1,853	889	909

* Alternative B = no action, Alternative F = modified proposed action

Table 6. The following road segments are proposed to be designated seasonally open

Road No.	Begin MP	End MP	Total Miles	Description	Ranger District	Dates Seasonally Open	Alternative					
							B[1]	C	D	E	F[1]	G
38	3.3	4.3	0.9	Eagle Peak Lookout	Reserve	April 1 through September 1	X[2]		X	X	X	X
154	6.9	7.1	0.2	Signal Peak Lookout	Silver City	April 1 through September 1	X[2]		X	X	X	X
770	5.3	5.6	0.3	Fox Mountain Lookout	Quemado	April 1 through September 1	X[2]	X	X	X	X	X
11 M	0.0	0.5	0.5	Mangas Mountain Lookout	Quemado	April 1 through September 1	X[2]	X	X	X	X	X
119 A	0.0	0.9	0.9	Bearwallow Lookout	Glenwood	April 1 through September 1	X[2]		X	X	X	X
4043 J	0.0	6.1	6.1	Resource Protection	Reserve	September 1 through February 28			X			
4172 O	0.0	1.1	1.1	Resource Protection	Reserve	September 1 through February 28			X			
4307 K	0.0	0.9	0.9	Resource Protection	Reserve	September 1 through February 28			X			

MP = milepost

[1] Alternative B = no action, Alternative F = modified proposed action

[2] Currently, these roads are seasonally open from approximately April 1 through September 1

Table 7. Road and trail miles for use as "periodic administrative use" or "by written authorization only"

Features of the Alternatives	Alt. B*	Alt. C	Alt. D	Alt. E	Alt. F*	Alt. G
Change open NFS roads	0	170	337	423	286	286
Reopen closed or decommissioned NFS roads	0	5	5	5	5	5
Add unauthorized routes	0	4	5	5	3	3
Total road miles	**0**	**179**	**341**	**433**	**294**	**294**
Change open NFS roads to ATV only	0	2	4	3	2	2
Change open NFS motorized trail	0	0	1	1	0	0
Add unauthorized routes to NFS motorized trail system	0	2	2	2	2	2
Total motorized trail miles	**0**	**4**	**7**	**6**	**4**	**4**

* Alternative B = no action, Alternative F = modified proposed action

Table 8. Changes to motorized trails in miles

Features of the Alternatives	Alt. B*	Alt. C	Alt. D	Alt. E	Alt. F*	Alt. G
Add unauthorized routes as NFS trails and designate for motorized vehicles less than 50 inches in width	0	61	34	0	53	51
Convert NFS closed or decommissioned roads to NFS trails for motorized vehicles less than 50 inches in width	0	30	15	0	23	23
Convert open NFS roads to NFS trails for motorized vehicles less than 50 inches in width	0	35	67	0	90	92
Shared use of NFS horse and foot trail by motorcycles (single track)	0	51	0	0	0	0
Add unauthorized routes as NFS trails and designate for motorcycles (single track)	0	13	0	0	0	0
Close open NFS motorized trails to motorized use	0	1	7	15	1	1

* Alternative B = no action, Alternative F = modified proposed action

Table 9. Motorized dispersed camping – 300 feet on both sides of the road

Features of the Alternatives	Alt. B[1]	Alt. C	Alt. D	Alt. E	Alt. F*	Alt. G
Open NFS roads	4,604	1,466	1,148	0	1,383	1,278
Unauthorized routes	0	1	1	0	0.2	1
Closed or decommissioned NFS roads	0	0.2	0.2	0	0.2	0.2
County roads	593	71	35	0	34	48
Total miles motorized dispersed camping (300 feet both sides of road)	**5,197**	**1,538**	**1,183**	**0**	**1,447**	**1,327**

[1.] In alternative B, no action, the forest is open to cross-country travel, so no limit on distance except for wilderness and other restricted areas.

* Alternative F = modified proposed action

Table 10. Description of motorized big game retrieval by alternative

Alternative	Motorized Big Game Retrieval Features of the Alternatives
B*	No limit on distance or species. Forest is open to cross-country travel except for wilderness and other restricted areas.
C	Allowed within 1 mile from each side of designated open roads, county roads, and State and Federal highways for retrieval of elk, deer, bear, mountain lion, javelina, and pronghorn.
D	Allowed within 300 feet using same motorized dispersed camping corridors for retrieval of elk and deer.
E	None allowed
F*	Allowed within 1/2 mile from each side of designated open roads, county roads, and State and Federal highways for retrieval of elk only.
G	Allowed within 300 feet using same motorized dispersed camping corridors. Retrieval limited to deer and elk.

* Alternative B = no action, Alternative F = modified proposed action

Table 11. Estimated acreage of motorized dispersed camping and motorized big game retrieval

Motorized Activity in Acres	Alt. B*	Alt. C	Alt. D	Alt. E	Alt. F*	Alt. G
Motorized dispersed camping	2,441,804	110,780	85,921	0	104,390	95,994
Motorized big game retrieval	2,441,804	2,076,414	85,921	0	1,501,870	95,994

* Alternative B = no action, Alternative F = modified proposed action

Table 12. Areas open to all motor vehicles

Features of the Alternatives	Alt. B*	Alt. C	Alt. D	Alt. E	Alt. F*	Alt. G
Number	No limit, forest is open to cross-country motorized vehicle travel	38	0	0	38	38
Acres	2,441,804	28	0	0	28	28

* Alternative B = no action, Alternative F = modified proposed action

Table 13. Areas open to all vehicle types

Label ID	Township	Range	Section	Associated Road No. or Description	Ranger District	Acres	Alternatives					
							B	C	D	E	F	G
QA1	4S	21W	10, 15	NFSR 385	Quemado	0.5		X			X	X
QA2	4S	21W	14	NFSR 385	Quemado	0.7		X			X	X
QA3	2S	15W	7	NFSR 13 D	Quemado	0.4		X			X	X
QA4	3S	18W	24	NFSR 770	Quemado	2.4		X			X	X
QA5	3S	18W	24, 25	Intersection of NFSR 93 and U.S. 180	Quemado	2.1		X			X	X
QA6	5S	20W	3	Intersection of CAT-B007 and B012	Quemado	1.2		X			X	X
QA7	3S	17W	22	NFSR 93	Quemado	2.1		X			X	X
QA8	5S	20W	20	Intersection of CAT-B007 and B009	Quemado	0.5		X			X	X
QA9	3S	15W	25	Cat A095	Quemado	0.8		X			X	X
QA10	4S	15W	28, 29	NFSR 4188 R - CDT South Trailhead	Quemado	2.1		X			X	X
RA1	6S	19W	34	End of 4161 W	Reserve	7.8		X			X	X
WA1	15S	12W	8, 9, 16, 17	Celebration Site (Intersection of 4202 W, 4202 X, 4078 U, and 4078Y)	Wilderness	78.6						
WA2	15S	11W	32	NFSR 4080 T	Wilderness	0.4		X			X	X
WA3	15S	11W	31	NFSR 4080 T; 2 Sites	Wilderness	2.3		X			X	X
WA4	14S	11W	29	End of NFSR 4201 M	Wilderness	0.2		X			X	X
WA5	14S	11W	30	End of NFSR 4204 E	Wilderness	0.4		X			X	X
WA6	14S	11W	20	Intersection of NFSR 4204 E and NFSR 4204 D	Wilderness	0.5		X			X	X
WA7	14S	11W	30	End of NFSR 4204 D	Wilderness	0.2		X			X	X

Table 13. Areas open to all vehicle types

Label ID	Township	Range	Section	Associated Road No. or Description	Ranger District	Acres	Alternatives					
							B	C	D	E	F	G
WA8	14S	11W	30	NFSR 4079 P	Wilderness	0.4		X			X	X
WA9	14S	11W	30	NFSR 4079 P	Wilderness	0.1		X			X	X
WA10	14S	11W	30	NFSR 4079 P	Wilderness	0.4		X			X	X
WA11	14S	12W	36	End of 4079 P	Wilderness	0.7		X			X	X
WA12	14S	12W	25	End of NFSR 4205 F	Wilderness	0.5		X			X	X
WA13	14S	12W	25	End of NFSR 4205 G	Wilderness	0.6		X			X	X
WA14	14S	12W	35, 36	End of NFSR 4203 A	Wilderness	0.3		X			X	X
WA15	14S	12W	35	NFSR 4203 A	Wilderness	1.4		X			X	X
WA16	14S	12W	35	NFSR 4203 A	Wilderness	0.4		X			X	X
WA17	15S	11W	6	End of NFSR 4079 U	Wilderness	1.5		X			X	X
WA18	15S	12W	11, 12	NFSR 4079 T	Wilderness	0.4		X			X	X
WA19	15S	12W	14	NFSR 4079 T	Wilderness	0.6		X			X	X
WA20	15S	12W	14	NFSR 4079 T	Wilderness	0.5		X			X	X
WA21	15S	12W	14	NFSR 4079 T	Wilderness	0.3		X			X	X
WA22	15S	12W	14, 15	NFSR 4079 T and NFSR 4085 Y	Wilderness	0.8		X			X	X
WA23	15S	12W	15	NFSR 4079 Tand NFSR 4085 Z	Wilderness	0.7		X			X	X
WA24	15S	12W	15	NFSR 4079 T	Wilderness	0.6		X			X	X
WA25	15S	11W	11	NFSR 4080 W	Wilderness	0.2		X			X	X
WA26	15S	11W	11	NFSR 4080 W	Wilderness	0.2		X			X	X
WA27	15S	11W	23	End of NFSR 4086 V	Wilderness	0.2		X			X	X
WA28	15S	11W	27	NFSR 4204 B	Wilderness	0.7		X			X	X
WA29	15S	11W	34	End of NFSR 4204 B	Wilderness	0.4		X			X	X

* Alternative B = no action, Alternative F = modified proposed action

Table 14. Areas restricted to ATV and motorcycles only

Features of the Alternatives	Alt. B*	Alt. C	Alt. D	Alt. E	Alt. F*	Alt. G
Number	No limit, forest is open to cross-country travel	1	0	0	1	1
Acres	2,441,804.3	8	0	0	8	8

* Alternative B = no action, Alternative F = modified proposed action

Mitigations

The Council on Environmental Quality's (CEQ) regulations for implementing NEPA define a mitigation as being measures that avoid, minimize, reduce, rectify, or compensate for impacts to the physical environment resulting from Federal actions (40 CFR 1508.20). They are things the Forest Service will do as part of implementing the decision to lessen any potential damage to natural or cultural resources. The mitigation measures listed here apply to all of the action alternatives.

Cultural Resources

Where we identify substantial impacts to cultural or historical resource sites from route designation, we will apply one of two mitigations:

1. The route, or a portion of the route, will be excluded from the motor vehicle use map.
2. The route, or a portion of the route, will be rerouted, reconstructed, or undergo another kind of physical mitigation. These activities would all require separate NEPA analysis and compliance with the National Historic Preservation Act.

Where we identify substantial impacts to cultural or historical resources from fixed-distance corridors for motorized dispersed camping or areas, we may apply one of two mitigations:

1. The corridor, or portions of the corridor, will be excluded from the motor vehicle use map so that sites are excluded from a corridor.
2. Other kinds of physical mitigation such as placement of fencing or barriers will be constructed to exclude sites from effects associated with designating the corridor.

Where we identify impacts to traditional cultural or historical properties from motorized access, we will apply two mitigations:

1. Where motorized access to traditional cultural properties is reduced because of designation, we will grant special use or other authorizations to users.
2. Where traditional cultural properties have the potential to be physically impacted by routes, fixed-distance corridors, or areas, mitigation will consist of not designating or using other kinds of mitigation to reduce adverse effects. In some cases, consultation with appropriate or traditional communities or practitioners may develop other mitigation measures resulting in traditional cultural or historical properties being avoided or not adversely affected by designation.

Alternatives Considered but Eliminated from Detailed Study

This section describes the alternatives considered but eliminated from detailed study and the reasons why. These are presented in no particular order. The Forest Service and public both developed alternatives that have not been carried forward in detail. Most suggestions from the public were not fully developed alternatives.

Alternative A – The Proposed Action

The proposed action was not studied in detail. The original proposed action (alternative A) has been eliminated from detailed analysis in this DEIS. Alternative F is the modified proposed action carried forward in the DEIS. Alternative A was eliminated for the following reasons:

- Technical errors were found in the data within this alternative. Errors included such things as: missing Forest Service constructed routes, wrong alignment, length errors, maintenance level identification, and incorrect jurisdiction identification. Technical errors have been corrected in the other action alternatives.
- Errors were found in the proposal (e.g., the proposed action originally proposed to close routes that were identified as a need by the public or forest staff for administrative uses or to access private inholdings).
- Approximately 100 miles of roads identified in the proposed action have been formally conveyed to counties and are no longer under Forest Service jurisdiction.
- A recent land exchange added new roads to the forest road system.
- There have been changes in route designations based on acquired rights-of-way.
- This alternative is very similar to alternative F; distinctions are not clear enough to show a major difference between this and the other alternative.
- All of the elements of the proposed action can be found in the other action alternatives.

Public Alternative for Wilderness Ranger District

The alternative submitted concerned only the Wilderness Ranger District. The alternative recommended no changes to be made to the current road system. Reasons not analyzed in detail follow:

- It was not comprehensive for the whole forest.
- All roads suggested were considered individually and incorporated into alternatives as appropriate, except where resource concerns or other administrative needs were identified.
- Alternative C incorporates nearly all of the routes identified in the public's alternative.

Comparison of Alternatives

Table 15. Overview of the key elements of the alternatives

Key Elements	Alternative					
	B	C	D	E	F	G
Miles of roads open to the public	4,604	4,266	2,977	2,332	3,343	3,323
Miles of motorized trails (less than 50 inches in width)	16	204	125	0	182	182
Miles of single-track (motorcycle) trails	0	64	0	0	0	0
Miles of routes for administrative use or by written authorization only	0	183	354	439	298	299
Total percent change in motorized roads and trails	0%	-2%	-33%	-50%	-24%	-24%
Miles open for motorized dispersed camping (300 feet on each side of road)	5,197 (no distance limit, forest is open	1,538	1,183	0	1,447	1,327
Motorized big game retrieval (description and acres open for MBGR)	No limit on distance or species. Forest is open (approx. 2,441,804 acres).	1 mile from each side of designated open roads, county roads, and State and Federal highways for retrieving elk, deer, bear, mountain lion, javelina, pronghorn (approx. 2,076,414 acres)	300 feet using same motorized dispersed camping corridors for retrieving elk and deer (approx. 86,023 acres)	No motorized big game retrieval allowed (0 acres)	1/2 mile from each side of designated open roads, county roads, and State and Federal highways for retrieving elk only (approx. 1,501,870 acres)	300 feet using same motorized dispersed camping corridors for retrieving elk and deer (approx. 96,492 acres)
No. of areas (acres) open to all vehicles	No limit, forest is open	38 (29)	0 (0)	0 (0)	38 (29)	38 (29)

* Alternative B = no action, Alternative F = modified proposed action

Table 16. Summary of the effects described in detail in chapter 3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Roads						
Safety	Currently some maintenance on majority of operation maintenance level (OML) 3–5 roads resulting in no reportable accidents.	No change from alt. B; there may be a minor redistribution of traffic due to a 3.5 percent reduction of OML 2 road miles.	No change from alt. B; there may be some redistribution of traffic due to a 28 percent reduction of OML 2 road miles.	No change from alt. B; anticipate more traffic on remaining OML 2 road miles.	No change from alt. B; there may be some redistribution of traffic due to a 21 percent reduction of OML 2 road miles.	No change from alt. B; there may be some redistribution of traffic due to a 21 percent reduction of OML 2 road miles.
Cost and Maintenance	Currently maintains approx. 11 percent of NFS roads.	Maintains approx. 11.5 percent of NFS roads after a mileage reduction of 3.5 percent. The addition of unauthorized routes is offset by the removal of greater OML 2.	Maintains approx.15 percent of NFS roads after a mileage reduction of 28 percent.	Maintains approx. 18 percent of NFS roads after a mileage reduction of 40 percent.	Maintains approx. 14 percent of NFS roads after a mileage reduction of 21 percent.	Maintains approx. 14 percent of NFS roads after a mileage reduction of 21 percent.
Recreation						
Roadless	Currently 734,000 acres with 894 miles of roads and trails.	Reduces 64 miles of roads and trails and adds 79 miles of motorized trails but does not alter characteristics of roadless areas due to dispersed, remote trail locations.	Reduces 311 miles of roads and trails and adds 22 miles of motorized trails. Reduction in miles benefits and/or increases quality of roadless characteristics. Addition of motorized trails has low potential to alter characteristics of roadless areas due to dispersed, remote trail locations.	Reduces 445 miles of roads and trails and adds no miles of motorized trails. Reduction in miles benefits and/or increases quality of roadless characteristics.	Reduces 219 miles of roads and trails and adds 51 miles of motorized trails. Reduction in miles benefits and/or increases quality of roadless characteristics. Addition of motorized trails has low potential to alter characteristics of roadless areas due to dispersed, remote trail locations.	Reduces 217 miles of roads and trails and adds 53 miles of motorized trails. Reduction in miles benefits and/or increases quality of roadless characteristics. Addition of motorized trails has low potential to alter characteristics of roadless areas due to dispersed, remote trail locations.

Table 16. Summary of the effects described in detail in chapter 3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Noise and User Conflict		All action alternatives eliminate cross-country motorized travel, except as described for the purposes of MDC and MBGR. Conflicts due to cross-country motorized travel will be eliminated or significantly reduced.				
	No change in short term – user conflicts and noise impacts will continue, with potential to increase in the long term.	Least reduction of noise and user conflict with the least reduction of miles.	Moderate reduction of noise and user conflict.	Most potential for reduction of noise and user conflict corresponding with the most reduction of miles.	Moderate reduction of noise and user conflict.	Moderate reduction of noise and user conflict.
Recreational Opportunities	No change to roads or motorized trails and forest is open to motorized cross-country travel. With the continuation of cross-country travel, a proliferation of unauthorized routes would occur. There would be a potential increase of conflicts between motorized an nonmotorized users.	Retains most miles of roads and trails open to motorized use, similar to alt. B except no cross-country travel. Allows for most MDC and MBGR compared to all action alternatives. Provides broader range of motorized recreation opportunities with inclusion of single-track trails. Designates 28 acres distributed among 39 areas that have been traditionally used for dispersed motorized camping as open to all motorized vehicles. This type of use is expected to continue. A total of 8 acres would be open on the Reserve Ranger District for motorcycle and ATV use.	Retains moderate level of miles of roads and trails open to motorized use, similar to alts. F and G. No cross-country travel. Allows for moderate level of miles of MDC, similar to F and G. Low level of MBGR allowed.	Retains least level of miles of roads and no motorized trails open to motorized use compared to other action alternatives. No cross-country, MDC, or MBGR.	Retains moderate level of miles of roads and trails open to motorized use, similar to alts. D and G. No cross-country travel. Allows for moderate level of miles of MDC, similar to D and G. Moderate level of MBGR allowed. Designates 28 acres distributed among 39 areas that have been traditionally used for dispersed motorized camping as open to all motorized vehicles. This type of use is expected to continue. A total of 8 acres would be open on the Reserve Ranger District for motorcycle and ATV use.	Retains moderate level of miles of roads and trails open to motorized use, similar to alts. D and F. No cross-country travel. Allows for moderate level of miles of MDC, similar to D and F. Low level of MBGR allowed. Designates 28 acres distributed among 39 areas that have been traditionally used for dispersed motorized camping as open to all motorized vehicles. This type of use is expected to continue. A total of 8 acres would be open on the Reserve Ranger District for motorcycle and ATV use.

Table 16. Summary of the effects described in detail in chapter 3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Air Quality						
Visibility	Overall good to excellent visibility; Gila Class I Wilderness area certified for visibility impairment.	Negligible improvement.	Negligible improvement.	Negligible improvement.	Negligible improvement.	Negligible improvement.
Air Quality	Overall good to excellent air quality; currently meeting all State and Federal standards.	When compared to alternative B: Negligible improvement.	When compared to alternative B: Negligible improvement.	When compared to alternative B: Negligible improvement.	When compared to alternative B: Negligible improvement.	When compared to alternative B: Negligible improvement.
Soils						
Soils	A total 7,682 acres of motorized routes having impacts to the soil resource and watershed condition. Unrestricted cross-country travel.	Of the action alternatives (i.e., not including the no action alternative), this alternative shows the least reduction in potential negative effects from motorized big game retrieval.	This alternative is similar to alternative G in reducing potential negative effects from motorized big game retrieval.	This alternative does not allow motorized big game retrieval.	This alternative shows the second least reduction in potential negative effects from motorized big game retrieval.	This alternative is similar to alternative D in reducing potential negative effects from motorized big game retrieval.
		For all action alternatives: No decommissioning of routes is proposed under the TMR, routes will continue to have an impact to the soil resource and subsequent watershed condition. Erosion will continue on some routes and some routes may re-vegetate slowly over time. For routes and route densities, all alternatives are similar. Eliminating cross-country travel reduces the potential for negative effects.				

Table 16. Summary of the effects described in detail in chapter 3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Water						
Riparian and Wetlands	No limits on cross-country travel	When compared to alternative B:	When compared to alternative B:	When compared to alternative B:	When compared to alternative B:	When compared to alternative B:
		Least opportunity for reducing negative impacts to riparian and wetland resources.	Second highest opportunity for reducing negative impacts to riparian and wetland resources.	Highest opportunity for reducing negative impacts to riparian and wetland resources.	Moderate opportunity for reducing negative impacts to riparian and wetland resources, similar to alt. G.	Moderate opportunity for reducing negative impacts to riparian and wetland resources, similar to alt. F.
	454 acres of motorized routes within riparian risk zone	18 fewer acres of motorized routes within riparian risk zone	136 fewer acres of motorized routes within riparian risk zone	200 fewer acres of motorized routes within riparian risk zone	82 fewer acres of motorized routes within riparian risk zone	88 fewer acres of motorized routes within riparian risk zone
	63,018 acres of motorized dispersed camping available within riparian risk zone	58,790 fewer acres of motorized dispersed camping available within riparian risk zone	60,756 fewer acres of motorized dispersed camping available within riparian risk zone	63,018 fewer acres of motorized dispersed camping available within riparian risk zone	59,500 fewer acres of motorized dispersed camping available within riparian risk zone	60,072 fewer acres of motorized dispersed camping available within riparian risk zone
	63,018 acres of motorized big game retrieval available within riparian risk zone	21,499 fewer acres of motorized big game retrieval available within riparian risk zone	60,756 fewer acres of motorized big game retrieval available within riparian risk zone	63,018 fewer acres of motorized big game retrieval available within riparian risk zone	33,115 fewer acres of motorized big game retrieval available within riparian risk zone	60,072 fewer acres of motorized big game retrieval available within riparian risk zone
	63,018 acres of riparian risk zone available for motorized areas	Less than 1 acre of riparian risk zone available for motorized areas	Less than 1 acre of riparian risk zone available for motorized areas	Less than 1 acre of riparian risk zone available for motorized areas	Less than 1 acre of riparian risk zone available for motorized areas	Less than 1 acre of riparian risk zone available for motorized areas
	1.33 acre of motorized routes within wetlands	0 fewer acres of motorized routes within wetlands	0.69 fewer acres of motorized routes within wetlands	0.77 fewer acres of motorized routes within wetlands	0.69 fewer acres of motorized routes within wetlands	0.69 fewer acres of motorized routes within wetlands

Table 16. Summary of the effects described in detail in chapter 3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Riparian and Wetlands (continued)	353 acres of motorized dispersed camping available within wetland	309 fewer acres of motorized dispersed camping available within wetlands	315 fewer acres of motorized dispersed camping available within wetlands	353 fewer acres of motorized dispersed camping available within wetlands	311 fewer acres of motorized dispersed camping available within wetlands	312 fewer acres of motorized dispersed camping available within wetlands
	353 acres of motorized big game retrieval available within wetlands	8 fewer acres of motorized big game retrieval available within wetlands	314 fewer acres of motorized big game retrieval available within wetlands	353 fewer acres of motorized big game retrieval available within wetlands	25 fewer acres of motorized big game retrieval available within wetlands	312 fewer acres of motorized big game retrieval available within wetlands
	353 acres of wetlands available for motorized areas	0 acres of wetlands available for motorized areas	0 acres of wetlands available for motorized areas	0 acres of wetlands available for motorized areas	0 acres of wetlands available for motorized areas	0 acres of wetlands available for motorized areas
Water Quality		When compared to alternative B:	When compared to alternative B:	When compared to alternative B:	When compared to alternative:	When compared to alternative B:
	No limits on cross-country travel.	Least opportunity for improvement of water quality.	Second highest opportunity for improvement to water quality.	Highest opportunity for improvement to water quality.	Moderate opportunity for improvement to water quality, similar to alt. G.	Moderate opportunity for improvement to water quality, similar to alt. F.
	919 motorized route stream crossings on perennial and intermittent streams	69 fewer motorized route stream crossings on perennial and intermittent streams	342 fewer motorized route stream crossings on perennial and intermittent streams	491 fewer motorized route stream crossings on perennial and intermittent streams	158 fewer motorized route stream crossings on perennial and intermittent streams	176 fewer motorized route stream crossings on perennial and intermittent streams within 300 ft.
	291 miles of perennial and intermittent streams impacted by motorized routes within 300 feet	2 fewer miles of perennial and intermittent streams impacted by motorized routes within 300 feet	87 fewer miles of perennial and intermittent streams impacted by motorized routes within 300 feet	129 fewer miles of perennial and intermittent streams impacted by motorized routes within 300 feet	51 fewer miles of perennial and intermittent streams impacted by motorized routes within 300 feet	56 fewer miles of perennial and intermittent streams impacted by motorized routes

Table 16. Summary of the effects described in detail in chapter 3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Water Quality (continued)	862 miles of perennial and intermittent streams potentially impacted by motorized dispersed camping	798 fewer miles of perennial and intermittent streams potentially impacted by motorized dispersed camping	828 fewer miles of perennial and intermittent streams potentially impacted by motorized dispersed camping	862 fewer miles of perennial and intermittent streams potentially impacted by motorized dispersed camping	809 fewer miles of perennial and intermittent streams potentially impacted by motorized dispersed camping	818 fewer miles of perennial and intermittent streams potentially impacted by motorized dispersed camping
	862 miles of perennial and intermittent streams potentially impacted by motorized big game retrieval	190 fewer miles of perennial and intermittent streams potentially impacted by motorized big game retrieval	828 fewer miles of perennial and intermittent streams potentially impacted by motorized big game retrieval	862 fewer miles of perennial and intermittent streams potentially impacted by motorized big game retrieval	393 fewer miles of perennial and intermittent streams potentially impacted by motorized big game retrieval	818 fewer miles of perennial and intermittent streams potentially impacted by motorized big game retrieval
	862 miles of perennial and intermittent stream potential impacted by motorized areas	No potential impacts to perennial and intermittent streams from motorized areas.	No potential impacts to perennial and intermittent streams from motorized area.	No potential impacts to perennial and intermittent streams from motorized area.	No potential impacts to perennial and intermittent streams from motorized area.	No potential impacts to perennial and intermittent streams from motorized area.
	78 motorized route stream crossings on impaired waters	9 fewer motorized route stream crossings on impaired waters	16 fewer motorized route stream crossings on impaired waters	16 fewer motorized route stream crossings on impaired waters	16 fewer motorized route stream crossings on impaired waters	16 fewer motorized route stream crossings on impaired waters
	44 miles of impaired streams impacted by motorized routes within 300 feet	3 fewer miles of impaired streams impacted by motorized routes within 300 feet	9 fewer miles of impaired streams impacted by motorized routes within 300 feet	11 fewer miles of impaired streams impacted by motorized routes with 300 feet	8 fewer miles of impaired streams impacted by motorized routes with 300 feet	8 fewer miles of impaired streams impacted by motorized routes with 300 feet
	126 miles of impaired streams potentially impacted by motorized dispersed camping	119 fewer miles of impaired streams potentially impacted by motorized dispersed camping	122 fewer miles of impaired streams potentially impacted by motorized dispersed camping	126 fewer miles of impaired streams potentially impacted by motorized dispersed camping	119 fewer miles of impaired streams potentially impacted by motorized dispersed camping	120 fewer miles of impaired streams potentially impacted by motorized dispersed camping
	126 miles of impaired streams potentially impacted by motorized big game retrieval	25 fewer miles of impaired streams potentially impacted by motorized big game retrieval	122 fewer miles of impaired streams potentially impacted by motorized big game retrieval	126 fewer miles of impaired streams potentially impacted by motorized big game retrieval	62 fewer miles of impaired streams potentially impacted by motorized big game retrieval	120 fewer miles of impaired streams potentially impacted by motorized big game retrieval

Table 16. Summary of the effects described in detail in chapter 3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
	126 miles of impaired streams potentially impacted by motorized big game retrieval	No potential impacts to impaired waters from motorized areas.	No potential impacts to impaired waters from motorized areas.	No potential impacts to impaired waters from motorized areas.	No potential impacts to impaired waters from motorized areas.	No potential impacts to impaired waters from motorized areas.
Road and Trail Condition Impacts on Watershed Health	No limits on cross-country travel which currently has minimal localized impacts on watershed condition overall; 7,682 acres of motorized routes impacting watershed health.	When compared to alternative B: All action alternatives are similar. Localized negative impacts will occur with motorized dispersed camping corridors and motorized big game retrieval. Impacts associated with these activities are minimal forestwide with current use levels. Slight improvement to watershed condition will result from limiting cross-country travel; no change in route density or acres impacted by routes as no decommissioning proposed.				
Fish Habitat						
Aquatic Habitat		When compared to alternative B:	When compared to alternative B:	When compared to alternative B:	When compared to alternative B:	When compared to alternative B:
	Currently cross-country travel is allowed and likely to contribute to additional unauthorized route development.	Slight decrease in relative risk to aquatic habitat and species.	Substantial decrease in level of relative risk to aquatic habitat and species.	Greatest reduction in level of relative risk to aquatic habitat and species.	Moderate reduction in level of relative risk to aquatic habitat and species.	Moderate reduction in level of relative risk to aquatic habitat and species. Similar to alt. F with slight decrease in relative risks.
	862 miles of stream within area available for cross-country travel	126 fewer miles of stream in areas available for cross-country travel associated with MBGR and MDC	829 fewer miles of stream in areas available for cross-country travel associated with MBGR and MDC	No streams within cross-country travel area associated with MBGR and MDC.	341 fewer miles of stream in areas available for cross-country travel associated with MBGR and MDC	818 fewer miles of stream in areas available for cross-country travel associated with MBGR and MDC

Table 16. Summary of the effects described in detail in chapter 3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
	302 miles of motorized routes within 300 feet of streams and 919 stream crossings contributing to risk of impacts to aquatic habitat and species	There is no change from alt. B in the 302 miles of motorized route within 300 feet of streams. There are 69 fewer stream crossings contributing to risk of impacts to aquatic habitat and species.	93 fewer miles of motorized route within 300 feet of streams and 342 fewer stream crossings contributing to risk of impacts to aquatic habitat and species	139 fewer miles of motorized routes within 300 feet of streams and 491 fewer stream crossings contributing to risk of impacts to aquatic habitat and species	56 fewer miles of motorized route within 300 feet of streams and 158 fewer stream crossings contributing to risk of impacts to aquatic habitat and species	60 fewer miles of motorized route within 300 feet of streams and 176 fewer stream crossings contributing to risk of impacts to aquatic habitat and species
Wildlife Habitat						
Wildlife Habitat	Cross-country travel is allowed and likely to contribute to additional unauthorized route development, with the greatest potential to cause harvest and disturbance.	Allows a 1-mile distance for MBGR, and increase in miles of motorized routes is similar to alternative B. Depending on location, for certain focal groups there may be a slightly greater potential for harvest and disturbance than alt. B.	Except for alt. E, this alternative causes the least harvest and disturbance effects to most focal groups. There still remains a fairly high potential to cause harvest effects to the Chiricahua leopard frog.	Most beneficial of the action alternatives for most wildlife focal groups, particularly for federally listed terrestrial wildlife species.	Compared with the five action alternatives, this alternative is better than C, not as good for E and D, and slightly less than G.	Compared with the five action alternatives this alternative is better than C and F, but not as good as E and D for most focal groups.
Invasive Species						
Plants	Would allow for the largest potential for spread of invasive plant species with continued cross-country motorized use.	Very similar to alternative B and, when compared to other alternatives, would have the second largest potential for spread of invasive plant species.	Moderate potential for spread of invasive plant species compared to alternative B and, when compared to other alternatives, would have the second smallest potential for spread of invasive plant species.	Least potential for spread of invasive plant species compared to alternative B and, when compared to other alternatives, would have the least amount of potential for spread of invasive plant species.	Lower potential for spread of invasive plant species compared to alternatives B and C.	Lower potential for spread of invasive plant species compared to alternatives B, C and F.

Table 16. Summary of the effects described in detail in chapter 3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Cultural Resources						
Cultural Resources	Maximum access to the most cultural sites due to cross-country travel; highest potential for effects to cultural sites.	Second highest potential for access and effects to cultural sites. National Historic Preservation Act compliance = No adverse effect.	Second lowest potential for effects to cultural sites due to less access to fewer sites. National Historic Preservation Act compliance = No adverse effect.	Least potential for effects to cultural resources; least access to fewest sites. National Historic Preservation Act compliance = No adverse effect.	Moderate access and effects to cultural resources; more effects than D, E, and G; fewer effects than B and C. National Historic Preservation Act compliance = No adverse effect.	Low to moderate access and effects to cultural resources; more effects than D and E; fewer effects than B, C, and F. National Historic Preservation Act compliance = No adverse effect.
Social and Economic						
Motorized Uses	No change from current motor vehicle use on the forest.	Most opportunity for motor vehicle use including routes, MDC, areas, and MBGR.	Moderate opportunity for motor vehicle use including routes and MDC. MBGR is limited to MDC corridors and is, therefore, reduced greatly.	Least opportunity for motor vehicle use. No opportunities for MDC and MBGR.	Moderate opportunity for motor vehicle use including routes, MDC, and areas. Greater opportunity for MBGR than alts. D and G with ½-mile corridor.	Moderate opportunity for motor vehicle use including routes, MDC, and areas. MBGR is limited to MDC corridors and is, therefore, reduced greatly.
Employment and Income	The precise relationship between miles of road and economic impacts is unknown; however, using the Recreation Economic Contribution Analysis model, it is assumed that jobs and income increase with more miles of road and decrease with fewer miles of road. According to the economic impact analysis, none of the alternatives will significantly affect jobs and income.					

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. The complete analysis documents are cited in each section and are part of the project record. It also presents the scientific and analytical basis for comparing the alternatives presented in the alternatives chapter. Analyses looked at changes (i.e., increase, decrease, or changes from current uses) from the no action alternative (alternative B).

Notes on Effects Analysis

This draft environmental impact statement examines effects on a forestwide scale. Effects are discussed at the national forest level rather than the site-specific effect of each road, trail, or area. Trends of effects are adequate because we don't know everything, such as number of hunters who use motorized vehicles to retrieve big game species or locations of all invasive plant species.

There are variations in the miles of routes displayed by some of the resource areas for alternatives. For example, the "Roads" section displays alternative B open road miles as 4,613 miles while the "Invasive Species" section shows 4,602 miles. The numbers may vary due to:

- Forest road management – Nine miles of National Forest System roads under Gila National Forest management are outside the forest boundary.
- Resource spatial data compared to road or route data – The two datasets may not extend over the same area. Some roads under Gila National Forest jurisdiction extend beyond the forest boundary or are on private lands (e.g., acquired road right-of-ways) and some resource data may extend beyond the forest boundary and onto private lands to include these roads, while other data sources may not and are limited to the forest boundary.
- Analysis measures – Depending on the question being analyzed, the miles of routes (roads or motorized trails) may include more than Forest Service jurisdiction, such as county, State, Federal, or private roads including roads outside the forest boundary.

For analysis purposes, the average width of roads and trails by maintenance level used were as shown in table 17.

Table 17. Average width of roads and trails by maintenance level

Existing and Proposed Roads and Trails	Average Width (feet)
Open trails	5
Operation maintenance level 1	12
Operation maintenance level 2	12
Operation maintenance level 3	14
Operation maintenance level 4	20
Operation maintenance level 5	20
Unauthorized route (full-size vehicle)	12
ATV trails	8

Assumptions and Limitations Common to All Resources

The forest's specialists didn't have all the information they needed about all aspects of this project. In order for the effects analysis to make sense, the interdisciplinary team made assumptions to fill those gaps. These assumptions and limitations apply to all the resources analyzed. Some specialists made additional assumptions pertaining to their resource.

- During analysis, the entire acreage (approximately 2.44 million acres) of National Forest System land outside of wilderness and other areas restricted to off-road vehicles was used for alternative B during assessment of motorized dispersed camping, motorized big game retrieval, and areas. We acknowledged that the entire 2.44 million acres is not available for motor vehicle use and that slope, topography, and vegetation may limit motor vehicle use and access.
- "Areas" are designated areas where any motorized vehicle activity may occur. Specific motor vehicle classes may be allowed or prohibited in designated areas. The "areas" are divided into two types for analytic purposes. One area is located on Reserve Ranger District and is open and restricted to ATV and motorcycle use only. The others have been traditionally used as dispersed camping areas and the assumption is that the traditional use of dispersed camping areas will continue.
- Corridors for the purpose of motorized dispersed camping are meant solely for the purpose of dispersed camping. Most of these corridors encompass traditional camping sites. Motorized access would be direct ingress and egress to the camping spot and the camp would be the base of activity. These corridors are not open to unrestrained motor vehicle use. For analysis purposes, the interdisciplinary team will assume compliance.
- Motorized big game retrieval fixed distances are meant solely for the purpose of retrieving game. They are not open areas to use motorized vehicles for hunting game. Once the game is downed, a vehicle may be used to retrieve the game. For analysis purposes, the interdisciplinary team assumes compliance.
- Information on the number of hunters that use motor vehicles to retrieve downed game was lacking. The forest calculated potential acres of disturbance by motor vehicles for each big game species by alternative using harvest information, season of hunt, license sales from the Department of Game and Fish, and the following assumptions:
    - Every hunter harvests their game on the Gila National Forest, even when the game management unit (GMU) does not lie entirely within the forest.
    - Every hunter uses a vehicle to retrieve their game.
    - Every hunter makes one trip in and one trip out, using the full distance allowable.
    - Every hunter uses a full-size vehicle (6-foot width).
    - Harvest numbers are averaged from 2006–2009 New Mexico Department of Game and Fish harvest records and surveys, with the exception of javelina.
    - No harvest records are available for javelina, so an average harvest rate for other species (30 percent) was used to calculate the number of javelina harvested based on 30 percent of 2,700 licenses issued throughout the state. Assuming that the vast majority of javelina are harvested in the southern half of the state, we used half of the potential harvest or 450 harvested.

- Vehicle use is allowed on approximately 2.2 million acres outside of wilderness and other areas.

Many hunters do not use a vehicle to retrieve their game, and it is unlikely that all will use the full distance allowed. Some may also need more than one trip in and out, and many will not use full-size vehicles. Data are not available to calculate the potential area of disturbance to a more precise estimate. It is likely that these estimates are overestimated. The potential disturbance acres by alternative for motorized big game retrieval were calculated for action alternatives with motorized big game retrieval (table 18).

Table 18. Acres of potential disturbance to wildlife from motorized big game retrieval

Species	Number of Days Open for Hunt	Average Harvest per Year	Potential Acres of Disturbance	Percent Acres Potentially Disturbed within the Motorized Big Game Retrieval Corridor Allowed
Alternative C corridor – 1 mile from each side of road (2,076,414 acres)				
Deer and Elk	108	2,633	3,995	
Javelina	90	450	675	
Bear	91	71	107	
Mountain Lion	212	33	50	
Antelope	18	18	27	
Total			4,854	0.2%
Alternative D corridor – 300 feet same as motorized dispersed camping corridors (85,922 acres)				
Deer and Elk	108	2,633	220	0.3%
Alternative F corridor – ½ mile from each side of road (1,501,870 acres)				
Elk	89	1,311	954	0.06%
Alternative G corridor – 300 feet – same as motorized dispersed camping corridors (95,994 acres)				
Deer and Elk	108	2,633	220	0.3%

Forest Plan Amendments

The proposed forest plan amendments are needed to bring the land management plan up-to-date with current management of the forest; remove outdated schedules; and to be in compliance with the Travel Management Rule.

The effect of allowing motorized use (parking and/or motorized dispersed camping) in some places where it was not previously allowed is analyzed in each of the alternatives by resources. The effect of closing or restricting motor vehicle uses would be beneficial and improve conditions for all resources.

Roads

This section summarizes the roads specialist report (USDA Forest Service 2010a).

Affected Environment

National Forest System (NFS) roads are managed for the use and administration of NFS lands. They provide access to multiple management activities of national forests including such things as: research, fish and wildlife habitat management, range management, timber harvesting, fire protection, and private land use. The transportation system on the Gila National Forest provides critical access needs for rural communities within or adjacent to the forest boundary. Also, the road system is used by more than 359,000 visitors (USDA Forest Service 2006) entering the forest to participate in the various recreational opportunities and other outdoor activities the Gila National Forest has to offer.

National Forest System roads are categorized by operational maintenance levels (OML) (table 19). OML 2–5 roads are those that are open to travel, while OML 1 roads are closed to travel by the general public. Currently, the forest has approximately 4,613 miles of OML 2–5 NFS roads open to motor vehicle use. There are approximately 2,244 miles of roads under other jurisdiction that access the forest such as Federal, State, or county agencies and private. Highway 180 and New Mexico Highway 12 are examples of non-Forest Service travel routes through the forest.

Table 19. Existing Gila NFS road miles by operational maintenance level (OML) and general description of operational maintenance levels (specific definitions are located in FSH 7709.59, 62.32)

Operational Maintenance Level and General Description	Miles
1 – Roads closed to motor vehicle use	1,169
2 – Roads open for use by high-clearance vehicles	4,196
3 – Roads open and maintained for travel by mindful drivers in standard passenger cars	262
4 – Roads that provide a moderate degree of user comfort and convenience at moderate travel speeds	131
5 – Roads that provide a high degree of user comfort and convenience	24
Total miles	5,782
Miles open to motor vehicle use (OML 2–5)	4,613

Public Safety

The use of motor vehicles on NFS roads is subject to State traffic law where applicable, except when in conflict with motor vehicle designations (36 CFR 212.51) or with the rules at Title 36, Code of Federal Regulations, Part 261 (36 CFR 212.5(a)(1)). State traffic law includes laws pertaining to motor vehicle operation, as well as insurance and license requirements; motor vehicle registration; and motor vehicle length, height, width, and weight. The State of New Mexico prohibits the operation of off-highway motor vehicles on paved streets or highways.

Forest Service Handbook (FSH) 7709.59-41 requires roads “open to public travel,” i.e., passable by four-wheel standard passenger cars and open to the general public, meet certain standards of

the Highway Safety Act of 1966 (23 U.S.C. 402) associated with design, construction, maintenance, signing, and traffic accident surveillance. NFS roads managed as operational maintenance level 3, 4 or 5 are subject to the Highway Safety Act.

Cost of Maintenance

The forest budget for road maintenance ranges between $880,000 and $1.2 million annually. This funding level allows the forest to complete basic custodial maintenance on level 3–5 roads as well as approximately 140 miles of level 2 roads on an annual basis. This level of maintenance occurs on approximately 500 miles or 10 percent of the existing open roads on an annual basis (table 20). Basic custodial maintenance includes such things as grading road surfaces, maintaining ditch lines, and roadside vegetation brushing.

Table 20. Miles of roads maintained based on annual forest road budget allocations. Values are also displayed as percent maintained of the total road miles (table 19).

Year	Miles of Road Maintained Based on Road Accomplishment Reports	Percent of the Total Road Miles (5,782) Maintained	Forest Road Maintenance Budget
2006	560	11%	$883,000
2007	498	10%	$1,023,000
2008	525	10%	$1,243,000
2009	510	10%	$1,035,000

Environmental Consequences

Public Safety

The New Mexico Department of Transportation Programs and Infrastructure Traffic Safety Bureau Traffic Records Section collects data from the New Mexico Uniform Crash Reports from all law enforcement agencies (State police, municipal police, tribal police, campus police, and county sheriffs). In 2007, the Gila National Forest requested accident data for the previous 5 years and found no reportable accidents occurred on National Forest System roads between 2002 and 2007. Forest law enforcement officers use a database called LEIMARS which tracks incidents, violations, and warnings. LEIMARS showed no reportable vehicle accidents on National Forest System roads managed by the Gila National Forest (USDA Forest Service 2010k).

Based on both of these databases, the safety concerns are relatively low for the current road system under alternative B. The safety concern for all action alternatives (C through G) would be the same as alternative B. The designation process does not change the speed that vehicles travel on routes nor does the Gila National Forest expect the volume, composition, or traffic patterns to change after designation.

Cost of Maintenance

There is no change to OML 3–5 road mileage in any of the action alternatives compared to alternative B (table 21). These roads are the main travel ways through the forest or are associated with various forest facilities such as administrative offices or campgrounds. The change in open

road miles is associated with OML 2 roads (table 21). Since there is no change in the OML 3–5 miles, which have the higher maintenance cost per mile, the overall maintenance costs do not vary greatly between alternatives when using the region's economic assessment tool (USDA Forest Service 2006) (table 22). Alternative E has the largest percent reduction in cost (11 percent) when compared to alternative B costs. This reduction is not significant considering there is a 40 percent difference in open road miles between the alternatives. Alternative C has only a 1 percent reduction in cost compared to alternative B, because it has the smallest change in overall road miles. Alternatives D, F, and G are similar in cost reduction, averaging 6 percent when compared to alternative B.

Table 21. Breakdown of road miles by operation maintenance level and alternatives, and a comparison of the change of total open road miles (OML 2–5 roads) by alternative (MPA = modified proposed action)

Operation Maintenance Level (OML)	Alt. B (No Action)	Alt. C	Alt. D	Alt. E	Alt. F (MPA)	Alt. G
Decommissioned	642	638	638	638	638	638
1	527	702	1,821	2,383	1,506	1,527
2	4,196	4,037	2,917	2,351	3,231	3,210
3	262	262	262	262	262	262
4	131	131	131	131	131	131
5	24	24	24	24	24	24
Total OML 2–5 Miles[1]	**4,613**	**4,453**	**3,333**	**2,767**	**3,647**	**3,626**
Percent change from alt. B of OML 2–5 roads		**-4%**	**-28%**	**-40%**	**-21%**	**-21%**

[1]The total OML 2–5 miles includes 9 miles of roads under Gila National Forest management that are outside the forest boundary.

None of the alternatives accommodates the current funding levels (table 22). Gila National Forest would continue to conduct the same basic custodial maintenance. Designating a road system that matches available funding levels would result in a system that would not meet the access needs for public and administrative purposes.

Table 22. Annual maintenance cost by alternative (miles of existing NFS roads by operational maintenance level)

OML	Annual Maintenance Cost $ per Mile	Alt. B Miles	Alt. B Annual Cost ($)	Alt. C Miles	Alt. C Annual Cost ($)	Alt. .D Miles	Alt. D Annual Cost ($)	Alt. E Miles	Alt. E Annual Cost ($)	Alt. F Miles	Alt. F Annual Cost ($)	Alt. G Miles	Alt. G Annual Cost ($)
1	55	527	29,002	702	38,627	1,821	100,144	2,383	131,082	1,506	82,803	1,527	84,002
2	350	4,196	1,468,705	4,037	1,412,775	2,917	1,021,020	2,351	822,850	3,231	1,130,710	3,210	1,123,535
3	8,282	262	2,167,399	262	2,167,399	262	2,167,399	262	2,167,399	262	2,167,399	262	2,167,399
4	10,294	131	1,345,426	131	1,345,426	131	1,345,426	131	1,345,426	131	1,345,426	131	1,345,426
5	6,597	24	159,647	24	159,647	24	159,647	24	159,647	24	159,647	24	159,647
Totals		5,140	5,170,179	5,155	5,123,874	5,155	4,793,637	5,151	4,626,404	5,153	4,885,985	5,154	4,880,009
Percent Change from alt. B					-0.9%		-7.3%		-10.5%		-5.5%		-5.6%

Recreation

This section summarizes the recreation specialist report (USDA Forest Service 2010b).

Affected Environment

Background

The Gila National Forest is the sixth largest forest in the United States and offers spectacular scenery ranging from high cool mountains with aspen and Douglas-fir to warm semiarid lowlands with juniper, oak and cactus. It remains one of the more remote and least developed national forests in the Southwest. The administrative boundary encompasses 3,392,519 acres. Nearly 23 percent of the forest's land mass is included in congressionally designated wilderness and is managed for primitive, nonmotorized use. These wilderness areas are the Gila Wilderness (559,688 acres), Blue Range Wilderness (29,099 acres), and Aldo Leopold Wilderness (203,797 acres).

Developed recreation is defined as recreation that requires facilities that result in concentrated use of an area (forest plan, p. 297). The Gila National Forest currently hosts 27 campgrounds (2 for groups), 7 picnic sites (3 for groups), a public shooting range, an observation site, and 4 interpretive sites. Developed sites and areas receive most use during the summer and fall seasons and holidays, although several facilities, primarily on the south end of the forest, remain open and receive use year-round.

Other prominent or special features on the forest that contribute to its recreational resource diversity is a 230-mile segment of the Continental Divide Scenic Trail, the Catwalk Recreation Area and National Recreation Trail, and the Gila Cliff Dwellings National Monument (a National Park Service area surrounded by lands managed by the Gila National Forest). Two scenic byways also travel through the forest; the Trail of the Mountain Spirits traces a circuit in the southern half of the forest, while the Geronimo Trail creates a longer loop encompassing the northern and eastern sections of the forest.

Dispersed recreation activities occur in general forest areas outside of designated sites or developed facilities, and are practiced by motorized and nonmotorized users alike. Dispersed recreation activities many times involve a combination of motorized and nonmotorized activities, and occur throughout the year.

Nonmotorized opportunities include hiking, backpacking, mountain climbing, mountain biking, horseback riding, dispersed camping, fishing, hunting, boating, and viewing nature. Visitors seeking these forms of recreational experiences often use the forest's single-track trail system. There are 1,577 miles of trail opportunities on the forest, with 59 percent of these trails located within wilderness areas. There are currently few prohibitions on motorized use of the single-track system in the general forest area; however, evidence of motorized use of single-track trails is limited. This could be because most single-track trails are designed and maintained for hikers or pack and saddle stock. Many public comments on the matter expressed a desire to authorize motorcycle use of certain trails throughout the forest. Other comments recommended closing all single-track trails to motorized travel.

Horseback riding and packing are also popular forms of nonmotorized recreation on the forest. This type of use is primarily observed within wilderness and areas adjacent to communities. Backcountry equestrians visiting wilderness areas use vehicles and stock trailers to access trailheads and areas throughout the forest. It is common for some of these users to pull stock trailers for 3 to 5 hours to reach a trailhead. Many of these trips are multiday backcountry trips using pack and saddle stock. Day trip equestrians more often use trails in areas of the forest immediately adjacent to local communities.

Although the Gila National Forest is relatively dry, fishing and water based recreation opportunities can be found on approximately 1,770 miles of perennial creeks and rivers as well as on three engineered lakes: Quemado Lake (112 acres), Lake Roberts (68 acres), and Snow Lake (72 acres). Some of the more common sport fish found in these waters include rainbow and brown trout, large and small mouth bass, as well as channel and flathead catfish. Many native fish are also found in the streams on the forest, several of these—such as the Gila trout—are considered threatened or endangered. None of the streams or rivers on the Gila National Forest is designated as wild and scenic.

Motorized opportunities involve the use of both highway legal and non-highway legal vehicles such as motorcycles, ATVs, and 4-wheel drives of all varieties. Hunters and people who practice motorized recreation such as firewood gathering and motorized dispersed camping are specific user groups who benefit greatly from the Gila National Forest's network of nearly 4,600 miles of open maintenance level 2–5 roads, since all motorized vehicle types, including non-highway legal OHVs, are allowed on them. Other motorized recreation activities include driving for pleasure, ATV, UTV, and motorcycle riding on roads and trails, and gathering forest products such as firewood.

The Gila National Forest's road system inventory includes an additional 1,194 miles of roads that are classified as either closed or decommissioned. Hunters are user groups that specifically benefit from closed and decommissioned roads since they allow for easier cross-country access to more remote areas of the forest from the open road system for hunting and big game retrieval. There are approximately 2,213 segments of these roads throughout the forest, with an average length of about 0.54 mile.

Issues Identified Through Outreach Efforts

Extensive public outreach concerning the motorized travel system occurred prior to publication of the proposed action. Outreach efforts consisted of open house meetings, workshops, and face-to-face meetings. These outreach efforts generated over 2,000 public comments, which contributed to the development of the proposed action that was published September 11, 2009. The forest received almost 16,000 letters and emails in response to the proposed action. The content of the letters and emails formed the basis of the alternatives and environmental analysis. Four significant issues emerged as a result of scoping. These issues concern: motorized routes, motorized big game retrieval, motorized dispersed camping, and motorized areas. This report includes analysis of each of these issues in relation to the changes described in alternatives C through G. This report will also analyze effects of the alternatives on the recreation opportunity spectrum, visual quality objectives, and roadless areas.

Motorized Routes

Motorized routes in the Gila National Forest include 4,607.3 miles of maintenance level 2–5 National Forest System roads, and 15.8 miles of National Forest System trails. Nearly all forest visitors, regardless of the purpose for their visit, use the motorized transportation system to reach their destination. Many times, recreation activities involve a combination of motorized and nonmotorized activities. Therefore, making changes to the existing motorized transportation system by adding and/or removing roads and motorized trails has the potential to affect the diversity of recreation opportunities for both motorized and nonmotorized uses of the forest.

Many nonmotorized activities such as picnicking, hiking, viewing wildlife, biking, and fishing depend on motorized routes to access areas in which to perform these primary activities. These same nonmotorized activities, however, are among the most susceptible to the detrimental impacts of noise, emissions, and use conflicts associated with the proliferation of motorized routes. Public responses to scoping emphasize this dilemma. Many comments expressed a desire to protect and enhance opportunities for quiet recreation, while others expressed a desire for continued motorized access to special places in which to perform nonmotorized forms of recreation.

Motorized Dispersed Camping

Motorized dispersed camping occurs in undeveloped areas, usually adjacent to roads, trails, and water areas. Though not identified among the Gila National Forest's geospatial inventory of features, there are numerous locations throughout the transportation system where motorized dispersed camping traditionally occurs (i.e., camping within direct proximity of a motorized vehicle). Such practice typically takes place where terrain is flat, and obstacles created by vegetation and rock features are sparse or few, allowing motorized vehicles to effectively exit the road system and park where they can have privacy. Many public comments regarding motorized dispersed camping emphasize the importance of this type of dispersed recreation opportunity. Many comments expressed support for the continuation of motorized dispersed camping, but were also critical of the idea of having motorized dispersed camping corridors because of the possibility of increasing resource damage within the corridors. Other comments expressed concern that the corridors were too restrictive and would limit motorized camping opportunities on the forest.

Currently on the Gila National Forest, 2,441,804.3 acres are open to motorized dispersed camping; however, evidence of motorized dispersed camping, such as fire rings and ground disturbance, is rarely seen beyond 300 feet from the adjacent road. Use of most motorized dispersed camping areas is consistent and predictable. Many areas are used on an annual basis by large family gatherings and hunting parties. Rarely are new dispersed camping areas created, and when they are, they are likely to only be used once because the "good" spot was already taken.

Motorized Big Game Retrieval

Of the 69 game management areas administered by the New Mexico Department of Game and Fish, 11 are located within the administrative boundary of the Gila National Forest. Motorized big game retrieval involves the use of full-size vehicles, ATVs, and UTVs and occurs throughout the nonwilderness portions of the forest. Motorized vehicles are used primarily to retrieve elk and deer, although some responses to scoping also expressed the desire to allow motorized retrieval of bear, mountain lion, and pronghorn. There is a wide diversity of opinion concerning motorized

big game retrieval within the sporting community, as well as in the public at large. Many scoping respondents report that motorized big game retrieval is essential to retrieving big game and protects against wanton waste, while others object to the noise and potential effects to adjacent hunters and recreationists. A separate issue for some respondents was the potential for the proliferation of unauthorized routes arising from motorized big game retrieval. Other comments emphasized the importance of motorized big game retrieval for elderly hunters or the mobility impaired.

There are currently no restrictions on motorized big game retrieval in areas outside of designated wilderness. Under the current forest plan, 2,441,804.3 acres are open to motorized big game retrieval. The actual number of acres used annually, or the total number of miles traveled, for motorized big game retrieval is quantitatively unknown. However, empirical knowledge coupled with game department harvest information, points to a limited and dispersed practice of motorized big game retrieval on the forest.

Motorized Areas

The forest is currently open to motorized cross-country travel, except in wilderness areas and where specified closed within certain management areas. Since there are currently no restrictions on motorized use within this area, the whole 2,441,804.3 acres of land can be considered a motorized area. Cross-country travel occurs on many parts of the forest; however, cross-country travel is rarely the primary activity for visitors. Cross-country travel is predominantly observed in combination with one or more recreation activity. Big game hunting, for example, often includes elements of nonmotorized and motorized activities, and sometimes includes cross-country travel to retrieve downed game. Route finding or “trail blazing” occurs in some areas, but often this is done in relation to firewood gathering or piñon nut gathering. In limited areas of the forest, cross-country travel for its own sake has been observed. In most instances, this cross-country travel is for connecting existing routes or for access to points of interest.

In some places on the forest, motorized cross-country travel has been observed to lead to the proliferation of unauthorized routes. Some unauthorized routes have become established on remnant logging roads or other formerly managed roads that are no longer part of the National Forest System, but were never obliterated and remain on the landscape. Some routes have developed as a result of firewood harvest, while others have developed through recurring use. The unplanned nature of many of these unauthorized routes makes it difficult to manage the transportation system and sometimes leads to resource damage and user conflicts.

Recreation Opportunity Spectrum

The forest plan provides goals for the recreation resource and requires a broad range of developed and dispersed recreation opportunities in balance with existing and future demand. For management and conceptual convenience, possible mixes or combinations of activities, settings, and probable experience opportunities have been arranged along a spectrum, or continuum. This continuum is called the recreation opportunity spectrum (ROS), and planning for recreation opportunities using the recreation opportunity spectrum is conducted as part of land and resource management planning. The recreation opportunity spectrum provides a framework for defining the types of outdoor recreation experience the public can expect in a certain area. A recreation opportunity inventory and assessment was conducted in 1980 for the Gila National Forest. This assessment, incorporated into the 1986 forest plan, identifies five recreation opportunity spectrum

classes: primitive, semiprimitive, semiprimitive motorized, roaded natural, and rural. The recreation opportunity spectrum as inventoried in 1980 forms the base for objectives in the forest plan. Guidelines for changes in inventory acreage throughout the recreation opportunity spectrum classes are included in the forest plan standards and guidelines, p. 26.

- Primitive classification characterized by an essentially unmodified environment, where trails may be present but structures are rare, and where the probability of isolation from the sights and sounds of man is extremely high. Primitive classification includes 526,611 acres, or 16 percent of the forest.
- Semiprimitive classification describes an area characterized by moderate opportunity for solitude in a predominately unmodified natural environment, with a moderate degree of trail maintenance. Semiprimitive classification includes 787,063 acres, or 24 percent of the forest.
- Semiprimitive motorized describes an area characterized by moderately dominant alterations by man, with strong evidence of primitive roads and/or trails. Semiprimitive motorized classification includes 240,940 acres, or 7 percent of the forest.
- Roaded natural describes areas characterized by a predominantly natural environment with evidence of moderate permanent alternate resources and resource utilization. Evidence of the sights and sound of man is moderate, but in harmony with the general environment. Opportunities exist for both social interaction and moderate isolation from the sights and sounds of man. Roaded natural classification includes 1,768,071 acres, or 53 percent of the forest.
- Rural classification describes areas in which the sights and sound of man are prevalent and the landscape has been considerably altered by the works of people. The rural classification includes 5,083 acres, or less than 1 percent of the forest.

For each management area identified in the forest plan, categories of recreation opportunity spectrum and inventoried acres for it are listed under management emphasis. The forest plan prescribes the following levels of acceptable change for each of these recreation opportunity spectrum classes:

- Primitive – no change
- Semiprimitive – no change in wilderness; change of plus or minus 10 percent in other areas
- Semiprimitive motorized – change of plus or minus 10 percent
- Roaded natural – change of plus or minus 10 percent
- Rural – no change

Visual Quality Objectives

The forest plan provides goals for visual quality and implements the visual management system as described on page 26 of the forest plan. Visual quality objectives were derived from a system that utilized a combination of land type, land characteristics, viewing distance, and viewer significance to arrive at a relative value scale. Like the recreation opportunity spectrum, visual quality objectives were inventoried in 1980, and serve as a base by which to compare the effects

of management activities. The "Gila National Forest Plan" identifies five visual quality objectives for management areas: preservation, retention, partial retention, modification, and maximum modification. The following descriptions of these visual quality objectives were taken from USDA Agriculture Handbook number 462, Volume 2.

- Preservation: Only ecological changes to visual qualities are allowed. Management activities, except for very low visual impact recreation facilities are prohibited. This objective applies to wilderness areas, primitive areas, and some unique management units. Approximately 25 percent of inventoried areas on the forest are in this classification.
- Retention: Activities may only repeat form, line, color, and texture, which are frequently found in the characteristic landscape. Changes in their size, amount, intensity, direction, pattern, etc., should not be evident. Approximately 1 percent of inventoried areas on the forest are in this classification.
- Partial retention: Activities must remain visually subordinate to the characteristic landscape. Associated visual impacts in form, line, color, and texture must be reduced as soon after project completion as possible. Approximately 19 percent of inventoried areas on the forest are in this classification.
- Modification: Activities may visually dominate the characteristic landscape. However, landform and vegetative alterations must borrow from naturally established form, line, color, and texture to blend in with the surrounding landscape character. Approximately 41 percent of inventoried areas on the forest are in this classification.
- Maximum modification: Activities may dominate the characteristic landscape. They may not appear to borrow from naturally established form, line, color, or texture. Approximately 14 percent of inventoried areas on the forest are in this classification.

The forest plan prescribes the following levels of acceptable change for each of these visual quality objectives.

- Preservation – no change.
- Retention – plus or minus 2 percent in foreground; plus or minus 5 percent in middle ground and background.
- Partial retention – plus or minus 5 percent in foreground; plus or minus 10 percent in middle ground and background.
- Modification – plus or minus 10 percent in all areas.
- Maximum modification – the forest plan does not discuss limits of acceptable change for maximum modification.

Inventoried Roadless Areas

Inventoried roadless areas were authorized by the 2001 Special Areas; Roadless Area Conservation Final Rule, 36 CFR Part 294. An inventoried roadless area is a large tract of land with characteristics similar to wilderness, but is usually not as pristine as wilderness, and may include existing roads and motorized trails. The "inventoried" part of the name comes from the fact that all national forests conducted an inventory in the 1970s and 1980s to find lands that

could potentially be recommended as wilderness. The characteristics that follow describe attributes considered when areas were inventoried for roadless area designation:

- Natural, being substantially free from the effect of modern civilization.
- Undeveloped, having little or no permanent improvements or human habitation.
- Outstanding opportunities for solitude or primitive and unconfined recreation.
- Special features and values, or the potential to contribute to unique fish, wildlife and plant species and communities; outstanding landscape features; and significant cultural resource sites.
- Manageability, meaning the area is at least 5,000 acres in size.

Approximately 22 percent of the forest's land mass is located within inventoried roadless areas. Of the 4,619.5 miles of motorized routes (roads and trails) open to the public, 375.5 miles lie within these roadless areas. A few segments of county roads and State highways are also located within roadless areas; however, they are not included in this analysis. Of the 375.5 miles of roads and motorized trails currently open within roadless areas, 93 percent are low volume, maintenance level 2 roads.

Environmental Consequences

Short-term timeframe: 1 year

Long-term timeframe: 20 years

Spatial Boundary: The administrative forest boundary is the unit of spatial analysis when considering effects associated with changes in the NFS or season of use.

Motorized Routes

Effects Common to All Action Alternatives Regarding Motorized Routes

- The prohibition on cross-country travel will be in place for all action alternatives. The effects of the prohibition on cross-country travel in the short and long term are expected to be the same for each action alternative. The perceived effects of motorized use such as noise, emissions, user conflicts, and impacts to wilderness, roadless areas, and private lands, will remain in predictable locations (within ½ mile of open roads), and will be minimized in areas beyond this ½-mile buffer. Unplanned proliferation of motorized routes resulting from unrestricted motorized access will be eliminated.
- Overall, user conflict on motorized routes is expected to be minimized by implementing the travel management rule under all action alternatives. Roads and motorized trails would be administratively defined and published on the motor vehicle use map. This would offer the public a means to better plan recreational pursuits based on the individual's unique expectations. As a result, frequency of conflicts between nonmotorized and motorized recreation users should decrease in the short and long terms.

Alternative B – No Action

The following are the direct and indirect effects of proposed actions relating to the issues presented by motorized routes. This includes the breakdown of any additions and/or changes to the NFS road and trail system for each alternative.

The effects of motorized routes in terms of noise, emissions, and user conflicts that could be experienced by people located within ½ mile from populated areas, neighboring private land, roadless areas, wilderness boundaries, developed recreation sites, and nonmotorized trails will remain unchanged in the short term. With no prohibition on cross-country travel, people around these boundaries can expect to experience an increase in motor vehicle related noise and emissions, along with a correlated increase in user conflict as the proliferation of unauthorized routes continues on its current, unpredictable, upward trend in the long term.

The number of NFS motorized routes (roads and trails) and their mileage will remain unchanged. While there are 15.8 miles of National Forest System trails for ATVs and motorcycles, use of motor vehicles is essentially unrestricted outside of designated wilderness and areas closed by forest order, since the forest would continue to be open to motorized cross-country travel.

There would be no restrictions on motor vehicle use under this alternative (outside of designated wilderness and other areas closed by forest orders). Users who practice nonmotorized activities will continue to come into contact with those who are using motorized vehicles for recreation. To some nonmotorized users, such contact is not an issue. But for those seeking solitude for a variety of reasons (i.e., hunting, wildlife viewing, etc.), it can be an important issue. As a result, such user conflict is expected to increase over time under alternative B.

As mentioned in the “Visual Quality” section, the proliferation of unauthorized routes, particularly in sparsely covered landscapes, has the potential to adversely affect the forest’s visual resources. In the long term, areas that have a more sensitive visual quality object (i.e., retention or partial retention) may take on characteristics of a more modified landscape and exceed their prescribed visual quality objective. The same is true regarding the effects to prescribed recreation opportunity spectrum classifications.

Alternative C

The effects of motorized routes in terms of noise, emissions, and user conflicts that could be experienced by people located within ½ mile from populated areas, neighboring private land, roadless areas, wilderness boundaries, developed recreation sites, and nonmotorized trails will be reduced by 19.3 percent when compared to the no action alternative. Alternative C ranks last in this regard among the five action alternatives proposed, offering the lowest reduction in miles for the elements for which this indicator measures.

Alternative C proposes 4,265.6 miles of roads open to the public, 11.7 miles are a result of additions or re-opening of previously closed or decommissioned routes. The number of road miles will be reduced by 7.34 percent or 338.1 miles from the current mileage displayed under alternative B due to closure or change to periodic administrative use or by written authorization only (i.e., not open to the public for general use).

Under this alternative, the miles of road designated for motor vehicle use would be reduced by 7.34 percent compared with alternative B. This alternative would result in the highest number of miles of road designated for motor vehicle use when compared to the other action alternatives.

National Forest System trails designated for motor vehicle use would increase from 15.8 miles to 203.9 miles. However, since motorized cross-country travel is eliminated, this represents a substantial decrease in the amount of motorized access that would be available under alternative B. Alternative C would provide more motorized trail opportunities than the other action alternatives.

NFS motorized trail mileage will experience an increase of 1,190.51 percent, up from its current level of 15.8 miles to 203.9 miles. The opportunity provided by this approximately 188.1-mile increase to the NFS trail inventory is still a substantial decrease from the amount of opportunity provided under open cross-country travel. However, alternative C ranks first in most opportunity for motorized trail access among the action alternatives proposed.

Motorized users who will benefit most under alternative C are single-track motorcycle riders since it is the only alternative that considers this use, exclusive of other motorized vehicles. However, of the 63.5 miles of single-track trail proposed, 50.6 miles are located on an existing nonmotorized trail, shared by both hikers and equestrian riders. User conflicts are not anticipated in the short run, because the 50.6-mile trail section in question is considered remote, lightly used, and deemed suitable for motorcycles and nonmotorized uses.

Alternative D

The effects of motorized routes in terms of noise, emissions, and user conflicts that could be experienced by people located within ½ mile from populated areas, neighboring private land, roadless areas, wilderness boundaries, developed recreation sites, and nonmotorized trails will be reduced by 48.2 percent when compared to the no action alternative. Alternative D offers the second largest reduction in miles for the elements this indicator measures for among the five action alternatives.

Alternative D proposes 2,977.2 miles of roads open to the public, 6.5 miles are a result of unauthorized route additions or re-opening of previously closed or decommissioned routes. The number of road miles will be reduced by 34.9 percent or 1,626.5 miles from the current mileage displayed under alternative B due to closure or change to periodic administrative use or by written authorization only (i.e., not open to the public for general use).

The short- and long-term effects regarding motorized access to opportunities on the general forest when compared to alternative B is that motorized and nonmotorized users alike (those who drive to the place of their nonmotorized activity) will experience a corresponding 34.9 percent reduction in road access. Of the five action alternatives proposed, alternative D ranks fourth in road miles available.

NFS motorized trail mileage will experience an increase of 692.41percent, up from its current level of 15.8 miles to 125.2 miles. As in alternative C, the opportunity provided by this approximately 109.3-mile increase to the NFS trail inventory is still a substantial decrease from the amount of opportunity provided under open cross-country travel. Alternative D ranks number 4 in opportunity for motorized trail access among the action alternatives proposed. Motorcycles

and ATVs would share the same designated motorized trail segments. None of the proposed segments are on nonmotorized shared-use segments either, so potential user conflicts among these groups are avoided in most cases.

Alternative E

The effects of motorized routes in terms of noise, emissions, and user conflicts that could be experienced by people located within ½ mile from populated areas, neighboring private land, roadless areas, wilderness boundaries, developed recreation sites, and nonmotorized trails will be reduced by 59.2 percent when compared to the no action alternative. Alternative E offers the largest reduction in miles among the other action alternatives for the elements for which this indicator measures.

Alternative E proposes 2,331.8 miles of roads open to the public. No additions or re-opening of closed or decommissioned roads are proposed. The road mileage will be reduced by 49.35 percent or 2,271.9 miles from the current mileage displayed under alternative B, due to closure or change to periodic administrative use or by written authorization only (i.e., not open to the public for general use).

The short- and long-term effects regarding motorized access to opportunities on the general forest when compared to alternative B is that, more than any alternative, motorized and nonmotorized users alike (those who drive to the place of their nonmotorized activity) will experience the most effects, a corresponding 49.35 percent reduction in road access. Of the five action alternatives proposed, alternative E ranks the lowest in road miles available.

NFS motorized trail mileage will experience a decrease of 100 percent. All existing system motorized trails (15.8 miles) will be converted to nonmotorized trails, and no additional are proposed for use by the general public. Unlike any of the alternatives proposed, users of ATVs and motorcycles will be restricted to those NFS roads designated open to all vehicles. This alternative offers the least opportunity for motorized users, and conversely, offers the least chance of user conflict between motorized and nonmotorized users. User conflict could increase, however, among motorized users of different vehicle classes sharing the same roads.

Alternative F

The effects of motorized routes in terms of noise, emissions, and user conflicts that could be experienced by people located within ½ mile from populated areas, neighboring private land, roadless areas, wilderness boundaries, developed recreation sites, and nonmotorized trails will be reduced by 43 percent when compared to the no action alternative. Alternative F offers the third largest reduction in miles for the elements for which this indicator measures among the action alternatives.

Alternative F proposes 3,343.1 miles of roads open to the public, 6.7 miles are a result of unauthorized route additions or re-opening of previously closed or decommissioned routes. The road mileage will be reduced by 27.38 percent or 1,260.6 miles from the current mileage displayed under alternative B due to closure or change to periodic administrative use or by written authorization only (i.e., not open to the public for general use).

The short- and long-term effects regarding motorized access to opportunities on the general forest when compared to alternative B is that motorized and nonmotorized users alike (those who drive to the place of their nonmotorized activity) will experience a corresponding 27.38 percent reduction in road access. Of the five action alternatives proposed, alternative F ranks second in road miles available.

NFS motorized trail mileage will experience an increase of 1,048.73 percent, up from its current level of 15.8 miles to 181.5 miles. The opportunity provided by this approximately 165.7-mile increase to the NFS trail inventory is still a substantial decrease from the amount of opportunity provided under open cross-country travel. Alternative F ranks second in opportunity for motorized trail access among action alternatives proposed. None of the proposed segments are on nonmotorized shared-use segments, so potential user conflicts among these groups are avoided in most cases.

Alternative G

The effects of motorized routes in terms of noise, emissions, and user conflicts that could be experienced by people located within ½ mile from populated areas, neighboring private land, roadless areas, wilderness boundaries, developed recreation sites, and nonmotorized trails will be reduced by 42.9 percent when compared to the no action alternative. Alternative G offers the fourth largest reduction in miles for the elements for which this indicator measures among the action alternatives.

Alternative G proposes 3,332.9 miles of roads open to the public, wherein 7.5 miles result from unauthorized route additions or re-opening of previously closed or decommissioned routes. The road mileage will be reduced by 27.82 percent or 1,280.8 miles from the current mileage displayed under alternative B due to closure or change to periodic administrative use or by written authorization only (i.e., not open to the public for general use).

The short- and long-term effects regarding motorized access to opportunities on the general forest when compared to alternative B is that motorized and nonmotorized users alike (those who drive to the place of their nonmotorized activity) will experience a corresponding 27.82 percent reduction in road access. Of the five action alternatives proposed, alternative G ranks third in road miles available.

NFS motorized trail mileage will experience an increase of 1,047.73 percent, up from its current level of 15.8 miles to 181.3 miles. The opportunity provided by this approximately 165.5-mile increase to the NFS trail inventory is still a substantial decrease from the amount of opportunity provided under open cross-country travel. Alternative G ranks third in opportunity for motorized trail access among action alternatives proposed, but only 0.2 mile behind alternative F. None of the proposed segments are on nonmotorized shared-use segments, so potential user conflicts among these groups are avoided in most cases.

Motorized Dispersed Camping

Effects Common to All Action Alternatives Regarding Motorized Dispersed Camping

- Implementing the Travel Management Rule only affects motorized dispersed camping (i.e., traveling off the designated NFS road system with a vehicle to camp). Dispersed

camping by any other nonmotorized means, such as by parking alongside an open road and walking in to a dispersed campsite, is not affected.

- To accommodate motorized dispersed camping, all action alternatives consider designation of a motorized dispersed camping corridor that would include 300 feet along both sides of all designated roads, and would be identified on the motor vehicle use map. Corridors were identified to incorporate areas where dispersed camping is currently occurring to the extent possible.

The following are the direct and indirect effects of proposed actions relating to the issues presented by motorized dispersed camping.

Alternative B

Under alternative B, all 4,603.7 miles of NFS roads are open to the public; people may park alongside any system road where it is safe to do so, and walk in to a dispersed campsite. In addition, because the forest is open to motorized cross-country travel (except for in wilderness and other areas closed by forest order), people may also drive off road for any distance and set up a campsite. This alternative affords the greatest opportunity for motorized dispersed camping and benefits those who use motor vehicles to access a camping spot that provides the desired level of privacy and solitude. Without restrictions on where and how far to travel off the roadway to camp, the range of camp distribution has potential to be greatest, and unintended contact among others is anticipated to be less. However, without the ability to predict where people may be, contact between user groups still has the potential to occur. Unintended consequences of this alternative include the proliferation of unauthorized routes through the establishment of new dispersed camping areas. This is due to the unrestricted cross-country travel associated with this alternative.

Though the public has the opportunity to practice motorized dispersed camping anywhere under alternative B, the reality is, they typically do not. Most motorized dispersed campsites on the forest have already been established due to terrain features such as gentle slopes, flat surfaces, and sparse vegetation types that provide for cover, all within proximity to places of interest like hunting grounds or natural features. Such favorable conditions do not exist along all 4,603.7 miles of roads on the Gila National Forest. With these considerations, use levels of motorized dispersed camping are expected to remain level in the short and long terms.

Alternative C

This alternative would result in 1,538.1 miles of NFS roads designated for motorized dispersed camping, which represents a 67 percent reduction from what currently exists.

The effect of this reduction in opportunity is not likely to be significant. Most campers will not notice the change because corridors were identified to incorporate areas where dispersed camping is currently occurring to the extent possible. This alternative ranks first among the five action alternatives in terms of motorized dispersed camping opportunities. However, the change from open, cross-country travel to the use of designated motorized camping corridors has the potential to exclude limited places and areas where motorized dispersed camping has previously occurred.

Conflicts between nonmotorized and motorized campers are not anticipated to increase under this alternative. Roads and motorized dispersed camping corridors would be defined and published on

the motor vehicle use map. This would offer the public a means to better plan recreational pursuits based on the individual's unique expectations. As a result, frequency of conflicts between nonmotorized and motorized campers should decrease in the short and long terms.

Areas (as opposed to corridors) proposed for dispersed camping are analyzed under the motorized areas issue.

Alternative D

Under this alternative, 1,182.8 miles of NFS roads with corridors are available to the public for motorized dispersed camping—a 74 percent reduction in opportunity from what currently exists.

The effect of this reduction in opportunity is not likely to be significant. Most campers will not notice the change because corridors were identified to incorporate areas where dispersed camping is currently occurring to the extent possible. However, this alternative ranks fourth among the five action alternatives in terms of motorized dispersed camping opportunity, and it is possible that some traditional motorized dispersed camping areas will no longer be available for public use. This could result in a concentration of use at desired camping areas within designated corridors, which could lead to user conflicts.

Conflicts between nonmotorized and motorized campers are not anticipated to increase under this alternative. Roads and motorized dispersed camping corridors would be defined and published on the motor vehicle use map. This would offer the public a means to better plan recreational pursuits based on the individual's unique expectations. As a result, frequency of conflicts between nonmotorized and motorized campers should decrease in the short and long terms.

Alternative E

No motorized dispersed camping corridors are designated in this alternative—a 100 percent reduction in opportunity from what currently exists. Alternative E ranks last among the five action alternatives in terms of motorized dispersed camping opportunities.

The public will be restricted to parking within one vehicle length of either side of the road where it is safe and feasible to do so, and then walk in to find a place to camp. Nonmotorized dispersed campers are not likely to be affected since this is reflecting their current use. People who rely on the comfort and convenience of their motor vehicle, but still seek privacy or added safety gained by parking off the roadway, will be most affected by this alternative. Some campers may leave the forest to find motorized dispersed camping opportunities elsewhere. A few campers may be displaced to developed campgrounds. Using developed campgrounds, however, would not provide the same opportunity since fees are often charged, campgrounds may not be in desired locations, and campsite availability may be limited. Equally, using developed campgrounds does not provide for the privacy and solitude important to many motorized dispersed campers.

Alternative F

Under this alternative, 1,446.8 miles of NFS roads are available to the public from which to practice the activity of motorized dispersed camping—a 69 percent reduction in opportunity from what currently exists.

The effect of this reduction in opportunity is not likely to be significant. Most campers will not notice the change because corridors were identified to incorporate areas where dispersed camping is currently occurring to the extent possible. This alternative ranks second among the five action alternatives in terms of motorized dispersed camping opportunities. It is anticipated that most motorized campers will be accommodated by this alternative; however, the change from open, cross-country travel to the use of designated motorized camping corridors has the potential to exclude places and areas where motorized dispersed camping has previously occurred.

Conflicts between nonmotorized and motorized campers are not anticipated to increase under this alternative. Roads and motorized dispersed camping corridors would be defined and published on the motor vehicle use map. This would offer the public a means to better plan recreational pursuits based on the individual's unique expectations. As a result, frequency of conflicts between nonmotorized and motorized campers should decrease in the short and long terms.

Alternative G

Under this alternative, 1,326.8 miles of NFS roads with corridors are available to the public for motorized dispersed camping—a 71 percent reduction in opportunity from what currently exists.

The effect of this reduction in opportunity is not likely to be significant. Most campers will not notice the change because corridors were identified to incorporate areas where dispersed camping is currently occurring to the extent possible. This alternative ranks third among the five action alternatives in terms of motorized dispersed camping opportunities. It is anticipated that most motorized campers will be accommodated by this alternative. However, the reduction in designated corridors in relation to the other action alternatives, coupled with the restrictions on cross-country travel, have the potential to affect motorized camping experiences and opportunities for some campers by limiting choice and concentrating use.

Conflicts between nonmotorized and motorized campers are not anticipated to increase under this alternative. Roads and motorized dispersed camping corridors would be defined and published on the motor vehicle use map. This would offer the public a means to better plan recreational pursuits based on the individual's unique expectations. As a result, frequency of conflicts between nonmotorized and motorized campers should decrease in the short and long terms.

Motorized Big Game Retrieval

The following are the direct and indirect effects of proposed actions that relate to the issues presented by motorized big game retrieval.

Alternative B

Under this alternative, 2,441,804.3 acres of forest lands are open to the public and available for all game retrieval by motorized means (designated wilderness and areas closed by forest order excluded). Access to these acres is from any road open to the public in the NFS roads inventory. Because of the open cross-country travel policy currently in place, distance from the roadway for hunters to retrieve legally downed animals is unrestricted.

Without restrictions on how far one can travel off the roadway for these purposes, there exists the potential for conflict between hunters who prefer solitude and an uninterrupted experience, and

those for which the assistance and convenience afforded by motor vehicles is of more value. Non-hunters who practice nonmotorized activities will continue to come into contact with those who are using motorized vehicles to retrieve game. To some nonmotorized users, such contact is not an issue, but for those seeking solitude for a variety of reasons (i.e., hunting, wildlife viewing, etc.), it can be an important issue. As a result, such user conflict is expected to increase over time under alternative B.

The proliferation of unauthorized routes is also a possible effect of this alternative. Cross-country travel to retrieve game has the possibility of creating travel ways, especially in cases where multiple trips are used to retrieve downed game. In the long term, the proliferation of these routes—particularly in sparsely covered landscapes—has the potential to adversely affect the forest's visual resources. Areas that have a more sensitive visual quality objective (i.e., retention or partial retention) may take on characteristics of a more modified landscape and could exceed their prescribed visual quality objective.

Alternative C

Under this alternative, a 1-mile-wide corridor solely for the purpose of big game retrieval would be designated along both sides of 4,265.6 miles of road. This would amount to 2,076,413.63 acres, representing a 14.96 percent reduction from what currently exists. Roads from which the public can access these open acres for this purpose would be from NFS roads open to the public under this alternative. Motorized trails are not included. Alternative C ranks first among the five action alternatives in terms of providing acreage available for motorized big game retrieval. Alternative C allows for retrieval of multiple game species identified through public scoping, and represents the most number of species among the action alternatives proposed. Species include elk, deer, pronghorn, bear, javelina, and mountain lion.

The 14.9 percent reduction in motorized big game retrieval opportunities from what currently exists is not likely to significantly impact hunters who retrieve big game with vehicles. It is anticipated that most hunters will not notice the change because most motorized game retrieval, and hunting in general, occurs within 1 mile of existing roads. This alternative ranks first among the five action alternatives in terms of motorized big game retrieval opportunities. The change from open, cross-country travel to the use of 1-mile-wide corridors represents a fundamental change in policy, but it is unlikely to have a significant effect on hunters who retrieve big game with vehicles.

Use conflict is expected to be minimal as hunters and other nonmotorized users will still have the ability to disperse along the 4,265.6 miles of roads open to the public under alternative C, and the only time a vehicle will enter the forest is to retrieve game.

Alternative D

Under this alternative, a 300-foot-wide corridor for the purpose of big game retrieval would be designated along both sides of 1,182.8 miles of road. This would amount to 86,023 acres, representing a 96.48 percent reduction from what currently exists. The corridors proposed under this alternative correspond to the motorized dispersed camping corridors in the alternative. In response to the travel management rule, motorized cross-country travel would be prohibited, and these corridors would represent the only opportunity for motorized big game retrieval. Motorized trails are not included. Alternative D ranks fourth among the five action alternatives in terms of

providing acreage available for motorized big game retrieval. Alternative D allows for the retrieval of elk and deer species only.

Users affected by the prohibition on cross-country travel element of the Travel Management Rule are the same stated in alternative C. However, those with a desire or need for using motorized vehicles to retrieve big game are restricted to the 1,182.8 miles of roads designated for motorized dispersed camping under this alternative.

The measures (recreation specialist report) used to analyze effects of motorized big game retrieval offer evidence to support that hunters typically travel within 0.28 to 0.35 mile from a road when hunting in a nonmotorized manner (excluding horses and pack animals). The 300-foot motorized camping corridor distance limit allowed for motorized big game retrieval under this alternative falls short of this range, so it is expected that hunters will not have the ability in most cases to travel the distance required to retrieve game. With this in mind, it is expected that other alternative or traditional nonmotorized methods such as the use of horses and pack animals can be expected to rise. In very limited cases, a hunter's inability to use motor vehicles to retrieve big game may lead to wanton waste of the animal.

Alternative E

No motorized big game retrieval would be allowed in this alternative—a 100 percent reduction from what currently exists. In response to the Travel Management Rule, motorized cross-country travel would be prohibited for all activities. Alternative E ranks last among the five action alternatives in terms of providing acreage or opportunity for motorized big game retrieval.

User conflict in general is expected to be minimal as the public will still have the ability to disperse along the 2,331.8 miles of roads open to the public under alternative E. However, those with a desire or need for using motorized vehicles to retrieve big game will not have that ability under this alternative. Because nonmotorized big game retrieval is an inherently physical activity, even with aid of pack and saddle stock, this alternative has the most potential to impact elderly and mobility impaired hunters.

Alternative F

Under this alternative, a ½-mile-wide corridor solely for the purpose of big game retrieval would be designated along both sides of 3,343.1 miles of road. This would amount to 1,501,870.25 acres, representing a 38.49 percent reduction from what currently exists. In response to the Travel Management Rule, motorized cross-country travel would be prohibited, and these open acres would represent opportunity for motorized big game retrieval purposes only, restricted to a ½-mile travel distance. Roads from which the public can access these open acres for this purpose would be from NFS road open to the public under this alternative. Motorized trails are not included. Alternative F ranks second among the five action alternatives in terms of providing acreage available for motorized big game retrieval, but allows for the retrieval of only elk.

The measures (recreation specialist report) used to analyze effects of motorized big game retrieval offer evidence to support that hunters typically travel within 0.28 to 0.35 mile from a road when hunting in a nonmotorized manner (excluding horses and pack animals). Similar to alternative C, the distance given for big game retrieval under this alternative (½ mile) still exceeds this range, so it is expected that hunters will have the ability in most cases to travel the distance required to

retrieve the game they take. As in alternative C, adopting alternative, nonmotorized means of big game retrieval is not anticipated for most hunters under this alternative.

Alternative G

Under this alternative, a 300-foot-wide corridor for the purpose of big game retrieval would be designated along both sides of 1,326.8 miles of road. This would amount to 96,492.3 acres, representing a 96.05 percent reduction from what currently exists. The corridors proposed under this alternative correspond to the motorized dispersed camping corridors in the alternative. In response to the Travel Management Rule, motorized cross-country travel would be prohibited, and these corridors would represent the only opportunity for motorized big game retrieval. Motorized trails are not included. Alternative G ranks third among the five action alternatives in terms of providing acreage available for motorized big game retrieval, and allows for the retrieval of elk and deer species only.

Users affected by the prohibition on cross-country travel element of the Travel Management Rule are the same as stated in alternative C. User conflict for hunting in general is expected to be minimal as the public will still have the ability to disperse along the 3,322.9 miles of roads open to the public under alternative G. However, those with a desire or need for using motorized vehicles to retrieve big game are restricted to the 1,326.8 miles of roads designated for motorized dispersed camping under this alternative.

The measures (recreation specialist report) used to analyze effects of motorized big game retrieval offer evidence to support that hunters typically travel within 0.28 to 0.35 mile from a road when hunting in a nonmotorized manner (excluding horses and pack animals). The 300-foot motorized camping corridor distance limit allowed for motorized big game retrieval under this alternative falls short of this range, so it is expected that hunters will not have the ability in most cases to travel the distance required to retrieve the game they take. With this in mind, it is expected that other alternative or traditional nonmotorized methods such as the use of horses and pack animals can be expected to rise. In very limited cases, a hunter’s inability to use motor vehicles to retrieve big game may lead to wanton waste of the animal.

Motorized Areas

The following are the direct and indirect effect of proposed actions that relate to the issues presented by added motorized areas. `

Alternative B

Under this alternative, 2,441,804.3 acres of land on the forest would remain open to motorized cross-country travel. Without restrictions, opportunities for motorized use are greatest, and benefit those who rely on or prefer to use motorized vehicles; however, no restriction on vehicle use has the most potential to create conflict between motorized and nonmotorized user groups.

Under this alternative, nonmotorized and motorized places of opportunity overlap (outside of designated wilderness and study areas) so users who prefer quieter nonmotorized activities will continue to come into contact, with those who are using motorized vehicles. To some nonmotorized users, such contact is not an issue, but for those seeking solitude for a variety of

reasons (i.e., hunting, wildlife viewing, etc.) it can be. As a result, such user conflict is expected to increase over time under alternative B.

In the long term, the proliferation of unauthorized routes—particularly in sparsely covered landscapes—has the potential to adversely affect the forest's visual resources. Areas that have a more sensitive visual quality objective (i.e., retention or partial retention) may take on characteristics of a more modified landscape and exceed their prescribed visual quality objective.

Alternatives C, F, and G

Alternative C proposes to designate 38 areas totaling 28.3 acres for use by all motor vehicle classes, and one 7.8-acre area restricted to only ATV and motorcycle use.

The 38 areas proposed for use by all vehicle classes are comprised of traditional motorized recreation areas throughout the forest. Typically, these areas have already been disturbed and receive predictable use by forest visitors. These areas were also identified through public input.

The prohibition on cross-country motorized travel included in all action alternatives has the potential to significantly impact many motor vehicle users. The 38 motorized areas proposed in this alternative will do little to address this change; however, motorized designation of these areas may fulfill needs and desires of a limited number of motorized users.

The 7.8-acre area proposed for ATV and motorcycle use under this alternative is located in a previously disturbed area that currently receives substantial motorized use. User conflicts associated with this area are currently few, and are not expected to rise as a result of designation as a motorized area.

In addition, motorized and nonmotorized users alike will benefit from the published motor vehicle use map that displays the locations of these motorized areas so that they may plan their recreational pursuits appropriately.

Recreation Opportunity Spectrum

Recreation opportunity spectrum class settings were determined using management prescriptions in the "Gila National Forest Plan." The action alternatives do not propose motorized route additions in primitive or semiprimitive recreation (nonmotorized) settings, where such use is not compatible with the recreation opportunity spectrum setting. Route additions are proposed only in semiprimitive motorized and roaded natural settings where such use is characteristic. Therefore, the range of available recreation opportunity spectrum settings would remain the same in each alternative and no recreation opportunity spectrum plan amendments would be needed for any alternatives. Recreation opportunity spectrum requirements are described on page 26 of the "Gila National Forest Plan," "Standards and Guidelines" section.

Listed below are descriptions of the recreation opportunity spectrum classifications for areas where proposed motorized routes are located. The definitions given are from the glossary of the "Gila National Forest Plan."

- Semiprimitive motorized: A classification of recreation opportunity spectrum characterized by moderately dominant alterations by man with strong evidence of primitive roads and/or trails.

- Roaded natural: A classification of recreation opportunity spectrum that characterizes a predominantly natural environment with evidence of moderate, permanent alteration resources, and resource utilization. Evidence of sights and sounds of man is moderate, but in harmony with the general environment. Opportunities exist for social interaction and moderate isolation from the sights and sounds of man.

Unauthorized routes proposed for addition to the transportation system under any action alternative meet these expectations; therefore, it is concluded that there are no effects to the recreation opportunity spectrum settings and effects to recreation opportunity spectrum are not discussed in any of the action alternatives.

Visual Quality Objectives

Concern for visual quality impacts of national forest transportation system type road and trail features is generally low since such features are small in scale when compared to the overall landscape scenes where they exist, and when aspects of roads are seen, they generally do not visually dominate it to a degree that invokes a maximum modification visual quality objective. Forest road and trail features typically consist of more natural surface materials, are narrower in widths, and exist with much less frequency or concentration than related highway or urban roadways with fewer natural characteristics. When forest system roads and trails are seen, they typically result in landscapes that meet the conditions of partial retention to modification visual quality objective, both acceptable in areas where route additions are planned.

As described on page 26 of the forest plan, the deviation of a certain percentage of an area's visual quality objective and/or a change from a higher visual quality objective to a lower, is acceptable. None of the routes or areas under any of the proposed actions are expected to exceed partial retention to modification visual quality objective where planned.

According to the Gila forest plan, the only visual quality objective that cannot experience change is preservation; however, no routes or areas are planned where the preservation visual quality objective is managed.

As with recreation opportunity spectrum, it is concluded that no effects to visual quality objectives are anticipated under any of the action alternatives, and the subject will not be discussed.

Alternative D and E

No areas are proposed. Nonmotorized users benefit the most, and the least amount of user conflict is expected.

Inventoried Roadless Areas

The Gila National Forest's GIS inventory shows that there are 734,380 acres of inventoried roadless area on the forest. Of the 4,619.5 miles of motorized routes (roads and trails) open to the public, 375.5 miles are within boundaries of these roadless areas. Each action alternative, with the exception of alternative C, proposes a combination of changes to the motorized route system that results in a net reduction of mileage in these roadless areas. Alternative C proposes a reduction in motorized roads, but also proposes an increase in the number of motorized trails.

The following list depicts the resulting change in motorized miles per alternative:

- Alternative C: Increase of 11.3 miles
- Alternative D: Reduction of 113.6 miles
- Alternative E: Reduction of 162.9 miles
- Alternative F: Reduction of 72.8 miles
- Alternative G: Reduction of 76.1 miles

It is concluded that the reduction of overall road mileage as proposed under any action alternative only serves to benefit or increase the quality of the roadless characteristics of the inventoried roadless areas the Gila National Forest manages. Therefore, the direct impact or effects of this will not be discussed further in this document. Indirect effects of motorized use, that is motorized associated impacts adjacent to roadless areas, may be found in the recreation specialist report (USDA Forest Service 2010b).

No alternative proposes adding new road segments to the system in these areas, but some motorized trails are added. The following lists the number of miles of motorized trails proposed under each alternative:

- Alternative B: 4.5 (existing)
- Alternative C: 52.6
- Alternative D: 7.4
- Alternative E: 0
- Alternative F: 20.4
- Alternative G: 21.9

Possible effects of adding motorized trails to the system in any of the action alternatives include increased conflicts between nonmotorized and motorized users and decreased capacity for quiet recreation opportunities. The dispersed and remote nature of these trails, however, could mitigate some of these possible effects.

Cumulative Effects

All national forests in the Southwestern Region are either in the process of travel management planning or implementing existing travel management plans. The Bureau of Land Management has also made decisions to designate routes for OHV use. All of the new decisions and implementation of past land use and travel management decisions are generally resulting in fewer opportunities for cross-country OHV uses and fewer open routes for OHV use. These past decisions include the establishment of wilderness and other areas that prohibit motor vehicle recreation, reducing the motor vehicle access to the forest. Although these past decisions are not part of current planning for the “Gila National Forest Travel Management Plan,” they are relevant because they are part of the cumulative effects of the travel management plan. The selection of any of the action alternatives reduces cross-country access (as required by the Travel

Management Rule). However, the range of alternatives provides a varying array of motorized recreation opportunities.

Air Quality

This section summarizes the air quality specialist report (USDA Forest Service 2010c).

Introduction

Air quality on National Forest System lands is potentially affected by land management and development activities both on and off the forest. Air pollution can affect human health, reduce visibility, and contribute to acidic deposition in sensitive, high elevation locations. This analysis reviews any potential effects for authorized motorized vehicle travel on the Gila National Forest to impact national and State ambient air quality standards, to degrade air quality by more than any applicable prevention of significant deterioration increment, to affect Class I wilderness areas, or to cause or contribute to visibility impairment beyond any existing conditions. Air pollutants related to travel management activities can include vehicle emissions and fine particulate matter created primarily by dust from vehicle travel over a dry and unpaved road surface. Local and regional air quality is discussed in the following sections as well as potential impacts to health (i.e., violating standards) and regional visibility.

Affected Environment

Regulatory Setting

Air quality in New Mexico is governed by a series of Federal, State and local laws. These laws are designed to ensure that air quality in the State are in compliance with the Clean Air Act of 1970. The EPA Office of Air Quality Planning and Standards has set national ambient air quality standards for six principal pollutants, which are called “criteria” pollutants (USDA Forest Service 2010c). Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air ($\mu g/m^3$). These standards (1) identify a chemical compound, (2) describe a time period for measurement, and (3) define a maximum concentration.

Ambient air quality standards in New Mexico are found in New Mexico Administrative Code 20.2.3, and define the upper limit of a pollutant that can be present in outdoor air without harming the public’s health. They are designed to protect even the most sensitive individuals in nearby communities. These standards represent objectives that will preserve air resources within the State, while recognizing that at certain times, due to unusual meteorological conditions, these standards may be exceeded for short periods of time without the addition of specific pollutants into the atmosphere.

The Freeport-McMoRan Chino Copper Smelter in Grant County, near the Gila National Forest, is currently considered an SO_2 maintenance area. The maintenance area is defined as a 3.5-mile-radius region around the smelter. The maintenance area also includes high elevation areas within an 8-mile radius. The State submitted a State implementation plan to the regional EPA headquarters in 1978, and a redesignation plan to the EPA in 2003. The EPA approved the redesignation plan in 2003.[1] In 2008, the Hurley smelter stack was demolished, thus no further

[1] http://www.nmenv.state.nm.us/aqb/Control_Strat/sip/Grant_Text.pdf

point source emissions are tied to the Chino Copper Smelter. To date, however, the New Mexico Air Quality Bureau has not updated any requirements specific to this SO_2 maintenance area.

All areas of the Gila National Forest outside of the Gila Wilderness are considered Class II areas for air quality. Although additional pollutants are limited in Class II areas, they are less protected than Class I areas. In Class II areas, State and Federal regulators set emission limits to meet or maintain the Federal criteria pollutant standards and State ambient air quality standards. These emission limits must be complied with to meet the requirements of the Clean Air Act. Class II areas usually experience ambient pollution levels that limit visibility for many days of the year. Despite this, the Air Quality Bureau of the New Mexico Environment Department has not designated any airsheds in or around the Gila National Forest as being in nonattainment of ambient air quality standards.

Gila Wilderness (Hoadley 2008)

The Gila Wilderness existed when the Clean Air Act Amendments of 1977 were passed, and thus, it was designated a Class I area and provided the highest level of protection from additional air pollution. The Aldo Leopold and Blue Range Wilderness areas were added to the Wilderness Preservation System in 1980, and are considered Class II areas for air quality because they were not designated until after 1977.

Air Quality Values at Risk

The Federal Land Managers Air Quality Values Related Workgroup identified in their 2000 (FLAG 2000) report that the three areas of greatest concern for air quality in Class I and II areas under their jurisdiction include: (1) visibility impairment, (2) ozone effects on vegetation, and (3) effects of pollutant deposition. Air quality related values at risk from these threats include flora, fauna, odor, water, soils, geologic features, and cultural resources. For established air quality related values (Blankenship 1990), the Gila Wilderness Class I airshed is certified for visibility impairment due to regional haze.

Pollution Sources

Prevailing winds on the Gila National Forest are generally from the southwest, though they may shift to easterly during the summer monsoon. Primary pollution sources are, therefore, most likely located in southeast Arizona, southwest New Mexico, and extreme west Texas. Pollutants are also likely being transported across the border from Mexico.

Visibility

Visibility impairment in this area results from regional haze caused by pollutants accumulated from multiple sources in a region. Emissions from industrial and natural sources may undergo chemical changes in the atmosphere to form particles of a size that scatter or absorb light and result in reductions in visibility.

Smoke from wildland fire is a large contributor to increased visibility reduction on the worst days monitored in the area. In the early summer months, when wildland fire peaks in this area, the contribution of organic carbon (likely attributed to wildland fires) is dominant. The greatest

contributor to visibility reduction when fires are not prevalent is ammonium sulfate, which is formed from SO_2 emissions from industrial sources.

Relative to other parts of the country, the Gila Wilderness has some of the least impacted visibility observed, even on the worst days. Visibility in the eastern states is generally more limited due to the presence of higher concentrations of water vapor. Visibility impact due to organic carbon in this region is primarily from wildfires. In 2004, the Gila showed more impact than surrounding areas, but less than either the east or west coast on the worst days.

Ozone

Ozone is considered a secondary pollutant because it forms on warm sunny days when the primary pollutants nitrogen oxide (NO_x) and volatile organic compounds (VOC) are present. In addition to its impact on plant and human health, ozone also contributes to regional haze and its subsequent visibility impairment. While other air pollutants may negatively affect vegetation, ozone is recognized as the one most likely to cause damage. Visible damage to cells may appear as spots or dead areas. Decreased growth or altered carbon allocation may also occur. Ponderosa pine is one species that is known to be sensitive to ozone in the atmosphere (FLAG 2000).

In 2006, ozone monitors in the southwestern United States indicated that while high concentrations are not generally present in this area, cumulative impacts are in the moderate range and may be having some impact on ozone sensitive species such as ponderosa pine.

Deposition

Deposition of acidic pollutants through precipitation can result in acidification of water and soil resources in areas far removed from the source of the pollution. Work is ongoing to determine the sensitivity and critical loads that will cause impacts in some areas. A study in the 1980s found that based on the geology, soils and existing water chemistry, the Gila Wilderness had sufficient acid-neutralizing capacity to merit a low sensitivity ranking with respect to acid deposition (Blankenship 1989).

A wet deposition monitor is maintained by the New Mexico Environment Department at the Gila Cliff Dwellings National Monument. Data are available from the National Acid Deposition Web site: http://nadp.sws.uiuc.edu/sites/siteinfo.asp?id=NM01&net=NTN

Trend plots for SO_4 and NO_3 from the National Acid Deposition site indicate a decrease over the past few years.

Smoke Management

The Gila National Forest has a memorandum of understanding with the New Mexico Environment Department Air Quality Bureau to follow the New Mexico Smoke Management Program (State of New Mexico 2004). The smoke management program was developed to protect the health and welfare of New Mexicans from the impacts of smoke from all sources of fire, and to meet the requirements of the Federal Regional Haze Rule. The objective of the memorandum of understanding between New Mexico Environment Department and the forest is to ensure that the forest has, and would use, all the tools and information necessary to manage impacts from smoke. Particulate monitors would be used to measure smoke concentrations. However, even

when heavy smoke blankets airsheds in and around the forest, monitoring indicates that National Ambient Air Quality Standards have not been exceeded.

Airsheds

The Gila National Forest occupies portions of four designated airsheds in New Mexico. Table 23 outlines the number of Gila National Forest acres within each airshed.

Table 23. Gila National Forest acres within New Mexico airsheds

Airshed	Total Acres in Airshed	GNF Acres within Airshed	Percent of Forest in Airshed	Percent of Airshed Occupied by GNF
Lower Rio Grande	3,613,983	290,744	9%	8%
Western Closed	1,997,830	137,191	4%	7%
Southwestern Closed	3,999,237	219,672	6%	5%
Lower Colorado River	8,679,673	2,744,899	81%	32%

In general, air quality conditions on the Gila National Forest—including the three wilderness areas—are very good and there are no violations of the National Ambient Air Quality Standards. While there is room for improvement, visibility in this area is some of the least impaired in the Nation. Primary contributors to visibility reduction include organic carbon associated with wildland fire and sulfates from industrial sources such as copper smelting and electric power generation. While there is some indication of elevated ozone levels, they rarely exceed levels determined to be harmful to vegetation. A cumulative effects index indicates moderate conditions, but values are lower than in neighboring areas. Deposition monitoring indicates a decreasing trend in some of the more harmful pollutants. This is likely a result of reduced activity in the copper smelting industry.

Climate Change

The U.S. Environmental Protection Agency (EPA) has asserted that scientists know with virtual certainty that human activities are changing the composition of the Earth's atmosphere. It is also documented that "greenhouse" gases, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and hydrofluorocarbons have been increasing (EPA 2010). The atmospheric buildup of these gases is largely the result of human activities such as the burning of fossil fuels. Greenhouse gases absorb infrared energy that would otherwise be reflected from the Earth. As the infrared energy is absorbed, air surrounding the Earth is heated (CARB 2007).

The Southwestern Region of the Forest Service recently released "Southwestern Region Climate Change – Trends and Forest Planning," May 2010. The following information is summarized from excerpts of this publication:

> "In the Southwest, climate modelers agree there is a drying trend that will continue well into the latter part of 21st century" (IPCC 2007 and Seager et al. 2007). The modelers predict increased precipitation, but believe that the overall balance between precipitation and evaporation would still likely result in an overall decrease in available moisture. Regional drying and warming trends have occurred twice during the 20th century (1930s Dust Bowl,

> and the 1950s Southwest Drought). The current drought conditions "may very well become the new climatology of the American Southwest within a timeframe of years to decades." According to recent modeling, the slight warming trend observed in the last 100 years in the Southwest may continue into the next century, with the greatest warming to occur during winter. These climate models depict temperatures rising approximately 5 to 8 degrees Fahrenheit by the end of the century (IPCC 2007). This trend would increase pressures on the region's already limited water supplies, as well as increase energy demand, alter fire regimes and ecosystems, create risks for human health, and affect agriculture (Sprigg and Hinkley 2000).

Due to the limitations of climate models, as stated above, site-specific analysis of climate change at the forest level in regards to implementing the Travel Management Rule remains improbable. Several unknowns further limit the discussion and analysis. These include lack of data regarding traffic numbers and projected increases or decreases in motorized visitors or passersby to the forest, limited data and knowledge of current effects to ecosystem resiliency within the forest as a result of motorized travel, and limited knowledge of surrounding areas' contributions to current and future climate impacts to assess cumulative effects.

Projected future climate change may possibly affect New Mexico in a variety of ways. Public health can suffer with an increase in extreme temperatures and severe weather events resulting in escalating transmission of infections, disease, and air pollution. Agriculture is vulnerable to altered temperature and rainfall patterns, and new pest problems. Forest ecosystems could face increased fire hazards and may be more susceptible to pests and diseases. Snowpacks could shrink and winter runoff may start in midwinter, not spring, with rain falling on snow triggering flood events.

While the future of climate change and its effects across the Southwest remains uncertain, it is certain that climate variability will continue to occur across the Gila National Forest. Forest management activities should strive for promoting resilience and resistance of natural resources to impacts of climate change. Implementation should focus on maintenance and restoration of resilient native ecosystems, thus reducing the ecosystems' vulnerability to variations in climate. Diversity remains an integral component in these native ecosystems and synchronization should be avoided so that one failure does not lead to a domino effect. Projects must promote connected landscapes and endeavor to reset significantly disrupted animal and plant communities, thus restoring their flexibility to changes in climate. Management across the forest will have to respond accordingly to climate change to minimize negative impacts from any ongoing or proposed activity.

Fugitive Dust

Fugitive dust is primarily lightweight soil particles, including silt and clay that rise to the atmosphere in an unconfined flow stream and become suspended in the air. It typically is a result of mechanical disturbance of granular material, but can also be a result of wind action on exposed soil. Fugitive road dust is a result of motor vehicle use on dry road surfaces.

Although a small amount of fugitive dust occurs naturally, the EPA lists road dust as the largest single source of particulate matter in the air (EPA 2005).

Motorized use on dirt roads, in particular during windy weather conditions, can increase fugitive dust levels. Dust is created and raised into the air as motorized vehicles travel along the road surface and disturb soil crusts, break down soils, and generate wind currents. Once soil surfaces are disturbed, wind erosion may continue to perpetuate fugitive dust in the air (Lovich and Bainbridge 1999). Adjacent to roads, dust generated from motorized traffic can cover plants, which can interfere with their growth by clogging pores and reducing light interception. In addition, fugitive dust can cause low visibility on unpaved roads.

Vehicle Emissions

Vehicle emissions in the project area are most concentrated along secondary highways. The forest does not have jurisdiction on vehicle use levels or emissions in any of these concentrated motorized areas. Recreation motorized use and emissions in the project area are more localized to roads and motorized trails, with generally sufficient wind dispersion to avoid air quality concerns. The EPA has set standards for emissions of nonroad engines and vehicles (snowmobiles, ATVs, boats, etc.). The standards for emission of oxides of nitrogen (NO_x), hydrocarbons (HC), and carbon monoxide (CO) are to ensure compliance with the Clean Air Act, and to regulate those emissions that contribute significantly to the formation of ozone and carbon monoxide. Compliance with these standards requires manufacturers to apply existing gasoline or diesel engine technologies to varying degrees, depending on the type of engine. OHV emissions also contain a variety of heavy metals, including zinc, copper, nickel, chromium, and lead.

Methodology and Assumptions

The analysis area under consideration for air quality impacts is the area within a radius of 62 miles (100 km) from the edge of the project area. New Mexico Environmental Department's air quality permitting system suggests that sources within a radius of 62 miles be considered, especially those located downwind of the project. Cumulative effects for air quality take into account the impacts of the alternatives when combined with past, present, and foreseeable future actions and events. Past actions may have no effect if the action is no longer contributing emissions to the air. Data sources and a comprehensive list of assumptions are listed in the specialist report. Several of the main assumptions are:

- Fugitive dust is the major air pollutant from native surface roads. Other pollutants from roads, such as trace metals and manmade chemicals may be attached to dust. Thus, the relative effects of the alternatives with regard to fugitive dust apply to trace metals and manmade chemicals.
- The designation of motorized routes does not translate to changes in emissions of vehicles that use the forest, just location of where emission may occur.
- Minimal fugitive dust emissions will be produced from motorized dispersed camping within designated corridors and areas. Acres associated with this activity will not be included in this analysis.
- Minimal fugitive dust emissions will be produced from motorized big game retrieval over vegetated surfaces. Acres associated with this activity will not be included in this analysis.

- The majority of dust generated from roads is a direct result of motorized traffic on the roads. Wind erosion plays a minor role.
- Road miles are converted to acres of disturbance (miles of road x assumed road widths) based on road maintenance levels.

Environmental Consequences

Each alternative is analyzed to determine if there is potential for motorized vehicle travel on the Gila National Forest to degrade air quality, contribute to violations of National Ambient Air Quality Standards, contribute to visibility impairment, or affect the Gila Wilderness Class I airshed beyond its current condition. Direct effects to air quality by motorized use on native surface routes are directly related to the level of use the forest receives. While this project will not result in a change in the levels of use, it will result in a change in the locations of use and acres available for negative impacts. Table 24 provides a summary of potential acres of roaded areas that would be available for vehicular traffic to produce fugitive dust.

Under alternatives C, D, E, F, and G, fewer miles of roads and trails are open for motorized use as compared to alternative B (no action). Alternative B would not produce fugitive dust beyond the amount produced currently by routine forest management or user activities. The effects of alternatives C, D, E, F, and G would be similar to alternative B, except that impacts from fugitive dust and vehicle emissions may be reduced because fewer miles and acres of roaded disturbance would be available for motorized vehicle use. It is possible that the same amount of motorized use would occur across the forest, with users increasing their activities on the remaining open routes, if other routes are made unavailable (closed). Closed roads would continue to be a minor source of fugitive dust during wind events until the road has been decommissioned, or naturally returns to pre-road conditions.

Roaded areas available for disturbance are displayed: (1) forestwide, (2) by each of the four airsheds occupied by the Gila National Forest, and (3) by the Gila Wilderness Class I airshed. Analysis indicates that, forestwide, alternative E provides the greatest reduction in potential roaded acres (-39 percent) that may impact air quality and reduce visibility within a Class I airshed, followed by alternative D (-25 percent). Alternatives F (-17 percent) and G (-18 percent) reduce motorized routes by virtually the same amounts. Alternative C provides the least reduction in motorized routes (-1 percent), and would leave the most roaded acres available for potential disturbance.

Table 24. Forestwide potential air quality impacts by alternative

Miles and Acres with Potential to Contribute to Fugitive Dust and Add to Visibility Impairment Forestwide	Miles	Change in Miles from No Action	Percent Increase or Decrease from No Action	Acres	Change in Acres from No Action	Percent Increase or Decrease from No Action
Alternative B – No Action	4,686			6,894		
Alternative C	4,633	-54	-1%	6,818	-77	-1%
Alternative D	3,441	-1,245	-27%	5,179	-1,715	-25%
Alternative E	2,756	-1,930	-41%	4,215	-2,679	-39%

Miles and Acres with Potential to Contribute to Fugitive Dust and Add to Visibility Impairment Forestwide	Miles	Change in Miles from No Action	Percent Increase or Decrease from No Action	Acres	Change in Acres from No Action	Percent Increase or Decrease from No Action
Alternative F	3,817	-869	-19%	5,713	-1,181	-17%
Alternative G	3,785	-901	-19%	5,666	-1,228	-18%

Cumulative Effects

In all action alternatives, the cumulative effects of fugitive dust on air quality caused by the proposed change in motorized travel on designated routes—combined with all other activities—would result in only negligible differences than those currently occurring. Fine particulate matter from road dust would combine with other particulates produced during implementation of forest projects such as prescribed burning and harvest operations. Future implementation of projects off-forest (i.e., State, private, BLM lands) such as prescribed burns, harvest and mining operations, and travel on native surface roads, would also contribute particles.

No data support predictions of the amount of particulates contributed by all of these other sources. In addition, past impacts to air quality are not usually evident. Motorized travel emissions would only be combined with other localized sources. Due to low traffic volume, these emissions are fairly low across the Gila National Forest and disperse rather quickly. Actual cumulative effects would be relatively minor and should show little change in any alternative from the existing condition. Depending on timing with other projects, some combinations of fugitive dust from motorized routes and other particulates in the air could contribute to further reduce visibility for short time periods within the Gila Wilderness Class I airshed. Emissions produced by motorized vehicles in use across the forest would continue to contribute to greenhouse gases, as under current conditions.

Conclusions about Alternative Effects

The Gila National Forest is meeting New Mexico Air Quality Standards and meeting forest plan standards and guidelines under the no action alternative, and would continue to meet all laws, regulations, and policies with implementation of any of the action alternatives.

Watershed and Soils

This section summarizes the watershed and soils specialist report (USDA Forest Service 2010d).

Affected Environment

Watershed

Lands managed by the Gila National Forest drain into seven major river basins within New Mexico. Within these river basins, 41 5th-code watersheds intersect portions of the forest. These 5th-code watersheds can be further divided into 6th-code subwatersheds. These watersheds and subwatersheds are geographic areas of land, water, and biota within the confines of a drainage divide that define the aerial extent of surface water drainage to a point. Due to the landscape level scale of this project, the analysis will address effects at the 5th-code watershed level, which can

range in size from 70,000 acres to 250,000 acres on the forest. The 6th-code watershed level will be utilized during discussion of road densities and cumulative watershed effects.

A general assessment of watershed condition of the forest was completed as part of the "Gila National Forest Plan" (1986). This assessment was based on whether the existing effective ground cover was adequate to ensure long-term soil productivity (existing ground cover greater than tolerance ground cover), and whether ground cover was enough to provide for satisfactory hydrologic function. Acreage was classified as being in one of three condition classes—optimum, satisfactory or unsatisfactory—and then compiled by condition class for each 5th-code watershed. Watershed conditions of satisfactory are considered to meet the satisfactory criteria as outlined in the forest plan. Watersheds are rated in unsatisfactory condition when optimum and satisfactory condition acres within the watershed are less than the number of acres classified as unsatisfactory. Forestwide, four 5th-code watersheds (10 percent) are classified in optimum condition, twenty-two 5th-code watersheds (52 percent) are classified in satisfactory condition, and sixteen 5th-code watersheds (38 percent) are classified in unsatisfactory condition.

Vegetation and ground cover play a key role in keeping watersheds intact. In higher elevations where ponderosa pine and mixed conifer stands are found, watershed conditions are typically satisfactory, with thick duff layers and deep soils contributing to stability. In lower elevations where woodlands are present, soils are often shallow and may be coupled with less ground cover, which can lead to more unstable watershed conditions, particularly when subjected to natural or man-caused disturbances.

Wildland fire is probably the most significant natural disturbance that impacts watersheds. Where high intensity wildland fires have occurred over large acreages, watershed conditions can rapidly deteriorate due to sudden lack of vegetative ground cover, lack of rainfall interception, and resultant poor hydrologic conditions. When severe fires create poor hydrologic conditions (less than 10 percent of the ground surface covered with plants and litter), surface runoff can increase over 70 percent, and erosion can increase by three orders of magnitude (DeBano et al. 1998). Poor hydrologic conditions have resulted in areas of the forest that have had high, or even moderate, burn severity.

Anthropogenic disturbances are another key contributor of impacts to watershed conditions. The current transportation system across the forest is one of the more prominent, land-disturbing activities occurring. This system is comprised of open routes (road and trails), motorized cross-country travel, and motorized dispersed camping use. The transportation system currently impacts both upland and valley bottom resources. The primary impacts to watershed condition include soil compaction, soil erosion, sedimentation, stream channel degradation, riparian degradation, and vegetation disturbance. High road densities can additionally contribute to unsatisfactory watershed conditions by increasing the connected disturbed areas associated with roads to the drainage network, or increasing the number of stream crossings within a watershed.

Soils

Currently the Gila National Forest does not have a terrestrial ecosystem survey coverage and associated interpretations completed on the forest. It does have the general ecosystem survey, an ecological unit inventory, mapped at 1:250,000 scale. The general ecosystem survey identified 28 distinct ecological map units and associated map unit components over the forest, which indicates high soil variability. The general ecosystem survey maps soils, climate, geology, potential natural

vegetation, and topography. It also provides various map unit interpretations such as soil condition and erosion hazard. Though the general ecosystem survey is a broad-scale inventory, it is the best available survey currently for the forest. Approximately 53 percent of the soil condition on the forest rated satisfactory (table 25) and 45 percent of the forest is categorized as having a rating of slight for erosion hazard (table 26).

Table 25. Summary of soils conditions on Gila National Forest

Soil Condition	Satisfactory	Unsatisfactory	Unsuited
Acres	1,812,649	861,620	714,928
Percent	53%	25%	21%

Table 26. Summary of erosion hazard on Gila National Forest

Erosion Hazard	Slight	Moderate	Severe
Acres	1,517,271	411,958	1,459,967
Percent	45%	12%	43%

The geology of the forest can be characterized as extremely variable. The Gila National Forest lies within the Mogollon Plateau of the Mogollon-Datil volcanic field. The area is highly variable as to its surface geology types and associated composition due to the undergoing basin and range extension and faulting, in conjunction with erosion. The geology of the forest is dominated by rhyolite, rhyolitic tuff and ash flow tuff, andesites, basalt, basaltic andesite, granite, and sedimentary rocks including limestone and gila conglomerate. It has been noted that soil erosion is higher on soils that were formed and underlain by granite, rhyolitic ashflow tuffs, gila conglomerate and volcanic sediments.

Vegetation

In 2009, the region and forest completed a mid-scale existing vegetation mapping project and associated accuracy assessment on the Gila National Forest. The map is a satellite remote sensing product that is polygon based and provides a mid-scale map at a scale of 1:100,000. The project incorporated satellite remote sensing and extensive vegetation plot training data that were collected in the field forestwide. The training data were used for modeling purposes. A total of 32 dominance types were initially identified on the forest, and these dominance types were field sampled extensively. Dominance types were identified and named according to principal life form and most abundant species occurring within that life form. Life forms mapped include trees, shrubs, and grasses. Through the process of performing the accuracy assessment, the initial 32 dominance types were aggregated into map units, for a total of 18 map units in the final product. Products from the mid-scale existing vegetation project were a map of vegetative cover type by life form (tree, shrub, herbaceous) and dominant species, map of vegetative canopy cover classes (10 to 29 percent, 30 to 59 percent, and greater than 60 percent) and vegetation structure (dominant tree diameter classes and shrub height). Table 27 displays this information.

Table 27. Mid-scale existing vegetation map units on Gila National Forest

Mid-Scale Existing Vegetation Map Unit Descriptions	Acres	Percent
Sparsely vegetated (less than 10 percent canopy cover of any one life form)	6,932	0.20
Grasslands	275,388	8.12
Deciduous shrub mix	19,625	0.58
Evergreen shrub mix	43,949	1.29
Alligator juniper	99,573	2.94
One seed juniper and piñon pine	327,368	9.66
Woodlands mixed (combinations of mixes of piñon, juniper and gray oak)	1,001,191	29.53
Evergreen oak (pure and mixed stands of gray oak, silverleaf oak, and netleaf oak)	245,027	7.23
Gambel oak	31,568	0.93
Ponderosa pine (pure ponderosa pine and pine stands with alligator juniper or gambel oak)	1,105,016	32.59
Ponderosa pine and gray oak	14,614	0.43
Aspen	8,738	0.26
Douglas-fir mixed (Douglas-fir and combinations of Douglas-fir and ponderosa pine, white pine, gambel oak)	103,844	3.06
White fir or white fir and Douglas-fir mixed.	33,521	0.99
Mixed conifer and gambel oak (mixed combinations of Douglas-fir, white fir, ponderosa pine, white pine with gambel oak)	51,475	1.52
Mixed conifer and aspen (mixed combinations of Douglas-fir, white fir, white pine, Engelmann spruce, corkbark fir with aspen)	8,200	0.24
Mixed conifer (mixed combinations of Engelmann spruce, corkbark fir, white fir, blue spruce, Douglas-fir)	11,764	0.35
Engelmann spruce and corkbark fir	2,540	0.07
Water	309	0.01
Total	**3,390,642**	

Aquatic Resources

Water resources on the forest include streams, wetlands, riparian areas, lakes, ponds, reservoirs, and numerous stock ponds and tanks. There are approximately 1,171 miles of perennial streams and 541 miles (GIS NHD) of intermittent streams on the forest. The remaining drainages are considered ephemeral, of which there are approximately 12,821 miles of these systems across the forest. Open water comprises almost 300 surface acres when including Quemado Lake, Snow Lake, and Lake Roberts. In addition, approximately 1,200 surface acres of open water may be associated with stock ponds and other storage tanks, when filled to capacity.

Riparian and Wetland

The forest has many perennial and intermittent streams and wetlands that provide riparian habitat for terrestrial wildlife, fisheries, avian fauna, and fauna. These unique areas also provide for aesthetic resources, natural water purification processes, flood control, and opportunities for agricultural and recreational uses. Riparian ecosystems essentially constitute the transition area between the aquatic ecosystem and the adjacent terrestrial system.

Vegetation types commonly associated with riparian areas on the Gila National Forest include both a woody component and herbaceous component. Woody species commonly found include narrowleaf and Fremont cottonwood, Arizona and thinleaf alder, baccharis, Arizona walnut, willow species, box elder, velvet ash, and others. Herbaceous species include sedges, rushes, Kentucky bluegrass, deer grass, and other water loving grasses and forbs.

In an effort to quantify acres and location of riparian areas that may be most at risk to negative impacts from motorized vehicles, a riparian risk zone was considered for this analysis. Using existing riparian width data from Riparian Area Survey and Evaluation System (RASES) data, the average width of forest riparian areas is 155 feet, with a median width of 90 feet. About 97 percent of all riparian areas assessed with RASES have a width of 500 feet or less. Four drainages have reaches measuring over 500 feet, including Mogollon Creek, Gallinas Canyon, Gila River, and South Diamond Creek. Very limited miles of roads are found within these drainages.

Based on the above information, it was determined that a 300-foot buffer on either side of perennial and intermittent drainages would be suitable to use as a riparian risk zone, knowing that a few exceptions occur across the forest where the riparian zone goes beyond a 600 foot total width. Although still not quantifying acres of riparian areas found on the forest, the 300-foot buffer captures the majority of riparian areas while at the same time providing some level of buffer protection beyond the true riparian zone.

The 300-foot buffer for the riparian risk zone captures most wetland systems on the forest, in particular those associated with stream systems. Wetland conditions across the forest vary, with some wetlands being intact with limited disturbance, while others have experienced some level of dewatering or degradation due to ungulate grazing or anthropogenic activities.

Upland Wet Meadows

Upland meadows across the forest range in elevation from 4,300 feet to 9,600 feet, however, the majority of these meadows are located at elevations averaging approximately 7,800 feet. They are typically associated with ponderosa pine and mixed conifer vegetation types. The upland wet meadows typically have bluegrass as one of the dominant herbaceous cover types. To date, the forest does not have an inventory of these systems, thus other methods were used to aid in their identification. Across the forest, 103 upland wet meadows were identified, totaling 432 acres and ranging in size from 0.2 acre to 69 acres. The average size of these meadows is approximately 4 acres.

Water Quality

Potential adverse effects from forest management activities are nonpoint sources, as opposed to point sources of water pollution. To ensure compliance with the Clean Water Act, water quality standards are set by the New Mexico Water Quality Control Commission. New Mexico’s Surface

Water Quality Standards define water quality goals by designating uses for waterbodies, setting criteria to protect those uses, and establishing provisions to preserve water quality. Under Section 303(d)(1) of the Clean Water Act, states are required to develop a list of waters within a state that are not in compliance with water quality standards. Reaches of streams that are in some state of nonattainment are documented in "Draft 2010–2012 Integrated 303d)/305(b) List of Impaired Waters" (State of New Mexico 2010) which was approved in April 2010 by the Water Quality Control Commission. EPA final approval is still pending.

Currently there are 29 waterbodies (streams and lakes) within or adjacent to National Forest System land that are not meeting State water quality standards. This list may be found in the watershed and soils specialist report (USDA Forest Service 2010d). Of these, 12 reaches have listed a probable source of impairment as off-road vehicles; highway, road, or bridge runoff; or surface or parking lot runoff. Five of the stream reaches document a probable cause of impairment as turbidity, which may be directly or indirectly linked to roads. Twenty of the stream reaches document a probable cause of impairment as water temperature, which may also be indirectly linked to roads if stream channel geometry has been altered due to road modified runoff.

The list includes only those waters assessed by the State of New Mexico on the Gila National Forest. However, all ephemeral, intermittent, and perennial streams carry storm water runoff that can contribute to water quality impairments. Routes found within or adjacent to these stream systems and/or wetland, riparian and aquatic habitats pose the most risk of contributing nonpoint source pollution to these resources.

Table 28 summarizes watershed characteristics across the Gila National Forest.

Table 28. Summary of forestwide watershed characteristics

Feature	Characteristics
Location	· Southwest corner of New Mexico · Mogollon Mountains in north-central portion of forest · Black Range Mountains along southeastern portion of forest (Continental Divide) · Approximately 150 miles southwest of Albuquerque · Abuts the Arizona-New Mexico state line
Elevation	· Low end approximately 4,160 feet where the Gila River exits the forest in the Burro Mountains · High end approximately 10,770 feet at Mogollon Baldy in the central portion of the forest
Climate	· Bi-modal precipitation pattern · Majority of precipitation occurs from July through September (monsoon) · Winter precipitation occurs from December through February, with snowfall occurring above 6,500 feet · Precipitation varies across forest from 11 inches per year at the northern end near Quemado and lower Black Range, to 35 inches per year at the higher elevations in the Mogollon Mountains
Aquatic Features	· 1,171 miles of perennial streams · 541 miles of intermittent streams · 12,820 miles of ephemeral streams · 13 miles of water pipeline · 16 miles of ditches · 289 surface acres of lakes · 432 acres of upland wet meadows

Table 28. Summary of forestwide watershed characteristics

Major Drainage Basins or Rivers	· San Francisco River and its headwaters which flow into Arizona and eventually the Gila River · Upper Gila River and its headwaters which flow into Arizona and eventually into the Colorado River near Yuma · Mimbres River and its headwaters which flow south of the forest into a closed basin within the Rio Grande region above the International U.S.-Mexico border · Northernmost portion of forest flows northwest into Little Colorado River via tributaries · Eastern portion of forest flows east, southeast into Rio Grande via tributaries
Watersheds	· 41 5th-code watersheds that intersect the forest with average size of 210,000 acres · 190 6th-code watersheds that intersect the forest with average size of 25,000 acres
Designated Uses of Water	Domestic water supply, coldwater aquatic life, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, marginal coldwater aquatic life, marginal warmwater aquatic life, primary contact, secondary contact, warmwater aquatic life, wildlife habitat.
Water Quality	· 29 waterbodies within or adjacent to forest not meeting State water quality standards · 12 of 29 list probable source of impairment as off-road vehicles, highway and road and bridge runoff, or surface and parking lot runoff. · 5 of 29 listed for turbidity which may be linked indirectly to roads
Riparian Condition	· 132 reaches assessed using proper functioning condition (PFC) assessment · 54 percent of these in proper functioning condition · 36 percent of these functional at risk (FAR) · 10 percent of these nonfunctional · 64 percent currently meeting forest plan standards of PFC or FAR - Upward Trend · 326 reaches inventoried using RASES · Average riparian width across forest is 155 feet · Median riparian width across forest is 90 feet
Soil Conditions	· satisfactory soil condition = 53 percent · unsatisfactory soil condition = 25 percent · unsuited soil condition = 21 percent · slight erosion hazard = 45 percent · moderate erosion hazard = 12 percent · severe erosion hazard = 43 percent
Roads	· More than 5,200 miles of roads and trails, a large portion of which are not paved · A small portion of the unpaved roads are not system roads, they are created by recreational use.
Existing Forest Road Density in 5th-code Watersheds	· 90 percent of the 5th-code watersheds have a road density of less than 1 mile of road per square mile of land (mi/mi^2). · 10 percent of the 5th-code watersheds have road density of 1 to 2 mi/mi^2. · No 5th-code watersheds have a road density of greater than 2 mi/mi^2.
Existing Forest Road Density in 6th-code Watersheds	· 76 percent of the 6th-code watersheds have a road density of less than 1 mile of road per square mile of land (mi/mi^2). · 20 percent of the 6th-code watersheds have a road density of 1 to 2 mi/mi^2. · 4 percent of the 6th-code watersheds have a road density of greater than 2 mi/mi^2)

Important Assumptions Pertinent to the Summary

The following assumptions were made for this analysis and are important to understanding the effects analysis. This is not a complete list of assumptions that were made for the analysis; see the watershed and soils specialist report (USDA Forest Service 2010d) for further information related to other assumptions.

- The action alternatives involve the closure of routes to vehicle use by the public and not the physical removal (decommissioning) of roads. Removal of roads typically involves the extraction of culverts, the ripping of the road surface, and in some cases, the re-contouring of the ground surface to blend in with the natural topography. It typically can take more than 20 years for closed roads to revegetate to background conditions, if traffic is successfully eliminated.
- Closed routes without fixed barriers are expected to revegetate minimally. These routes will not disappear from the landscape until decommissioned, and will continue to be a source of sediment and erosion to some degree.
- An undetermined number of unauthorized routes exist which are not included in any current inventory.
- Sediment is the major pollutant from native surface roads. Most other pollutants from roads, such as trace metals and manmade chemicals are attached to sediment (Gucinski et al. 2001and Dissmeyer 2000). Thus, the relative effects of the alternatives with regard to sediment apply to trace metals and manmade chemicals.
- Disturbance within 300 feet of streams has the greatest potential to impact water quality via overland flow (Burroughs and King 1989 and Belt, O'Laughlin, and Merrill 1992).
- The most important factors influencing the risk of adverse effects to water quality from unpaved roads are related to the length (and associated acres) of unpaved roads near a stream, the distance of the unpaved roads from a stream, and the number of times that unpaved roads cross the stream.
- Riparian risk zones are considered areas within 300 feet of perennial and intermittent streams. Average riparian width based on RASES data across the forest is 175 feet. This risk zone is assumed to be inclusive of more than 97 percent of all riparian areas across the forest, minus four of the larger riverine systems.
- Existing road system has already committed soil resources to loss of productivity.
- Routes connected to the drainage network provide some level of sediment transport, regardless of whether drainage is perennial, intermittent, or ephemeral. These sediment inputs vary, based on duration and frequency of flow events. During short-duration, high-intensity storm events, ephemeral drainages can carry a considerable amount of sediment, some of it generated by roads.

Environmental Consequences

The alternatives are analyzed in the following sections to determine if there is potential for the changes proposed under each alternative to impact critical ecological functions that affect watershed condition and health. Components reviewed in this analysis include soil resources, riparian and wetland resources, and water quality. Other factors related to road and trail conditions were examined to evaluate the relative risk of motorized uses to disrupt hydrologic function and potentially impact watershed health.

Effects to Soils

The effects to soils by motorized uses on native surface routes are directly related to the impact the road footprint has on the landscape, as well as the impact the vehicle has both directly, and indirectly, on the ground itself. This project will result in a change in the levels of use of a particular road, however, no alternative poses decommissioning or obliteration of any roads to return them to a more natural state. Tables that summarize acres of motorized routes that pose a relative risk of adverse impacts to soils, by alternative, as well as potential acres that may be impacted by motorized dispersed recreation, motorized areas, and motorized big game retrieval are found in the watershed and soils specialist report (USDA Forest Service 2010d).

General Direct and Indirect Effects of Motorized Routes Common to All Alternatives

Effects that carry through all alternatives are related to soil compaction, loss of soil productivity, concentrated runoff resulting in erosion and sediment production, and loss of vegetative ground cover of existing routes. The presence of roads across the Gila National Forest has already resulted in negative impacts to the soil resource. With the implementation of any of the action alternatives, there will be a continued commitment of the soil resource and associated negative impacts, with effects remaining the same, increasing, or decreasing. Impacts to the soil resource will vary to some degree by alternative, with the potential for negative impacts varying by the number of roads that will remain open for motorized use, acres available for motorized cross-country travel, acres of motorized dispersed camping and motorized areas affected by parking one vehicle length off road in each proposal. Negative effects are not limited to the road prism alone, but include direct and indirect effects to areas adjacent to the motorized route. Roads are a major source of sediment and contribute more offsite sediment than any other land management activity (Gibbons and Salo 1973, Meehan 1991).

Soil compaction is a direct result of the weight of a motor vehicle and its wheels contacting the ground surface. The heavier the vehicle, the more contact pressure (pounds per square inch) the tire exerts on the ground surface. As tire width increases in relation to the weight of the vehicle, less contact pressure (psi) is exerted by the tire on the ground surface. Soil compaction occurs when soil particles are pressed together, reducing the amount and size of pore spaces between soil particles. The higher the clay content of a soil, the more susceptible it is to compaction. When soils are wet, they are much more susceptible to compaction, and to a greater depth, than when dry. As a result of soil compaction, a series of additional direct impacts occur to soils including, but not limited to, decreased soil porosity, increased soil bulk density, reduced infiltration rates, increased surface runoff, increased surface erosion, reduced nutrient cycling, and reduced plant growth.

Compacted soils can persist for many years, and variables such as how severely a soil was compacted and to what depth compaction occurred dictate time of recovery. Compaction of soils by motorized use results in a series of indirect effects that can be detrimental to soil productivity, watershed condition, and water quality.

Loss of soil productivity occurred when the route was established, and is still occurring to varying degrees. In addition, loss of soil productivity to areas adjacent to motorized routes has and is still occurring. Factors contributing to the motorized route's loss of soil productivity, or to areas adjacent to motorized routes include: inadequate maintenance, inadequate drainage, poor

route and or drainage design, and poor route location. Loss of soil productivity to areas adjacent to motorized routes occurs as sheet, rill and gully erosion.

Concentrated runoff resulting in soil erosion and sediment production is the primary agent of erosion and sediment production on native surface motorized routes and areas adjacent to—or connected to—the route. Factors influencing the degree of concentrated runoff include: drainage features, route design, route location, and maintenance levels. Though concentrated runoff is the primary source of soil loss and erosion from native road surfaces, soil loss also occurs in the form of dust from motorized routes. The release of dust into the air is a result of the interaction of tires on the native road surface and the mechanical displacement of soil particles. Wind is another agent that can remove soil particles from motorized routes. These are typically smaller soil particles, but as wind velocity increases, larger soil particles become more susceptible to being removed from the route.

Loss of vegetative ground cover has occurred on all motorized routes. Maintenance level 3 and 4 roads are typically bladed every year or so, and are generally void of vegetative ground cover. Maintenance level 1 and 2 routes receive less frequent maintenance, have lower use levels, and have varying degrees of vegetative ground cover associated with the road prism. Vegetative ground cover assists in reducing the effects of erosion from concentrated flows and wind on motorized routes and areas adjacent to them.

General Direct and Indirect Effects of Motorized Off-Road Travel Common to All Alternatives Including the No Action Alternative

The effects described below will remain the same for any changes described in each alternative. However, the degree of effect will vary by alternative, based on the change in route miles and permitted cross-country travel.

Effects of motorized off-road travel by all vehicle types (for the purpose of camping, parking, game retrieval, and recreational use) to soil productivity include soil compaction, loss of vegetative ground cover, decreased soil porosity, increased soil bulk density, displacement of litter or duff layer leaving bare soil exposed, soil displacement, reduced infiltration rates, decreased plant growth, disturbance to soil biotic crusts, and reduced nutrient cycling. All of these lead to increased and concentrated overland flow and sediment transport to downslope areas and connected stream courses following storm events, which pose a risk to long-term soil productivity, downstream water quality, and overall watershed condition. Impacts from motorized off-road travel are most pronounced when soils are wet, and are minimized under dry soil conditions.

Typically, a single one-time pass on a piece of ground has minimal effects to vegetation and the soil resource. It is when there are repeated passes, or when a new route is established, that negative effects start to occur to vegetation and the soil resource. Slope also plays a critical role on the magnitude of the effects that cross-country travel has on vegetation and soil productivity. As slope that a vehicle is traveling on increases, either parallel or perpendicular to, the greater the amount of ground disturbance that occurs. Due to wheel slip or churn and the forces of gravity, more vegetation, litter, and soil are displaced. This exposes bare soil that can potentially be moved offsite, and may lead to accelerated erosion, consequently reducing soil productivity, soil quality, and overall watershed condition. Off-road travel on soils with moderate or high erosion

hazard is more likely to induce accelerated erosion, runoff, and sediment delivery into connected stream courses.

On soils with slight erosion hazard, the direct impacts of cross-country travel activities are not expected to result in accelerated soil erosion, but will cause loss of soil productivity when vegetative ground cover is removed, soil is compacted, or rutting occurs. Cross-country travel on soils with unsatisfactory or unsuited soil condition ratings are more likely to realize negative impacts in the form of loss of soil productivity and erosion than travel on soils with satisfactory soil condition ratings.

Following is a summary of potential effects to soils:

- This project does not address decommissioning; all road scars will remain with the addition of a few roads added to the system (i.e., converting of decommissioned to motorized route or trail). Until decommissioned, the roads will remain in passive storage, still having compacted soils, loss of soil productivity, concentrated runoff resulting in erosion and sediment production, and lack of vegetative ground cover. Due to compaction and loss of soil productivity of roads, natural revegetation of the road will be a slow process. In areas of low freeze and thaw such as in the Southwest, research supports that it takes many years for compacted soils to begin to break up.
- In reviewing only motorized routes and the reduction in relative risk to the soil resource, alternative E indicates the largest reduction in acres impacted on soils with moderate or severe erosion hazard and unsatisfactory or unsuited soils. Alternative D shows the next largest reduction, followed by alternatives F and G, which are virtually the same. Alternative C shows little change (+1 percent) from the no action alternative.
- Alternatives D (-98 percent), E (-100 percent) and G (-97 percent) show significant reduction in potential acres of soils with moderate or severe erosion hazard ratings disturbed by motorized big game retrieval, followed by alternatives F (≈ -50 percent) and alternative C (≈ -22 percent).
- Alternatives D (-97 percent), E (-100 percent) and G (-96 percent) show significant reduction in potential acres of soils with unsatisfactory or unsuited soil condition ratings disturbed by motorized big game retrieval, followed by alternatives F (≈ -42 percent) and alternative C (≈ -19 percent).
- All alternatives show significant reduction (greater than 94 percent) in potential acres of soils having moderate or severe erosion hazard ratings and soils with unsatisfactory or unsuited soil condition ratings disturbed by motorized dispersed camping.
- Alternatives D and E completely removed the 38 areas from soils having moderate or severe erosion hazard ratings and soils with unsatisfactory or unsuited soil condition ratings, while alternatives G, F, and C show no change from the no action alternative.
- The one ATV and motorcycle area does not impact soils having moderate or severe erosion hazard. However, the site is located within soils having unsatisfactory or unsuited soil condition ratings (alternatives C, F, and G).

Effects to Riparian and Wetland Vegetation

Each action alternative was analyzed to determine if there is potential for motorized vehicle travel on the Gila National Forest to impact riparian and wetland vegetation. The effects to riparian and wetland vegetation by motorized uses are related to the impacts of the road prism across wet surfaces, disturbance of riparian vegetation, compaction of soils and streambanks, and concentration of flows into these areas. The wet nature of these areas provides an increased level of resiliency to irreversible, adverse impacts, and often increases the opportunity for recovery, more so than drier, upland sites. These areas will often recover to a more natural state in a shorter period of time. Koury and Natharius (personal observations 2010) have observed on the Gila National Forest and other southwestern forests that once roads are closed in riparian areas and wetlands, many of these will naturally self-decommission through regrowth of vegetation, exposure to flood flows, and re-establishment of streambanks and flood plains, or a combination of these. Thus, closed roads were considered a net benefit to riparian and wetland areas, and the acres associated with roads proposed for closure within these sensitive areas were removed from the calculations of route impacts. This does not suggest, however, that all closed roads will no longer have adverse impacts on wetlands and riparian areas. Instead, while some closed roads will continue to negatively impact these areas, the level of impact is anticipated to be reduced across the forest due to natural recovery of many sites.

The area in this analysis used a riparian risk zone that encompassed a 300-foot buffer on both sides of all identified perennial and intermittent drainages on the forest, as well as the areas identified as wetlands. The riparian risk zone does not constitute the true acres of riparian areas on the forest, but rather presents a conservative estimate of acres where riparian vegetation would be found within.

Tables that summarize the proposed changes in acres of motorized routes by alternative that may impact riparian and wetlands areas—as well as the proposed changes in potential acres that may be impacted by motorized dispersed recreation, motorized big game retrieval, and motorized areas—are found in the watershed and soils specialist report (USDA Forest Service 2010d).

General Direct and Indirect Effects Common to All Alternatives Including the No Action Alternative

The effects described below will remain the same for any changes described in each alternative. However, the degree of effect will vary by alternative, based on the change in route miles and permitted cross-country travel.

Although riparian and wetland areas occupy less than 1 percent of the lands managed by the Gila National Forest, they are key to productive fisheries and wildlife habitat; they attenuate flooding; and they provide quality water for downstream users, continuous ground water recharge, and diverse scenery and recreation sites.

Motorized uses can affect riparian and wetland areas directly or indirectly by inducing changes to natural hydrologic functions. These uses can result in modification of surface and subsurface drainage patterns, which can cause changes in moisture regimes of these areas. Routes can directly damage riparian vegetation within or near the stream channel. A reduction of riparian function may result by tires churning up and removing vegetation and causing streambank alteration. Soil rutting, compaction and detachment, and accelerated erosion may occur, as well as sediment transport and sediment deposition occurring into connected waters, reducing water

quality onsite and downstream. Roads adjacent to, or that intersect portions of, wetlands alter surface hydrology and waterflow, causing loss of water storage, vegetative productivity, and wetland function. Continued driving in stream channels would directly break down streambanks that provide for riparian function and aquatic habitat.

Many wetlands and upland meadows across the forest have road access and provide easy opportunity for motorized dispersed camping and motorized big game retrieval. Motorized uses in these areas pose the greatest threat to soil productivity, vegetation and wildlife, versus motorized uses in other vegetation types. Repeated motor vehicle use can cause soil compaction and rutting which can have a long-term adverse effect. Personal observations (Koury and Natharius 2010) indicate that it usually takes several motorized passes to remove or destroy vegetation. The size of vehicle also influences the level of disturbance in these sensitive areas, as larger and heavier vehicles most often leave more negative impacts than smaller ATVs.

Adverse impacts to riparian areas and wetlands related to motorized travel off of designated routes can range from high to low. Riparian areas tend to be a natural draw for concentration of motorized and nonmotorized recreation. In areas where travel off of designated routes is high, levels of negative impacts typically increase, while low concentration areas may show incidental impacts. Wetlands on the forest typically have low concentrations of motorized travel off of designated routes, however, the level of disturbance can be more severe due to the sensitive nature of soils in these areas to rutting and compaction. Personal observations (Koury and Natharius 2010) on the Gila National Forest indicate that adverse effects to riparian areas and wetlands from travel off of designated routes are minimal. Travel off of designated routes is mostly infrequent and/or a one-time occurrence, with little compaction occurring or permanent tracks created. In a few locations, motorized users have created visible routes that are repeatedly used for big game hunting, antler hunting, and unrestricted cross-country motorized travel.

In summary, for riparian risk zones:

- Alternative E reduces acres of motorized routes within riparian risk zones by 40 percent, followed by alternative D (-30 percent). Alternatives F and G show similar reductions (-18 percent) and alternative C shows little reduction (-4 percent) in motorized routes within riparian risk zones from the no action alternative.
- All alternatives significantly (greater than 90 percent) reduce potential acres impacted by motorized dispersed camping and motorized areas within riparian risk zones.
- Alternatives E, D, and G significantly (greater than 90 percent) reduce potential acres impacted by motorized big game retrieval within riparian risk zones. Alternatives F (-53 percent) and C (-34 percent) follow.

In summary, for identified wetlands:

- All alternatives except C significantly (greater than 50 percent) reduce acres of motorized routes within identified wetlands. Alternative C shows no change from the no action alternative.
- All alternatives significantly (greater than 85 percent) reduce potential acres impacted by motorized dispersed camping and motorized areas within identified wetlands.

- Alternatives E, D, and G significantly (greater than 85 percent) reduce potential acres impacted by motorized big game retrieval within wetlands. Alternatives F (-7 percent) and C (-2 percent) minimally reduce potential acres impacted by motorized big game retrieval within wetlands and are similar to the no action alternative.

Effects to Water Quality

Each alternative was analyzed to determine if there is potential for motor vehicle travel on the Gila National Forest to impact water quality. Water quality was evaluated on all perennial, intermittent, and impaired (303d) waters. Analysis of effects to these waters was based on motorized uses and their proximity to drainages, concentration of flows into streams, and stream crossings that disturb stream bottom sediments. Impaired waters were analyzed separately to see how the action alternatives compared to the no action alternative regarding impacts to streams currently not meeting State water quality standards.

Literature supports that disturbance within 300 feet of streams has the greatest potential to impact water quality, via overland flow (Burroughs and King 1989; and Belt, O'Laughlin and Merrill 1992). The analysis area for water quality was designed by buffering 300 feet on either side of perennial, intermittent, and impaired streams. Closed roads within this buffer were considered a net benefit to water quality because they limited the use on the road and restricted motorized stream crossings on these routes. Acres associated with roads proposed for closure were removed from calculations of route impacts on water quality.

General Direct and Indirect Effects Common to All Alternatives

The effects described below will remain the same for any changes described in each alternative. However, the degree of effect will vary by alternative, based on the change in route miles and permitted cross-country travel.

The primary effect to water quality related to motorized uses is sedimentation originating from road erosion. Numerous researchers have established that roads are a major source of sediment delivered to streams in otherwise relatively undisturbed watersheds, such as forests and rangelands. In addition, research has concluded that sediment from roads can result in adverse effects to streams and aquatic habitat (MacDonald and Stednick 2003, Gucinski et al. 2001, Dissmeyer 2000, and Meehan 1991). Motorized uses can affect water quality both directly through the physical crossing of a route on a stream, and indirectly through the connectivity of the road system to the drainage network. The farther a road is from a stream channel, the less risk of direct deposits of sediment into the drainage. Roads constructed near a stream pose a higher relative risk to water quality and to modifying hydrologic response of streamflow from runoff events. When located close to a stream channel, there is less available vegetation and land surface to buffer or capture the transport of eroded material and other pollutants that may become mobilized during runoff events. In addition, because routes intercept and concentrate water, the closer they are to a drainage channel, the quicker water is delivered to the stream channel, potentially increasing runoff response. This can lead to higher peak flows, which may then lead to a higher risk of channel erosion. Parent material the roadbed is situated on can also influence effects that a road or trail has on erosion and sedimentation. On the Gila National Forest, roads situated on decomposing granite or rhyolite are highly susceptible to rutting and erosion. Water temperature issues may also arise if routes are located adjacent to stream channels where riparian

vegetation is removed to accommodate the route or where stream channel geometry has been altered, creating a wider, more shallow channel.

Stream crossings create the most vulnerable point on the stream channel to adverse impacts from motorized use. Effects from stream crossings are twofold. They directly impact the stream by the action of vehicle tires disturbing and mobilizing stream bottom sediments. This effect is typically short lived, provided there is not continual traffic going across the stream. Crossings, additionally, indirectly affect water quality by providing a direct flow path from the route into the stream, without any vegetative buffer that might filter out suspended sediments in runoff events. This flow path, until hydrologically disconnected, will continue to funnel sediment laden runoff into the stream.

Motorized use adjacent to and within drier, ephemeral channels can also move large and small bedload material, which becomes further mobilized during large rain events. Disturbed streambanks in these dry channels are left with bare soil that has an increased potential for future erosion and bank destabilization. This can lead to lateral cutting, widening of channels, and increased sediment in the channel, which moves downstream. While ephemeral channels do not transport sediment most of the year, they still remain an integral part of the watershed's conduit system to carry runoff and sediment during storm events. Ephemeral channels have proven to be very efficient transporters of muddy water, as evidenced during summer monsoon storms on the Gila National Forest.

Research also indicates that sediment movement off of roads is related to levels of maintenance, road drainage, and amount of use (Clinton and Vose 2003, Maholland and Bullard 2005, and Reid and Dunne 1984). High traffic use typically delivers more sediment to stream courses than low traffic use. Successfully closed roads are assumed to deliver the lowest amount of sediment to stream courses compared to low or high traffic use on all road types. Native surfaced and unauthorized roads produce and deliver more sediment than improved, gravel roads. Insloped, bar ditched roads produce more sediment than all other roads types. Thus, reduction of miles of native surfaced maintenance level 2 roads is anticipated to decrease road erosion and sedimentation delivery more than restricting traffic on improved, graveled forest level 3, 4, and 5 roads, however, this amount has not been quantified. These effects also apply to motorized trails, but may vary depending on level of use, size of trail, and location.

Cross-country travel impacts on water quality on the Gila National Forest can range from high to low, but in general are typically minimal. Short-lived negative impacts occur when motorists cross live streams attempting to retrieve big game animals or to reach a desired camping spot. These crossings are most often one-time passes that do not create a permanent route. Damage to riparian vegetation and streambanks may also occur, creating a nickpoint that may be vulnerable during higher flows. At current use levels, personal observations (Koury and Natharius 2010) across the forest indicate that motorized dispersed camping and motorized big game retrieval is infrequent enough that negligible adverse effects are occurring due to these activities. All action alternatives have significantly reduced the acreage available for motorized dispersed camping and motorized big game retrieval, thus having less opportunity for negative impacts to occur.

Tables summarizing stream crossings, as well as miles of stream that may be impacted by motorized routes, motorized dispersed recreation, motorized big game retrieval, and motorized areas may be found in the watershed and soils specialist report (USDA Forest Service 2010d).

- Alternative E provides the most reduction (greater than 50 percent) of motorized crossings on perennial and intermittent streams, followed by alternatives D (-37 percent), G (-19 percent), and F (-17 percent). Alternative C reduces motorized crossings at -8 percent, which is the least of any action alternative.
- Alternatives D, E, F, and G are similar in reduction of motorized crossings on impaired streams (≈21 percent reduction from no action). Alternative C reduces motorized crossings on impaired streams by 12 percent.
- Alternative E reduces miles of perennial and intermittent streams potentially impacted by motorized routes by 44 percent, and potentially reduces impacts to impaired streams by 24 percent, which is the most of any action alternative. Alternative D provides the second largest reduction in potential effects: perennial and intermittent streams (-30 percent) and impaired streams (-21 percent). Alternatives F and G show similar reductions (-19 percent), followed by alternative C, which shows a reduction of 7 percent from the no action alternative.
- All alternatives almost completely remove motorized camping areas from perennial, intermittent, and impaired streams. All alternatives significantly (greater than 90 percent) reduce potential impacts from motorized dispersed recreation on perennial, intermittent, and impaired streams. Alternatives E, D, and G significantly (greater than 90 percent) reduce potential impacts from motorized big game retrieval on perennial, intermittent, and impaired streams. Alternative F provides for the next largest reduction (≈45 percent), followed by alternative C (≈20 percent).

For all action alternatives, fewer motorized routes would be designated for motor vehicle use within 300 feet of perennial, intermittent, and impaired streams. Reducing the acres of roads and trails within this buffer strip is anticipated to improve water quality by reducing the relative risk of routes adjacent to the streams. In addition, less access to these areas would allow these routes to re-establish vegetation, reduce sediment yields, and improve channel and riparian conditions over time.

It is important to note, however, that until hydrologically disconnected, closed routes will continue to be pathways for flow and sediment to enter the stream system to some extent, as recovery time can take decades. All of the action alternatives involve closing some system roads to motorized use rather than decommissioning (physical removal). In some instances, the relative risk of sedimentation may increase due to problems associated with lack of consistent maintenance, while in others the relative risk may decrease dramatically due to rapid recovery of a riparian area to more natural conditions.

Effects to Watershed Health from Road and Trail Condition

Each of the alternatives was analyzed to determine if there is potential for motorized uses on the Gila National Forest to affect the integrity of a watershed. The indirect effects to watershed condition related to motorized routes are primarily related to the level of disturbance the road has created on the landscape and the ensuing hydrologic disruption created. This disruption can lead to concentration of flows, movement of sediment, and impacts to riparian areas, aquatic resources and water quality, all of which contribute to watershed health. While this project proposes to change the number of routes open for motorized use, it does not propose to decommission or obliterate any routes that will be closed. Decommissioning of a road is defined as “activities that

result in the stabilization and restoration of unneeded roads to a more natural state" (36 CFR 212.1, Forest Service Manual 7705-Transportation System (USDA Forest Service 2003)). The "Draft Implementation Guide for Assessing and Tracking Changes to Watershed Condition" (USDA Forest Service 2010) states that "properly closed roads should be hydrologically disconnected from the stream network. If roads have a closure order, but are still contributing to hydrological damage, they should be considered open for the purposes of road density calculations."

For this portion of the analysis, closed roads are still considered land disturbance with the potential to impact watershed health across the forest. This approach is viewed from a landscape level and does not discount negative effects that may be more quickly reversed in riparian areas and wetlands, and water quality improvements that may occur from closed routes. It is just one of many factors that must be considered when assessing watershed condition.

General Direct and Indirect Effects Common to All Alternatives

Effects to watershed condition that will carry throughout all alternatives are related to the impact routes can have on watershed conditions across the landscape. Roads are a major source of sediment and contribute more offsite sediment than any other land management activity (Gibbons and Salo 1973 and Meehan 1991). Roads directly alter natural sediment and hydrologic regimes by changing streamflow patterns and amounts, sediment loading, transport, and deposition, channel morphology and stability, water quality, and riparian conditions within a watershed (Gibbons and Salo 1973, Dunne and Leopold 1978, and Copstead et al. 1997). Road maintenance can also increase sediment routing to streams by creating areas prone to surface runoff, altering slope stability in cut and fill areas, and altering drainage patterns (Reid and Dunne 1984, Megahan 1978, Burroughs and King, 1989, and Luce and Black 2001). Road density is known to play a dominant role in human induced augmentation of sediment supply by erosion and mass wasting in upland forested landscapes in the Pacific Northwest (Cederholm et al. 1981, Furniss et al. 1991) and it reasonable to assume that similar relationships exist elsewhere. Road related mass soil movements can continue for decades after roads have been constructed and long-term slope failures frequently occur following road construction and timber harvest (Megahan and Bohn 1989).

Any road segment that has a continuous surface flow path between the road prism and a natural stream channel during a high runoff event is a hydrologically connected road segment. The proximity of roads to streams is a surrogate for identifying hydrologically connected roads to streams. Road closures do not immediately eliminate hydrologic impacts. Rather, the disturbed surface takes years to stabilize, which depends on the level of success in the closure, underlying soils, vegetative regrowth, and other such factors. Roads, including those behind gates and dropped from inventories, continue to produce sediment until they are totally revegetated. Proper road obliteration or decommissioning, which returns the roadbed and fill slope to the contours of the land and replaces culverts with natural stream channels, offers the best opportunity to restore health to heavily roaded watersheds and to aquatic habitat downstream.

Across several million acres of the Gila National Forest, the combined total acres of motorized roads and trails can impact the integrity of a watershed. Unpaved roads, which are the majority of National Forest System roads, are particularly vulnerable to rainfall and the ensuing runoff that erodes the road surface. Both paved and unpaved roads concentrate and accelerate flow, which

can further erode unarmored surfaces including the roadbed, road fills, cut hillslopes, and unarmored outlets to drainage features. Without any means of detention such as vegetation or sediment basins, roads can efficiently convey sediment directly into the drainage network, including all ephemeral, intermittent, and perennial streams. Road widths on this forest range on average from 3 feet for motorcycle trails to 20+ feet on maintenance level 5 roads, at the expense of vegetation and ground cover. In addition, the road prism of cut, fill, and travel surface typically disturbs and occupies a wider area than trails primarily used for nonmotorized travel. Road widths on maintenance level 2 roads can become wider when traveled on during wet periods, as motorists often drive around large mud puddles creating a secondary route adjacent to the primary route.

Routes also disrupt a watershed's natural hydrologic flow by capturing surface and subsurface runoff on hillslopes. This interrupts natural flow paths to the stream system. Unmitigated, the captured runoff can be delivered to stream systems more rapidly, at higher rates of flow, and can impact the timing and magnitude of natural streamflows. Stream channels will respond to significant increases in flow rates by widening or deepening to carry these greater flow rates. When a road is cut across a hillside, it often intercepts subsurface waterflow and runs it down ditches and through culverts. It then picks up sediment and is joined by sediment laden runoff from the roadbed and cut banks before running into a stream. Increased deposits of sediment into a watershed's entire drainage network can come from roads and trails that are directly and indirectly connected to a channel. In addition, roads constructed on unstable slopes can add to structural instability of these areas, leading to landslides and greater sources of sediments.

Road impacts can persist long after a travel way is closed unless measures are taken to disconnect runoff pathways into a stream channel and/or onto a road surface. Proper design and location of travel ways can significantly reduce the risk of flood flows, slope failures, sedimentation, and stream channel degradation. This includes avoidance of steep slopes, high erosion hazard areas, stream channels, riparian and wetland areas, and areas of high mass movement potential. When roads are properly planned, constructed, and maintained, their long-term impacts on watershed resources, whether or not they are open or closed to travel, are effectively reduced.

Watershed conservation practices and forest plan standards and guidelines prescribe extensive measures to protect soil, riparian, wetland, and aquatic resources. Generally, adverse impacts on these resources can be minimized when all applicable measures are applied and effective. However, there is always a risk that these protective measures will fail to be fully effective. Alternatives that propose lesser densities of roads may decrease the risk of adverse impacts on aquatic and riparian resources and, ultimately, water quality.

Cross-country travel across the entire analysis area would potentially cause adverse impacts to a watershed, especially those with vulnerable resources such as sensitive soils, riparian areas, wetlands, and aquatic resources. Continued cross-country use may result in additional unauthorized trails simply from the continued act of riding over the same area several times. As this activity is not regulated or constructed to forest standards, it is difficult for the Forest Service to limit or control. As evidenced by existing unauthorized trails, these new trails will typically lack proper planning and design to limit the negative effects on soil and water resources. Currently, the Gila National Forest has seen minimal adverse impacts related to cross-country travel for dispersed camping and big game retrieval. Cross-country use on this forest is infrequent and dispersed enough that few permanent tracks are created, based on forest staff observations.

Some situations do exist, however, where local residents have created an “undesignated” route based on a favorite destination off of a designated route.

In summary:

- This project does not address decommissioning; all road scars will remain with the addition of a few roads added to the system (i.e., converting of decommissioned to motorized route or trail). For the majority of motorized routes in the uplands, the changing of designation of road will result in minor change on the landscape until the road is decommissioned or removed from passive storage. At a landscape level, there is little to no change from existing road and trail condition, as a result of changes in route designation under any alternative. There will be little to no change in road densities under any alternative, as routes will remain hydrologically connected until decommissioned.
- Alternatives D, E, and G significantly (greater than 90 percent) reduce the acres of potential disturbance by motorized big game retrieval. Alternative F moderately (-38 percent) reduces potential disturbance by motorized big game retrieval. Alternative C reduces potential disturbance by motorized big game retrieval by 15 percent.
- All alternatives significantly (90 percent) reduce acres of potential disturbance by motorized dispersed camping. Motorized camping areas are eliminated under alternatives D and E, and almost eliminated under alternatives C, F and G, as only 31 acres would remain.

Conclusions About Alternative Effects

All action alternatives provide for some level of beneficial watershed and soil impacts by reducing acres available to motorized cross-country travel, including motorized dispersed recreation and motorized big game retrieval, across the forest. In addition, all alternatives reduce miles of motorized routes open to the public, which reduces the relative risk of negative impacts to riparian areas, wetlands, and water quality. No decommissioning of roads will occur as the result of implementation of any action alternative; thus, road densities and road and trail conditions will continue to impact overall watershed health similar to the existing condition.

In comparing alternatives, alternative E provides the greatest opportunity for beneficial impacts to the resource as a result of implementation of the Travel Management Rule. Alternative E has the greatest reduction in acres of disturbance related to motorized routes and the least available acreage to motorized cross-country travel that can disturb these resources. The only motorized cross-country travel available is within the 1-vehicle-length parking width available off of all motorized routes.

Alternative D provides the second greatest opportunity for beneficial impacts to watershed and soils resources. It has the second largest reduction in motorized routes, and similar to alternative E, does not allow for cross-country travel outside of the 1-vehicle parking width.

Alternatives F and G also would provide for beneficial impacts, however, not to the extent of alternatives D and E. Alternatives F and G are similar in almost all respects, with the exception of motorized big game retrieval, where alternative G further restricts this corridor to ½ mile, versus 1 mile in alternative F. Observable differences between these two alternatives related to

motorized big game retrieval would be slight, as current observable impacts from this activity are minimal on the Gila National Forest.

Alternative C provides for the least amount of beneficial impacts to watershed and soil resources, and a slight improvement over the no action alternative as it reduces the least amount of motorized routes. It does restrict motorized cross-country travel similar to alternative F, however, again this activity currently has minimal watershed and soil impacts on the forest.

All action alternatives are consistent with law, regulation, and policy.

Cumulative Effects

Cumulative effects are often assessed by watershed, or as a portion of a specific watershed. This type of assessment addresses the incremental impacts of an action when added to other past, present, and foreseeable future actions, regardless of what entity is or has undertaken the action(s). A watershed cumulative impact can be defined as the total impact, positive or negative, on runoff, erosion, water yield, floods, and/or water quality that results from the incremental impact of a proposed action, when added to other past, present and reasonably foreseeable future actions occurring within the same natural drainage basin (watershed) (1978 CEQ definition of cumulative impacts). Cumulative watershed effects are defined as the impact of activities on surface runoff and erosion, water yield, peak flows and flooding, channel stability, sedimentation, and water quality. Activities that influence these effects can include timber harvest, grazing, roads, fire, mining, recreational activities, and other land-disturbing actions that remove vegetation and litter, which can expose or compact soil. Loss of vegetation and exposed soil can result in reduced interception and transpiration rates, and increase surface runoff and erosion.

The Gila National Forest currently has 29 water bodies that are listed as not meeting New Mexico State Water Quality Standards. The majority of these streams originates on National Forest System lands, and flow through land managed by the Gila National Forest. It is only reasonable to consider that cumulative impacts of past forest activities, as well as ongoing forest activities, have played a role in some of these listings. While difficult to quantify or measure cumulative effects, it is possible to estimate acres of disturbance across a watershed and estimate which activities may have the greatest influence in cumulatively impacting watershed health.

To estimate cumulative effects for this project, a preliminary screening procedure (adapted from the Apache-Sitgreaves National Forests' cumulative watershed effects analysis procedure, 2004) was used that was designed to indicate the possibility of adverse effects occurring as a result of cumulative watershed impacts. The procedure looks at activities within Gila National Forest watersheds to assess if the amount of activities has resulted in land disturbance that has reached or exceeded a threshold of concern. This procedure is based on equivalent disturbed area within a watershed, which includes the area associated with land-disturbing activities, within the past 25 years. A recovery factor is used to reflect dissipation of effects over a 2- to 25-year period, depending on the severity of the activity. Activities are then converted into equivalent disturbed area, using roads as an index. Equivalent disturbed area (EDA) is a means to display disturbed areas in a watershed on an equal basis. Roads can be assigned a rating of 1 (based on curve number rationale), and all other activities can be assigned a rating that is proportional to 1. The threshold level was set at 15 percent for this project, where cumulative impacts of a watershed area are in a disturbed condition. Meeting this threshold does not necessarily indicate that a level has been passed where cumulative effects are significantly adverse, however, it is used as an

indicator that land-disturbing activities may be approaching a level where a watershed may begin to lose its resiliency to change. If a threshold of concern is approached, then it may lead to development of a new alternative, modification of an existing alternative, or a more detailed hydrologic analysis to determine if cumulative effects are adverse and significant.

Cumulative effects were analyzed at the 5th-code watershed, which is reasonable for a landscape-level project. One limitation of the procedure used, however, is that it was developed for watershed sizes comparative to a 6th-code watershed level. To compensate for this, where specific 5th code watersheds indicated higher levels of disturbance, a closer look at the 6th-code level was examined to assess if activities were concentrated enough in one location to create concern for adverse impacts. While the large scale at which the 5th-code watershed is delineated is so large that it does not allow accurate determination of effects of a specific project proposal, it is still considered relevant in a broad look at cumulative impacts across the Gila National Forest. Another constraint of doing the analysis at this scale is that observable impacts (beneficial or detrimental) at the outlet of a 5th-code watershed would likely be diluted over such a large area. The factors and analysis tables for this analysis may be found in the watershed and soils specialist report (USDA Forest Service 2010d).

The EDA analysis was performed on all 5th-code watersheds that intersect the Gila National Forest, where forest ownership is 8 percent or greater. Thirty-three 5th-code watersheds met these criteria. The EDA analysis was performed for 2 years, 2010 and 2025, to assess change over a 15-year period. Existing cumulative impacts were assessed for the no action alternative to determine if any of Gila National Forest's watersheds were already approaching, or exceeding, a level of disturbance that would cause concern. Results of this analysis are available in the watershed and soils specialist report found in the project record.

In summary, none of the 5th-code watersheds approached the 15 percent disturbance threshold, which was expected due to the dilution effect of these large watersheds. Review of alternative B identifies three watersheds having disturbance levels above 3 percent: Corduroy Canyon at 8.6 percent, Negrito Creek at 5.7 percent, and Upper San Francisco at 3.4 percent. A closer look was taken at these three watersheds to see how large a role roads (all ownerships) are playing in watershed disturbance. A review of road densities at the 5th-code level indicates that the Upper San Francisco River 5th-code watershed has the second highest road density (1.83 mi/mi^2) of all forest watersheds. The Negrito Creek watershed has the fourth highest road density (1.73 mi/mi^2), and the Corduroy Canyon watershed has a density of 1.21 mi/mi^2, which is close to the forest average 5th-code watershed road density of 1.14 mi/mi^2.

Breaking these densities down even further, 6th-code watershed densities were evaluated using the criteria established in the "Draft Implementation Guide for Assessing and Tracking Changes to Watershed Condition." The guide uses a road and trail network indicator as 1 of 12 factors to consider in assessing 6th-code watershed condition. This indicator identifies the following three condition ratings for road densities:

- Less than 1 mi/mi^2 = Good (Functioning Properly)
- 1 mi/mi^2 – 2.4 mi/mi^2 = Fair (Functioning at Risk)
- Greater than 2.4 mi/mi^2 = Poor (Impaired)

Using these criteria, within the Corduroy Canyon 5th-code watershed, five 6th-code watersheds are rated “Fair” and two are rated “Good.” Within the Negrito Creek 5th-code watershed, two 6th-code watersheds are rated “Poor,” three are rated “Fair,” and three are rated “Good.” Within the Upper San Francisco River 5th-code watershed, two 6th-code watersheds are rated “Poor,” seven are rated “Fair,” and one is rated “Good.” Closed roads were still considered part of the road system for the density calculations, as decommissioning of closed roads is currently not scheduled or planned as part of this project.

These results initiated a further look at the Negrito Creek and Upper San Francisco 5th-code watersheds, as road densities were high in four of the 6th-code watersheds. Neither of these two watersheds has any acres of wilderness, and activities appear to be well distributed across the watershed versus confined to smaller areas, such as one or two 6th-code watersheds. Under the existing condition, 7 percent of the disturbance acres in the Negrito Creek watershed are a result of motorized routes, while 14 percent of the disturbance acres in the Upper San Francisco watershed are a result of motorized routes. These two watersheds have hosted the majority of past and present timber harvesting activities on the forest, with roads having been constructed to accommodate this action. While timber harvesting activities are not as prevalent today as they were in the 1980s and 1990s, a majority of the timber related roads are still in use and continue to contribute to cumulative watershed impacts and high road densities. The majority of disturbance acres in both watersheds are a result of past and present vegetation treatment activities, including fire. In the 2025 equivalent disturbed area analysis, cumulative effects diminish; however, it is unforeseen what levels of disturbance that future activities may bring. While not currently approaching a threshold of concern at the 5th-code level, these two watersheds provide opportune locations to prioritize future decommissioning activities to further alleviate cumulative watershed impacts and reduce road densities.

Summary of Cumulative Effects

Past and ongoing activities on the Gila National Forest include a variety of actions such as firewood harvest, timber sale activities, mining, prescribed burns, fires, road and trail construction, rangeland grazing, hunting, camping, OHV use, other recreational uses, and water impoundments. Current timber sale activities have been minimal and small, and firewood cutting has been and would continue to be dispersed. Mining activities do occur within many of the watersheds, but to a minimal extent on the forest.

Existing National Forest System roads receive periodic maintenance designed to improve drainage and reduce excessive runoff and sediment into connected drainages. Future runoff and sediment are not expected to increase on existing improved forest roads.

Current road density within many watersheds is low, although roads are one of the larger contributors of sediment to the drainage network. As noted prior, 29 stream reaches are currently not attaining State water quality standards, having sedimentation and temperature issues. With many roads across the forest lacking adequate drainage features, roads have been identified by the State as being one probable source of impairment. Water quality issues would continue to be a concern in these watersheds for stream reaches that are impaired and for those that have designated or occupied habitat for threatened, endangered, and/or sensitive species. While other perennial streams are not listed as impaired, many of these stream reaches have not yet been assessed by the State of New Mexico. Sediment input would still remain a concern in all perennial and intermittent streams impacted by routes.

Livestock grazing across the forest has seen reductions, with added measures taken to either exclude riparian areas or implement riparian specific management along streams. Future impacts should be consistent with current impacts. Fires managed for resource benefit and vegetation treatments would continue to play a role in these watersheds, when possible, in attempts to restore ecosystem health. Several localized areas across the forest are at high risk for current and/or future resource degradation without attention to best management practices. In particular, those areas having sensitive soils, riparian areas, and wetlands would be most vulnerable.

Reasonable foreseeable actions that are expected to occur include reauthorization of livestock grazing allotments, vegetation management projects, watershed, road and trail improvement projects, and development of recreational opportunities. In addition, the adjacent Apache-Sitgreaves National Forests are conducting a similar travel management analysis, and are expected to reduce impacts from motorized routes, as well as pose some restrictions on cross-country motorized travel. These neighboring forests share several 5th-code watersheds with the Gila National Forest, and improvements on its adjacent National Forest System lands would have beneficial cumulative impacts, watershedwide.

Existing watershed and soil conditions that have been described in alternative B—no action—can be viewed as a collective assessment of all prior activities, both natural and human-caused, that have cumulatively impacted watershed and soil resources. Considering all natural and human impacts that have occurred and continue to occur on 5th-code watersheds across the Gila National Forest, cumulative effects on these watersheds have not surpassed a threshold that threatens to undermine their resilience to change. This does not advocate that adverse effects have not occurred, or would not continue to occur due to land management activities; but simply, that the cumulative impacts of these activities have been moderated through natural processes and/or human-made mitigation measures. As noted in the above previous discussion, a few watersheds do have acres of disturbance that would be of concern if all activities were centrally located. Careful planning should occur in these watersheds to ensure that future projects are spread out over space and time. Some forestwide programs and activities may continue to have localized short-term adverse effects to watershed and soil resources, however, the cumulative effects of past, present and reasonable foreseeable future activities, including the reduction of open, motorized roads and trails and cross-country travel through designation under the Travel Management Rule, are generally beneficial.

In comparison to alternative B (no action), all alternatives provide for a net decrease in adverse cumulative watershed impacts by reducing miles of motorized routes and limiting acreage available for cross-country travel. Closing of routes provides for the greatest benefit to riparian and wetland resources, and water quality improvement, which all alternatives accomplish to varying extents. Recovery, in particular, in the uplands will be slow until routes are returned to a more natural state, either through decommissioning or natural processes. Limiting cross-country travel will reduce adverse cumulative watershed impacts slightly, as this activity currently has minimal impacts across the forest.

Implementation of alternative E provides the most reduction of adverse cumulative impacts to watershed and soil resources forestwide by eliminating motorized cross-country travel and reducing the most miles of open roads and use. Alternative D provides the second most reduction of cumulative impacts by eliminating motorized cross-country travel outside of the 300-foot motorized camping corridor and providing for the second most reduction of motorized routes.

Alternatives F and G provide for reduction of adverse cumulative watershed impacts by reducing similar miles of open routes, although not as much as alternatives E and D. Alternative G, furthermore, eliminates cross-country travel outside of the 300-foot motorized dispersed camping corridors, similar to alternative D, while alternative F provides for cross-country travel within a ½-mile corridor. Alternative C, while reducing motorized routes, provides for the least reduction of open routes of all alternatives, and allows the most cross-country travel of any action alternative. Overall, no increase in adverse cumulative impacts to soil resources, riparian and wetland resources, and water quality or quantity would be expected with implementation of any of the action alternatives.

Aquatics

This section summarizes the aquatics specialist report (USDA Forest Service 2010e).

Affected Environment

This section summarizes the environmental consequences of the travel management alternatives to aquatic resources. Aquatic features found on the Gila National Forest include both moving water and still water systems. The forest is situated within four river basins—the Gila-San Francisco, Mimbres, Little Colorado, and Rio Grande—with over 1,700 miles of perennial and intermittent stream habitat. These streams contain a variety of aquatic species, most significant of which are those native resident species that are key for aquatic habitat management. The species diversity, richness, and endemism are variable across these river basins, in part due to geologic history, relative proximity to more mesic and species-rich regions, climatic factors, and relative size and complexity of each drainage (Propst 1999). Species status as endangered, threatened, sensitive, and management indicator species (table 29) emphasize the need for not only conservation, but also recovery efforts as part of interagency management programs throughout the project area. The forest has three manmade lakes completely or partially on National Forest System lands. Over the last 150 years, anthropogenic disturbances throughout the forest have altered water temperatures, water volume, streamflow patterns, and quantities of many streams. Additionally, introduction of nonnative fish into streams has altered many aquatic systems. Riparian and wetland areas have been damaged locally by roads, recreational activities, ungulate grazing, water diversion, and timber harvest.

Table 29. Special status aquatic species occurring on the Gila National Forest

Species (Common Name)	Status	Designated Critical Habitat
Threatened or Endangered Species		
Loach minnow	Threatened	Yes
Spikedace	Threatened	Yes
Gila chub	Endangered	Yes
Chihuahua chub	Threatened	No
Gila trout	Threatened, MIS	No

Table 29. Special status aquatic species occurring on the Gila National Forest

Species (Common Name)	Status	Designated Critical Habitat
Southwestern Regional Forester's Sensitive Species (R3 sensitive) and Gila National Forest Management Indicator Species (MIS)		
Rio Grande cutthroat trout	R3 sensitive, MIS	N/A
Headwater chub	R3 sensitive	N/A
Roundtail chub	R3 sensitive	N/A
Longfin dace	R3 sensitive	N/A
Sonora sucker	R3 sensitive	N/A
Desert sucker	R3 sensitive	N/A
Rio Grande sucker	R3 sensitive	N/A
Rio Grande chub	R3 sensitive	N/A
Gila springsnail	R3 sensitive	N/A
New Mexico hot springsnail	R3 sensitive	N/A
Black Range Mountainsnails *Oreohelix swopei* *Oreohelix metcalfei acutidiscus* *Oreohelix metcalfei metcalfei* *Oreohelix pilsbryi* *Oreohelixs metcalfei concentric* **Bearded Mountainsnail** *Oreohelix barbata* **Subalpine Mountainsnail** *Oreohelix subrudis* **Whitewater Woodlandsnail** *Ashmunella danielsi* **Silver Creek Woodlandsnail** *Ashmunella binneyi* **Iron Creek Woodlandsnail** *Ashmunella mendex* **Dry Creek Woodlandsnails** *Ashmunella tetradon inermis* *Ashmunella tetradon mutator* *Ashmunella tetradon tetradon* *Ashmunella tetradon animorum* **Black Range Woodlandsnails** *Ashmunella cockerelli cockerelli* *Ashmunella cockerilli argenticola* *Ashmunella cockerelli perobtusa*	R3 sensitive	N/A

Environmental Consequences

Effects to Aquatic Species and Habitat

The relative risk of the alternatives to aquatic species and their habitat were examined by analyzing three indicators: (1) total road and motorized trail miles or route density and use; (2) total miles of roads within 300 feet of perennial or intermittent streams; and (3) number of motorized route crossings through perennial and intermittent streams. An important assumption that was made for this analysis is that habitats are considered occupied if the necessary life history elements are present. For this analysis, it was assumed that perennial and intermittent streams had the necessary life history elements present for aquatic species occupancy at least during some period.

Important Assumptions Pertinent to the Summary

The follow assumptions were made for this analysis and are important to understanding the effects analysis for aquatic species. This list is not a complete list of assumptions that were made for the analysis; see the aquatic specialist report (USDA Forest Service 2010e) for further information related to other assumptions.

Habitats for the species being analyzed were assumed to be occupied if they contained the necessary life history elements.

- The overall effect of roads on aquatic habitat is related to the amount of sediment movement from road surfaces, and is highly variable within and among surface types. Sediment movement is related to levels of maintenance, road drainage (Clinton and Vose 2003), and amount of use of the road (Maholland and Bullard 2005, Reid and Dunne 1984).
- The reduction or elimination of vehicle traffic on a road near a stream will result in less sediment delivered from the road to the stream (Maholland and Bullard 2005, Reid and Dunne 1984).
- The density of roads and trails at the forest and watershed scale will not be substantially changed as a result of any of the action alternatives for at least the next 20 years because all of the action alternatives involve the closure of roads and unauthorized routes to vehicle use by the public rather than the physical removal of roads.

Because of the limitation posed by the assumptions described above and others in the aquatic specialist report (USDA Forest Service 2010e), the analysis provided here is a relative risk assessment of each of the action alternatives compared to the no action alternative.

Effects of the No Action Alternative

The no action alternative represents no change from current management and consists of the system of roads, motorized trails, and areas open to motorized cross-country travel identified as the current travel system. The no action alternative includes 302 miles of National Forest System motorized routes within 300 feet of perennial and intermittent streams and rivers, and 918 stream crossings. Motorized routes include 5,221 miles of routes that are open to all users and vehicle types, and 16 miles of less than 50-inch trail that are open to all terrain vehicle uses. Stream crossings on perennial and intermittent streams and rivers consist of 882 low water crossings, 5

bridges, and 31 culverts. Under the no action alternative, the forest (2,441,804 acres) is open to motorized cross-country travel and motorized dispersed camping, although many areas are not actually available due to steep slopes, rocky conditions, and/or dense timber. In open areas, vehicles can legally travel to any place possible and, as a result, user routes are created, riparian areas are impacted by indiscriminate motor vehicle use, and streambanks are often directly impacted when vehicles cross streams.

Effects Common to All Action Alternatives

General Effects

For this analysis, it is assumed that when a road is closed it will continue to have impacts on the aquatic system because all of the action alternatives involve the closure of roads and unauthorized routes to vehicle use by the public rather than the physical removal of roads. However, curtailing or reducing use on those routes that are closed or open only by written permit will decrease impacts.

The effects of roads on aquatic organisms are well documented. Roads and trails disturb soils and increase the potential for erosion and sediment transport and deposition in streams. Likewise, motorized and nonmotorized uses (motorcycles, ATVs, horses, mountain bikes, and hikers) can further disturb soils and increase potential for erosion and sediment delivery. Surface erosion from forest roads affects the fine sediment budget and may impose a chronic condition of sediment inputs to streams, directly affecting the stream substrate and the health of aquatic life (Luce et al. 2001). Chronic erosion from roads can greatly reduce an aquatic system's integrity and, in some cases, can be the sole source of sediment input (Switalski et al. 2004). Sediment concerns are generally highest when roads and trails are not sufficiently drained. Water and sediment can concentrate on roads and trails during spring snowmelt runoff or periods of intense rain and be delivered to streams. With sufficient drainage, water and sediment from upland segments roads can be diverted, filtered through forest vegetation, and not routed to streams. As such, upland segments of roads can generally be designed to mitigate sediment delivery concerns. The primary concern is erosion and sediment delivery from roads that are near streams and that cross streams. Fine material, or sediment, is a key physical element to focus on when attempting to delineate land management effects on stream habitat and biota (Rinne 1990). Excessive fine sediment input to a stream can fill pool habitat and reduce both summer and winter rearing habitat for juvenile fish (Heede and Rinne 1990). Native, desert fish species such as the loach minnow require clean gravel-cobble substrates. Rinne (1989) found that loach minnow used shallow, moderately swift flow areas with gravel to cobble substrates. Rinne (1991) also found that spikedace were absent from areas where fine silt and sand had accumulated. Neary et al. (1996) documented that spikedace numbers increased almost threefold when the fine component of the substrate decreased from about 27 percent to 7 percent.

A synthesis of road impact information can be found in "Forest Roads: A Synthesis of Scientific Information" (Gucinski et al. 2001). Some of the key findings from this document that relate to travel management include both physical and biological effects.

Physical effects include:

- "Roads affect geomorphic process by four primary mechanisms: Accelerating erosion from the road surface and prism itself by both mass and surface erosion processes;

directly affecting channel structure and geometry; altering surface flowpaths, leading to diversion or extension of channels onto previously unchannelized portions of the landscape; and causing interactions among water, sediment, and woody debris at engineered road-stream crossings."

- "Roads have three primary effects on water: they intercept rainfall directly on the road surface and road cutbanks and intercept subsurface water moving down the hillslope; they concentrate flow, either on the surface or in an adjacent ditch or channel; and they divert or reroute water from flowpaths that it would otherwise take if the road were not present."

These physical effects lead to the following biological effects:

- "Increased fine sediment composition in stream gravel has been linked to decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fishes."
- "The effects of roads are not limited to those associated with increases in fine sediment delivery to streams; they can include barriers to migration, water temperature changes, and alterations to streamflow regimes."
- "Road-stream crossings have been shown to have effects on stream invertebrates. Hawkins and others found that the aquatic invertebrate species assemblages (observed versus expected based on reference sites) were related to the number of stream crossings above a site."
- "Several studies at broad scales document aquatic habitat or fish density changes associated with road density or indices of road density."

Direct and Indirect Effects

Direct and indirect effects to fisheries, aquatic, and riparian habitats as a result of designating motorized routes and use classes throughout non-wilderness watersheds of the Gila National Forest are essentially the same for all alternatives and differ primarily in relation to the indicators for number of motorized route miles within stream buffer zones (300 feet) and number of stream crossings. Indirect effects to aquatic and aquatic-dependent species resulting from roads and motorized vehicle use include habitat alteration due to elevated levels of in-channel sediment delivery, riparian habitat alteration, and to a lesser degree, collection (includes fishing and hunting). Common direct effects occurring in all alternatives include:

- The direct and indirect physical loss of riparian habitat and functions within the 100-year flood plain, as a result of uses in those areas destroying vegetation.
- The direct and indirect creation of drainage pathways that follow route treads and alter surface water pathways of both the immediate stream, as well as its associated high water pathways, throughout the 100-year flood plain during periods of flooding.
- The indirect conversion of dispersed surface runoff and sediment filtering throughout the riparian area, to direct (point source) deliveries of accumulated runoff and sediment, following route tread pathways leading from both the intercepted adjacent watershed areas, as well as channelized runoff flowing directly down a route tread.

- The creation of direct and indirect impact to streams, habitats, and aquatic species at route crossing points. The direct channel disturbances of streambank damage, leading to indirect effects of increased bank erosion and stream sedimentation.
- The direct dislocation of fish spawning activity within ford crossings that can occur depending on fish species and spawning suitability of stream substrate and flows.
- Indirect decrease in fish egg hatching success and subsequent fish populations due to sedimentation.

Based on the natural history of U.S. Fish and Wildlife endangered, threatened, and candidate species, USDA Forest Service Southwestern Region sensitive species, and Gila National Forest management indicator species, and the potential for disturbance resulting from the change to route designations, the following analysis framework was developed to address the indicator measures.

Roads Within 300 Feet of Streams

The closer a road is to a stream system, the greater the impacts on the stream and the organisms inhabiting it. Roads directly adjacent to streams can impact streams by channelizing the stream, eliminating streamside vegetation, and introducing sediment into the stream. Where roads are close to streams, they affect the stream more directly (Luce et al. 2001). Sediment transport from roads can exceed 300 feet (Burroughs and King 1989 and Belt et al. 1992). Road-stream crossings are addressed separately. Table 30 displays the total miles of National Forest System (NFS) motorized routes and the percent decrease or increase in miles of motorized routes within 300 feet of streams and rivers for all alternatives.

Table 30. Miles of NFS motorized routes within 300 feet of perennial and intermittent streams and rivers

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of NFS motorized roads	298	230	138	102	179	175
Miles of NFS administrative roads	0	42	61	58	52	52
Miles of NFS motorized trail <50 inches	4	14	7	0.32	14	14
Miles of NFS administrative motorized trail <50 inches	0	1	3	3	1	1
Motorized NFS 2-wheel vehicle trail	0	15	0	0	0	0
Total Miles of NFS Motorized Routes	**302**	**302**	**209**	**163**	**246**	**242**
Change in number of miles of NFS motorized routes expressed as a percent (+ or -) of the no action alternative		0%	-31%	-46%	-19%	-20%

Alternative B, the no action alternative, has the greatest length of motorized routes within 300 feet of streams and rivers, followed by alternative C, alternative F, and alternative G, respectively. When compared to alternative B, alternatives E and D reduce the miles of road within 300 feet of streams and rivers by 46 percent and 31 percent, respectively. Alternative E has the fewest miles

of motorized routes within 300 feet of streams and rivers of any alternative. Alternative E presents the lowest relative risk to aquatic species and habitat related to the impacts from motorized routes. The relative risk to aquatic habitat and species is greatest from alternatives B and C. Alternatives F and G are similar and moderately reduce the level of relative risk to aquatic species and habitat with alternative G having 6 fewer miles of motorized route than alternative F.

Road-stream Crossings

Road-stream crossings are areas where the impacts of roads are the greatest in terms of channel impacts, sediment, and potential movement barriers. There is a high correlation between road-stream crossings and fine sediment (McCaffery et al. 2007). The number of crossings was obtained for the proposed action by visiting the crossings and collecting location data that was utilized to construct a spatial GIS layer. The number of road crossings for roads that were motorized in other alternatives and not the proposed action were obtained by utilizing GIS layers and intersecting roads and streams. The stream crossing number for roads not included in the proposed action may not be accurate due to inaccuracies in the GIS data layers. While absolute counts of stream crossings in this analysis are not reliable, the relative differences between alternatives is considered “very good” since the same datasets were used for each alternative and actual crossing locations have been collected for most roads. Table 31 displays the number of stream crossings by NFS motorized routes and the percent increase or decrease in that number, when compared to alternative B.

Table 31. Number of NFS road crossings on perennial and intermittent streams by crossing type

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	883	635	352	237	518	500
Low water administrative road	0	141	182	153	160	160
Low water motorized trail <50 inches	0	34	1	0	44	44
Low water administrative motorized trail <50 inches	0	4	8	8	4	4
Bridge	5	5	5	5	5	5
Culvert	31	31	29	25	30	30
Total Number of Crossings	**919**	**850**	**577**	**428**	**761**	**743**
Change in number of stream crossings expressed as a percent (+ or –) of the no action alternative		-8%	-37%	-53%	-17%	-19%

Alternative B, the no action alternative, has the greatest number of stream and river crossings, followed by alternative C, alternative F, and alternative G, respectively. When compared to alternative B, alternatives E and D reduce stream and river crossings by 50 percent and 33 percent, respectively. Alternative E has the fewest crossings of any alternative. Alternative E presents the lowest relative risk to aquatic species and habitat related to the impacts from NFS motorized road-stream crossings. The relative risk to aquatic habitat and species is greatest from alternatives B and C. Alternatives F and G are similar and moderately reduce the level of relative

risk to aquatic species and habitat with alternative G having 19 fewer stream crossings than alternative F.

Route Density and Use

An evaluation of road and motorized trail density indicates the potential for erosion, adverse water quality impacts, and modified hydrology. Roads and the trails used by motorized vehicles can intercept, concentrate, and divert water. Their impacts can be mitigated, but not completely eliminated, if they are to serve as travel routes. This analysis of road and motorized trail density is based on the general assumption that areas with greater road and motorized trail density generally have a greater relative risk of adverse impacts.

Route density is used by the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration's National Marine Fisheries (NOAA Fisheries) as one way to measure watershed condition. The joint agencies' general recommendation is that a given watershed should have less than 2.5 miles per square mile of road system; if in excess, that factor is considered to be not properly functioning. While this recommendation is not a Regional standard, it was utilized to display effects on aquatic species in the biological assessment for the 11 land and resource management plans (LRMP) of the national forests and grasslands in the Southwestern Region (USDA Forest Service 2004). That biological assessment was prepared in response to a need for re-initiation of Endangered Species Act Section 7 consultation on the 11 LRMPs, and in that analysis, the route density for each national forest was compared to this recommendation. Table 32 displays the route density, at the landscape scale, for each of the alternatives.

Because all of the action alternatives involve the closure of routes to vehicle use by the public rather than the physical removal of roads, the miles of NFS routes on the forest will not substantially change. Miles of NFS routes in all action alternatives, except alternative E, slightly increase from the no action alternative. The miles of routes in alternative E and the no action alternative are essentially the same. The miles of NFS routes and, therefore, densities will not decrease until routes are physically removed, or naturally decommission as vegetation establishes on them over time.

Table 32. Miles and density of NFS routes existing on the forest

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of NFS routes*	5,221	5,290	5,233	5,222	5,234	5,234
Change in miles of NFS routes		+69	+12	+1	+13	+13
Density of NFS routes* (mi/mi²)	1.30	1.32	1.31	1.30	1.31	1.31
Change in density of NFS routes expressed as a percent (+ or –) of the no action alternative		+1.5%	+0.7%	0%	+0.7%	+0.7%

*Includes all NFS routes except those that have been previously decommissioned and that will remain so. For density calculations, wilderness, research natural areas, and areas presently closed to off-highway vehicles were excluded from the area of the forest.

However, use of NFS routes by motorized vehicles differs in each of the action alternatives. The miles of NFS routes that are open to motorized use decreases in each of the action alternatives and routes that are open only to motorized use through a written permit and/or for administrative use increase, when compared to the no action alternative. Since, to some degree, sediment production by routes is related to motorized use of the route, both of these route designations will reduce the relative risk to aquatic species and habitat by suspending use on nonmotorized routes and reducing use on routes that are designated administrative. Table 33 displays the miles of routes that will be nonmotorized or designated as administrative for each of the alternatives.

Table 33. Miles of NFS routes with no or reduced use

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. E	Alt. F
Miles of routes proposed to be nonmotorized[1]	0	151	1,261	1,915	898	919
Miles of routes proposed to be administrative routes[2]	0	182	354	432	298	299
Miles of routes with no or reduced use	0	333	1,615	2,347	1,196	1,218

[1] Currently motorized routes that will be nonmotorized.

[2] Currently motorized, closed, decommissioned or user-created routes proposed to be open for use by written permission and/or administrative use.

Alternative B will not nonmotorize or place any routes in administrative status and presents the greatest relative risk to aquatic species and habitat. Alternative E presents the greatest reduction in relative risk to aquatic species and habitat by designating the most miles of nonmotorized and administrative routes. Alternative D reduces the relative risk to aquatic species and habitat less than alternative E, but significantly more that alternatives C, F, and G. Alternatives F and G are similar and present substantial decreases in the relative risk to aquatic species and habitat, alternative G presents a slight decrease in the relative risk when compared to alternative F. When the action alternatives are compared, alternative C presents the greatest relative risk to aquatic species and habitat.

Motorized Dispersed Camping

Motorized dispersed camping currently occurs across the entire forest landscape excluding areas within wilderness, research natural areas (RNA), and off-highway vehicle restricted (OHV) areas. Motorized dispersed camping is currently limited by terrain features, vegetation, and other conditions that limit accessibility with motorized vehicles. Motorized dispersed camping may impact aquatic habitat and species in areas that are available for the activity and where streams are within the corridors. Riparian areas along streams are favored camping areas and the potential exists for motorized dispersed camping to impact riparian vegetation, increase available sediment, and cause streambank disturbance in camping corridors. Table 34 displays the miles of perennial and intermittent streams that are within areas available for motorized dispersed camping. The miles of streams potentially affected are significantly reduced in all of the action alternatives.

Table 34. Miles of perennial and intermittent streams within motorized dispersed camping corridors

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of stream within motorized camping corridors	862*	64	33	0	52	44
Change in miles of stream within motorized camping corridors		-798	-829	-862	-810	-818

*Includes all miles of perennial and intermittent streams that are not located within wilderness, RNAs, OHVs, and because the forest is currently open to cross-country travel, could be impacted assuming they are accessible by motorized dispersed camping.

Alternative E does not include motorized dispersed camping corridors and presents the lowest relative risk from motorized dispersed camping to aquatic species and habitat. Alternative B includes the highest relative risk because the entire forest, excluding wilderness, RNAs, and OHVs, is open to motorized cross-country travel which allows dispersed camping anywhere that is accessible. Alternatives F and G are similar and present less relative risk to aquatic species and habitat than alternatives B and C, but more than alternatives E and D.

Motorized Big Game Retrieval

Motorized big game retrieval currently occurs across the entire forest landscape excluding areas within wilderness, RNAs, and off-road vehicle restricted areas. Motorized big game retrieval is currently limited in some areas by terrain features, vegetation, and other conditions that limit accessibility with motorized vehicles. Table 35 displays the miles of perennial and intermittent streams that are within areas available for motorized big game retrieval. The miles of streams potentially affected are significantly reduced in all of the action alternatives.

Table 35. Miles of perennial and intermittent stream within areas available for motorized big game retrieval

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of perennial and intermittent stream in areas available for motorized big game retrieval	862	672	33	0	469	44
Change in miles of stream in areas available for motorized big game retrieval		-190	-829	-862	-393	-818

Alternative E presents the lowest relative risk to aquatic habitat and species from motorized big game retrieval. Alternative B includes the most miles of perennial and intermittent streams that could potentially be affected by motorized big game retrieval and presents the highest relative risk. Alternative C presents reduced relative risk when compared to alternative B. However, alternative C presents the highest level of relative risk of any action alternative. Alternatives D, E, and G are similar, with alternative D presenting a greater reduction in relative risk when the three are compared. Alternative F presents a greater relative risk to aquatic habitat and species than alternatives D, E, and G.

Motorized Areas

Motorized areas include 38 traditional camping sites located along or at the terminus of forest roads and one area (3.31 acres) on the Reserve Ranger District that is proposed as an all-terrain vehicle play area. Alternatives D and E do not include any of the areas. Alternatives C, F, and G include all of the areas. These areas are already being utilized for motorized camping or recreation under alternative B, which also allows cross-country motorized travel across the entire forest excluding wilderness, RNAs, and OHV areas. Alternative B presents the highest level of relative risk due to the potential for cross-country travel to affect aquatic habitat and species. Alternatives D and E present the lowest level of relative risk due to no areas being proposed as open to motorized use. Alternatives C, F, and G include 0.03 mile of perennial or intermittent stream within one of these areas that may be impacted by motorized use.

Threatened and Endangered Species

Loach Minnow (Threatened)

In New Mexico, the loach minnow historically occupied about 330 stream km (205 miles); now it is found in about 258 stream km (160 miles). The loach minnow has become very rare in substantial portions of this remaining range. The species is extant in the upper Gila River, including the East, Middle, and West Forks, the San Francisco and Tularosa Rivers, Negrito Creek, and Dry Blue Creek.

The status of loach minnow during the last century—both in distribution and abundance—has been greatly reduced throughout the species' range (Propst et al. 1986). Both historic and present landscapes surrounding loach minnow habitats have been impacted to varying degrees by domestic livestock grazing, mining, agriculture, timber harvest, recreation, development, or impoundments (U.S. Fish and Wildlife 1990). These activities degrade loach minnow habitats by altering flow regimes, increasing watershed and channel erosion and thus sedimentation, and adding contaminants to streams and rivers. As a result, these activities may affect loach minnow through direct mortality, interference with reproduction, and reduction of invertebrate food supplies. Competition for food and space with nonnative fishes is often cited as a major factor in the decline of loach minnow (Propst 1999).

Comparison of Alternatives

Motorized routes can have both direct and indirect effects on loach minnow and designated critical habitat. Motorized routes cause the physical loss of riparian habitat and functions, create drainage pathways that follow route treads and alter surface water pathways, and convert dispersed surface runoff and sediment filtering throughout the riparian area to direct (point source) deliveries of accumulated runoff and sediment. Table 36 displays the miles of NFS motorized routes within 300 feet of loach minnow critical habitat for each alternative.

Alternative B, the no action alternative, has the greatest length of motorized routes within 300 feet of loach minnow critical habitat, followed by alternatives E, D, and G, respectively. When compared to alternative B, alternatives E, D, and G reduce the miles of road within 300 feet of loach minnow critical habitat by 38 percent, 31 percent, and 31 percent, respectively. Alternative E has the fewest miles of motorized routes within 300 feet of critical habitat of any alternative, and presents the lowest relative risk to loach minnow and critical habitat related to the impacts

from motorized routes. The relative risk to aquatic habitat and species is greatest from alternatives B, C, and F.

Table 36. Miles of NFS motorized routes within 300 feet of loach minnow designated critical habitat

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of motorized road	24	14	5	4	13	6
Miles of administrative road	0	10	12	12	11	11
Motorized trail <50 inches	2	2	1	0	1	1
Total miles of motorized routes	26	26	18	16	25	18
Change in number of miles of motorized routes expressed as a percent (+ or -) of the no action alternative		0%	-31%	-38%	-4%	-31%

Motorized routes create direct and indirect impact to streams, habitats, and aquatic species at route crossing points. Motorized route crossings can: (1) indirectly decrease fish egg hatching success and subsequent fish populations due to sedimentation; (2) directly dislocate fish spawning activity within ford crossings, depending on fish species and spawning suitability of stream substrate and flows; and (3) cause direct disturbances including streambank damage, leading to indirect effects of increased bank erosion and stream sedimentation. Table 37 displays the number of motorized route crossings within designated critical habitat for the loach minnow.

Table 37. Number of stream crossings in loach minnow designated critical habitat

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	75	44	5	5	41	8
Low water administrative road	0	31	39	39	37	37
Low water motorized trail <50 inches	4	4	0	0	1	1
Bridge	1	1	1	1	1	1
Culvert	1	1	1	1	1	1
Total number of crossings	81	81	46	46	81	48
Change in number of stream crossings expressed as a percent (+ or –) of the no action alternative		0%	-43%	-43%	0%	-41%

Alternatives B, C, and F have the greatest number of stream and river crossings in loach minnow critical habitat. There is no change in the number of crossings in alternatives C and F from the no action alternative. However, both alternatives C and F substantially reduce the number of motorized crossings that are open to the public and all vehicle types. When compared to alternative B, alternatives E and D both reduce stream and river crossings by 43 percent and present the lowest relative risk to aquatic species and habitat related to the impacts from NFS motorized road-stream crossings. The relative risk to aquatic habitat and species is greatest from alternatives B, C, and F. Alternative G is similar to alternatives D and E, but includes more route

crossings in loach minnow critical habitat that are motorized to all users and vehicle types. Alternatives D and E do not include any motorized trail crossings and alternatives F and G substantially decrease the number of motorized trail crossings.

Spikedace (Threatened)

The spikedace is native to the Gila River drainage, including the San Francisco drainage, except in the extreme headwaters (Propst et al. 1986). The spikedace currently persists only in the upper Verde River and Aravaipa Creek in Arizona and portions of the Gila River in New Mexico (Minckley 1973, Bestgen 1985, and Sublette et al. 1990). The species is generally absent from the Gila River from the confluence of the West and East Forks downstream to the mouth of Turkey Creek, and occurs irregularly downstream from the mouth of the Middle Box of the Gila River to the Arizona-New Mexico state line (Propst et al. 1986).

Since the 1800s, the spikedace has declined markedly in distribution and abundance throughout its range (Propst et al. 1986, U.S. Fish and Wildlife Service 1986). By 1996, the spikedace had been eliminated from over 85 percent of its historic range (New Mexico Department of Game and Fish 1996). Distribution and abundance of spikedace has declined due to riparian degradation, water diversion, and ground water pumping. Introduction and spread of nonnative predatory and competitive fishes also contributed to its decline. Resource activities that affect water quality, such as removal of riparian vegetation, sedimentation, or control of water levels, can affect spikedace habitat quality.

Comparison of Alternatives

Motorized routes can have both direct and indirect effects on spikedace and designated critical habitat. Motorized routes cause the physical loss of riparian habitat and functions, create drainage pathways that follow route treads and alter surface water pathways, and convert dispersed surface runoff and sediment filtering throughout the riparian area to direct (point source) deliveries of accumulated runoff and sediment. Table 38 displays the miles of NFS motorized routes within 300 feet of spikedace critical habitat for each alternative.

Table 38. Miles of National Forest System motorized routes within 300 feet of spikedace designated critical habitat

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of motorized road	5	3	2	2	2	2
Miles of administrative road	0	2	2	2	2	2
Motorized trail <50 inches	0	0	0	0	0	0
Total miles of motorized routes	5	5	4	4	4	4
Change in number of miles of motorized routes expressed as a percent (+ or -) of the no action alternative		0%	-20%	-20%	-20%	-20%

Alternatives B and C have the greatest number of miles of NFS motorized routes within 300 feet of spikedace critical habitat. All of the action alternatives, except alternative C, decrease the miles of motorized routes within critical habitat for the spikedace. The miles of motorized routes within

300 feet of spikedace critical habitat is relatively the same for all action alternatives. Alternatives D, E, F, and G are similar. Alternative C presents slightly less relative risk to spikedace and designated critical habitat than alternative B due to 2 miles becoming administrative roads and subsequent reduced use.

Motorized routes create direct and indirect impact to streams, habitats, and aquatic species at route crossing points. Motorized route crossings can: (1) indirectly decrease fish egg hatching success and subsequent fish populations due to sedimentation; (2) directly dislocate fish spawning activity within ford crossings, depending on fish species and spawning suitability of stream substrate and flows; and (3) cause direct disturbances including streambank damage, leading to indirect effects of increased bank erosion and stream sedimentation. Table 39 displays the number of motorized route crossings within designated critical habitat for the spikedace.

The number of crossings within spikedace critical habitat is the same for all alternatives. Alternative E presents the lowest relative risk to spikedace and designated critical habitat due to eight stream crossings on routes that are proposed to become administrative routes. Alternatives C, D, F, and G are identical and present increased relative risk when compared to alternative E, but decreased relative risk when compared to alternative B. The decreased relative risk is due to some routes being proposed as administrative routes and the reduced use associated with this status.

Table 39. Number of stream crossings in spikedace designated critical habitat

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	11	3	3	1	3	3
Low water administrative road	0	8	8	10	8	8
Low water motorized trail <50 inches	0	0	0	0	0	0
Bridge	1	1	1	1	1	1
Culvert	1	1	1	1	1	1
Total number of crossings	13	13	13	13	13	13
Change in number of stream crossing expressed as a percent (+ or –) of the no action alternative		0%	0%	0%	0%	0%

Gila Chub (Endangered)

Historically, the Gila chub was found in approximately 30 headwater streams of the Gila River basin in Arizona and New Mexico, and within the Santa Cruz and San Pedro River systems of Arizona and Sonora, Mexico (Miller and Lowe 1967, Rinne 1994, Minckley 1973, and Bestgen and Propst 1989). The Gila chub is currently restricted to small isolated populations scattered throughout its historical range. It is thought to occur in Turkey Creek on the Gila National Forest in New Mexico. In Sonora, it was recently found in two cienegas near the headwaters of the San Pedro River. In Arizona, populations have been extirpated from Monkey Spring; Arnett, Cave, Fish, and Queen Creeks; San Simon, San Pedro, and Santa Cruz Rivers; and Post Canyon. Gila Chub are found in fewer than 15 streams in central and southern Arizona, and are abundant at no more than 10 of these locations.

Eighty-five to 90 percent of Gila chub habitat has been degraded or destroyed, and much of it is unrecoverable (USFWS 2005). Only 29 extant populations of Gila chub remain; all but one is small, isolated, and threatened. Fifty-nine percent of the land supporting all of the extant populations occurs on Bureau of Land Management and Forest Service lands.

Where Gila chub is still present, populations are often small, scattered, and at risk from known and potential threats and random events. Continued degradation of habitat and nonnative species are considered the major threats to Gila chub. The decline of this fish is due to habitat loss and invasion of nonindigenous fish species. Habitat loss has included past and current dewatering of rivers, springs, and cienegas; diversion of water channels; impoundments; regulation of flow; and land management practices. All of these activities have promoted erosion and arroyo formation, and the introduction of predacious and competing nonindigenous fish species (Miller 1961).

Comparison of Alternatives

Motorized routes can have both direct and indirect effects on Gila chub and designated critical habitat. Motorized routes cause the physical loss of riparian habitat and functions, create drainage pathways that follow route treads and alter surface water pathways, and convert dispersed surface runoff and sediment filtering throughout the riparian area to direct (point source) deliveries of accumulated runoff and sediment. Table 40 displays the miles of NFS motorized routes within 300 feet of Gila chub critical habitat for each alternative.

Table 40. Miles of NFS motorized routes within 300 feet of Gila chub designated critical habitat

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of motorized road	4	4	2	2	2	2
Miles of administrative road	0	0	1	1	1	1
Motorized trail < 50 inches	0	0	0	0	0	0
Total miles of motorized routes	4	4	3	3	3	3
Change in number of miles of motorized routes expressed as a percent (+ or -) of the no action alternative		0%	-25%	-25%	-25%	-25%

Primary constituent elements of critical habitat include perennial water that is of the correct temperature for all life stages, water quality that supports the species, sufficient food base and cover, and is devoid of nonnative species that are detrimental to Gila chub. All alternatives include motorized routes that are within 300 feet of Gila chub critical habitat in Harden Cienega and Turkey Creeks. However, the majority of designated critical habitat on the Gila National Forest lacks most of these primary constituent elements, including perennial water. Designated critical habitat on the forest that does have these elements present is located in the Gila Wilderness where there are no roads.

Alternatives B and C have the greatest miles of motorized routes within 300 feet of Gila chub critical habitat, and present the greatest relative risk to the species. The miles of motorized routes within 300 feet of Gila chub critical habitat are the same for alternatives D, E, F, and G.

Motorized routes create direct and indirect impacts to streams, habitats, and aquatic species at route crossing points. Motorized route crossings can: (1) indirectly decrease fish egg hatching success and subsequent fish populations due to sedimentation; (2) directly dislocate fish spawning activity within ford crossings, depending on fish species and spawning suitability of stream substrate and flows; and (3) cause direct disturbances including streambank damage, leading to indirect effects of increased bank erosion and stream sedimentation. Table 41 displays the number of motorized route crossings within designated critical habitat for the Gila chub.

The number of crossings within Gila chub critical habitat is the same for alternatives D, F, and G, and when compared to the no action alternative, they all present a slight decrease in the relative risk to Gila chub. Alternative C includes the greatest number of crossings and presents the greatest relative risk to the Gila chub. Alternative E has the fewest number of crossings and presents the lowest relative risk to Gila chub.

Table 41. Number of stream crossings in Gila chub designated critical habitat

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	5	5	3	2	3	3
Low water administrative road	0	1	1	1	1	1
Low water motorized trail <50 inches	0	0	0	0	0	0
Bridge	0	0	0	0	0	0
Culvert	0	0	0	0	0	0
Total number of crossings	5	6	4	3	4	4
Change in number of stream crossing expressed as a percent (+ or –) of the no action alternative		+20%	-20%	-40%	-20%	-20%

Chihuahua Chub (Threatened)

In New Mexico, Chihuahua chub is only native to the Mimbres River drainage (Sublette et al. 1990). In 1975, a small reproducing population was found in Moreno Spring (Propst 1999). Moreno Spring is located off NFS lands along the Mimbres River, Grant County, New Mexico. Chihuahua chub are reported to occur regularly at Moreno Spring, and irregularly along an approximate 15 km (9.3 mi) reach of the Mimbres River from Allie Canyon southward to the New Mexico Department of Game and Fish property south of Mimbres, New Mexico (Propst 1999). Chihuahua chub were stocked in McKnight Creek, a Mimbres River tributary, by New Mexico Department of Game and Fish, U.S. Fish and Wildlife Service, and Forest Service. Reproduction in McKnight Creek was not confirmed, and recent surveys indicate that the species is no longer present in the creek. During 2008 stream surveys, Chihuahua chub were collected from a reach of Mimbres River within the Gila National Forest (J. Monzingo, personal observation). This site is approximately 11 miles upstream of known occupied habitat.

Populations rangewide appear to be decreasing, particularly in Mexico (Propst 1994). Propst (1999) reports Chihuahua chub numbers are typically less than 300 around Moreno Spring. Sublette et al. (1990) report the status of the population as “diminishing.” However, D. Propst (D. Propst personal communication) believes the population has remained stable at 200 to 300

individuals in the recent past. Historically, Chihuahua chub probably occupied all of the warmwater reaches of the Mimbres River drainage (Propst 1999).

Habitat modification or loss appears to have played a major role in the decline of Chihuahua chub. Improper grazing, irrigation diversion, stream modification (e.g., channelization, levees, etc.), and degraded watershed conditions that caused severe flooding and loss of riparian vegetation have been identified as causes for the loss of habitat (U.S. Fish and Wildlife Service 1986).

Introduced nonnative species have been reported to prey on Chihuahua chub and/or have been reported to take over preferred habitats (Sublette et al. 1990 and Propst 1999).

Comparison of Alternatives

Motorized routes can have both direct and indirect effects on Chihuahua chub and its habitat. Motorized routes cause the physical loss of riparian habitat and functions, create drainage pathways that follow route treads and alter surface water pathways, and convert dispersed surface runoff and sediment filtering throughout the riparian area to direct (point source) deliveries of accumulated runoff and sediment. Table 42 displays the miles of NFS motorized routes within 300 feet of Chihuahua chub occupied habitat.

Alternative B includes the highest number of miles of motorized routes in occupied Chihuahua chub habitat and, therefore, presents the greatest relative risk to the species. All of the action alternatives reduce the miles of routes in occupied habitat. However, alternative E reduces the relative risk further by designating the routes that are within occupied habitat as administrative, therefore reducing use.

Table 42. Miles of NFS motorized routes within 300 feet of occupied Chihuahua chub habitat

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of motorized roads	2	1	1	0	1	1
Miles of administrative roads	0	0	0	1	0	0
Motorized trail <50 inches	0	0	0	0	0	0
Total miles of motorized routes	2	1	1	1	1	1
Change in number of miles of motorized routes expressed as a percent (+or-) of the no action alternative		-50%	-50%	-50%	-50%	-50%

Motorized routes create direct and indirect impact to streams, habitats, and aquatic species at route crossing points. Motorized route crossings can: (1) indirectly decrease fish egg hatching success and subsequent fish populations due to sedimentation; (2) directly dislocate fish spawning activity within ford crossings, depending on fish species and spawning suitability of stream substrate and flows; and (3) cause direct disturbances including streambank damage, leading to indirect effects of increased bank erosion and stream sedimentation. Table 43 displays the number of motorized route crossings within occupied Chihuahua chub habitat.

Table 43. Number of NFS route stream crossings in occupied Chihuahua chub habitat

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	17	2	2	0	2	2
Low water administrative road	0	0	0	2	0	0
Total number of crossings	17	2	2	2	2	2
Change in number of stream crossings expressed as a percent (+ or –) of the no action alternative		-88%	-88%	-88%	-88%	-88%

Alternative B includes the highest number of stream crossings in occupied Chihuahua chub habitat and, therefore, presents the greatest relative risk to the species. All of the action alternatives reduce the number of stream crossings in occupied habitat. However, alternative E reduces the relative risk further by designating as administrative the routes and, thus, the crossings that are within occupied habitat, therefore reducing use.

Gila Trout (Threatened)

Historically, Gila trout were believed to occupy the upper Gila in New Mexico and parts of the San Francisco systems of Arizona and New Mexico (Behnke 2002). The Arizona populations were believed to be extirpated around the turn of the 20th century (U.S. Fish and Wildlife Service 1993). The New Mexico populations were depleted to five populations in the headwaters of the Gila drainage by the 1960s (Minckley 1973, Propst and Stefferud 1997). Distribution of both Gila and Apache trout is not known for certain, but Behnke (2002) theorizes that Gila and Apache trout may have come together in the Verde River during the last glacial period to hybridize and produce a form intermediate to the two still existing trout. By the 1960s, the Gila trout range had been severely fragmented into small isolated populations in five headwater streams: Main Diamond, South Diamond, McKenna, Spruce, and Iron Creeks (U.S. Fish and Wildlife Service 1993). Beginning in 1970, Gila trout from each of the five relict populations were translocated into other streams. Iron Creek and McKenna fish were later found to be hybridized with rainbow trout. In 1992, a relict population in Whiskey Creek was discovered. There are now four relict lineages: Main Diamond, South Diamond, Spruce Creek, and Whiskey Creek.

Currently there are 15 populations of Gila trout in the wild. Of the four relict populations (Main Diamond, South Diamond, Spruce, and Whiskey Creek), only Main Diamond, South Diamond, and Spruce are secure. Whiskey Creek is no longer considered a viable replicated population due to the fires of 2003. The total population size in 1998 was estimated to be approximately 37,000 fish (U.S. Fish and Wildlife Service 2003) and approximately 62 miles (100 km) of stream were occupied in June 2000 (U.S. Fish and Wildlife Service 2003).

Major threats to this species include habitat alterations, competition, hybridization and predation by nonindigenous fish.

Comparison of Alternatives

Motorized routes can have both direct and indirect effects on Gila trout and its habitat. Motorized routes cause the physical loss of riparian habitat and functions, create drainage pathways that

follow route treads and alter surface water pathways, and convert dispersed surface runoff and sediment filtering throughout the riparian area to direct (point source) deliveries of accumulated runoff and sediment. Table 44 displays the miles of NFS motorized routes within 300 feet of occupied Gila trout habitat.

Alternative B includes the highest number of miles of motorized routes open to all users in occupied Gila trout habitat and, therefore, presents the greatest relative risk to the species. Alternative E is the only action alternative that reduces the miles of routes within occupied habitat and presents the lowest relative risk. Alternatives C, D, F, and G are the same and reduce relative risk when compared to alternative B due to reduced use on 0.20 mile of route proposed as administrative. These alternatives present a slightly higher relative risk than alternative E due to 0.1 mile more motorized route.

Table 44. Miles of NFS motorized routes within 300 feet of occupied Gila trout habitat

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of motorized road	1.30	1.10	1.10	1.00	1.10	1.10
Miles of administrative road	0	0.20	0.20	0.20	0.20	0.20
Motorized trail <50 inches	0	0	0	0	0	0
Total miles of motorized routes	1.30	1.30	1.30	1.20	1.30	1.30
Change in number of miles of motorized routes expressed as a percent (+ or -) of the no action alternative	0%	0%	0%	-8%	0%	0%

Motorized routes create direct and indirect impact to streams, habitats, and aquatic species at route crossing points. Motorized route crossings can: (1) indirectly decrease fish egg hatching success and subsequent fish populations due to sedimentation; (2) directly dislocate fish spawning activity within ford crossings, depending on fish species and spawning suitability of stream substrate and flows; and (3) cause direct disturbances including streambank damage, leading to indirect effects of increased bank erosion and stream sedimentation. Table 45 displays the number of motorized route crossings within occupied Gila trout habitat.

Table 45. Number of stream crossings in occupied Gila trout habitat

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	2	1	1	1	1	1
Low water administrative road	0	1	1	1	1	1
Low water motorized trail <50 inches	0	0	0	0	0	0
Bridge	1	1	1	1	1	1
Culvert	0	0	0	0	0	0
Total number of crossings	3	3	3	3	3	3
Change in number of stream crossings expressed as a percent (+ or –) of the no action alternative		0%	0%	0%	0%	0%

All of the action alternatives are the same and present a decrease in relative risk to occupied Gila trout habitat when compared to alternative B due to one stream crossing being proposed as administrative, thus reducing use. Alternative B presents the highest relative risk to Gila trout.

Endangered Species Act, Section 7 Consultation Effects Determinations

All action alternatives reduce the relative risk to listed species by: (1) prohibiting motorized cross-country travel; (2) reducing use levels by closing some motorized routes across the forest (the effects of the road on the landscape will continue until decommissioned); (3) reducing or eliminating the area that may be impacted by motorized big game retrieval and motorized dispersed camping; (4) reducing the number of motorized route stream crossings; and (5) reducing motorized use levels on some routes and at associated stream crossings by designating routes for administrative use only. Table 46 displays the effects determination for federally listed aquatic species that occur on the Gila National Forest and critical habitat for those species for which it has been designated. However, the changes proposed in each of the action alternatives will present some continued level of relative risk and have direct and indirect effects on listed species. The level of relative risk is different for each of the action alternatives and is dependent upon proposed changes to the above elements.

Table 46. Gila National Forest threatened, endangered, and designated critical habitat effects determinations

Species (Common Name)	Status	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Loach minnow	T with DCH		MALAA	MALAA	MALAA	MALAA	MALAA
Spikedace	T with DCH		MALAA	MALAA	MALAA	MALAA	MALAA
Gila chub	E with DCH		MANLAA	MANLAA	MANLAA	MANLAA	MANLAA
Chihuahua chub	T		MALAA	MALAA	MALAA	MALAA	MALAA
Gila trout	T		MALAA	MALAA	MALAA	MALAA	MALAA

Key: T=threatened; E=endangered; DCH=designated critical habitat; NE= no effect; MANLAA=may affect, not likely to adversely affect; MALAA=may affect likely to adversely affect

Southwestern Region Sensitive Aquatic Species

Sensitive species are those animal species identified by a regional forester for which population viability is a concern as evidenced by a significant current or predicted downward trend in population numbers, density, or in habitat capability that will reduce a species' existing distribution (FSM 2670.5.19). Protection of sensitive species and their habitats is a response to the mandate of the National Forest Management Act (NFMA) to maintain viable populations of all native and desired nonnative vertebrate species (36 CFR 219.19). The sensitive species program is intended to be proactive by identifying potentially vulnerable species and taking positive action to prevent declines that will result in listing under the Endangered Species Act. Effects to aquatic sensitive species are summarized in table 47.

Table 47. Gila National Forest, Southwestern Region sensitive aquatic species effects determinations by alternative

Species	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Effects Summary
Rio Grande cutthroat trout		NI	NI	NI	NI	NI	No impact to Rio Grande cutthroat trout. Currently there are no populations on the forest, but suitable habitat exists. All action alternatives reduce the potential risk through reduction of motorized use from open to all vehicles to motorized for administrative use only on the single road located in the species habitat.
Headwater chub		MI	MI	MI	MI	MI	Headwater chub occur in the three forks of the Gila River. Alternatives D and E reduce the miles of motorized route within 300 feet of occupied habitat when compared to the no action alternative; alternatives C, F, and G do not. The number of stream crossings in occupied habitat is the same for all alternatives. However, most of the crossings and miles of motorized route will have reduced use levels because of designation as administrative use only.
Roundtail chub		MI	MI	MI	MI	MI	Roundtail chub occur in the mainstem Gila River. All action alternatives, except alternative C reduce the miles of motorized route within 300 feet of stream occupied by the species. There is no change in the number of stream crossings between any of the alternatives. However, most of the crossings and miles of motorized route will have reduced use levels because of designation as administrative use only.
Gila springsnail		NI	NI	NI	NI	NI	Alternative B includes 0.05 mile of motorized route within 300 feet of one population. All action alternatives propose to nonmotorize this route.
New Mexico hot springsnail		NI	NI	NI	NI	NI	There are no motorized routes currently or proposed in any of the action alternatives that will impact the species.
Longfin dace		MI	MI	MI	MI	MI	Longfin dace are common and widespread in streams on the forest. All action alternatives reduce the direct and indirect effects to the species by reducing the number of stream crossings and miles of motorized (except alternative C) routes within 300 feet of stream habitat. However, the changes proposed in all action alternatives include motorized routes that are within 300 feet or have crossings that may impact streams where the species occurs.

Table 47. Gila National Forest, Southwestern Region sensitive aquatic species effects determinations by alternative

Species	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Effects Summary
Sonora sucker		MI	MI	MI	MI	MI	The Sonora sucker is common and widespread in streams on the forest. All action alternatives reduce the direct and indirect effects to the species by reducing the number of stream crossings and miles of motorized (except alternative C) routes within 300 feet of stream habitat. However, the changes proposed in all action alternatives include motorized routes that are within 300 feet or have crossings that may impact streams where the species occurs.
Desert sucker		MI	MI	MI	MI	MI	The desert sucker is common and widespread in streams on the forest. All action alternatives reduce the direct and indirect effects to the species by reducing the number of stream crossings and miles of motorized (except alternative C) routes within 300 feet of stream habitat. However, the changes proposed in all action alternatives include motorized routes that are within 300 feet or have crossings that may impact streams where the species occurs.
Rio Grande chub		MI	MI	MI	MI	MI	All alternatives propose no change in the total miles of motorized route within 300 feet of streams or the number of stream crossings that may be occupied by the species. Motorized use levels may be reduced due to designation of some of these routes and associated stream crossings as administrative use only. There may be continued impacts to the species by the changes proposed in each alternative.
Rio Grande sucker		MI	MI	MI	MI	MI	The Rio Grande sucker is common and widespread in streams on the forest. All action alternatives reduce the direct and indirect effects to the species by reducing the number of stream crossings and miles of motorized (except alternative C) routes within 300 feet of stream habitat. However, the changes proposed in all action alternatives include motorized routes that are within 300 feet or have crossings that may impact streams where the species occurs.

Table 47. Gila National Forest, Southwestern Region sensitive aquatic species effects determinations by alternative

Species	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Effects Summary
Black Range Mountainsnails *Oreohelix swopei* *Oreohelix metcalfei acutidiscus* *Oreohelix metcalfei metcalfei* *Oreohelix pilsbryi* *Oreohelixs metcalfei concentric* Bearded Mountainsnail *Oreohelix barbata* Subalpine Mountainsnail *Oreohelix subrudis* Whitewater Woodlandsnail *Ashmunella danielsi*		MI	MI	MI	MI	MI	Most of the occurrence records for these snails are historic and based on general localities rather than exact locations of populations (i.e., the bearded mountainsnail is known to occur in canyons between Dry Creek and Willow Creek). Many of the localities are within wilderness and are not susceptible to disturbance from motorized uses. All of the action alternatives reduce the relative risk to these species by eliminating cross-country travel, reducing or eliminating off-road use associated with motorized big game retrieval and motorized dispersed camping, reducing the miles of routes open for motorized use, and reducing use on some routes.

Table 47. Gila National Forest, Southwestern Region sensitive aquatic species effects determinations by alternative

Species	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Effects Summary
Silver Creek Woodlandsnail *Ashmunella binneyi* Iron Creek Woodlandsnail *Ashmunella mendex* Dry Creek Woodlandsnails *Ashmunella tetradon inermis* *Ashmunella tetradon mutator* *Ashmunella tetradon tetradon* *Ashmunella tetradon animorum* Black Range Woodlandsnails *Ashmunella cockerelli cockerelli* *Ashmunella cockerilli argenticola* *Ashmunella cockerelli perobtusa*							Most of the occurrence records for these snails are historic and based on general localities rather than exact locations of populations (i.e., the bearded mountainsnail is known to occur in canyons between Dry Creek and Willow Creek). Many of the localities are within wilderness and are not susceptible to disturbance from motorized uses. All of the action alternatives reduce the relative risk to these species by eliminating cross-country travel, reducing or eliminating off-road use associated with motorized big game retrieval and motorized dispersed camping, reducing the miles of routes open for motorized use, and reducing use on some routes.

Key: NI= no impact; MI= may impact, but will not result in loss of species viability or create significant trend toward Federal listing

Gila National Forest Management Indicator Species

Gila and Rio Grande cutthroat trout are identified as Gila National Forest management indicator species. One stream, Black Canyon, occupied by Gila trout, has two motorized routes within 300 feet with a bridge and two low water stream crossings associated with them. Black Canyon is seasonally open to fishing and is stocked with Gila trout on occasion. All of the action alternatives reduce the length of motorized route within 300 feet of the stream that is open to all users by designating a portion of the route as an administrative road for access to private property. One stream crossing along this portion of the route will also see reduced use as a result of this designation. The relative risk to Gila trout from motorized routes will be slightly reduced in all action alternatives. Gila trout population trends will not be affected by any of the action alternatives. There currently are no Rio Grande cutthroat trout populations on the forest. However, one stream, Animas Creek, is considered historical habitat for the species. There are 3 miles of motorized route within 300 feet of the stream and 15 stream crossings associated with the route. All action alternatives will reduce the motorized use on the route by designating it as an administrative route. Relative risk to Rio Grande cutthroat trout habitat will be reduced in all action alternatives. Habitat suitability for the species will not be affected by any of the action alternatives.

Conclusions

- At the forestwide scale, alternative B (no action) would be expected to have the greatest potential to adversely affect aquatic habitats and species because alternative B includes the greatest overall length of motorized route, has the most miles of motorized route within 300 feet of perennial and intermittent streams, has the highest number of stream crossings, and permits motorized cross-country travel.
- All action alternatives propose to prohibit motorized cross-country travel except where, in some alternatives, it is allowed for motorized dispersed camping and/or motorized big game retrieval. All action alternatives decrease and/or remove the level of relative risk to aquatic habitat and species from motorized cross-country travel.
- At the forestwide scale, when compared to the other action alternatives, alternative C would be expected to present the greatest relative risk of adversely affecting aquatic habitats and aquatic species. Alternative C includes the greatest number of miles of motorized routes, the greatest number of miles of motorized route within 300 feet of perennial and intermittent streams, and the greatest number of stream crossings. Alternative C proposes to convert the greatest length of current National Forest System nonmotorized trails and reopen closed and decommissioned routes to motorized use. Alternative C includes the greatest number of acres across the forest landscape where motorized dispersed camping and motorized big game retrieval activities could occur.
- At the forestwide scale, alternative D presents the second lowest level of relative risk to aquatic habitat and species. This alternative includes fewer miles of motorized routes, motorized routes within 300 feet of perennial and intermittent streams, and stream crossings than alternatives B, C, F, and G, but greater numbers of these indicators than alternative E. This alternative also reduces the relative risk to aquatic habitat and species greater than alternatives B, C, G, and F by proposing less area on the forest that would be subject to motorized cross-country travel associated with motorized dispersed camping

and motorized big game retrieval. However, alternative D does propose more area that would be subject to these activities than alternative E.

- At the forestwide scale, alternative E would be expected to present the lowest relative risk of adversely affecting aquatic habitats and species of all alternatives. Alternative E proposes the fewest miles of motorized routes, the fewest miles of motorized routes within 300 feet of perennial and intermittent streams, and the fewest stream crossings. Alternative E proposes to reopen the fewest miles of closed and/or decommissioned routes and eliminates relative risk associated with motorized dispersed camping and motorized big game retrieval. Alternative E also reduces use on the most miles of motorized routes by proposing the most miles of routes that would only be available for use by written permit and/or for administrative use.
- At the forestwide scale, alternatives F and G present similar levels of relative risk to aquatic habitat and species. Both alternatives present lower levels of risk than alternatives B and C, and increased levels of relative risk when compared to alternatives D and E. Alternative G proposes fewer miles of motorized routes, motorized routes within 300 feet of perennial and intermittent streams, and stream crossing than alternative F. Alternative G also proposes a reduction in the area that is subject to motorized dispersed camping and motorized big game retrieval. Both alternatives F and G propose the same miles of closed and decommissioned routes to be reopened.
- At the special status aquatic species and habitat level, the relative risk of each alternative generally follows the same trend as the level of risk at the forestwide scale. Alternative B presents the greatest relative risk and alternative E presents the lowest relative risk. Alternatives F and G are similar and present lower relative risk levels than alternatives B and C. Alternative D presents a lower level of relative risk than alternatives B, C, F, and G, but a higher level than alternative E.

Cumulative Effects

Cumulative effects are the combined impacts of past, present and reasonably foreseeable events on the indicators that were identified and utilized to determine the relative risk of effects to aquatic species and habitats. Activities considered include those directly modifying aquatic habitat and those indirectly affecting sediment delivery. See the hydrology report for activities that directly and indirectly affect water quality, riparian vegetation, and watershed condition. These habitats have been altered in many cases by past road and trail construction, vegetation management, domestic livestock grazing, recreation activities, motorized cross-country travel, and other factors. The following analysis was derived by reviewing the compilation of past and present programs and activities presented in the watershed and soils specialist report (USDA Forest Service 2010d).

The net effect of past programs and activities was a reduction in aquatic habitat quantity and quality from pristine conditions. However, these effects are highly variable and localized. In general, present programs and activities are at best reducing impacts or not increasing impacts at worst, with the net effects combining to reduce negative effects to aquatic resources. Most important among these activities, in terms of magnitude of beneficial effects, are projects to restore fish populations and aquatic habitat, modification of range management methods including exclusion of livestock from major drainages, vegetation management, and reduced road

construction related to timber harvest. Although localized degraded habitats continue to be present, the overall forest trend for aquatic habitat and species is positive.

Although some programs and activities will maintain existing effects on aquatic biota and their habitats, and others may have localized short-term negative effects, the net combined effects of reasonably foreseeable programs and activities are also beneficial with regard to aquatic species and habitat. Reasonably foreseeable actions that are expected to occur include reauthorization of grazing permits, vegetation management projects (mechanical thinning and prescribed fire), firewood gathering, road and trail improvement, aquatic habitat improvement projects, native fish restoration projects, and development of recreational opportunities.

Alternative B, the no action alternative, has the highest potential to result in adverse cumulative impacts to aquatic resources. This is primarily related to the continuation of open cross-country travel across the forest, including sensitive riparian areas, streams occupied by rare aquatic resources, and other stream corridors. This alternative also allows all unauthorized routes currently identified as part of the forest travel system to continue to be utilized and the risk of additional unauthorized routes to develop.

Cumulative effects related to sediment delivery decrease from alternative B in all action alternatives, with alternative E presenting the lowest level of relative risk and alternative C presenting the greatest. However, the decrease in sediment is likely to be small because the routes that are being nonmotorized will remain on the landscape and continue to produce sediment. The relative risk of negative cumulative effects related to the direct effect of motorized routes at stream crossings also decreases in all action alternatives when compared to the no action alternative. Again, alternative E presents the lowest level of cumulative effects risk and alternative C the greatest. All of the action alternatives prohibit cross-country travel, reduce the miles of motorized routes, reduce motorized use levels on some routes, and limit or prohibit activities such as motorized big game retrieval and motorized dispersed camping. Cumulative effects will increase, from alternative E with the lowest level, in order from D, G, F, and C.

Wildlife

This section summarizes the wildlife specialist report (USDA Forest Service 2010f).

Affected Environment

Vegetation on the forest is diverse and complex. Tree, shrub, grass and forb species from the Rocky Mountains and Mogollon Plateau are integrated with species from the Chihuahuan Desert. The highest zone encompasses Engelmann and corkbark fir communities, followed by the Engelmann spruce and Douglas-fir community. Douglas-fir, ponderosa pine, white fir, and southwestern white pine are dominant members of the next lower community. Aspen is commonly intermixed in portions of these higher elevations. Ponderosa pine is typically intermixed with either Gambel oak or alligator juniper, and then piñon-juniper woodlands are the next community down on the elevation gradient. The semidesert zones at lower elevations include mesquite, yucca, cacti, desert ceanothus, beargrass, and black grama in the various communities. Riparian zones range from the alder-narrowleaf cottonwood zones in higher elevations to sycamore-walnut-boxelder and Fremont cottonwood zones at the lower elevations. Data from a

recent mid-scale vegetation mapping project was used to summarize the acres of the different vegetation types on the forest (table 48).

The diverse topography, elevations, and climatic conditions on the Gila National Forest create a diversity of landforms and plant and animal habitats.

Several federally listed threatened and endangered species occur on the forest. Federally listed terrestrial species include the Mexican spotted owl, southwestern willow flycatcher, Chiricahua leopard frog, and Mexican gray wolf.

Table 48. Primary vegetation types on the forest

Vegetation Type	NFS Acres	Non-Wilderness Acres	Wilderness Acres
Spruce-fir	2,540.41	0.00	2,540.41
Mixed conifer	163,916.45	84,337.23	79,579.22
Ponderosa pine	1,177,746.00	905,500.46	272,245.55
Piñon-juniper and shrub oak woodland	1,643,096.46	1,228,044.12	415,052.35
Plains grassland and mountain grassland	227,231.69	217,998.45	9,233.24
Desert shrub and grassland	18,138.20	17,446.93	691.27
Sparsely vegetated	5,744.84	3,874.06	1,870.78
Lake	269.00	269.00	0.00
Wet meadow and wetland	423.29	384.51	38.78
High riparian	6,387.25	3,474.78	2,912.47
Mid riparian	10,870.67	6,918.44	3,952.23
Low riparian	10,862.33	6,672.37	4,189.96
Sum	**3,267,226.59**	**2,474,920.36**	**792,306.24**

In January 1998, the U.S. Fish and Wildlife Service published the final rule that allowed for the establishment of a nonessential experimental population of Mexican gray wolf on the Apache-Sitgreaves National Forests in Arizona and the Gila National Forest. As part of the Mexican Gray Wolf Reintroduction Program, the wolf has been translocated onto the Gila National Forest.

Biological study of the Gila National Forest first started in October 1846 when Emory (1848) made observations and collected specimens there en route between the Rio Grande and San Diego, California (Hubbard 1977). Hubbard 1977 reports that various biologists visited the area to collect specimens and carry out research, including members of the U.S. Biological Survey in the period 1906 to 1913. Hubbard (1977) documents that the first attempt to summarize this biological information appears by said author in 1968. Zimmerman (1968) expanded considerably on the available information related to the bird fauna of the Gila River Valley.

In 1977, a study was published by an interagency group that used available literature and some inventory work to identify the fauna of the Gila River in New Mexico. The interagency group consisted of the New Mexico Department of Game and Fish, Soil Conservation Service, Bureau of Land Management, Bureau of Reclamation, U.S. Forest Service, and U.S. Fish and Wildlife Service. John P. Hubbard of the New Mexico Department of Game and Fish compiled and edited this study; therefore, it will be referenced as Hubbard 1977. Since Hubbard (1977) there have been a few more studies on the birds of the Gila River, but aside from birds, work on other terrestrial vertebrates has been very limited.

The Gila National Forest supports a diverse mammalian fauna. Several biotic regions contribute species to the fauna, and several species reach their distributional limits in or near the forest (Hubbard 1977). The Gila National Forest mammalian checklist documents the occurrence of 84 mammals on the forest. Important game species that are part of the mammalian group include mule deer, Coues deer, elk, bighorn sheep, pronghorn, mountain lions, and black bears.

The Gila Valley in New Mexico supports a diverse avifauna, drawing species from several distinct biotic areas (Hubbard 1977). Species from the following biotic areas are represented in the project area: Sonoran Desert, Chihuahuan Desert, Rocky Mountain, and Sierra Madrean. The "Birds of the Gila National Forest: A Checklist" documents the occurrence of 337 species of birds that use the forest; 166 known to breed on the Gila, 114 others that are more or less regular nonbreeders, and 57 species considered casual or accidental. Hubbard (1977) reports that about half of the breeding species depend on riparian habitats and many others make use of them.

The forest supports a diverse amphibian and reptile (herpetofauna) community within its boundaries. Species from several biotic regions are represented. One of the most important features is that several species reach their distributional limits in or near the forest, especially from the Sonoran Desert herpetofauna. The breakdown of species from the most current literature reports 1 salamander, 4 toads, 6 frogs, 3 turtles, 21 lizards, and 20 snakes. Ecologically, most of the amphibian species use the riparian habitats; however, only the tiger salamander, Woodhouse's toad, canyon treefrog, bullfrog, Chiricahua leopard frog, and lowland leopard frog appear closely dependent on mesic environments.

Species Considered

Species analyzed include those occurring on the Gila National Forest that are:

1. Federally listed endangered, threatened, or proposed (FSM 2672.4), and designated critical habitat for these species.
2. Region 3 Regional Forester Sensitive Species (FSM 2670.5).
3. Migratory bird species that may occur on the Gila National Forest.
4. Gila National Forest management indicator species (MIS) as listed by the "Gila National Forest Land and Resource Management Plan."
5. Species identified through scoping, and species or species groups that occur on the Gila National Forest that have the potential to be impacted by implementation of an alternative, but not covered by the species listed above.

Threatened, Endangered and Proposed Species, and Designated Critical Habitat

The U.S. Fish and Wildlife Service county list of endangered, threatened, and proposed species, and species of concern was reviewed to determine the federally listed species that would need to be considered in this evaluation.

Table 49 identifies the federally listed species and respective designated critical habitat considered in this evaluation, and the species dropped from additional evaluation.

Table 49. Federally listed species (endangered, threatened, proposed and experimental) for Catron, Grant, Hidalgo, and Sierra Counties, New Mexico (accessed February 2010)

Scientific Name	Common Name	Status	County	Species Dropped from Additional Analysis and Rationale
Strix occidentalis lucida	Mexican spotted owl	Threatened and Critical Habitat	Catron, Grant, Hidalgo, Sierra	
Sterna antillarum	Least tern (interior population	Endangered	Catron	No habitat on the Gila. No effect determination
Empidonax traillii extimus	Southwestern willow flycatcher	Endangered and Critical Habitat	Catron, Grant, Hidalgo, Sierra	
Charadrius montanus	Mountain plover	Proposed	Catron, Hidalgo, Sierra	No habitat on the Gila. No effect determination
Mustela nigripes	Black-footed ferret	Endangered	Catron, Grant, Sierra	Extirpated from Gila. No effect determination
Falco femoralis septentrionalis	Northern aplomado falcon	Endangered	Grant, Hidalgo, Sierra	No habitat on the Gila. No effect determination.
Leptonycteris curasoae yerbabuenae	Lesser long-nosed bat	Endangered	Hidalgo	No habitat on the Gila. No effect determination.
Leptonycteris nivalis	Mexican long-nosed bat	Endangered	Hidalgo	No habitat on the Gila. No effect determination.
Rana chiricahuensis	Chiricahua leopard frog	Threatened	Catron, Grant, Hidalgo, Sierra	
Crotalus willardi obscurus	New Mexico ridgenose rattlesnake	Threatened	Hidalgo	No habitat on the Gila. No effect determination.
Canis lupus baileyi	Mexican gray wolf	Endangered Experimental	Catron, Grant, Hidalgo, Sierra	
Panthera onca arizonensis	Jaguar	Endangered	Hidalgo	No recent occurance records on the Gila. No effect determination.
Erigeron rhizomatus	Zuni fleabane	Threatened	Catron	No habitat on the Gila. No effect determination.
Hedeoma todsenii	Todsen's pennyroyal	Endangered	Sierra	No habitat on the Gila. No effect determination.

Regional Forester Sensitive Species and Federal Candidates

The U.S. Fish and Wildlife Service candidate species and Forest Service sensitive species list for the Southwestern Region were reviewed to determine the species that would need to be considered in evaluating this project. Table 50 identifies the sensitive species considered for this evaluation, and the species dropped from additional evaluation.

Table 50. Forest Service Southwestern Region sensitive species and Federal candidates

Scientific Name	Common Name	Status	Species Dropped from Additional Analysis and Rationale
Mammals			
Sorex merriami leucogenys	Merriam's shrew	Sensitive	Not found on the Gila. No impact.
Sorex nanus	Dwarf shrew	Sensitive	Not found on the Gila. No impact.
Lasiurus blossevilli	Western red bat	Sensitive	
Euderma maculatum	Spotted bat	Sensitive	Bat mortality due to major highways is less than 0.5 percent. Along forest roads with lower speeds and significantly less volumes of traffic there would be no adverse effects to cliff-dwelling bats. Implementation of this project will have no impact to these bats.
Idionycteris phyllotis	Allen's lappet-browed bat	Sensitive	
Corynorhinus townsendii	Townsend's big-eared bat	Sensitive	
Spermophilus tridecemlineatus monticola	White Mountains ground squirrel	Sensitive	
Cynomys gunnisoni	Gunnison's prairie dog	Sensitive	
Sciurus arizonensis arizonensis	Arizona gray squirrel	Sensitive	
Thomomys bottae aureus	Botta's pocket gopher	Sensitive	
Sigmodon ochrognathus	Yellow-nosed cotton rat	Sensitive	Not found on the Gila. No impact.
Clethrionomys gapperi	Southern red-backed vole	Sensitive	
Microtus montanus arizonensis	Arizona montane vole	Sensitive	
Microtus longicaudus	Long-tailed vole	Sensitive	
Nasua narica	White-nosed Coati	Sensitive	
Mephitis macroura milleri	Hooded skunk	Sensitive	
Ovis canadensis canadensis	Rocky Mountain bighorn sheep	Sensitive	
Birds			
Haliaeetus leucocephalus	Bald eagle	Sensitive	
Phalacrocorax brasilianus	Neotropic cormorant	Sensitive	
Accipiter gentilis apache	Apache northern goshawk	Sensitive	

Table 50. Forest Service Southwestern Region sensitive species and Federal candidates

Scientific Name	Common Name	Status	Species Dropped from Additional Analysis and Rationale
Asturina nitida maximus	Northern gray hawk	Sensitive	
Buteogallus anthracinus	Common blackhawk	Sensitive	
Falco peregrinus anatum	American peregrine falcon	Sensitive	
Columbina passerina	Common ground dove	Sensitive	
Coccyzus americanus occidentalis	Western yellow-billed cuckoo	Candidate or Sensitive	
Athene cunicularia hypugaea	Burrowing owl	Sensitive	
Hylocharis leucotis	White-eared hummingbird	Sensitive	
Calypte costae	Costa's hummingbird	Sensitive	
Melanerpes uropygialis	Gila woodpecker	Sensitive	
Vireo bellii	Bell's vireo	Sensitive	
Vireo vicinior	Gray vireo	Sensitive	
Pipilo aberti	Abert's towhee	Sensitive	
Amphibians			
Bufo microscaphus microscaphus	Southwestern (Arizona) toad	Sensitive	
Rana yavapaiensis	Lowland leopard frog	Sensitive	Extensive surveys on FS land for leopard frogs over the last 15 to 25 years have failed to document this species. No impact.
Reptiles			
Thamnophis rufipunctatus	Narrow-headed gartersnake	Sensitive	
Thamnophis eques megalops	Mexican gartersnake	Sensitive	
Heloderma suspectum suspectum	Reticulate Gila monster	Sensitive	
Insects			
Erpetogomphus heterodon	Dashed ringtail	Sensitive	
Lachiania dencyannae	A May fly	Sensitive	
Speyeria nokomis nitocris	Nitocris fritillary	Sensitive	
Euhyparpax rosea	A notodontid moth	Sensitive	

Migratory Bird Species

The Gila National Forest migratory bird assessment identified migratory bird species that occur or have the potential to occur on the forest by reviewing information from the "Birds of the Gila National Forest: A Checklist," New Mexico Partners in Flight, U.S. Fish and Wildlife Service, and the National Audubon Society. This information has been compiled to serve as a guide in local project and landscape planning and analysis. The forest level migratory bird analysis is incorporated by reference into this analysis. The Forest Service memorandum of understanding with the U.S. Fish and Wildlife Service identifies specific activities for bird conservation, pursuant to Executive Order 13186, including striving to protect, restore, enhance, and manage habitat of migratory birds, and prevent the further loss or degradation of remaining habitats on National Forest System lands. This includes identifying management practices that impact populations of high priority migratory bird species on National Forest System lands. The Gila National Forest used New Mexico Partners in Flight information to identify high priority species by vegetation types on the forest. Table 51 identifies the high priority species considered.

Table 51. New Mexico Partners in Flight high priority migratory bird species by vegetation type

Habitat Type	Species
Chihuahuan desert grassland	Prairie falcon
	Long-billed curlew
Wet meadow	Wilson's phalarope
Southwestern riparian woodland (low to moderate elevation riparian)	Common black hawk
	Common ground dove
	Elf owl
	Gila woodpecker
	Southwestern willow flycatcher
	Bell's vireo
	Lucy's warbler
	Summer tanager
	Abert's towhee
High elevation (montane) riparian woodland	Black swift
	Red-naped sapsucker
	Hammond's flycatcher
	American dipper
	MacGillivray's warbler
	Painted redstart
Chihuahuan desert shrub	Crissal thrasher
	Scott's oriole

Table 51. New Mexico Partners in Flight high priority migratory bird species by vegetation type

Habitat Type	Species
Montane shrub	MacGillivray's warbler
	Green-tailed towhee
	Black-chinned sparrow
Piñon–juniper woodland	Ferruginous hawk
	Gray flycatcher
	Gray vireo
	Black-throated gray warbler
Ponderosa pine	Northern goshawk
	Mexican spotted owl
	Flammulated owl
	Greater pewee
	Olive warbler
	Virginia's warbler
	Grace's warbler
Mixed conifer	Northern goshawk
	Mexican spotted owl
	Williamson's sapsucker
	Olive-sided flycatcher
	Dusky flycatcher
	Red-faced warbler
Spruce-fir	Blue grouse
Cliff, cave, or rock	Prairie falcon
	Peregrine falcon
	Black swift

Management Indicator Species

Gila National Forest management indicator species are listed in the "Gila National Forest Land and Resource Management Plan." The forest level management indicator species analysis is incorporated by reference into this analysis where all 11 management indicator species and their associated habitats are considered. Table 52 identifies the management indicator species considered for this evaluation.

Table 52. Species and vegetation types for each management indicator species

Management Indicator Species	Vegetation Type
Mule deer	Desert shrub
Mearns' quail	Plains grassland or mountain grassland
Plain titmouse, mule deer	Piñon-juniper or shrub oak woodland
Northern goshawk	Ponderosa pine
Mexican spotted owl	Mixed conifer
Hairy woodpecker	Ponderosa pine and mixed conifer snag component
Black hawk, beaver	Low or middle riparian
Beaver	High riparian
Long-tailed vole	Wet meadow or wetlands

Other Species Considered in this Analysis

Species identified through scoping that occur on the Gila National Forest which have the potential to be impacted by the implementation of an alternative, but are not covered by a Federal list, Southwestern Sensitive Species list, the Gila migratory bird list, and/or the Gila management indicator species list.

Analysis Process

For over 80 years, biologists have recognized roads as a potential threat to wildlife species (Gagnon et al. 2007). Not all species are negatively impacted by motorized use (Trombulak and Frissell 2000), but the majority of the literature does support the general conclusion that road and motor vehicle use negatively affects the biotic integrity of both terrestrial and aquatic ecosystems (Trombulak and Frissell 2000). Wisdom et al. (2000) found that of 91 species analyzed, greater than 70 percent were negatively affected by one or more factors associated with roads.

For this analysis, motorized travel includes motorized travel on roads, motorized travel on trails or OHV use, cross-country motorized travel (including motorized big game retrieval), and motorized dispersed camping. The objective of this analysis is to evaluate the potential effects of the different alternatives to different wildlife species or groups of wildlife species known or likely to occur on the Gila National Forest within the context of specific road and travel conditions that exist on the forest.

Potential effects of motorized travel and recreation (camping) on wildlife can be categorized in many ways; the following road associated factors and effects are condensed and summarized from a review of Wisdom et al. (2000):

- Habitat Loss and Fragmentation Including Negative Edge Effects – Roads can have the direct impact of converting large areas of habitat into nonhabitat, while the indirect effects of noise and exhaust can further reduce habitat quality and create avoidance of additional habitat in the surrounding area. In addition, species that respond negatively to openings or linear edges, such as habitat interior species, avoid areas near roads.

- Disturbance, Displacement, Avoidance, Harassment (i.e., chronic negative interactions with humans) – Roads can directly interfere with life functions at specific use sites (e.g., increased disturbance of nest sites, breeding leks, or communal roost sites). This can result in spatial shifts of individuals and populations away from a road in relation to human activities on or near a road.
- Collisions – Death or injury resulting from a motorized vehicle running over or hitting an animal on a road.
- Harvest or Collection Facilitated by Motorized Travel – Roads can facilitate greater access into areas used for hunting and trapping, and result in legal and illegal overharvest or collection of wildlife resources.
- Snag and Downed Log Reductions – Roads facilitate firewood collection, which can result in a loss of snags and downed logs. Larger snags are typically desired by woodcutters and are also the most beneficial to many wildlife species such as flammulated owls.
- Barriers to Animal Travel or Movement – Preclusion of dispersal, migration, or other movements as posed by a road itself or by human activities on or near a road or road network.
- Route for Competitors and Predators – Human-induced change in the environment providing access for competitors or predators that would not have existed otherwise.
- Physiological Response – Changes in levels of stress hormones and heart rate as a result of proximity to roads or trails.

Analysis Factors

Knights and Cole (1995) developed a conceptual model of the responses of wildlife to recreational activities. They grouped recreational impacts into four groups: harvest, habitat modification, disturbance, and pollution. Liddle (1997) grouped road impacts into three groups: disturbance type 1 occurs when an animal sees, smells, hears, or perceives the presence of a human, but no contact is made, and it may or may not alter behavior; disturbance type 2 is when habitat is changed in some way; and disturbance type 3 involves human actions in which there is direct damaging contact with the animal. Gaines et al. (2003) grouped Wisdom et al. (2000), Knight and Cole (1991), and Liddle (1997) classification schemes as described in table 53. We've further grouped the two analysis factors into harvest/direct effects and disturbance/indirect effects in table 53.

Table 53. Responses of wildlife to various disturbance factors

Road and Trail Associated Factors	Knight and Cole Recreation Activity	Liddle	Combined Analysis Factors
Disturbance, displacement, avoidance, harassment	Disturbance	Disturbance type 1	Disturbance
Physiological response	Disturbance	Disturbance type 1	Disturbance
Habitat loss and fragmentation	Habitat modification	Disturbance type 2	Disturbance
Negative edge effects	Habitat modification	Disturbance type 2	Disturbance
Snag and downed log reductions	Habitat modification	Disturbance type 2	Disturbance
Barriers to animal travel or movement	Habitat modification	Disturbance type 2	Disturbance
Route for competitors and predators	Habitat modification	Disturbance type 2	Disturbance
Collisions	Harvest	Disturbance type 3	Harvest
Harvest or collection facilitated by motorized travel	Harvest	Disturbance type 3	Harvest

Focal Species

Ecologists have used different systems to evaluate potential effects of an activity on species (Lambeck 1997 and Millsap et al. 1990). The focal species approach is one of these systems (Lambeck 1997). Focal species are species that are used to represent a group of species because they are sensitive to a particular activity. Carroll et al. (2001) and Watson et al. (2001) recently tested this approach for wide ranging carnivores and birds, respectively, with favorable results. Research related to road effects to federally listed and Southwestern Region sensitive species in this region of the Forest Service is limited; the focal species approach uses information related to different groups of species to help evaluate the potential effects of motorized use to similar species in the group.

Analysis Indicators

For this analysis, two separate analysis indicators were typically used to analyze the potential effects (harvest and disturbance) of motorized travel and recreation on terrestrial wildlife on the Gila National Forest. These indicators were: (1) total miles of routes within an analysis area and (2) the potential “Acres of Influence” for a species or group of species (focal species). Indicators were selected for project effects based on an extensive review of literature on the interaction between wildlife and motorized routes. Disturbance from motorized routes affect wildlife beyond the immediate road prism, into an area that can be referred to as a disturbance zone. This zone differs for each species, based on its tolerance to disturbance (Trombulak and Frissell 2000, Gaines et al. 2003). Literature related to this area is not available for some species or groups of species. For these focal species, route miles will be the only indicator used to analyze the potential for harvest and disturbance. Number of road crossings will also be used as a potential harvest indicator for occupied Chiricahua leopard frog sites, occupied southwestern willow flycatcher sites, and designated southwestern willow flycatcher critical habitat.

Analysis Area

The effects were determined using an approach that analyzes changes to analysis indicators within an analysis area. The analysis area is typically based on habitat that focal species are associated with. For elk, bighorn sheep, pronghorn, black bear, and mountain lion, the New Mexico Department of Game and Fish has mapped core habitat areas on the forest; the analysis indicators analyze the change in these areas from the existing condition by alternative. For small mammals, birds, reptiles, and amphibians, the analysis indicators analyze the change in habitat/vegetation communities; vegetation communities as identified in the management indicator species analysis for the Gila National Forest, or by Partners in Flight for migratory bird species. The acreage of these vegetative/habitat types on the Gila National Forest are identified in table 48. The "Gila National Forest Land and Resource Management Plan" identified 13 habitat associations for management indicator species, and Partners in Flight identified 3 additional habitat types for priority species. Selected species (focal species) reflect general habitat conditions needed by other species with similar habitats. Since little research has been completed on the effects of roads to many of the species that occur or are listed on the Gila National Forest, this habitat association approach was used. This approach follows a method similar to that of a management indicator or focal species approach to assess impacts of the proposed project and associated alternatives.

There is an exception to this approach of using habitat association for the analysis area. For federally listed species and some Southwestern Region sensitive species, the analysis indicators also analyze the change in identified management areas by alternative from the existing condition (i.e., critical habitat, protected activity centers, post-fledgling areas, occupied sites, etc.). For habitat generalists like the wolf, the analysis indicators analyzed the change in 5th-code watersheds by alternative compared to the existing condition.

Analysis Questions

1. Wildlife standard or guideline in the Gila National Forest plan related to species, groups of species, or wildlife emphasis areas in the Gila National Forest plan that relate to implementation of this project.
2. Issues identified during scoping related to terrestrial wildlife species.

Issues Identified During Scoping Related to Terrestrial Wildlife Species

Motorized Routes

The proposed motorized routes, specifically the type, extent, level of use and location of motorized routes may lead to resource, recreation, social, and economic impacts.

Motorized Dispersed Recreation

Motorized dispersed camping within proposed designated corridors and areas may lead to resource, recreation, social, and economic impacts.

Motorized Big Game Retrieval

The proposed motorized big game retrieval may lead to resource, recreation, social, and economic impacts.

Area

The proposed designated area specifically for OHV activities may lead to resource, recreation, social, and economic impacts.

Environmental Consequences

Ungulates

The Arizona Game and Fish Department document that research related to road effects on ungulates did not begin until the 1970s (Gagnon et al. 2007). Gagnon et al. (2007) literature review concentrated on traffic levels or road type effects on ungulates. Of the 53 sources reviewed, 47 percent of the papers suggested deer were affected by traffic or road type, 84 percent elk, 80 percent bighorn sheep, and 100 percent pronghorn (Gagnon et al. 2007). Their findings suggest that wild ungulates do not always respond to the same level (table 54).

Table 54. Ungulate species selected to be analyzed and rationale for selection

Species Analyzed	Rationale for Selection
Elk	Game species identified as species of concern during scoping
Pronghorn	Game species identified as species of concern during scoping
Bighorn sheep	Forest Service Sensitive Species
Deer	Management indicator species representative of desert shrub and piñon-juniper and shrub oak woodland vegetation cover types.

As described in the analysis factor section, motorized and recreation effects to ungulates can be grouped into two analysis factors:

1. A greater potential for harvest or direct effects, and/or
2. Disturbance or indirect effects, avoiding or changing behavior in the area adjacent to where these type activities are occurring.

Increases in ungulate harvest are associated with increased access. Rowland et al. (2005) states that elk vulnerability to harvest increases as open road density increases. This statement is supported by the literature (Unsworth et al. 1993, Gratson and Whitman 2000, and Hayes et al. 2002). Diefenbach et al. (2005) reported that deer hunters are almost three times less likely to hunt in an area for every 500-meter increase in distance from a road. Watson (2005) reported that roads facilitate poaching of pronghorn. Change in road miles from the existing condition is the indicator that analyzes the potential for harvest effects under the different alternatives.

The literature also documents that ungulates typically respond to recreation activities by avoiding areas near roads (Gaines et al. 2003). Elk avoid or move away from areas with motorized use (Gaines et al. 2003, Johnson et al. 2000, Rowland et al. 2000, and Wisdom et al. 2000). MacArthur et al. (1982) generally found that bighorn sheep avoid areas of high vehicle use more than areas of lower vehicle use (see table 55).

Table 55. Summary of the harvest indicator, disturbance zone, and analysis area that is used to analyze the effects of the different alternatives to ungulates

Focal Species	Motorized Activity	Harvest Indicator	Disturbance Zone	Analysis Area
Elk	Motorized trail or OHV use	Route Miles	300 m	Core elk habitat mapped by NMDGF*
Elk	Motorized roads	Route Miles	650 m	Core elk habitat mapped by NMDGF
Pronghorn	Motorized trail or OHV and roads	Route Miles	200 m	Core pronghorn habitat mapped by NMDGF
Bighorn sheep	Motorized trail or OHV and roads	Route Miles	200 m	Core bighorn sheep habitat mapped by NMDGF
Deer	Motorized trail or OHV and roads	Route Miles	200 m	Desert shrub and piñon-juniper and shrub oak woodland

*New Mexico Department of Game and Fish

Ungulates – Effects by Alternative

Rocky Mountain Elk and Pronghorn (Game Species Identified as a Species of Concern During Scoping and Ungulate Focal Species)

No Action Alternative (Alternative B): Under this alternative, there would be 3,898 miles of motorized routes in the elk analysis area and 315 miles of motorized routes in the pronghorn analysis area (table 56 and table 57). Habitat associated with these routes has been lost. The potential for collision loss exists on Forest Service routes; however, lower traffic rates and travel speeds on forest routes reduce this potential. Increases in road density increase the potential for take associated with poaching. The potential disturbance zone in the elk analysis area (1,297,441 acres) and pronghorn analysis area (43,320 acres) along motorized routes continues to cause the potential for indirect effects. Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval will continue to be allowed across the Gila National Forest. These three types of use continue to have potential effects to elk and pronghorn. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of greater road density. Under this alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to the species and its habitat.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel (see assumption) is no longer allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. In the elk analysis area, motorized dispersed camping is reduced by 96 to 100 percent under all action alternatives; and in the pronghorn analysis area, it is reduced by 92 to 100 percent. For elk, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 97 percent under alternative D, 96 percent under alternative G, 37 percent under alternative F, and 14 percent under alternative C. For pronghorn, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 93 percent under alternative D, 93 percent under alternative G, 20 percent under alternative F, and 3 percent under alternative C.

Table 56. Elk analysis area - existing condition and proposed change by issue and alternative

Total NMGF Core Elk Habitat on NFS Land = 2,894,880 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	3,914	3,898	2,930	2,352	3,260	3,247
Percent in miles of alt. B (Existing)		-0.40%	-25.14%	-39.91%	-16.70%	-17.03%
Motorized dispersed camping in acres	2,102,340	-2,008,043	-2,029,136	-2,102,340	-2,012,753	-2,020,239
Percent in acres of alt. B (Existing)		-95.51%	-96.52%	-100.00%	-95.74%	-96.09%
Motorized area in acres	28	NC	-28	-28	NC	NC
Motorized area in acres - all vehicles						
Motorized area in acres - OHV only	3	NC	-3	-3	NC	NC
Motorized big game retrieval acres	2,102,340	-300,730	-2,029,136	-2,102,340	-781,140	-2,020,239
Percent in acres of alt. B (Existing)		-14.30%	-96.52%	-100.00%	-37.16%	-96.09%

Table 57. Pronghorn analysis area - existing condition and proposed change by issue and alternative

Total NMGF Core Pronghorn Habitat on NFS Land = 58,426 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	315	310	242	213	254	250
Percent in miles of alt. B (Existing)		-1.55%	-23.18%	-32.48%	-19.36%	-20.71%
Motorized dispersed camping acres	126,017	-116,401	-117,712	-126,017	-116,566	-116,972
Percent in acres of alt. B (Existing)		-92.37%	-93.41%	-100.00%	-92.50%	-92.82%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	126,017	-3,589	-117,712	-126,017	-25,572	-116,972
Percent in acres of alt. B (Existing)		-2.85%	-93.41%	-100.00%	-20.29%	-92.82%

Motorized areas are locations where there have been traditional uses like motorized dispersed camping and OHV use. No motorized areas currently occur or are proposed in the pronghorn analysis area. In the elk analysis area, there is a reduction of 31 acres of potentially affected habitat under alternatives D and E, and under the remaining action alternative, there is no change from the existing condition (31 acres of habitat will continue to be affected).

Miles of motorized routes and trails and acres of potentially affected habitat within the elk analysis area are reduced by approximately 40 percent under alternative E; 25 percent under alternative D; 17 percent under alternatives F and G; and by less than 0.5 percent under alternative C. Within the pronghorn analysis area, these effects are reduced by approximately 32 percent under alternative E; 23 percent under alternative D; 21 percent under alternative G; 19 percent under F, and 2 percent under alternative C. The greater the reduction in miles in the analysis areas, the less the potential for direct and indirect effects; the reduction in direct and indirect effects to the species and its habitat is relative to the amount of miles reduced in the analysis areas.

Findings: Under all action alternatives, the potential effects to elk and pronghorn are reduced, particularly under alternative E. The potential to affect individuals under all action alternatives still exists, but none will affect the overall population levels of these species or any other wild ungulate on the Gila National Forest.

Bighorn Sheep (Forest Service Sensitive Species)

No Action Alternative (Alternative B): Under this alternative, there are 34 miles of motorized routes in bighorn sheep habitat (table 58 and table 59). Habitat associated with these routes has been lost. The potential for collision loss exists on Forest Service motorized routes; however, lower traffic rates and travel speeds on forest routes reduce this potential. Increases in road density increases the potential for take associated with poaching. The potential disturbance zone (5,734 acres) along motorized routes in this analysis area continues to cause the potential for indirect effects. Pappouchis et al. (2001) reported that their findings were consistent with other research that shows that roads cause a zone of influence larger than the road itself. In high use areas, some sheep may habituate to road traffic, but more typically, the closer to a road the more likely sheep will flee. Increases in the level of use on these routes through time would increase the potential for direct and indirect effects.

Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval will continue to be allowed across the Gila National Forest. These three types of uses continue to have potential effects to bighorn sheep. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of greater road density. Under this alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to the species and habitat.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel (see assumption) is no longer allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. Motorized dispersed camping is reduced by 97 to 100 percent under all action alternatives. The area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 99 percent under alternatives D and G, 50 percent under alternative F, and 19 percent under alternative C.

Table 58. Bighorn sheep analysis area - existing condition and proposed change by issue and alternative

Total NMGF Core Bighorn Habitat on NFS Land = 68,737 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	34	35	24	16	33	26
Percent in miles of alt. B (Existing)		3.41%	-27.16%	-51.34%	-0.29%	-21.80%
Motorized dispersed camping acres	46,160	-44,615	-45,676	-46,160	-45,262	-45,700
Percent in acres of alt. B (Existing)		-96.65%	-98.95%	-100.00%	-98.05%	-99.00%
Motorized areas in acres	0	NC	NC	NC	NC	NC
Motorized big game retrieval acres	46,160	-8,712	-45,676	-46,160	-23,094	-45,700
Percent in acres of alt. B (Existing)		-18.87%	-98.95%	-100.00%	-50.03%	-99.00%

Motorized areas are locations where there have been traditional uses like motorized dispersed camping and OHV use. Under all action alternatives, this type of use is not allowed in this analysis area. There would be no direct or indirect effects to bighorn sheep from motorized areas in the action alternatives.

Miles of motorized routes and trails and acres of potentially affected habitat within the analysis area are reduced by approximately 51 percent under alternative E, 27 percent under alternative D, 26 percent under alternative G, and 0 percent under alternative F. Under alternative C, motorized routes are increased by 3 percent. The greater the reduction in miles in the analysis areas, the less the potential for direct and indirect effects; the reduction in direct and indirect effects to the species and its habitat is relative to the amount of miles reduced in the analysis areas.

Table 59. Bighorn sheep Forest Service sensitive species determination by alternative

Sensitive Species	Determination by Alternative					
	B Existing Condition	C	D	E	F	G
Bighorn Sheep		MI	MI	MI	MI	MI
Rationale for Determination	Under all action alternatives, the potential effects to bighorn sheep are reduced, particularly under alternatives E, D, and G. The potential to affect individuals still exists; therefore, a determination of may impact individuals is made. None of the action alternatives will impact the viability of this species or cause a trend toward Federal listing.					

*MI – may impact

Mule Deer (Gila Management Indicator Species Representative of Desert Shrub, and Piñon-juniper/Shrub Oak Woodland Vegetation Cover Types)

No Action Alternative (Alternative B): Under this alternative, there are 1,667 miles of motorized routes in deer habitat (table 60 and table 61). Habitat associated with these routes has been lost and will not recover unless the route is closed and possibly decommissioned. The potential for collision loss exists on Forest Service routes; however, lower traffic rates and travel speeds on forest routes reduce this potential. Increases in road density increase the potential for take associated with poaching. The potential disturbance zone (253,756 acres) along motorized routes in this analysis area continues to cause the potential for indirect effects.

Table 60. Mule deer analysis area - existing condition and proposed change table by issue and alternative

Mule Deer Habitat (Desert Shrub and Piñon-juniper and Shrub Oak Woodland) Analysis Area on NFS Land = 1,661,235 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	1,671	1,698	1,309	1,066	1,412	1,410
Percent in miles of alt. B (Existing)		1.64%	-21.64%	-36.19%	-15.51%	-15.63%
Motorized dispersed camping acres	1,214,150	-1,169,975	-1,179,425	-1,214,150	-1,173,508	-1,175,921
Percent in acres of alt. B (Existing)		-96.36%	-97.14%	-100.00%	-96.65%	-96.85%
Motorized areas in acres - all vehicles	17	NC	-17	-17	NC	NC
Motorized big game retrieval acres	1,214,150	-235,751	-1,179,425	-1,214,150	-553,078	-1,175,921
Percent in acres of alt. B (Existing)		-19.42%	-97.14%	-100.00%	-45.55%	-96.85%

Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval would continue to be allowed across the Gila National Forest. These three types of use continue to have potential effects to deer. Additionally, these three types of uses may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of greater road densities. Under this alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to the species and habitat.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel (see assumption) is no longer allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. Motorized dispersed camping is reduced by 96 to 100 percent under all action alternatives. The area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 97 percent under alternatives D and G, 46 percent under alternative F, and 19 percent under alternative C.

Motorized areas are locations where there have been traditional uses like motorized dispersed camping and OHV use. Under alternatives D and E, there is a reduction of 17 acres of potentially

affected habitat, and under the remaining action alternative, there is no change from the existing condition.

Miles of motorized routes and trails, and acres of potentially affected habitat within the analysis area are reduced by approximately 36 percent under alternative E; 22 percent under alternative D; and 16 percent under alternatives F and G. Under alternative C, motorized routes are increased by 2 percent. The greater the reduction in miles in the analysis areas, the less the potential for direct and indirect effects; the reduction in direct and indirect effects to the species and its habitat is relative to the amount of miles reduced in the analysis areas.

Table 61. Mule deer Gila National Forest management indicator species determination by alternative

Management Indicator Species	Determination by Alternative					
	B Existing Condition	C	D	E	F	G
Mule deer		NA	NA	NA	NA	NA
Rationale for Determination	Under all action alternatives, the potential effects to deer are reduced, particularly under alternative E. The potential to affect individuals under all action alternatives still exists, but none will adversely affect the population levels or habitat trends. All action alternatives reduce effects to this species and its habitat on the Gila.					

*NA – not adversely affecting the population or habitat trend of this species

Wide Ranging Carnivores

Claar et al. (1999) document that research related to recreational impacts to carnivores is lacking. They do go on to state that increased access into remote habitats is a concern, particularly to carnivore species that usually seek secluded areas. As with ungulates, motorized/recreation effects to wide ranging carnivores can be grouped into two analysis factors:

1. A greater potential for harvest/direct effects, and/or
2. Disturbance/indirect effects, avoiding or changing behavior in the area adjacent to where these type of activities are occurring.

The literature documenting potential disturbance distances from different road types or traffic levels to wide ranging carnivores is lacking. Some literature exists for potential disturbance distances for black bears. For wolves and mountain lions, the literature related to recreation/motorized use effects is associated with road densities. Road density is the indicator that is used to analyze the potential for harvest under the different alternatives. Road density is used to analyze the potential for disturbance to wolves and mountain lions. To analyze disturbance effects of motorized activities to black bears, this analysis uses potential disturbance zone (see p. 145). For habitat generalists like wide ranging wolves, the analysis indicators analyzed the change in 5th-code watersheds by alternative compared to the existing condition. For black bear and mountain lion, the analysis indicators analyze the change in core habitats as mapped by the New Mexico Department of Game and Fish (Table 62 and Table 63).

Table 62. Wide ranging carnivore species selected to be analyzed and rationale for selection

Species Analyzed	Rationale for Selection
Mountain lion	Game species identified as species of concern during scoping
Black bear	Game species identified as species of concern during scoping
Mexican gray wolf	Federally listed as endangered with a designation of experimental population

Table 63. Summary of the harvest indicator, disturbance indicator, and analysis area that is used to analyze the effects of the different alternatives to wide ranging carnivores

Focal Species	Motorized Activity	Harvest Indicator	Disturbance Zone	Analysis Area
Mountain lion	Motorized trail or OHV and roads	Route Miles	Route Miles	Core mountain lion habitat mapped by NMDGF
Black bear	Motorized trail or OHV and roads	Route Miles	200 m	Core black bear habitat mapped by NMDGF
Mexican gray wolf	Motorized trail and OHV use	Route Density	Route Density	5th-code watersheds outside of wilderness

Mexican Gray Wolf (Federally Listed as Endangered with a Designation of Experimental Population) – Claar et al. (1999) state that wolves are habitat generalists and are a very resilient species that can coexist with people, if they are tolerated by humans. They are an intelligent species, which allows individuals to adapt to different levels of disturbance. Individuals may be very sensitive to human disturbance, but others tolerate disturbance. These traits in different individuals make it difficult to evaluate the overall effects of recreational activities (Claar et al. 1999). Much of the literature shows a strong negative relationship between wolves and increased road density (Claar et al. 1999, Thiel 1985, and Mech et al. 1988). Researchers have found that when road density exceeds about 1 mile/mi² (1.6 km/0.9 km radius circle), wolves were displaced or avoided the area (Mech et al. 1988 and Thiel 1985). However, Claar et al. (1999) state that findings from many of these studies that looked at large, well established wolf populations may not be applicable to fragmented, recovering populations in western states. Wolf populations in Wisconsin, Minnesota, and Montana have become more habituated to humans through time since re-colonization has occurred in these recovering populations (Claar et al. 1999 and Thiel et al. 1998).

On January 12, 1998, the Fish and Wildlife Service published an Endangered Species Act, section 10(j) rule for the Mexican gray wolf. The section 10(j) rule provides for the designation of specific populations of listed species in the United States as “experimental populations.” The Fish and Wildlife Service is in the process of reintroducing the Mexican gray wolf on the entire 3.3 million acres of the Gila National Forest in New Mexico and on the Apache-Sitgreaves National Forests in Arizona. These wolves have been designated as a nonessential experimental population, pursuant to section 10(j) of the Endangered Species Act, as amended.

The “Mexican Wolf Reintroduction Environmental Impact Statement” (EIS) did not recognize road density on the Gila National Forest as a problem. The EIS did recognize roads adjacent to

dens as a concern. To mitigate the potential for motor vehicle use to affect wolf dens, the Gila National Forest will continue to issue closure orders adjacent to these areas as recommended by the Fish and Wildlife Service (see design criteria). Again, road density changes are the indicator used to analyze potential harvest and disturbance effects under the different alternatives, and the analysis area is be the 5th-code watershed.

Wide Ranging Carnivores – Effects by Alternative

Mountain Lion and Black Bear (Game Species Identified as Species of Concern During Scoping)

No Action Alternative (Alternative B): Under this alternative, there are 3,764 miles of motorized routes in the black bear analysis area and 2,918 miles of motorized routes in the mountain lion analysis area (table 64 and table 65). Habitat associated with these routes has been lost and will not recover unless the route is closed and possibly decommissioned. Lower traffic rates and travel speeds on forest routes reduce the potential for collision loss; however, increases in road density increases the potential for take associated with hunting and poaching. In the black bear analysis area, the potential disturbance zone of 522,626 acres along motorized routes continues to cause the potential for indirect effects. The literature related to disturbance zones related to mountain lions is lacking, but one can assume that as the road density increases so does the potential to cause indirect effects to mountain lions adjacent to motorized routes.

Table 64. Mountain lion analysis area - existing condition and proposed change by issue and alternative

Total NMDGF Core Mtn. Lion Habitat on NFS Land = 2,806,314 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	2,934	2,990	2,149	1,641	2,420	2,409
Percent in miles of alt. B (Existing)		1.90%	-26.77%	-44.07%	-17.53%	-17.91%
Motorized dispersed camping acres	1,994,180	-1,924,754	-1,942,682	-1,994,180	-1,930,497	-1,936,656
Percent in acres of alt. B (Existing)		-96.52%	-97.42%	-100.00%	-96.81%	-97.12%
Motorized area in acres - all vehicles	11	0	-11	-11	0	0
Motorized area in acres - OHV only	2	0	-2	-2	0	0
Motorized big game retrieval acres	1,994,180	-357,650	-1,942,682	-1,994,180	-889,550	-1,936,656
Percent in acres of alt. B (Existing)		-17.93%	-97.42%	-100.00%	-44.61%	-97.12%

Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval would continue to be allowed across the Gila National Forest. These

three types of use would continue to have potential effects to black bears and mountain lions. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails, potentially allowing for the development of greater road density. Under this alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to these species.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel (see assumption) is no longer allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. In the black bear analysis area, motorized dispersed camping is reduced by 96 to 100 percent under all action alternatives; and in the mountain lion analysis area, it is reduced by 97 to 100 percent. For black bears, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 97 percent under alternative D, 96 percent under alternative G, 40 percent under alternative F, and 16 percent under alternative C. For mountain lions, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 97 percent under alternatives D and G, 45 percent under alternative F, and 18 percent under alternative C.

Motorized areas are locations where there have been traditional uses like motorized dispersed camping and OHV use. In the bear analysis area under alternatives D and E, there is a reduction of 26 acres of potentially affected habitat, and under the remaining action alternative there is no change from the existing condition. In the mountain lion analysis area, under alternatives D and E there is a reduction of 13 acres of potentially affected habitat, and under the remaining action alternative, there is no change from the existing condition.

Table 65. Black bear analysis area - existing condition and proposed change by issue and alternative

Total NMDGF Core Black Bear Habitat on NFS Land = 2,823,904 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	3,780	3,819	2,777	2,167	3,100	3,081
Percent in miles of alt. B (Existing)		1.03%	-26.54%	-42.67%	-18.00%	-18.49%
Motorized dispersed camping acres	2,042,920	-1,951,453	-1,973,320	-2,042,920	-1,957,667	-1,964,683
Percent in acres of alt. B (Existing)		-95.52%	-96.59%	-100.00%	-95.83%	-96.17%
Motorized areas in acres - all vehicles	26	0	-26	-26	0	0
Motorized big game retrieval acres	2,042,920	-321,850	-1,973,320	-2,042,920	-819,910	-1,964,683
Percent in acres of alt. B (Existing)		-15.75%	-96.59%	-100.00%	-40.13%	-96.17%

Miles of motorized routes and trails and acres of potentially affected habitat within the bear analysis area are reduced by approximately 43 percent under alternative E, 27 percent under alternative D, and 18 percent under alternatives F and G. Under alternative C, motorized routes are increased by 2 percent. Within the lion analysis area, these effects are reduced by approximately 44 percent under alternative E, 27 percent under alternative D, and 18 percent under alternatives F and G. Under alternative C, motorized routes are increased by 2 percent. The greater the reduction in miles in the analysis areas, the less the potential for direct and indirect effects. The reduction in direct and indirect effects to the species and its habitat is relative to the amount of miles reduced in the analysis areas. Under alternative C, increases in road miles above the existing condition increase the amount of direct and indirect effects.

Findings: Under all action alternatives, the potential effects to black bears and mountain lions are reduced, particularly under alternative E. The potential to affect individuals under all action alternatives still exists, but none will affect the viability of these species or the viability of any other wide-ranging carnivore on the Gila National Forest.

Mexican Gray Wolf (Federally Listed as Endangered with a Designation of Experimental Population)

No Action Alternative (Alternative B): Under the existing condition, the average road density across the Gila National Forest is approximately 1 mile per square mile (table 66 and table 67). Claar et al. (1999) state that wolves are habitat generalists and are a very resilient species that can coexist with people if they are tolerated by humans. They are an intelligent species, which allows individuals to adapt to different levels of disturbance. Individuals may be very sensitive to human disturbance, but others tolerate disturbance. The Mexican wolf reintroduction EIS did not identify road density on the Gila National Forest as a problem. The potential for collision loss does exist on Forest Service motorized routes; however, lower traffic rates and travel speeds on forest routes reduces this potential. Increases in road density increases the potential for take associated with poaching. Poaching on the Gila National Forest has been a problem for this species. Increases in the level of use on these routes through time would increase the potential for direct and indirect effects.

Table 66. Mexican gray wolf analysis area - existing condition and proposed change by issue and alternative

Summary of Miles of NFS Routes and Trails per Square Mile of USFS Jurisdiction in 5th-Code Watersheds	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Avg. of FS routes and trails on FS portion of all hydrologic unit codes in Mi/Mi²	0.99	-0.02	-0.29	-0.40	-0.22	-0.23
Average Percent Change in % Mi/Mi²		-2.09%	-29.03%	-40.45%	-22.63%	-22.86%
Motorized dispersed camping acres	2,441,806	-2,331,025	-2,355,884	-2,441,806	-2,337,416	-2,345,812

Table 66. Mexican gray wolf analysis area - existing condition and proposed change by issue and alternative

Summary of Miles of NFS Routes and Trails per Square Mile of USFS Jurisdiction in 5th-Code Watersheds	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Percent in acres of alt. B (Existing)		-95.46%	-96.48%	-100%	-95.72%	-96.07%
Motorized area in acres - all vehicles	28.02	0.00	-28.02	-28.02	0.00	0.00
Motorized area in acres - OHV only	3.31	0.00	-3.31	-3.31	0.00	0.00
Motorized big game retrieval acres	2,441,806	-365,391.16	-2,355,884	-2,441,806	-939,936	-2,345,812
Percent in acres of alt. B (Existing)		-14.96%	-96.48%	-100.00%	-38.49%	-96.07%

Under this alternative, motorized cross-country travel and dispersed camping is allowed across the Gila National Forest. These two types of use continue to have the potential for negative impacts to the Mexican gray wolf. Additionally, these two types of use perpetuate the development of additional roads and motorized trails; potentially allowing for the development of road densities that are greater than the current average of 0.99 miles per square mile. So under this alternative, through time the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to the species and habitat.

Effect Common to All Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel (see assumption) is no longer allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. Since no cross-country travel is allowed in the analysis area, there would be no effect to the Mexican gray wolf or its habitat from this activity.

Differences Among the Action Alternatives (C, D, E, F, and G): Miles of motorized routes and trails and acres of potentially affected habitat within the analysis area are reduced by approximately 40 percent under alternative E, 29 percent under alternative D, 23 percent under alternatives F and G, and 2 percent under alternatives C (see table 66 for specific numbers). Under alternative C, motorized routes are increased in 14 watersheds above the no action alternative; none of the other action alternatives increase route densities above the existing condition. Additionally, under alternatives E and D, more of the routes are only open to administrative use, which also reduces the potential for direct and indirect effects. The greater the reduction in miles in the analysis areas, the less the potential for direct and indirect effects; the reduction in direct and indirect effects to the species and its habitat is relative to the amount of miles reduced in the analysis areas.

Compared to the no action alternative, the authorization to allow motorized dispersed camping in alternatives C to G is reduced by 89 percent to 100 percent within the analysis area.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. Under alternatives E and D, these activities are not allowed. Under alternatives C, F, and G, you have motorized vehicle areas in five watersheds and motorized OHV areas in two watersheds. Under alternatives E and D, there would be less direct and indirect effect to the Mexican gray wolf from this activity.

The area of potentially affected habitat for motorized big game retrieval is reduced on average by 100 percent under alternative E, 96 percent under alternative D, 38 percent under alternative F, 96 percent under alternative G, and 15 percent under alternative C.

Table 67. Mexican gray wolf federally listed species determination by alternative

Federally Listed Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Mexican gray wolf		*NLJ	NLJ	NLJ	NLJ	NLJ
Rationale for Determination	Under alternative E, beneficial effects to the species and its habitat are greater than the other action alternatives. Alternatives D, G, and F also improve habitat conditions for the Mexican gray wolf, but to lesser degrees than alternative E. Alternative C eliminates cross-country travel, but the change related to route density is very small, maintaining conditions that are very similar to the no action alternative. None of the action alternatives would have a significant effect to the species or its habitat. A determination of “not likely to jeopardize” is made for all action alternatives.					

*NLJ – not likely to jeopardize determination

Small Mammals

Although a large number of studies addressing the impact of roads on small mammals have assessed road barrier effects, less attention has been given to the effect of roads on the density and diversity of local communities. (See Goosem (2002) for a well done study.) Some have mentioned the importance of road edges to small mammal conservation, but have not made reference to road effects on diversity or density in adjacent habitats beyond the edge (Bellamy et al. 2000). Others have compared diversity and density between natural adjacent habitat and road edges or medians (Douglass 1977, Adams and Geis 1983, Adams 1984, Garland and Bradley 1984, Meunier et al. 1999, and Goosem 2000), but have not described community attributes in natural areas without road influences.

The most visible effect of roads on wildlife is direct mortality from collisions with vehicles. Road influences on landscapes extend much further than their physical boundaries (Reijnen et al. 1995, Forman 2000, Forman and Deblinger 2000, Riitters and Wickham 2003). McGregor et al. (2008), working with translocated white-footed mice (*Peromyscus leucopus*) and eastern chipmunks (*Tamias striatus*), found that although these species tended to avoid crossing the road surface, their densities were not lower near roads. Bissonette and Rosa (2009) detected no clear abundance, density, or diversity effects relative to distance from the road. The zone of influence for small mammals and roads appears to be out to approximately 400 meters. This study analyzed effects out to 600 meters from roads. Only 2 of 13 species were never captured near roads. The abundance of the remaining 11 small mammal species was either similar at different distances from the road or higher closer to the road. Although roads may act as barriers and possible sources of mortality, adjacent zones of vegetation often provide favorable microhabitat in the

desert landscape for many small mammals (Bissonette and Rosa 2009). Underhill and Angold (2000) described an effect zone of up to 100 meters as causing visible impacts on roadside ecological communities.

While studies show that small mammal density is greatest along large, mostly paved, roadways (Adams and Geis 1983, Adams 1984, McGregor et al. 2008, and Bissonette and Rosa 2009), few researchers have done comparative studies along rural dirt roads. One study that did look at more rural county roads (Adams and Geis 1983) showed that small mammal density increased away from the road right-of-way. In this analysis, it is assumed that most roads traversing the forest will be similar to the rural roads in the Adams and Geis (1983) study, rather than large interstate type roads normally analyzed. Zone of influence according to a review of literature appears to be between 100 and 400 meters. The analysis uses a disturbance zone based on a median of 250 meters from roadways for small mammals.

As with other groups of terrestrial wildlife, motorized/recreation effects to small mammals can be grouped into two analysis factors:

1. A greater potential for harvest/direct effects, and/or
2. Disturbance/indirect effects.

Harvest or direct effect is be analyzed by miles of roadway within each habitat type and disturbance or indirect effect is analyzed by distance from road out to 250 meters (acres).

Again, the effects were determined by using an approach that analyzes the change in habitats that focal species are associated with among the different alternatives. These selected species reflect general habitat conditions needed by other small mammals with similar habitats (see table 68 and table 69).

Table 68. Small mammal species selected to be analyzed and rationale for selection

Species Analyzed	Rationale for Selection
Hooded skunk	FS Sensitive Species
Botta's pocket gopher	FS Sensitive Species
Gunnison's prairie dog	FS Sensitive Species
White Mountains ground squirrel	FS Sensitive Species
Southern red-backed vole	FS Sensitive Species
Long-tailed vole	FS Sensitive Species and FS MIS Species – Representative of wet meadow and wetland habitat.
Arizona montane vole	FS Sensitive Species
White-nose coati	FS Sensitive Species
Western red bat	FS Sensitive Species
Arizona gray squirrel	FS Sensitive Species
Beaver	FS MIS – Representative of low, middle and high elevation riparian habitat.

Table 69. Summary of the harvest indicator, disturbance indicator, and analysis area used to analyze the effects of the different alternatives to small mammals

Focal Species	Motorized Activity	Harvest Indicator	Disturbance Zone	Analysis Area
Hooded skunk Botta's pocket gopher	Motorized trail or OHV use	Route Miles	250 m	Desert shrub or grasslands, and piñon-juniper or shrub oak woodland
Gunnison's prairie dog White Mountain ground squirrel	Motorized trail or OHV and roads	Route Miles	250 m	Plains and mountain grasslands
Southern red-backed vole	Motorized trail or OHV and roads	Route Miles	250 m	Spruce-fir
Long-tailed vole Arizona montane vole	Motorized trail or OHV and roads	Route Miles	250 m	Wet meadow, wetland, and high elevation riparian
White-nosed coati Western red bat Arizona gray squirrel	Motorized trail or OHV and roads	Route Miles	250 m	Low and middle elevation riparian
Beaver	Motorized trail or OHV and roads	Route Miles	250 m	Low, middle, and high elevation riparian

Small Mammals – Effects by Alternative

Hooded Skunk and Botta's Pocket Gopher (Forest Service Sensitive Species)

Table 70. Hooded skunk – Botta's pocket gopher habitat (desert shrub, piñon-juniper, and shrub oak woodland) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS Land = 1,661,235 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	1,671	1,698	1,309	1,066	1,412	1,410
Percent in miles of alt. B (Existing)		2%	-22%	-36%	-16%	-16%
Motorized dispersed camping acres	1,214,155	-1,169,980	-1,179,430	-1,214,155	-1,173,513	-1,175,926
Percent in acres of alt. B (Existing)		-96%	-97%	-100%	-97%	-97%
Motorized areas in acres - all vehicles	17	*NC	-17	-17	NC	NC
Motorized big game retrieval acres	1,214,155	-235,755	-1,179,430	-1,214,155	-553,082	-1,175,926
Percent in acres of alt. B (Existing)		-19%	-97%	-100%	-46%	-97%

Gunnison's Prairie Dog and White Mountain Ground Squirrel (Forest Service Sensitive Species)

Table 71. Gunnison's prairie dog - White Mountain ground squirrel habitat (plains and mountain grassland) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS Land = 227,232 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and Trails in miles	622	615	517	469	540	537
Percent in miles of alt. B (Existing)		-1%	-17%	-25%	-13%	-14%
Motorized dispersed camping acres	216,904	-200,953	-204,062	-216,904	-201,071	-202,386
Percent in acres of alt. B (Existing)		-93%	-94%	-100%	-93%	-93%
Motorized areas in Acres - all vehicles	3	0	-3	-3	0	0
Motorized area in acres - OHV only	3	0	-3	-3	0	0
Motorized big game retrieval acres	216,904	-11,665	-204,062	-216,904	-42,912	-202,386
Percent in acres of alt. B (Existing)		-5%	-94%	-100%	-20%	-93%

Long-tailed Vole (Forest Service Sensitive Species and Gila Management Indicator Species Representative of Wet Meadow/wetland Habitat) and Arizona Montane Vole (Forest Service Sensitive Species)

Table 72. Long-tailed vole - Arizona montane habitat (wet meadow, wetland, and high elevation riparian) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS Land = 6,811 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	42	40	29	18	35	35
Percent in miles of alt. B (Existing)		-4%	-31%	-56%	-17%	-17%
Motorized dispersed camping acres	3,828	-3,408	-3,616	-3,828	-3,412	-3,523
Percent in acres of alt. B (Existing)		-89%	-947%	-100%	-89%	-92%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	3,828	-443	-3,616	-3,828	-992	-3,523
Percent in acres of alt. B (Existing)		-12%	-947%	-100%	-26%	-92%

White-nosed Coati, Western Red Bat, and Arizona Gray Squirrel (Forest Service Sensitive Species)

Table 73. White-nosed coati, western red bat, Arizona gray squirrel habitat (low and middle elevation riparian) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS Land = 21,733 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternatives				
		C	D	E	F	G
Total FS routes and trails in miles	97	97	59	49	75	71
Percent in miles of alt. B (Existing)		- <1%	-39%	-49%	-23%	-27%
Motorized dispersed camping acres	12,853	-11,970	-12,403	-12,853	-12,249	-12,302
Percent in acres of alt. B (Existing)		-93%	-97%	-100%	-95%	-96%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	12,853	-3,176	-12,403	-12,853	-6,477	-12,302
Percent in acres of alt. B (Existing)		-24%	-97%	-100%	-50%	-96%

Beaver (Gila Management Indicator Species Representative of Low, Middle, and High Elevation Riparian Habitat)

Table 74. Beaver habitat (low, middle, and high elevation riparian) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS land = 28,120 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	138	136	88	67	109	106
Percent in miles of alt. B (Existing)		-1%	-37%	-51%	-21%	-24%
Motorized dispersed camping acres	16,328	-15,070	-15,705	-16,328	-15,349	-15,513
Percent in acres of alt. B (Existing)		-92%	-96%	-100%	-94%	-95%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	16,328	-3,611	-15,705	-16,328	-7,445	-15,513
Percent in acres of alt. B (Existing)		-22%	-96%	-100%	-46%	-95%

No Action Alternative (Alternative B): For upland species of small mammals under this alternative, there are 1,671 miles of motorized routes in the hooded skunk and Botta's pocket gopher analysis area, and 622 miles of motorized routes in the Gunnison's prairie dog and White Mountain ground squirrel analysis area. For riparian and wetland species of small mammals under this alternative, there are 138 miles of motorized routes in the beaver analysis area; 42 miles of motorized routes in the long-tailed and Arizona montane vole analysis area; and 97 miles of motorized routes in the white-nosed coati, western red bat, and Arizona gray squirrel analysis area. Habitat associated with these routes has been lost and will not recover unless the route is

closed and possibly decommissioned. The potential for direct effects like vehicle collision, poaching, and trapping to these species would continue at the same rate. The potential disturbance zone for hooded skunks and Botta's pocket gopher is 311,967 acres, and 86,542 acres for Gunnison's prairie dog and White Mountain ground squirrel. The potential disturbance zone for beaver is 6,748 acres, 2,256 acres for long-tailed and Arizona montane voles, and 4,713 acres for white-nosed coati, western red bat and Arizona gray squirrel. Within these potential disturbance zones, motorized routes continue to cause the potential for indirect effects like disturbance, displacement, avoidance, and harassment.

Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval would continue to be allowed across the Gila National Forest. These three types of use continue to have potential effects to upland, riparian, and wetland species of small mammals. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road density. Under the no action alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to these species.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel (see assumption) would no longer be allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. In the hooded skunk and Botta's pocket gopher analysis area, motorized dispersed camping is reduced by 96 to 100 percent under all action alternatives; Gunnison's prairie dog and White Mountain ground squirrel analysis area 93 to 100 percent; beaver analysis area 92 to 100 percent; long-tailed and Arizona montane voles analysis area 89 to 100 percent; and 93 to 100 percent in the white-nosed coati, western red bat and Arizona gray squirrel analysis area. For all small mammals, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 94 to 97 percent under alternative D, 92 to 97 percent under alternative G, 19 to 50 percent under alternative F, and 5 to 25 percent under alternative C.

Motorized areas are locations where there have been traditional uses like motorized camping and OHV use. Under all action alternatives, in the beaver, vole, and coati/bat/gray squirrel analysis areas, no areas currently exist and no areas have been designated. Under alternatives D and E, in the hooded skunk and pocket gopher analysis areas, there is a reduction of 17 acres of potentially affected habitat, and under the remaining action alternatives, there is no change from the existing condition. In the prairie dog and ground squirrel analysis area under alternatives D and E, there is a reduction of 3 acres of potentially affected habitat, and under the remaining action alternatives, there is no change from the existing condition.

Miles of motorized routes and trails and acres of potentially affected habitat within the analysis area for small mammals that occur in upland habitats are reduced by 25 to 36 percent under alternative E, 17 to 22 percent under alternative D, 13 to 16 percent under alternative F, and 14 to 16 percent under alternative G. Under alternative C, motorized routes are increased by 2 percent in the hooded skunk and Botta's pocket gopher analysis area, and reduced by 1 percent in the Gunnison's prairie dog and White Mountain ground squirrel analysis area.

Miles of motorized routes and trails and acres of potentially affected habitat within the analysis area for small mammals that occur in riparian habitats are reduced by 49 to 56 percent under alternative E, 31 to 39 percent under alternative D, 17 to 23 percent under alternative F, and 17 to

27 percent under alternative G. Under alternative C there is less than 4 percent reduction in riparian analysis areas for small mammals.

In the shrub and woodland communities used by hooded skunks and Botta pocket gophers, all action alternatives except alternative E add 13 to 69 miles of routes that are not currently system roads and trails. For the other focal species and their associated analysis areas, alternative E adds 0 miles of routes that are currently not system routes; alternatives D, F, and G add 1 mile; and alternative C adds up to 10 miles of routes (table 75 and table 76).

Table 75. Small mammal Forest Service sensitive species determination by alternative

Sensitive Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Hooded skunk		MI	MI	MI	MI	MI
Botta's pocket gopher		MI	MI	MI	MI	MI
Gunnison's prairie dog		MI	MI	MI	MI	MI
White Mountain ground squirrel		MI	MI	MI	MI	MI
Southern red-backed vole		MI	MI	MI	MI	MI
Long-tailed vole		MI	MI	MI	MI	MI
Arizona montane vole		MI	MI	MI	MI	MI
White-nose coati		MI	MI	MI	MI	MI
Western red bat		MI	MI	MI	MI	MI
Arizona gray squirrel		MI	MI	MI	MI	MI
Rationale for Determination	Under alternatives D to G, the potential effects to small mammals are reduced, particularly under alternative E. Under alternative C there is very little change from the existing condition, and in the shrub and woodland communities there is an increase in motorized routes. Under alternatives F and C, the amount of available habitat in riparian species habitat accessible to motorized big game retrieval remains high. This activity may not occur often in this habitat type, but, as stated with other riparian species/groups, the potential to cause several years of damage with a single entry is high. The amount of potentially affected habitat in a given year would be small considering the relatively low number of game retrievals that could occur in a given year and the amount of Forest Service land on which this activity has the potential to occur. The potential to affect individuals under all action alternatives still exists; therefore, a determination of "may impact" is made for all action alternatives. None of the alternatives would affect the viability of these species or the viability of any other small mammals that occur on the Gila National Forest. None of the alternatives would cause a trend toward Federal listing.					

*MI – may impact

Table 76. Long-tailed vole and beaver Gila National Forest management indicator species determination by alternative

Management Indicator Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Long-tailed vole		NA	NA	NA	NA	NA
Beaver		NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives D to G, the potential effects to small mammals are reduced, particularly under alternative E. The potential to affect individuals under all action alternatives still exists; but population and habitat trends for the beaver and long-tailed vole would not be affected by any of the action alternatives.					

*NA – no adverse effects to the population or habitat trends

Amphibians and Reptiles

Compared to groups like large mammals, relatively few studies have been completed related to the effects of human recreation and travel activities on herpetofauna. Habitats important to many herpetofauna are breeding/rearing, foraging, and overwintering areas. Amphibians usually require warmer lentic aquatic areas with vegetation for breeding/rearing, riparian areas that support large amounts of insects for foraging, and soils that lend themselves to burrows, forest litter and/or large woody debris, or deep waters that are unlikely to completely freeze for overwintering (Maxwell and Hokit 1999). Reptiles usually require adequate sun exposure and substrate for nesting or basking; habitats that support adequate forage, which includes insects, fish, amphibians, small mammal, or birds; and overwintering areas like deep water, mud flats, deep rock crevices, or mammal burrows. In areas where these three types of habitat are in relatively close proximity, herpetofuana migration distances are relatively short; but if these areas are isolated spatially, reptiles and amphibians are capable of undertaking quite extensive seasonal migrations. Management actions that have the potential to affect one or more of these habitats, or the migration that many species undergo to reach these habitats, should be considered when evaluating the effects of an activity (table 77).

Table 77. Amphibian and reptile species selected to be analyzed and rationale for selection

Species Analyzed	Rationale for Selection
Mexican gartersnake	FS Sensitive Species
Arizona toad	FS Sensitive Species
Narrow-headed gartersnake	FS Sensitive Species
Reticulate Gila monster	FS Sensitive Species
Chiricahua leopard frog	Federally Listed “Threatened” Species

The literature documents that a large number of amphibians and reptiles are killed on roadways (Maxwell and Hokit 1999). Fahrig et al. (1995) documented that the higher the traffic intensity, the greater the number of dead frogs and toads. OHVs have also been documented to cause direct mortality (Maxwell and Hokit 1999). Motor vehicles on roads and OHVs also affect habitat quality and fragmentation, and herpetofauna have even been documented to suffer from vehicle

noise. Soil disturbance can negatively affect amphibians and reptiles. Temporary pools of water on roadways have been documented to negatively affect amphibians. Voss and Chardon (1998) documented that Moor Frog populations were negatively affected by density of roads within 250 meters of waterways. Semlitsch (1998) found that some species used and dispersed within 250 meters of riparian, wetland and aquatic habitats.

Effects to reptiles and amphibians can be grouped into two analysis factors:

1. A greater potential for harvest, and/or
2. Disturbance effects.

Harvest effects were analyzed by miles of roadway within each habitat type and disturbance effects were analyzed by distance from road within the identified associated habitat out to 250 m (acres).

The effects were determined by using an approach that analyzed the change in habitats that focal species are associated with between the different alternatives. These selected species reflect general habitat conditions needed by other reptiles and amphibians with similar habitats. There is an exception to this approach of using habitat association as the analysis area. For the federally listed Chiricahua leopard frog, the analysis examined the change in miles of road within dispersal distances of extant populations (the dispersal distance identified by the FWS), and the change in the number of road-stream crossings within this zone (table 78).

Table 78. Summary of the harvest indicator, disturbance indicator, and analysis area used to analyze the effects of the different alternatives to amphibians and reptiles

Focal Species	Motorized Activity	Harvest Indicator	Disturbance Zone	Analysis Area
Mexican gartersnake	Motorized trail or OHV and roads	Route Miles	250 m	Low elevation riparian
Arizona toad, narrow-headed gartersnake	Motorized trail or OHV and roads	Route Miles	250 m	Low, middle, and high elevation riparian
Retculate Gila monster	Motorized trail or OHV and roads	Route Miles	250 m	Desert shrub or grassland
Chiricahua leopard frog	Motorized trail or OHV use	Route Miles Number of Stream Crossings	Miles of routes within: - 1 mile overland -3 miles along an ephemeral or intermittent drainage -5 miles along a perennial stream	Occupied sites

Chiricahua Leopard Frog (Federally "Threatened" Species) – On the Gila National Forest, 15 occupied sites were known in 2009. Compared to many of the other federally listed species in the region, the concern for this species within its historic range is relatively high. The low number of occupied sites on the Gila National Forest adds to this concern.

Chiricahua leopard frog movement patterns are not well understood. Active movement of adult frogs up and down a drainage, or directional dispersal of metamorph and subadult frogs may be in response to deteriorating habitat (i.e., drying of breeding pond), predators (e.g., conspecifics and gartersnakes), or intraspecific competition (Southwest Endangered Species Act Team 2008). Historically, it is likely that perennial corridors were important for dispersing individual frogs. In the absence of perennial corridors, movement by frogs is likely facilitated by the presence of seasonal surface waters (lotic and lentic) and otherwise wet conditions during the summer rainy season that permit overland movement in typically dry environments (Southwest Endangered Species Act Team 2008). Based on observations of various ranids in Arizona and New Mexico (Southwest Endangered Species Act Team 2008), reasonable dispersal distances for the species are (1) 1 mile overland, (2) 3 miles along intermittent drainages, and (3) 5 miles along permanent watercourses (Southwest Endangered Species Act Team 2008), or some combination thereof.

Accurately identifying (1) the action area of a proposed project, and (2) whether habitats occur within the action area where the species is reasonably likely to occur are critical steps for analyzing if and how a particular action may affect Chiricahua leopard frogs.

Chiricahua Leopard Frog Summary – For this species, miles of roads within the reasonable dispersal distances from occupied sites was the indicator used to analyze the potential for harvest and disturbance under the different alternatives. Reasonable dispersal distances for the frog from occupied habitats are described above. We also analyzed the change in the number of road-stream crossings within this zone.

The forest has completed extensive survey work for this species over the past 9 years. During this time, the number of populations on the Gila has continued to decline as a result of presence of Chytridiomycosis fungus. Analyzing the change in miles of roads within a reasonable dispersal distance from occupied sites between the different alternatives, along with the analysis of other focal amphibian species that are dependent on perennial riparian areas provides the basis needed to determine the potential effects to this species from the different alternatives.

These species have been selected as a focal species for amphibians and reptiles that occur in the indicated vegetation types. For these species, the analysis indicators (road miles and acres of potential disturbance) analyzed the change in low elevation riparian habitat by alternative from the existing condition.

Reptiles and Amphibians – Effects by Alternative

Mexican Gartersnake (Forest Service Sensitive Species)

Table 79. Mexican gartersnake habitat (low elevation riparian) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS Land = 10,862.33 Acres	Existing Effects, Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	42	43	27	24	38	33
Percent in miles of alt. B (Existing)		3%	-34%	-43%	-9%	-20%
Motorized dispersed camping acres	6,037	-5,427	-5,775	-6,037	-5,701	-5,758
Percent in acres of alt. B (Existing)		-90%	-96%	-100%	-94%	-95%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	6,037	-1,210	-5,775	-6,037	-2,890	-5,758
Percent in acres of alt. B (Existing)		-20%	-96%	-100%	-48%	-95%

Arizona Toad and Narrow-Headed Gartersnake (Forest Service Sensitive Species)

Table 80. Arizona toad – narrow-headed gartersnake habitat (low, middle, and high elevation riparian) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS Land = 28,120 acres.	Existing Effects Alt. B (No Action)	Change in Effects by Alternatives				
		C	D	E	F	G
Total FS routes and trails in miles	138	136	88	67	109	106
Percent in miles of alt. B (Existing)		-1%	-37%	-51%	-21%	-24%
Motorized dispersed camping acres	16,328	-15,070	-15,705	-16,328	-15,349	-15,513
Percent in acres of alt. B (Existing)		-92%	-96%	-100%	-94%	-95%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	16,328	-3,611	-15,705	-16,328	-7,445	-15,513
Percent in acres of alt. B (Existing)		-22%	-96%	-100%	-46%	-95%

Reticulate Gila Monster (Forest Service Sensitive Species)

Table 81. Reticulate Gila monster habitat (desert shrub and grassland) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS Land = 18,138 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	25	26	20	16	20	20
Percent in miles of alt. B (Existing)		4%	-21%	-34%	-19%	-19%
Motorized dispersed camping acres	15,795	-14,838	-14,993	-15,795	-14,858	-14,995
Percent in acres of alt. B (Existing)		-94%	-95%	-100%	-94%	-95%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	15,795	-2,508	-14,993	-15,795	-7,426	-14,995
Percent in acres of alt. B (Existing)		-16%	-95%	-100%	-47%	-95%

No Action Alternative (Alternative B): Under the existing condition for reptiles and amphibians, there are 42 miles of motorized routes in the Mexican gartersnake analysis area, 138 motorized routes in the Arizona toad and narrow-headed gartersnake analysis area, and 25 miles of motorized routes in the Reticulate Gila monster analysis area. Habitat associated with these routes has been lost and will not recover unless the route is closed and possibly decommissioned, and the potential for direct effects like vehicle collision, poaching, and collection would continue. The potential disturbance zone for Mexican gartersnake is 2,330 acres, 6,858 acres for Arizona toad and narrow headed gartersnake, and 3,905 acres for Reticulate Gila monster. Within these potential disturbance zones, motorized routes continue to cause the potential for disturbance, displacement, avoidance, and harassment.

Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval would continue to be allowed across the Gila National Forest. These three types of use continue to have potential effects to upland, riparian, and wetland species of reptiles and amphibians. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road density. Under the no action alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to these species.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel (see assumption) is no longer allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. Motorized dispersed camping is reduced in the Mexican gartersnake analysis area by 90 to 100 percent under all action alternatives; in the Arizona toad and narrow headed gartersnake analysis area, 92 to 100 percent; and 94 to 100 percent in the Gila monster analysis area. For these focal species, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 95 to 96 percent under alternative D, 46 to 94 percent under alternative F, 95 percent under alternative G, and 16 to 22 percent under alternative C.

Motorized areas are locations where there have been traditional uses like motorized camping and OHV use. Under all action alternatives, no areas have been designated in the reptile and amphibian analysis areas (table 82).

Miles of motorized routes and trails and acres of potentially affected habitat within the analysis area for reptiles and amphibians are reduced by 34 to 51 percent under alternative E, 21 to 37 percent under alternative D, 9 to 19 percent under alternative F, and 19 to 24 percent under alternative G. Under alternative C, motorized routes are increased by 4 percent in the Gila monster analysis area, 3 percent in the Mexican gartersnake analysis area, and reduced by 1 percent in the Arizona toad and narrow-headed gartersnake analysis area.

For the focal species and their associated analysis areas, alternative E adds no miles of routes; alternatives D, F, and G add 1 mile of currently unauthorized route; and alternative C adds up to 10 miles of unauthorized routes. Because the Gila National Forest currently allows cross-country travel, most proposed routes even though unauthorized/recognized are currently being used.

Table 82. Amphibian and reptile Forest Service sensitive species determination by alternative

Sensitive Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Mexican gartersnake		MI	MI	MI	MI	MI
Arizona toad		MI	MI	MI	MI	MI
Narrow-headed gartersnake		MI	MI	MI	MI	MI
Reticulate Gila monster		MI	MI	MI	MI	MI
Rationale for Determination	Under alternatives D to G, the potential effects to reptiles and amphibians are reduced, particularly under alternative E. Under alternative C, there is an increase in motorized routes in the Mexican gartersnake and Gila Monster analysis areas; and a 1 percent decrease in the Arizona toad and narrow-headed gartersnake analysis area. Under alternatives F and C, the amount of available habitat in riparian species habitat accessible to motorized big game retrieval remains high. This activity may not occur often in this habitat type, but as stated with other riparian species/groups, the potential to cause several years of damage with a single entry is high. The amount of potentially affected habitat in a given year would be small, considering the relatively low number of motorized game retrievals that could occur in a given year, and the amount of Forest Service land that this activity has the potential to occur in. The potential to affect individuals under all action alternatives still exists; therefore, a determination of “may impact” is made for all action alternatives. None of the alternatives would affect the viability of these species or the viability of any other reptile or amphibian that occurs on the Gila National Forest.					

Chiricahua Leopard Frog (Federally listed threatened species)

Table 83. Chiricahua leopard frog reasonable dispersal analysis area - existing condition and proposed change by issue and alternative

Analysis Area (15 occupied sites) on NFS Lands = 71,624 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	71	70.6	59.7	36.6	64.5	67.7
Percent in miles of alt. B (Existing)		-0.6%	-15.9%	-48.5%	-9.2%	-4.7%
Routes Crossing Streams						
No. of Open existing ML 2–ML 5	65	-21	-38	-57	-34	-23
No. of Administrative routes		20	21	23	21	21
Total FS route and trail crossings	65	64	48	31	52	63
Percent change of alt. B (Existing)		-9.9%	-32.5%	-56.4%	-26.8%	-11.4%
No. of private road-stream crossings	2	NC	NC	NC	NC	NC
Motorized dispersed camping in acres	39,828	-38,529	-38,971	-39,828	-38,643	-38,612
Percent in acres of alt. B (Existing)		-96.7%	-97.9%	-100%	-97%	-96.9%
Motorized Areas						
Motorized area in acres - all vehicles	0.0	0.0	0.0	0.0	0.0	0.0
Motorized area in acres - OHV only	0.0	0.0	0.0	0.0	0.0	0.0
Motorized big game retrieval acres	39,828	-4,966	-38,971	-39,828	-16,873	-38,612
Percent in acres of alt. B (Existing)		-12.5%	-97.9%	-100%	-42.4%	-96.9%

No Action Alternative (Alternative B): Under this alternative, there are 71 miles of motorized routes within a reasonable dispersal area of occupied Chiricahua leopard frog sites. The literature documents that a large number of amphibians and reptiles are killed on roadways (Maxwell and Hokit 1999). Fahrig et al. (1995) did document that the higher the traffic intensity, the greater the number of dead frogs and toads. OHVs have also been documented to cause direct mortality

(Maxwell and Hokit 1999). Motor vehicles on roads and OHVs also affect habitat quality and fragmentation, and herpetofauna have even been documented to suffer from vehicle noise. Temporary pools of water on roadways have been documented to negatively affect amphibians. The potential for collision loss does exist on Forest Service motorized routes; the lower traffic rates and travel speeds on forest routes reduces this potential. The potential for take associated with poaching also exists. Increases in the level of use on these routes through time would increase the potential for direct and indirect effects.

Under this alternative, motorized cross-country travel and dispersed camping continues to be allowed across the Gila National Forest. These two types of use continue to have the potential to impact the Chiricahua leopard frog in habitats located within the dispersal distances of this species (39,828 acres). Additionally, these two types of use perpetuate the development of additional roads and OHV routes; potentially allowing for the development of more routes than the 71 miles currently identified within the dispersal distance analysis area. So under this alternative, through time the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to the species and habitat.

Effect Common to All Action Alternatives (C, D, E, F, and G): Under these alternatives, motorized cross-country travel (see assumption) is no longer allowed. Under all action alternatives, the change from the existing condition is a 100 percent reduction in motorized cross-country travel. The authorization to allow motorized dispersed camping in these alternatives is reduced by 97 percent to 100 percent within the analysis area. No motorized areas are designated within this analysis area. Since no cross-country travel and no motorized areas are located in the analysis area, there would be no effect to the Chiricahua leopard frog or its habitat from these activities (table 84).

Table 84. Chiricahua leopard frog federally listed species determination by alternative

Federally Listed Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Chiricahua leopard frog		MALAA	MALAA	MALAA	MALAA	MALAA
Rationale for Determination	Under alternative E, the change results in a much higher benefit to the species and its habitat than the other action alternatives. The remaining four alternatives do change the uses within analysis areas, reducing the risk of potential effects in the following order: alternative D, F, G, and C. This change in use does cause less adverse effects than roads and trails open under the no action alternative. All action alternatives propose some level of administrative use, reducing the potential level of effect relative to the change. The change to administrative use reduces traffic levels; therefore, providing long-term beneficial effects by reducing the potential to cause the direct mortality of frogs. However, even low levels of use through occupied habitat still have the potential to cause harvest/take. Under alternatives F and C, the area open to big game retrieval is still relatively high compared to the other action alternatives. Many of the remaining Chiricahua leopard frog locations on the forest occur in popular hunting areas, so it is reasonable to expect some level of game retrieval within the analysis area. Leopard frogs are associated with riparian/aquatic type habitats that are more susceptible to damage by cross-country motorized use than upland habitats; therefore, the relative potential for adverse effects is greater under alternatives F and C for big game retrieval than the other action alternatives. All action alternatives have the potential to affect individuals by causing the direct take of the species; therefore, a “may affect likely to adversely affect” determination is made for all action alternatives.					

*MALAA - may affect likely to adversely affect determination

Differences Among the Action Alternatives (C, D, E, F, and G): Miles of motorized routes and trails and acres of potentially affected habitat within the analysis area are reduced by approximately 48 percent (-35 mi) under alternative E, 16 percent (-11 mi) under alternative D, 9 percent (-7 mi) under alternative F, 5 percent (-3 mi) under alternative G, and 1 percent (-1 mi) under alternative C (see table 83 for specific numbers). Under the existing condition, there are 65 stream crossings within the analysis area. This number is reduced by 56 percent under alternative E to 31 crossings; by 32.5 percent under alternative D to 48 stream crossings; by 27 percent under alternative F to 52 crossings; by 11 percent under alternative G to 63 stream crossings; and by 10 percent under alternative C to 64 crossings. Under alternative E, 23 of the stream crossing go to administrative use only; under alternatives D, F, and G, 21 go to administrative use only; and under alternative C, 20 go to administrative use. The greater the reduction in miles of motorized routes and number of motorized stream crossing in the analysis areas, the less the potential for direct and indirect effects. Additionally, the more of these miles and crossings that go to administrative use only, the less the potential for direct and indirect effects. The reduction in direct and indirect effects to the species and its habitat is relative to the amount of miles and stream crossings reduced in the analysis areas.

The area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 98 percent under alternative D, 42 percent under alternative F, 97 percent under alternative G, and 12.5 percent under alternative C.

Avian Analysis

Analyses for this document in regard to avian species are based on an extensive literature review, the “Gila National Forest Plan,” “Mexican Spotted Owl Recovery Plan,” “Northern Goshawk Management Recommendations” (GTR RM-17), and the “New Mexico Partners in Flight (NMPIF) Draft Land Bird Conservation Plan for the State of New Mexico” (New Mexico Partners in Flight 2010).

Studies examining the effects that motorized roads have on avifauna are relatively numerous compared to guilds of other species such as large carnivores and amphibians. Studies emphasizing the direct effect of road mortality to bird species were historically most prevalent, with more recent ornithological analyses focusing on habitat fragmentation and modification, and road effects to migratory bird species. Liddle (1997) states that road building, and particularly alteration of roadside habitat, can have a major effect on passerine (songbird) species. Volume of traffic was shown to have a quantitative effect on the density of nesting birds (Reijnen et al. 1995), with noise identified as the main disturbance factor. Edges of roads with low traffic densities may actually provide nesting areas for some species, if managed properly (Warner 1992). Gaines et al. (2003) summarized motorized routes’ effects to focal species of birds occurring as edge effects, habitat loss or fragmentation, disturbance at specific sites, collisions, snag reduction, physiological response, and routes for competitors or predators. Habitats important to bird species vary widely according to each species’ life history and occur across the entire forest. As with analyses for the other guilds of species in this analysis, it is appropriate for focal species to be selected from each habitat type selected. Analysis was conducted for the following guilds of avian species: raptorial birds, primary cavity nesters, riparian birds, songbirds from forested areas, songbirds from grassland areas, and game birds. Analyses for road effects to wildlife, and specifically on guilds of avian species, can be generally described as follows:

1. A greater potential for harvest/direct effects, and
2. Disturbance/indirect effects.

Road mile reduction is identified as the main disturbance factor for measuring direct effects, so analyses of each action alternative's road miles as it pertains to that species or guild of species occupying that habitat type will be the first analytical tool to measure the Gila National Forest's travel management project proposed action and each alternative. To measure indirect effects, acres of disturbance are calculated for focal species within each habitat type. A zone of disturbance on either side of the road will be the analysis tool for that guild of species occupying that habitat type.

Raptorial Birds

Human activities can impact raptorial birds (hawks, falcons, and owls) by physically harming or killing birds, altering habitats, or disrupting normal behavior (Postovit and Postovit 1987, Richardson and Miller 1997). At key stages in a raptor's breeding activity, such as courtship periods and nest building, raptorial birds may desert a nest site as a result of disturbance (Hamann et al. 1999). Alteration of habitat could physically remove nest sites, potential nest sites, roost sites, disrupt perching and hunting locations, or alter the prey base on which these species rely (Hamann et al. 1999). Distances at which raptors flush from human activity from vehicles has been recorded for some species (Richardson and Miller 1997, and Holmes et al. 1993). Energy used for escape flights can further affect birds of prey during periods of extreme weather or prey scarcity (Stalmaster and Newman 1978, Buehler et al. 1991, and Grubb et al. 1992). Management recommendations to minimize effects to raptorial birds from roads include temporary or permanent closure of roads near nesting areas, managing travel corridors such that vehicles and campers do not remain close to known nest sites, and buffering known or potential nesting areas from human disturbances. The literature suggests that raptors are unlikely to be disturbed by routine use of roads, homes, and other facilities where such use predates the species' successful nesting activity in a given area. Therefore, in most cases, ongoing existing uses may proceed with the same intensity with little risk of disturbing birds of prey (USFWS 2007) (table 85).

Mexican Spotted Owl – The "Mexican Spotted Owl Recovery Plan" divided the range of the owl into 11 geographic areas called "recovery units" (RUs). One of these recovery units, "The Upper Gila Mountains" recovery unit partially falls within the boundary of the Gila National Forest. The Upper Gila Mountains Recovery Unit contains the largest known number of Mexican spotted owls (MSOs) of all the recovery units with 55 percent of known Mexican spotted owl territories (Ward et al. 1995). The forest plan amendment standards and guidelines state**:**

> "Establish a Protected Activity Center (PAC) at all MSO sites located during surveys and all management territories established since 1989. Delineate an area of not less than 600 acres around the PAC using boundaries of known habitat polygons and/or topographic features."

On the Gila National Forest, we have 286 protected activity centers; and approximately 604,825 acres of designated critical habitat outside of wilderness. The Gila National Forest has the highest number of protected activity centers of any national forest within the range of the species. Most of these designated management areas are within the boundary of mixed conifer habitat on the forest (84,337 acres of non-wilderness and 79,579 acres of wilderness). Gainey et al. (2008) suggest that the Gila region is a source population for Mexican spotted owls and that the species is highly correlated with both cliff/rock habitat, and mixed conifer habitat cover type. Mixed

conifer and pine-oak forests are identified in the "Mexican Spotted Owl Recovery Plan" as the habitat type in this recovery unit where Mexican spotted owls are primarily found.

Table 85. Raptor species selected to be analyzed and rationale for selection

Species Analyzed	Rationale for Selection
Northern goshawk[1]	FS sensitive species, management indicator species representative of ponderosa pine habitat cover type, and NM PIF high priority species.
Peregrine falcon[2]	FS sensitive species and NM PIF high priority species.
Bald eagle	FS sensitive species and protected under the Bald and Golden Eagle Protection Act of 1962.
Golden eagle	Protected under the Bald and Golden Eagle Protection Act of 1962.
Mexican spotted owl[3]	Federally listed "threatened" species with designated critical habitat, management indicator species representative of mixed conifer habitat cover type, and NM PIF high priority species.

[1] The ponderosa pine analysis area for this Gila MIS/NMPIF HP/Focal species will be used to determine potential effects to other NMPIF high priority species that occur in this habitat type (flammulated owl).
[2] The analysis area for this Forest Service sensitive species/NMPIF HP/Focal species will be used to determine potential effects to other NMPIF high priority species that occur in cliff habitats (prairie falcon).
[3] The mixed conifer analysis area for this Gila MIS/NMPIF HP/Focal species will be used to determine potential effects to other NMPIF high priority species that occur in this habitat type (Williamson's sapsucker, olive-sided flycatcher, dusky flycatcher, and red-faced warbler. The disturbance zone for these upland birds is similar to that of the Mexican spotted owl).

The "Mexican Spotted Owl Recovery Plan" states that recreation activities may affect Mexican spotted owls directly by disturbing nests, roosts, or foraging areas. Indirect disturbance was identified from recreation through altered habitat caused by trampling of vegetation, soil damage, or both. The "Mexican Spotted Owl Recovery Plan" states if a given recreational activity does not cause habitat alteration, the activity will have a generally low impact potential to spotted owls. The plan also states that noise produced from vehicles may disturb spotted owls at important nesting and roost sites. Gaines et al. (2003) reviewed studies on the northern spotted owl and determined that road and trail associated factors that were likely to affect spotted owls were collisions, disturbances at a specific site, physiological responses, edge effects, and snag reduction. These same factors are expected to affect the Mexican spotted owl. During a study investigating noise effects to Mexican spotted owl, Delaney et al. (1999) found that owls did not flush from roosts or nests when chain saws were used greater than 105 meters away. Mexican spotted owls were determined to be capable of hearing road construction noise from as far as 400 meters away, though responses to these noises were not documented (Delaney and Grubb 2002). A study investigating noise disturbance from helicopters on the Lincoln National Forest indicated that a 105-meter buffer zone for helicopter overflights would minimize Mexican spotted owl flush response and any potential effects on nesting activity (Delaney et al. 1999). To analyze effects to this species from the proposed action and each alternative of the travel management project on the Gila National Forest, analysis will focus on two factors:

1. To analyze the potential for harvest/direct disturbance effects of motorized activities to Mexican spotted owls, we will measure road miles within protected activity centers,

Mexican spotted owl critical habitat, and within the mixed conifer vegetation type as these miles pertain to the existing condition and the change proposed in each alternative.

2. To analyze potential disturbance/indirect effects we will use a disturbance zone of 105 meters within protected activity centers, critical habitat, and mixed conifer vegetation types as it pertains to the existing condition and to the change proposed in each alternative (table 86).

Table 86. Summary of the harvest indicator, disturbance indicator, and analysis area used to analyze the effects of the different alternatives to raptors

Focal Species	Motorized Activity	Harvest Indicator	Disturbance Zone	Analysis Area
Northern goshawk	Motorized trail or OHV and roads	Route Miles	400 m	PFAs, ponderosa pine
Peregrine falcon	Motorized trail or OHV and roads	Route Miles	2,200 m	Peregrine nest area
Bald eagle	Motorized trail or OHV and roads	Route Miles	500 m	Quemado Lake, Snow Lake, and Lake Roberts
Golden eagle	Motorized trail or OHV and roads	Route Miles	200 m	Desert shrub or grassland
Mexican spotted owl	Motorized trail and roads	Route Miles	105 m	Protected activity centers, critical habitat, mixed conifer

Raptors – Effects by Alternative

Northern Goshawk (Forest Service Sensitive Species, Gila MIS Species, and NMPIF High Priority Species)

Table 87. Northern goshawk post-fledgling area analysis area – existing condition and proposed change by issue and alternative

Northern Goshawk Post-Fledgling Area Analysis Area on NFS Land = 34,961 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	97	106	50	33	71	70
Percent in miles of alt. B (Existing)		9%	-49%	-66%	-27%	-28%
Motorized dispersed camping acres	31,962	-29,911	-31,021	-31,962	-29,998	-30,275
Percent in acres of alt. B (Existing)		-94%	-97%	-100%	-94%	-95%
Motorized areas in acres - all vehicles	0	0	0	0	0	0
Motorized big game retrieval acres	31,962	-383	-31,021	-31,962	-6,311	-30,275
Percent in acres of alt. B (Existing)		-1%	-97%	-100%	-20%	-95%

Table 88. Northern goshawk ponderosa pine analysis area – existing condition and proposed change by issue and alternative

Northern Goshawk Ponderosa Pine Analysis Area on NFS Land = 1,177,746 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	1,994	1,999	1,394	1,043	1,597	1,585
Percent in miles of alt. B (Existing)		<+1%	-30%	-48%	-21%	-21%
Motorized dispersed camping acres	903,431	-856,552	-867,641	-903,431	-858,877	-863,114
Percent in acres of alt. B (Existing)		-95%	-96%	-100%	-95%	-96%
Motorized areas in acres - All vehicles	9	NC	-9	-9	NC	NC
Motorized big game retrieval acres	903,431	-98,979	-867,641	-903,431	-298,469	-863,114
Percent in acres of alt. B (Existing)		-11%	-96%	-100.00%	-33%	-96%

Peregrine Falcon (Forest Service Sensitive Species and New Mexico Partners in Flight High Priority Species)

Table 89. Peregrine falcon analysis area – existing condition and proposed change by issue and alternative

Peregrine Falcon Nest/Management Analysis Area on NFS Land = 47,408 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Motorized Routes						
Miles of open existing ML 2–ML 5	19	0	-7	-13	-3	-5
Miles of administrative route	0	0	0	5	0	0
Total FS routes and trails in miles	19	20	13	11	17	15
Percent in miles of alt. B (Existing)		+2%	-33%	-44%	-13%	-22%
Motorized dispersed camping acres	20,764	-20,221	-20,512	-20,764	-20,221	-20,512
Percent in acres of alt. B (Existing)		-97%	-99%	-100%	-97%	-99%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	20,764	-5,873	-20,512	-20,764	-11,732	-20,512
Percent in acres of alt. B (Existing)		-28%	-99%	-100%	-57%	-99%

Bald Eagle (Forest Service Sensitive Species)

Table 90. Bald eagle analysis area – existing condition and proposed change by issue and alternative

Bald Eagle Analysis Area-Lake Habitat 500-Meter Buffer on NFS Land = 2,081 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	7	<7	<7	<7	<7	<7
Percent in miles of alt. B (Existing)		<-1%	-3%	-3%	-3%	-3%
Motorized dispersed camping acres	2,031	-2,026	-2,026	-2,031	-2,026	-2,026
Percent in acres of alt. B (Existing)		-99.7%	-99.7%	-100%	-99.7%	-99.7%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	2,031	0	-2,026	-2,031	-153	-2,026
Percent in acres of alt. B (Existing)		0%	-99.7%	-100%	-8%	-99.7%

Golden Eagle (Protected Under the Bald and Golden Eagle Protection Act of 1962)

Table 91. Golden Eagle analysis area – existing condition and proposed change by issue and alternative

Golden Eagle Habitat (Desert Shrub/Grassland) Analysis Area Total Habitat on NFS Land = 18,138 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Motorized Routes						
Total FS routes and trails in miles	25	26	20	16	20	20
Percent in miles of alt. B (Existing)		4%	-21%	-34%	-19%	-19%
Motorized dispersed camping acres	15,795	-14,838	-14,993	-15,795	-14,858	-14,995
Percent in acres of alt. B (Existing)		-94%	-95%	-100%	-94%	-95%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	15,795	-2,508	-14,993	-15,795	-7,426	-14,995
Percent in acres of alt. B (Existing)		-16%	-95%	-100%	-47%	-95%

No Action Alternative (Alternative B): Under the existing condition for raptors, there are 97 miles of motorized routes in the northern goshawk post-fledgling area analysis area, 1,985 miles of motorized routes in the northern goshawk ponderosa pine analysis area, 19 miles of motorized routes in the peregrine falcon analysis area, 7 miles of motorized routes in the bald eagle analysis area, and 25 miles of motorized routes in the golden eagle analysis area. Habitat associated with these routes has been lost and will not recover unless the route is closed and possibly decommissioned. The potential disturbance zone for goshawks in the post-fledgling area analysis area is 21,041 acres, 455,287 acres in the goshawk ponderosa pine analysis area, 19 miles of road

in the peregrine falcon analysis area, 1,632 acres in the bald eagle analysis area, and 3,248 acres in the golden eagle area. Within these potential disturbance zones, motorized routes continue to cause the potential for disturbance, displacement, avoidance, and harassment. The literature suggests that raptors are unlikely to be disturbed by routine use of roads, homes, and other facilities where such use predates the species' successful nesting activity in a given area. Therefore, in most cases, ongoing existing uses may proceed with the same intensity with little risk of disturbing birds of prey (USFWS 2007). Increases in the level of use on these routes, through time, would increase the potential for indirect effects.

Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval would continue to be allowed across the Gila National Forest. These three types of use continue to have potential effect on raptors. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road density. Under the no action alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to these species.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel would no longer be allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. In the goshawk post-fledgling area analysis area, motorized dispersed camping is reduced by 94 to 100 percent under all action alternatives; goshawk ponderosa pine analysis area 95 to 100 percent; peregrine falcon analysis area 97 to 100 percent; bald eagle analysis area 99.7 to 100 percent; and 94 to 100 percent in the golden eagle analysis area. For these focal species, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 95 to 99.7 percent under alternative D, 8 to 57 percent under alternative F, 95 to 99.7 percent under alternative G, and 0 to 16 percent under alternative C. The wide range of change between focal species under alternative F is, more specifically, a reduction of 8 percent in the bald eagle analysis area; 20 percent reduction in the goshawk post-fledgling area analysis area; 33 percent reduction in the goshawk ponderosa pine analysis area; 57 percent reduction in the peregrine falcon analysis area; and 47 percent reduction in the golden eagle analysis area.

Motorized areas are locations where there have been traditional uses like motorized camping and OHV use. For all focal species except the goshawk ponderosa pine analysis area, no areas have been designated under any of the action alternatives. In the goshawk ponderosa pine analysis area, currently there are 9 acres of habitat being affected by a motorized area. Alternatives E and D eliminate these acres of affected habitat, and the remaining action alternatives propose no change from the existing condition.

Under alternatives D, E, F, and G, the number of miles of motorized routes and trails and acres of potentially affected habitat is reduced respectively by 49, 66, 27, and 28 percent in the goshawk post-fledgling area analysis area; 30, 48, 21, and 21 percent in goshawk ponderosa pine analysis area; 33, 44, 13 and 22 percent in peregrine analysis area; 3, 3, 3, and 3 percent in the bald eagle analysis area; and 21, 34, 19 and 19 percent in the golden eagle analysis area. Under alternative C, miles of motorized routes and trails and acres of potentially affected habitat is increased by 9 percent in the goshawk post-fledgling area analysis area; less than 1 percent in the goshawk ponderosa pine analysis area; 2 percent in the peregrine analysis area; 4 percent in the golden eagle analysis area; and is reduced by less than 1 percent in the bald eagle analysis area.

For the focal species and their associated analysis areas, alternative E adds no miles of routes, alternative D adds 0 to 8 miles, alternatives F and G add 0 to 21 miles, and alternative C adds 0 to 41 miles of unauthorized routes. Alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis areas. Because the forest allows cross-country travel on some proposed routes, even though unauthorized, they are currently being used. See table 92, table 93, and table 94 for species determination by alternative.

Table 92. Raptorial birds Forest Service sensitive species determination by alternative

Sensitive Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Northern goshawk		*MI	MI	MI	MI	MI
Peregrine falcon		MI	MI	MI	MI	MI
Bald eagle		MI	MI	MI	MI	MI
Rationale for Determination	Under alternatives D, E, F, and G, the potential effects to these raptors are reduced, particularly under alternatives E and D. Under alternative C, there is an increase in motorized routes in the goshawk analysis areas, peregrine analysis area, and golden eagle analysis area. The potential to affect individuals under all action alternatives exists; therefore, a determination of “may impact” is made for all action alternatives. None of the alternatives would affect the viability of these species or cause a trend toward Federal listing.					

*MI – may impact

Table 93. Northern goshawk Gila National Forest management indicator species determination by alternative

Management Indicator Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Northern goshawk		*NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives D, E, F, and G the potential effects to goshawks are reduced, particularly under alternatives E and D. Under alternative C, there is an increase in motorized routes in both goshawk analysis areas. The potential to affect individuals under all action alternatives exists. Population and habitat trends for the northern goshawk would not be affected by any of the action alternatives.					

*NA – no adverse effects to the population or habitat trends

Table 94. Raptor New Mexico Partners in Flight (NMPIF) high priority species determination by alternative

NMPIF High Priority Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Northern goshawk		*NA	NA	NA	NA	NA
Flammulated owl		NA	NA	NA	NA	NA
Peregrine falcon		NA	NA	NA	NA	NA
Prairie falcon		NA	NA	NA	NA	NA
Golden eagle		NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives D, E, F, and G, the potential effects to these species are reduced, particularly under alternatives E and D. Under alternative C, there is an increase in motorized routes in goshawk ponderosa pine analysis areas, the peregrine analysis area, and the golden eagle analysis area. The potential to affect individuals under all action alternatives exists; but there will be no measurable negative effects on these migratory species. Unintentional take of individuals may occur, but these alternatives will not negatively affect population levels.					

*NA – no adverse effects to the population or habitat trends

Mexican Spotted Owl (Federally Listed Threatened species, with Designated Critical Habitat, Gila Management Indicator Species, and NMPIF High Priority Species)

Table 95, table 96, and table 97 provide comparisons of existing conditions and proposed change by issue and alternatives.

Table 95. Mexican spotted owl protected activity center analysis area – existing condition and proposed change by issue and alternative

Mexican Spotted Owl Protected Activity Centers (MSO PACs) Analysis Area on NFS Land = 187,083.17 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	244	250	128	80	184	183
Percent in miles of alt. B (Existing)		3%	-48%	-67%	-25%	-25%
Motorized dispersed camping in acres	132,119	-128,145	-130,568	-132,119	-128,624	-129,520
Percent in acres of alt. B (Existing)		-97%	-99%	-100%	-97%	-98%
Motorized areas in acres - all vehicles	0	0	0	0	0	0
Motorized big game retrieval acres	132,119	-16,442	-130,568	-132,119	-49,278	-129,520
Percent in acres of alt. B (Existing)		-12%	-99%	-100%	-37%	-98%

Table 96. Mexican spotted owl critical habitat analysis area – existing condition and proposed change by issue and alternative

Mexican Spotted Owl Critical Habitat Analysis Area on NFS Land = 1,122,932 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternatives				
		C	D	E	F	G
Total FS routes and trails in miles	1,308	1,343/+35	882/-426	569/-739	1,041/-267	1,043/-265
Percent in miles of alt. B (Existing)		3%	-33%	-57%	-20%	-20%
Closed road to OHV trail in miles	0	7	NC	NC	7	7
Add unauthorized trail in miles	0	43	NC	NC	4	4
Motorized dispersed camping acres	604,825	-577,147	-584,498	-604,825	-578,062	-580,600
Percent in acres of alt. B (Existing)		-95%	-97%	-100%	-96%	-96%
Motorized areas in acres - all vehicles	1	NC	-1	-1	NC	NC
Motorized big game retrieval acres	604,825	-78,693	-584,498	-604,825	-222,323	-580,600
Percent in acres of alt. B (Existing)		-13%	-97%	-100%	-37%	-96%

Table 97. Mexican spotted owl mixed conifer or restricted habitat analysis area – existing condition and proposed change by issue and alternative

Mexican Spotted Owl Habitat (Restricted or Mixed Conifer) Analysis Area on NFS lands= 163,916 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternatives				
		C	D	E	F	G
Total FS routes and trails in miles	105	115	67	45	83	83
Percent in miles of alt. B (Existing)		10%	-36%	-57%	-21%	-21%
Motorized dispersed camping in acres	84,101	-81,721	-82,278	-84,101	-81,869	-82,135
Percent in acres of alt. B (Existing)		-97%	-98%	-100%	-97%	-98%
Motorized areas in acres - all vehicles	0	NC	NC	NC	NC	NC
Motorized big game retrieval acres	84,101	-13,631	-82,278	-84,101	-34,745	-82,135
Percent in acres of alt. B (Existing)		-16%	-98%	-100%	-41%	-98%

No Action Alternative (Alternative B): Under this alternative, there are 244 miles of motorized routes in protected activity centers, 1,308 miles in designated Mexican spotted owl critical habitat, and 105 miles in protected mixed conifer habitat. These routes continue to cause habitat loss. The potential for other types of direct effects to the Mexican spotted owl are relatively low. The potential for collision or poaching loss is relatively low on Forest Service motorized routes because of lower traffic rates and travel speeds, and the tendency for this species to be more active at night. On motorized routes with higher speeds and more traffic, Mexican spotted owl collision losses have been documented.

The potential disturbance area in protected activity centers (19,372 acres), Mexican spotted owl critical habitat (100,904 acres), and mixed conifer habitat (10,381 acres) continues to cause the potential for indirect effects. The literature suggests that raptors are unlikely to be disturbed by routine use of roads, homes, and other facilities where such use predates the species' successful nesting activity in a given area. Therefore, in most cases ongoing existing uses may proceed with the same intensity with little risk of disturbing birds of prey (USFWS 2007). Increases in the level of use on these routes through time would increase the potential for indirect effects.

Under this alternative, you continue to have motorized cross-country travel and dispersed camping allowed across the Gila National Forest. These two types of use continue to have the potential to impact Mexican spotted owl protected activity center habitat (132,119 acres), designated critical habitat (604,825 acres), and yet to be identified protected activity centers in unsurveyed mixed conifer habitat. Additionally, these two types of use perpetuate the development of additional roads and OHV routes; potentially allowing for development of more routes than the 244 miles that are currently identified in protected activity centers, 1,308 miles in designated Mexican spotted owl critical habitat, and 105 miles in mixed conifer habitat. So under this alternative, through time the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to the species and habitat.

Effect Common to All Action Alternatives (C, D, E, F, and G): Under these alternatives, motorized cross-country travel (see assumption) is no longer allowed. The authorization to allow motorized dispersed camping in these alternatives is reduced by 95 to 100 percent in areas with Mexican spotted owl habitat. No motorized areas are designated in Mexican spotted owl protected activity centers or mixed conifer habitat. Under all action alternatives, the change from the existing condition is a 100 percent reduction in motorized cross-country travel. It is also important to note that Mexican spotted owls typically nest and roost in narrow or steep canyons with a dense canopy cover and large amount of dead and down material. These nesting and roosting characteristics further limit the potential to cause direct and indirect effects to Mexican spotted owls and their habitat from dispersed camping. Under alternatives C, F, and G, our analysis shows that there is 1 acre of disturbance to Mexican spotted owl critical habitat. This disturbance does not affect any of the primary constituent elements in designated critical habitat. Since no motorized areas are located in protected activity centers or mixed conifer habitat, and the 1 acre within the boundary of critical habitat does not affect the primary constituent elements, none of these actions will have an effect to Mexican spotted owls or their habitat.

Differences Among the Action Alternatives (C, D, E, F, and G): Miles of motorized routes and trails and acres of potentially affected habitat are reduced by 57 to 67 percent in all analysis areas under alternative E; 33 to 48 percent under alternative D; and 20 to 25 percent under alternatives F and G (see table 95, table 96, and table 97 for specific numbers). Additionally, under alternatives E and D, more of the routes are only open to administrative use, which also reduces the potential for direct and indirect effects. Under alternative D, you also have a seasonal restriction in an area that has several established protected activity centers adding more protection to nesting Mexican spotted owls. The greater the reduction in miles and acres of potentially affected habitat in these analysis areas, the less direct and indirect effects; the reduction in direct and indirect effects to the species and its habitat is relative to the amount of miles reduced in these analysis areas. Miles of motorized routes and trails and acres of potentially affected habitat increase by 3 to 10 percent in all analysis areas under alternative C. Since these are new miles and

acres of disturbance, there is a greater potential to cause direct and indirect effects to this species and its habitat under alternative C.

Alternatives E and D add 0 miles of currently closed or unauthorized routes in the protected activity center analysis area. Alternatives F and G add 2 miles of currently closed motorized trails and 2 miles of currently unauthorized routes to the protected activity center analysis area. Alternative C adds 2 miles of currently closed motorized trail and 7 miles of unauthorized routes to the protected activity center analysis area. In restricted habitat, alternative C is the only action alternative that adds any currently closed or unauthorized routes, adding 11 miles to this analysis area. In critical habitat, all action alternatives at a minimum reopen 1 mile of road. The reopening of this 1 mile should not affect the primary constituent elements of critical habitat. Alternatives F and G reopen an additional 7 miles of closed road to OHVs and 4 miles of unauthorized trail. These two alternatives have a greater potential to affect the primary constituent elements of critical habitat. Alternative C reopens an additional 7 miles of closed road to OHVs and 43 miles of unauthorized trail. This alternative has the greatest potential to affect the primary constituent elements of critical habitat. Alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis areas. New routes have the potential to cause new disturbance (table 98, table 99, and table 100). In these analysis areas, potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 97 to 99 percent under alternative D, 37 to 41 percent under alternative F, 96 to 98 percent under alternative G, and 12 to 16 percent under alternative C.

Table 98. Mexican spotted owl federally listed species and critical habitat determinations by alternative

Federally Listed Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Mexican spotted owl		*MALAA	*MANLAA	MANLAA	MALAA	MALAA
Mexican spotted owl critical habitat		MALAA	MANLAA	MANLAA	MALAA	MALAA
Rationale for Species Determination	Under alternatives E and D, longer term beneficial effects to the species and its habitat are greater than the other action alternatives, respectively. Under alternatives F and G, long-term beneficial effects are less, but both still benefit the species and its habitat above the existing condition. These four alternatives change the use within portions of each of the analysis areas; proposing administrative use. This change causes less effects than roads and trails open to all of the public. Alternatives E and D don't add any closed roads in protected activity centers and don't change the primary constituent elements of designated critical habitat, don't affect mixed conifer habitat, and don't increase, but rather decrease disturbance in occupied habitat. Therefore, a determination of "may affect, not likely to adversely affect" is made for these two alternatives. Alternatives F and G add closed and currently unauthorized routes to Mexican spotted owl protected activity centers and critical habitat providing for the potential for new direct and disturbance effects. Alternative C adds closed and currently unauthorized routes to protected activity centers, critical habitat, and restricted/mixed conifer habitat providing for the potential for new direct and disturbance effects. Again, alternative C is the only alternative that allows for an increase in miles of routes above the existing condition. Even though alternatives C, F, and G would have long-term beneficial effects to the Mexican spotted owl and its habitat, adding routes can cause adverse effects, requiring a "may affect likely to adversely affect" determination be made for these three action alternatives. Additionally, alternatives F and C continue to allow big game retrieval in a greater proportion of the analysis areas than the other action alternatives. The relative risk of affecting the primary constituent elements in critical habitat and causing direct effects to the habitat is greater under these two alternatives.					

Table 98. Mexican spotted owl federally listed species and critical habitat determinations by alternative

Federally Listed Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Rationale for Critical Habitat Determination	Alternatives E and D don't add any closed roads in protected activity centers and do not change the primary constituent elements of designated critical habitat, and they don't affect mixed conifer habitat. Alternatives F and G add closed and currently unauthorized routes to Mexican spotted owl protected activity centers and critical habitat providing for the potential for new direct and disturbance effects. Alternative C adds closed and currently unauthorized routes to Mexican spotted owl protected activity centers, critical habitat, and restricted/mixed conifer habitat providing for the potential for new direct and disturbance effects. Again, alternative C is the only alternative that allows for an actual increase in miles of routes above the existing condition. Alternatives E and D don't change the primary constituent elements in critical habitat, therefore, a determination of "may affect, not likely to adversely affect " is made for these two alternatives. Alternatives C, F, and G add routes to designated critical habitat which can affect the primary constituent elements; therefore, a determination of "may affect, likely to adversely affect;" is made for these three alternatives.					

*MALAA - may affect likely to adversely affect determination

**MANLAA - may affect not likely to adversely affect determination

Table 99. Mexican spotted owl Gila National Forest management indicator species determination by alternative

Management Indicator Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Mexican spotted owl		NA	NA	NA	NA	NA
Rationale for Determination	Population and habitat trends for the Mexican spotted owl would not be affected by any of the action alternatives.					

Table 100. New Mexico Partners in Flight (NMPIF) high priority species determination by alternative

NMPIF High Priority Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Mexican spotted owl		*NA	NA	NA	NA	NA
Williamson's sapsucker		NA	NA	NA	NA	NA
Olive-sided flycatcher		NA	NA	NA	NA	NA
Dusky flycatcher		NA	NA	NA	NA	NA
Red-faced warbler		NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives D, E, F, and G, the potential effects to these species are reduced, particularly under alternatives E and D. Under alternative C, there is an increase in motorized routes in the mixed conifer habitat analysis areas. The potential to affect individuals under all action alternatives exists; but there will be no measurable negative effects on these migratory species. Unintentional take of individuals may occur, but these alternatives will not negatively affect population levels.					

*NA – no adverse effects to the population or habitat trends

Primary Cavity Nesters and Excavators

Disturbance to primary cavity nesters from roads, including negative edge effects and snag and downed log reduction from wood harvesting, prescribed fire, and safety implementation is well documented (Bull and Holthausen 1993, Kreisel and Stein 1999, Hutto 1995, Milne and Heijl 1989, Raphael and White 1984). Scott and Patton (1978) conducted a study examining the characteristics of ponderosa pine snags used by cavity nesters in Arizona, and determined that larger ponderosa pine snags, greater than 15 inches diameter at breast height (d.b.h.) were preferred by all 14 species of birds whose nests were located during the study. Gaines et al. (2003) assessed effects of road associated factors on primary cavity excavators by buffering open roads through forested habitat by 60 meters on either side of the road. The analysis area selected (Gaines et al. 2003) was at the 5th-code watershed level. The focal species used for the analysis is the hairy woodpecker (table 101 and table 102). To analyze effects to this guild of species from the proposed action and each alternative of the travel management project on the Gila National Forest, analysis will focus on two factors:

1. To analyze the potential for harvest/direct effects of motorized activities to primary cavity nesters, road miles within ponderosa pine and mixed conifer vegetation cover types were measured, as these densities pertain to the existing condition and the change proposed in each alternative.
2. To analyze disturbance/indirect effects, a disturbance zone of 60 meters from roads within ponderosa pine and mixed conifer vegetation cover types was used as it pertains to the existing condition and the change proposed in each alternative (see table 100).

Table 101. Primary cavity nester and excavator species selected to be analyzed and rationale for selection

Species Analyzed	Rationale for Selection
Hairy woodpecker	Management indicator species representative of ponderosa pine and mixed conifer snag component

Table 102. Summary of the harvest indicator, disturbance indicator, and analysis area that was used to analyze the effects of the different alternatives to cavity nesters

Focal Species	Motorized Activity	Harvest Indicator	Disturbance Zone	Analysis Area
Hairy woodpecker	Motorized trail or OHV use	Route Miles	60 m	Ponderosa pine Mixed conifer

Overall, the hairy woodpecker appears to be minimally impacted by forest fragmentation, although a few studies have reported a decline in numbers as forest patch size decreases. The hairy woodpecker is the focal species for this group/guild of species. The analysis indicators for direct and disturbance effects are described above.

Cavity Nesting Birds – Effects by Alternative

Hairy Woodpecker (Gila MIS Species - Representative of Ponderosa Pine and Mixed Conifer Snag Component Species)

Table 103. Hairy woodpecker habitat (ponderosa pine and mixed conifer) analysis area – existing condition and proposed change by alternative

Analysis Area Total Habitat on NFS Land = 1,341,662 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	2,099	2,114	1,461	1,089	1,680	1,668
Percent in miles of alt. B (Existing)		1%	-30%	-48%	-20%	-21%
Motorized dispersed camping acres	987,532	-938,273	-949,919	-987,532	-940,746	-945,249
Percent in acres of alt. B (Existing)		-95%	-96%	-100%	-95%	-96%
Motorized areas in acres - all vehicles	9	NC	-9	-9	NC	NC
Motorized big game retrieval acres	987,532	-112,610	-949,919	-987,532	-333,214	-945,249
Percent in acres of alt. B (Existing)		-11%	-96%	-100%	-33%	-96%

No Action Alternative (Alternative B): Under the existing condition for the hairy woodpecker and its associated analysis area, there are 2,087 miles of motorized routes. Habitat associated with these routes has been lost and will not recover unless the route is closed and possibly decommissioned, and the potential for direct effects like collision, poaching, and collection would continue. The potential disturbance zone for this species and its associated analysis area is 98,052 acres. Within this potential disturbance zone, motorized routes continue to cause the potential for disturbance, displacement, avoidance, and harassment. Increase in the level of use on these routes through time would increase the potential for indirect effects.

Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval would continue to be allowed across the Gila National Forest. These three types of use continue to have potential effects to cavity nesting birds. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road density. Under the no action alternative, through time, the potential for direct loss of individuals and habitat would increase, as would the potential for disturbance effects to the hairy woodpecker.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel would no longer be allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. Motorized dispersed camping is reduced by 95 to 100 percent under all action alternatives. Motorized big game retrieval is reduced by 100 percent

under alternative E, 96 percent under alternatives D and G, 33 percent under alternative F, and 11 percent under alternative C.

Motorized areas are locations where there have been traditional uses like motorized dispersed camping and OHV use. In this analysis area, 9 acres of habitat are being affected by a motorized area. Alternatives E and D eliminate these acres of affected habitat, and the remaining action alternatives propose no change from the existing condition.

Under alternatives D, E, F, and G, miles of motorized routes and trails and acres of potentially affected habitat are reduced by 30 percent, 48 percent, 20 percent, and 21 percent, respectively, in this analysis area. Under alternative C, miles of motorized routes and trails and acres of potentially affected habitat are increased by 1 percent.

For the focal species and their associated analysis areas, alternative E adds no miles of routes, alternative D adds 8 miles, alternative F adds 22 miles, alternative G adds 23 miles, and alternative C adds 53 miles of unauthorized routes. None of the action alternatives allow for an actual increase in the total miles of routes through the associated analysis areas, except alternative C, which allows for a 1 percent increase. Because the Gila National Forest allows motorized cross-country travel, some proposed routes, even though unauthorized, are currently being used.

Table 104. Hairy woodpecker Gila National Forest management indicator species determination by alternative

Management Indicator Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Hairy woodpecker		*NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives D, E, F, and G, the potential effects to cavity nesting birds are reduced. Alternative C slightly increases the miles of motorized routes, but reduces the effects of motorized cross-country travel. The potential to cause the unintentional take of individuals exist under all action alternatives, but the population and habitat trends for the hairy woodpecker would not be affected by any of the action alternatives.					

*NA – no adverse effects to the population or habitat trends

Riparian Birds

As with the amphibian analysis included in this report, avian species that occupy riparian habitat on the Gila National Forest can be affected by vehicular traffic and roads by disturbance at a specific site, displacement or avoidance, habitat loss or fragmentation, and collisions (Gaines et al. 2003). Knight and Cole (1991) indicate that birds may respond to human activity by altering their behavior, spatial distribution, and habitat use. Corridors created by roads can fragment songbird habitat, and human activity within these areas may displace or disrupt breeding activity for songbirds and other avian species (Hamann et al. 1999). Increased nest parasitism by brown-headed cowbirds and increased access by nest predators is also a major source of disturbance in fragmented riparian ecosystems. Fragmentation of limited, high value habitats such as riparian corridors may result in some of the most severe impacts to songbirds (Hamann et al. 1999). Hutto (1995) indicates that many songbird species are largely or exclusively restricted to riparian habitats. Therefore, it can be inferred that songbirds occupying these specific habitats will be more affected by riparian corridor fragmentation via roads and trails, than fragmentation of

adjacent forests (Hamann et al. 1999). A recommended corridor buffer of 100 meters or greater was suggested as the minimum width within fragmented riparian habitat necessary to minimize effects to songbirds (Vander Hagen and Degraaf 1996). Other researchers have suggested managers buffer minimum corridor widths from 75 to 175 meters to include at least 90 percent of all songbird species that may be impacted by road fragmentation of habitat. This analysis used a buffer of 100 meters on each side of the road to analyze the effects of roads to riparian bird species. Road miles and densities in riparian corridors were the analytical tool by which direct effects to riparian bird species were measured (see table 105 and table 106).

Southwestern Willow Flycatcher - The subspecies was listed as endangered effective March 29, 1995 (USFWS 2002). The Southwestern willow flycatcher breeds in relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands, including lakes (e.g., reservoirs) (USFWS 2002). In 2007, the New Mexico population was estimated at 800 to 900 birds, based on documentation of approximately 514 territories and 403 nests (NMPIF 2010). The total species population is estimated at 1,200 territories or approximately 2,400 individuals (Durst et al. 2008). About 32 percent of the global population is thought to occur in New Mexico (NMPIF 2010). On the Gila National Forest, we have two sites along the Gila River that have been consistently occupied for over 10 years. These two areas are in locations known as the Gila Bird Management Area (GBMA) and the Forest West ditch site. In 2008, seven territories were found at the Gila Bird Management Area and four territories at the Forest West ditch site (Shook 2009). In 2007, a new breeding site was discovered on the forest along the San Francisco River (Keller Canyon site). The Keller Canyon site, located on the reach between Deep Creek and Alma Highway 180, had three flycatcher territories in 2007, 2008, and 2009.

Ubar Ranch, found in the Cliff-Gila Valley on private land, is located near the two sites on the Gila River on the forest, and is one of the largest sites known throughout the subspecies range. In 2008, 140 territories were detected on the Ubar Ranch (Durst et al. 2008). The Gila Bird Management Area is primarily managed to enhance habitat conditions for birds. Since 2004, the Keller Canyon site has not had livestock grazing in this area.

Southwestern Willow Flycatcher Summary - Analyzing the change in miles of roads within 100 meters of occupied sites and within 100 meters of designated critical habitat will be the indicator that is used to analyze the potential for harvest and disturbance to the Southwestern willow flycatcher under the different alternatives. For this species and its designated critical habitat, we also analyzed the number of road stream crossings within occupied habitat and designated critical habitat.

Table 105. Riparian bird species selected to be analyzed and rationale for selection

Species Analyzed	Rationale for Selection
Northern gray hawk[1]	FS sensitive species
Western yellow-billed cuckoo[1]	FS sensitive species
Arizona Bell's vireo[1]	FS sensitive species
Albert's towhee[1]	NMPIF high priority species in low and middle elevation riparian areas.
Gila woodpecker[1]	FS sensitive species and NMPIF high priority species in low and middle elevation riparian areas.
Common ground dove[1]	FS sensitive species and NMPIF high priority species in low and middle elevation riparian areas.
Black hawk[1]	FS sensitive species, Gila MIS, and NMPIF high priority species in low and middle elevation riparian areas.
Neotropic cormorant	FS sensitive species
Red-naped sapsucker[2]	NMPIF high priority species
Wilson's Phalarope	NMPIF high priority species for wetland/wet meadow habitat
Southwestern willow flycatcher	Federally "endangered" species with designated critical habitat and NMPIF high priority species

[1] The low to middle elevation riparian analysis area for this group of focal species will be used to determine potential effects to other New Mexico Partners in Flight high priority species that occur in this habitat type (elf owl, Lucy's warbler, and summer tanager).
[2] The high elevation riparian analysis area for this focal species will be used to determine potential effects to other New Mexico Partners in Flight high priority species that occur in this habitat type (black swift, Hammond's flycatcher, American dipper, MacGillivray's warbler, and painted redstart).

Table 106. Summary of the harvest indicator, disturbance indicator, and analysis area used to analyze the effects of the different alternatives to riparian birds

Focal Species	Motorized Activity	Harvest Indicator	Disturbance Zone	Analysis Area
Northern gray hawk Yellow-billed cuckoo Arizona bell's vireo Abert's towhee Gila woodpecker Common ground dove Black hawk	Motorized trail or OHV and roads	Route Miles	100 m	Low and middle elevation riparian
Neotropic vormorant	Motorized trail or OHV and roads	Route Miles	100 m	Lake
Red-naped sapsucker	Motorized trail or OHV and roads	Route Miles	100 m	High elevation riparian
Wilson's phalarope	Motorized trail or OHV and roads	Route Miles	100 m	Wetland and wet meadow
Southwestern willow flycatcher	Motorized trail or OHV use	Route Miles Number of stream crossings	100 m	Occupied sites Critical habitat

Riparian Bird – Effects by Alternative

Northern Gray Hawk, Western Yellow-billed Cuckoo, and Arizona Bell's Vireo (Forest Service Sensitive Species); Common Ground Dove, Abert's Towhee, and Gila Woodpecker (Forest Service Sensitive Species and NM PIF High Priority Migratory Bird); and Black Hawk (Forest Service Sensitive Species, Gila Management Indicator Species, and NM PIF High Priority Migratory Bird Species)

Table 107. Northern gray hawk, yellow-billed cuckoo, Arizona Bell's vireo, Gila woodpecker, common ground dove, black hawk habitat (low, middle riparian) analysis area – existing condition and proposed change by issue and alternative

Analysis Area on NFS Land = 10,862 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	97	97	59	49	75	71
Percent in miles of alt. B (Existing)		<-1%	-39%	-49%	-23%	-27%
Motorized dispersed camping acres	12,853	-11,970	-12,403	-12,853	-12,249	-12,302
Percent in acres of alt. B (Existing)		-93%	-97%	-100%	-95%	-96%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	12,853	-3,176	-12,403	-12,853	-6,477	-12,302
Percent in acres of alt. B (Existing)		-25%	-97%	-100%	-50%	-96%

Neotropic Cormorant (Forest Service Sensitive Species)

Table 108. Neotropic cormorant habitat (lakes) analysis area – existing condition and proposed change by issue and alternative

Analysis Area (Habitat 500-m. Buffer) on NFS Land = 2,081 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	7	7	7	7	7	7
Percent in miles of alt. B (Existing)		<-1%	-3%	-3%	-3%	-3%
Motorized dispersed camping acres	2031	-2,026	-2,026	-2,031	-2,026	-2,026
Percent in acres of alt. B (Existing)		-99.7%	-99.7%	-100%	-99.7%	-99.7%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	2,031	0	-2,026	-2,031	-153	-2,026
Percent in acres of alt. B (Existing)		0%	-99.7%	-100%	-8%	-99.7%

Red-naped Sapsucker (NM PIF High Priority Migratory Bird Species)

Table 109. Red-naped sapsucker analysis area - existing condition and proposed change by issue and alternative

Red-naped Sapsucker Habitat (High Elevation Riparian) Analysis Area on NFS Land = 6,387 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Motorized Routes						
Total FS routes and trails in miles	41	40	29	18	34	34
Percent in miles of alt. B (Existing)		-4%	-31%	-56%	-16%	-16%
Motorized dispersed camping acres	3,475	-3,100	-3,302	-3,475	-3,100	-3,211
Percent in acres of alt. B (Existing)		-89%	-95%	-100%	-89%	-92%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	3,475	-435	-3,302	-3,475	-968	-3,211
Percent in acres of alt. B (Existing)		-13%	-95%	-100%	-28%	-92%

Wilson's Phalarope (NM PIF High Priority Migratory Bird for Wet Meadow and Wetland Habitat)

Table 110. Wilson's phalarope analysis area – existing condition and proposed change by issue and alternative

Wilson's Phalarope Habitat (Wetland/Wet Meadow) Analysis Area on NFS Land = 423 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles		1	0	0	0	0
Percent in miles of alt. B (Existing)		0%	-52%	-58%	-52%	-52%
Motorized dispersed camping acres	353	-309	-314	-353	-311	-312
Percent in acres of alt. B (Existing)		-87%	-89%	-100%	-88%	-88%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	353	-8	-314	-353	-24	-312
Percent in acres of alt. B (Existing)		-2%	-89%	-100%	-7%	-88%

No Action Alternative (Alternative B): Under the existing condition for riparian birds, there are 7 miles of motorized routes in the neotropic cormorant analysis area, 41 miles of motorized routes in the red-naped sapsucker analysis area, 1 mile of motorized routes in the Wilson's snipe analysis area, and 95 miles of motorized routes in the low to middle elevation riparian bird focal species analysis area. Habitat associated with these routes has been lost and will not recover unless the route is closed and possibly decommissioned, and the potential for direct effects like collision, poaching, and collection would continue. The potential disturbance zone for cormorant areas is 456 acres, 1,587 acres in red-naped sapsucker area, 105 acres for Wilson's snipe area, and 3,586

acres for low to middle elevation riparian bird species focal area. Within these potential disturbance zones, motorized routes continue to cause the potential for disturbance, displacement, avoidance, and harassment. Increases in the level of use on these routes through time would increase the potential for indirect effects.

Under this alternative motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval would continue to be allowed across the Gila National Forest. These three types of use continue to have potential effect to riparian birds. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road density. Under the no action alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to these species.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel (see assumption) is no longer allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. In the cormorant analysis area, motorized dispersed camping is reduced by 100 percent under all action alternatives; 87 to 100 percent in the sapsucker analysis area; 87 to 100 percent in the snipe analysis area; and 93 to 100 percent in the low to middle elevation riparian bird analysis area. For these focal species, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 89 to 100 percent under alternative D, 7 to 50 percent under alternative F, 88 to 100 percent under alternative G, and 0 to 25 percent under alternative C. The wide range of change between focal species under alternative F is a reduction of 8 percent in the cormorant analysis area; 28 percent reduction in the sapsucker analysis area; 7 percent reduction in the snipe analysis area; and 50 percent reduction in the low to middle elevation riparian bird analysis area.

Motorized areas are locations where there have been traditional uses like motorized camping and OHV use. Under all action alternatives, no areas currently exist in the different riparian bird analysis areas, and no areas have been designated.

Under alternatives C, D, E, F, and G, miles of motorized routes and trails and acres of potentially affected habitat are reduced by less than 1, 3, 3, 3, and 3 percent in the cormorant analysis area, respectively; 4, 31, 56, 16, and 16 percent in the sapsucker analysis area, respectively; 0, 52, 58, 52 and 52 percent in the snipe analysis area, respectively; and less than 1, 39, 49, 23, and 27 percent in the low to middle elevation riparian bird analysis area, respectively.

For the focal species and their associated analysis areas, alternative E adds no miles of routes; alternatives D, F, and G add 0 to 2 miles, and alternative C adds 0 to 13 miles of unauthorized routes. None of the action alternatives allow for an actual increase in the total miles of routes through the associated analysis areas. Because the Gila National Forest allows motorized cross-country travel, most proposed routes, even though unauthorized, are currently being used.

Table 111. Riparian bird Forest Service sensitive species determinations by alternative

Sensitive Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Northern gray hawk		*MI	MI	MI	MI	MI
Western yellow-billed cuckoo		MI	MI	MI	MI	MI
Arizona Bell's vireo		MI	MI	MI	MI	MI
Albert's towhee		MI	MI	MI	MI	MI
Gila woodpecker		MI	MI	MI	MI	MI
Common ground dove		MI	MI	MI	MI	MI
Black hawk		MI	MI	MI	MI	MI
Neotropic cormorant		MI	MI	MI	MI	MI
Rationale for Determination	Under alternatives C, D, E, F, and G, the potential effects to riparian birds are reduced. The potential to affect individuals under all action alternatives still exists; therefore, a determination of "may impact" is made for all action alternatives. None of the alternatives would affect the viability of these species or cause a trend toward Federal listing.					

*MI – may impact

Table 112. Black hawk Gila National Forest management indicator species determinations by alternative

Management Indicator Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Black hawk		*NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives C, D, E, F, and G, the potential effects to black hawks are reduced. The potential to affect individuals under all action alternatives exists. Population and habitat trends for the black hawk would not be affected by any of the action alternatives.					

*NA – no adverse effects to the population or habitat trends

Table 113. Riparian bird New Mexico Partners in Flight high priority species determinations by alternative

NMPIF High Priority Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Albert's towhee		*NA	NA	NA	NA	NA
Gila woodpecker		NA	NA	NA	NA	NA
Common ground dove		NA	NA	NA	NA	NA
Black hawk		NA	NA	NA	NA	NA
Elf owl		NA	NA	NA	NA	NA

Table 113. Riparian bird New Mexico Partners in Flight high priority species determinations by alternative

NMPIF High Priority Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Lucy's warbler		NA	NA	NA	NA	NA
Summer tanager		NA	NA	NA	NA	NA
Red-naped sapsucker		NA	NA	NA	NA	NA
Black swift		NA	NA	NA	NA	NA
Hammond's flycatcher		NA	NA	NA	NA	NA
American dipper		NA	NA	NA	NA	NA
MacGillivray's warbler		NA	NA	NA	NA	NA
Painted red start		NA	NA	NA	NA	NA
Wilson's phalarope		NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives C, D, E, F, and G, the potential effects to these species are reduced. Unintentional take of individuals may occur, but these alternatives will not negatively affect population levels.					

*NA – no adverse effects to the population or habitat trends

Southwestern Willow Flycatcher (Federally "Endangered" Species with Designated Critical Habitat)

Table 114. Southwestern willow flycatcher occupied habitat analysis area - existing condition and proposed change by issue and alternative

Occupied Sites (3 occupied areas) Analysis Area on NFS Land = 247 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	0.7	0.7	0.7	0.7	0.7	0.7
Percent in miles of alt. B (Existing)		0%	0%	0%	0%	0%
Routes crossing streams						
Total number of FS route and trail crossings	0.0	0.0	0.0	0.0	0.0	0.0
Motorized dispersed camping acres	62.0	-57.5	-57.5	-62.0	-57.5	-57.5
Percent in acres of alt. B (Existing)		-92.8%	-92.8%	-100.0%	-92.8%	-92.8%
Motorized areas in acres - all vehicles	0.0	0.0	0.0	0.0	0.0	0.0
Motorized big game retrieval acres	62.0	0.0	-57.5	-62.0	0.0	-57.5
Percent in acres of alt. B (Existing)		0.0%	-92.8%	-100.0%	0.0%	-92.8%

Table 115. Southwestern willow flycatcher critical habitat analysis area - existing condition and proposed change by issue and alternative

Critical Habitat Analysis Area on NFS lands = 1,032 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	2.8	2.8	2.3	2.2	2.3	2.3
Percent in miles of alt. B (Existing)		-0.9%	-18.5%	-20.1%	-18.5%	-18.5%
Routes crossing streams						
Number of open existing ML 2–5	5	0	0	0	0	0
Number of administrative routes		5	5	5	5	5
Total number of FS route and trail crossings	5	5	5	5	5	5
Percent change of alt. B (Existing)		0%	0%	0%	0%	0%
Motorized dispersed camping acres	413.4	-344.9	-344.9	-413.4	-344.9	-344.9
Percent in acres of alt. B (Existing)		-83.4%	-83.4%	-100.0%	-83.4%	-83.4%
Motorized areas in acres - all vehicles	0.0	0.0	0.0	0.0	0.0	0.0
Motorized big game retrieval acres	413.4	-40.9	-345.0	-413.4	-122.8	-345.0
Percent in acres of alt. B (Existing)		-9.9%	-83.4%	-100.0%	-29.7%	-83.4%

No Action Alternative (Alternative B): Under this alternative, 0.7 mile of motorized routes occur within the three occupied areas, and 2.8 miles within designated southwestern willow flycatcher critical habitat. These routes continue to cause habitat loss and an increased potential for nest parasitism. The potential for collision loss or poaching loss is relatively low. The potential disturbance area in occupied sites (57 acres), and southwestern willow flycatcher critical habitat (176 acres) continues to cause the potential for indirect effects. Knight and Cole (1995) indicated that birds may respond to human activity by altering their behavior, spatial distribution, and habitat use. Corridors created by roads can fragment songbird habitat, and human activity within these areas may displace or disrupt breeding activity for songbirds and other avian species (Hamann et al. 1999). Increases in the level of use on these routes through time would increase the potential for indirect effects.

Under this alternative, motorized cross-country travel and dispersed camping will continue to be allowed across the Gila National Forest outside of designated wilderness and other special management areas. These two types of use continue to have the potential to impact the 62 acres of occupied sites and 413 acres of designated critical habitat. Additionally these two types of use perpetuate the development of additional roads and OHV routes; potentially allowing for the development of more routes than the 0.7 mile that is currently identified in occupied sites, and 2.8 miles in designated southwestern willow flycatcher critical habitat. So, under this alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to the species and its habitat.

Effects Common to All Action Alternatives (C, D, E, F, and G): Under these alternatives, motorized cross-country travel (see assumption) is no longer allowed. Under all action alternatives, the change from the existing condition is a 100 percent reduction in motorized cross-country travel. Under these alternatives no motorized areas have been designated. The authorization to allow motorized dispersed camping in occupied sites is reduced by 93 to 100 percent, and 83 to 100 percent in designated critical habitat. The effects from these changes will be beneficial to the species under all alternatives.

In occupied sites, miles of motorized routes and trails and acres of potentially affected habitat remain the same under all action alternatives as the no action alternative (0.7 mile of motorized routes and 0 stream crossings). The change between the no-action alternative and alternatives D, E, F, and G, is that the 0.7 mile in occupied sites is now only available to administrative use. In alternative C, the change is a conversion of 0.6 mile of the 0.7 mile to administrative use. Again, administrative routes have less use than routes open to the public, so the level of direct and indirect effects would be reduced in all action alternatives. Under alternative C, the reduction in effects would be less than the other action alternatives.

Differences Among the Action Alternatives (C, D, E, F, and G): In southwestern willow flycatcher critical habitat, miles of motorized routes and trails and acres of potentially affected habitat are reduced by 20 percent in alternative E; 18.5 percent under alternatives D, F, and G; and 0.9 percent under alternative C. The four alternatives also reduce the use within portions of each of the analysis areas by proposing administrative use. Under alternatives D, E, F, and G, 1.4 miles of the existing routes go from open to the public to administrative use only. Under alternative C, 1.1 miles go to administrative use only. Under the existing condition, you have five stream crossings open to the public, and under each of the action alternatives these five crossings go to administrative use only. The reduction in direct and indirect effects to the species and its habitat is relative to the amount of miles reduced in these analysis areas. No alternatives propose adding closed routes or unauthorized routes to these analysis areas.

In these analysis areas, potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 83 to 93 percent under alternative D, 0 to 30 percent under alternative F, 83 to 93 percent under alternative G, and 0 to 10 percent under alternative C.

Table 116. Southwestern willow flycatcher federally listed species and critical habitat determinations by alternative

Federally Listed Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Southwestern willow flycatcher		*MANLAA	MANLAA	MANLAA	MANLAA	MANLAA
Southwestern willow flycatcher critical habitat		MANLAA	MANLAA	MANLAA	MANLAA	MANLAA
Rationale for Species Determination	Long-term beneficial effects under alternative E are greater than the other action alternatives. Under alternatives D, F and G, the effects are very similar except for motorized big game retrieval, which has reduced effects in alternatives D and G; under alternative F, the access into these analysis areas is similar to alternative B. Under alternative C there is less of a reduction in motorized routes in Southwestern willow flycatcher critical habitat and less of a reduction in acres of potential habitat available to motorized big game retrieval in both analysis areas. southwestern willow flycatchers are associated with riparian type habitats that are more susceptible to damage by cross-country motorized use than upland habitats; therefore, the relative potential for big game retrieval to affect southwestern willow flycatcher habitat is greater under alternatives F and C than the other action alternatives. The four action alternatives do change the use within portions of each of the analysis areas, proposing administrative use. This change in use causes less effects than roads and trails open to all of the public. The level of potential effect under alternatives C, D, E, F, and G is reduced to an insignificant and discountable level; therefore, a determination of “may affect, not likely to adversely affect” is made for these alternatives.					
Rationale for Critical Habitat Determination	All action alternatives reduce the level of effect to southwestern willow flycatcher critical habitat. Under all alternatives, the number of stream crossings remains the same, but the use is changed to administrative use only, reducing the level of effect to an insignificant and discountable level. For these reasons, a determination of “May affect, Not Likely to Adversely Affect” is made for designated southwestern willow flycatcher critical habitat.					

*MANLAA - may affect not likely to adversely affect; **MALAA - may affect likely to adversely affect determination

Table 117. Southwestern willow flycatcher New Mexico Partners in Flight high priority species determination by alternative

NMPIF High Priority Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Southwestern willow flycatcher		*NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives C, D, E, F, and G, the potential effects to these species are reduced. These alternatives will not negatively affect population levels.					

Songbirds from Forested and Grassland Areas

Knight and Cole (1991) indicate that birds may respond to human activity by altering their behavior, spatial distribution, and habitat use. Corridors created by roads can fragment songbird habitat, and human activity within these areas may displace or disrupt breeding activity for songbirds and other avian species (Hamann et al. 1999). For example, the brown creeper may be affected by roads from loss of habitat, snag reduction, fragmentation of habitat, edge effects, displacement or avoidance, and increased depredation from predators/nest parasites (brown-headed cowbirds). Another study found that brown creepers were twice as likely to occur in habitats that were more than 100 m. from a road (Hutto 1995). Further researchers corroborated that creepers, thrush species, and the red-breasted nuthatch were associated with larger forest patches (Keller and Anderson 1992, and Brand and George 2001).

Roads and motorized trails reduced forest bird reproduction up to a distance of 200 m. adjacent to a major highway (Foppen and Reijnen 1994). As analysis for the travel management project on the Gila National Forest deals with secondary roads with much less traffic than primary roads, this distance should be interpreted with caution. However, in a study investigating forest cover on the movements of forest birds, Belisle et al. (2001) supported that forest birds' movements are constrained when they travel in deforested or fragmented landscapes. Fragmentation as a result of forest roads can, therefore, be interpreted to degrade remaining forest habitat, in which breeding success is thereby decreased (Belisle et al. 2001, Burke and Nol 1998, Payne and Payne 1993, and Haas 1998). Miller et al. (1998) found that the majority of species in both forested and grassland habitats were disturbed by trails in a zone of influence up to 100 m. Marzluff (1997) hypothesized that changes in songbird abundance in response to roads in southwestern ponderosa pine forests were beneficial to some species (Corvids, juncos and finches), but would moderately decrease abundance of robins, warblers, tanagers, grosbeaks and song sparrows. In addition, roads and recreation trails may fragment forest patches and increase nest predation and parasitism rates by species such as cowbirds and gray jays (Hickman 1990, Miller et al. 1998, and Gutzwiller et al. 2002). The focal species used for the analysis are the plain titmouse, gray vireo, white-eared hummingbird, and Costa's hummingbird. To analyze effects to this guild of species from the proposed action and each alternative of the travel management project on the Gila National Forest, analysis will focus on two factors:

1. To analyze the potential for harvest/direct disturbance effects of motorized activities to songbird/birds from forested and grassland areas, road densities within forest and grassland vegetation cover types were measured, as these densities pertain to the proposed action and each alternative.
2. To analyze disturbance/indirect effects, a disturbance zone of 100 m. from roads within forested and grassland vegetation cover types was used as it pertains to the proposed action and each alternative.

Table 118. Songbird species selected to be analyzed and rationale for selection

Species Analyzed	Rationale for Selection
Burrowing owl	FS sensitive species
White-eared hummingbird[1]	FS sensitive species
Costa's hummingbird[2]	FS sensitive species, and focal species representative for NMPIF HP desert shrub/grasslands
Plain titmouse[3]	Gila MIS representative for piñon-juniper/shrub oak woodland
Gray vireo[3]	FS sensitive species and NMPIF high priority species

[1] The ponderosa pine for this group of focal species will be used to determine potential effects to other NMPIF high priority species that occur in this habitat type (greater pewee, olive warbler, Virginia's warbler, and Grace's warbler).
[2] The desert shrub and grassland analysis area for this focal species will be used to determine potential effects to other NMPIF high priority species that occur in this habitat type (long-billed curlew).
[3] The piñon-juniper/shrub oak woodland analysis area for this focal species will be used to determine potential effects to other New Mexico Partners in Flight high priority species that occur in this habitat type (Scott's oriole, MacGillivray's warbler, green-tailed towhee, black-chinned sparrow, ferruginous hawk, and black-throated gray warbler).

Table 119. Summary of the harvest indicator, disturbance indicator, and analysis area used to analyze the effects of the different alternatives to songbirds

Focal Species	Motorized Activity	Harvest Indicator	Disturbance Zone	Analysis Area
Burrowing owl	Motorized trail or OHV and roads	Route Miles	75 m	Plains and mountain grassland
White-eared hummingbird	Motorized trail or OHV and roads	Route Miles	100 m	Ponderosa pine
Costa's hummingbird	Motorized trail or OHV and roads	Route Miles	100 m	Desert shrub or grassland
Plains titmouse Gray vireo	Motorized trail or OHV use	Route Miles	100 m	Piñon-juniper or shrub oak woodland

Upland Nongame and Songbirds – Effects by Alternative

Burrowing Owl (Forest Service Sensitive Species)

Table 120. Burrowing owl habitat (plains and mountain grassland) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS lands = 227,232 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	622	615	517	469	540	537
Percent in miles of alt. B (Existing)		-1%	-17%	-25%	-13%	-14%
Motorized dispersed camping acres	216,904	-200,953	-204,062	-216,904	-201,071	-202,386
Percent in acres of alt. B (Existing)		-93%	-94%	-100%	-93%	-93%
Motorized areas						
Motorized area in acres - all vehicles	3	0	-3	-3	0	0
Motorized area in acres - OHV only	3	0	-3	-3	0	0
Motorized big game retrieval acres	216,904	-11,665	-204,062	-216,904	-42,912	-202,386
Percent in acres of alt. B (Existing)		-5%	-94%	-100%	-20%	-93%

White-eared Hummingbird (Forest Service Sensitive Species and Ponderosa Pine Focal Species)

Table 121. White-eared hummingbird habitat (ponderosa pine) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS lands = 1,177,746 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	1,994	1,999	1,394	1,043	1,597	1,585
Percent in miles of alt. B (Existing)		<+1%	-30%	-48%	-20%	-21%
Motorized dispersed camping acres	903,431	-856,552	-867,641	-903,431	-858,877	-863,114
Percent in acres of alt. B (Existing)		-95%	-96%	-100%	-95%	-96%
Motorized areas in acres - all vehicles	9	0	-9	-9	0	0
Motorized big game retrieval acres	903,431	-98,979	-867,641	-903,431	-298,469	-863,114
Percent in acres of alt. B (Existing)		-11%	-96%	-100%	-33%	-96%

Costa's Hummingbird (Forest Service Sensitive Species, NM PIF High Priority Migratory Bird Species and Focal Species Representative for Desert Shrub or Grassland Habitat)

Table 122. Costa's hummingbird habitat (desert shrub and grassland) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS lands = 18,138 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	25	26	20	16	20	20
Percent in miles of alt. B (Existing)		4%	-21%	-34%	-19%	-19%
Motorized dispersed camping acres	15,795	-14,838	-14,993	-15,795	-14,858	-14,995
Percent in acres of alt. B (Existing)		-94%	-95%	-100%	-94%	-95%
Motorized areas in acres	0	0	0	0	0	0
Motorized big game retrieval acres	15,795	-2,508	-14,993	-15,795	-7,426	-14,995
Percent in acres of alt. B (Existing)		-16%	-95%	-100%	-47%	-95%

Plains Titmouse (Gila Management Indicator Species for Piñon-juniper/Shrub Oak Woodland Birds) and Gray Vireo (Forest Service Sensitive Species and NM PIF High Priority Migratory Bird Species and Piñon-juniper/Shrub Oak Woodland Bird Focal Species)

Table 123. Plains titmouse and gray vireo habitat (piñon-juniper and shrub oak woodland) analysis area – existing condition and proposed change by issue and alternative

Analysis Area on NFS lands = 1,643,096 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	1,646	1,672	1,290	1,050	1,391	1,389
Percent in miles of alt. B (Existing)		2%	-22%	-36%	-15%	-16%
Motorized dispersed camping acres	1,198,360	-1,155,142	-1,164,437	-1,198,360	-1,158,654	-1,160,931
Percent in acres of alt. B (Existing)		-96%	-97%	-100%	-97%	-97%
Motorized areas in acres - all vehicles	17	0	-17	-17	0	0
Motorized big game retrieval acres	1,198,360	-233,247	-1,164,437	-1,198,360	-545,656	-1,160,931
Percent in acres of alt. B (Existing)		-19%	-97%	-100%	-46%	-97%

No Action Alternative (Alternative B): Under the existing condition for nongame birds, there are 622 miles of motorized routes in the burrowing owl analysis area, 25 miles of motorized routes in the Costa's hummingbird analysis area, 1,985 miles of motorized routes in the white-eared hummingbird analysis area, and 1,642 miles of motorized routes in the plains titmouse/gray vireo analysis area. Habitat associated with these routes has been lost and will not recover unless the route is closed and possibly decommissioned, and the potential for direct effects like collision, poaching, and collection continues. The potential disturbance zone for burrowing owls is 32,935 acres, 1,758 acres in the Costa's hummingbird area, 150,242 acres for the white-eared hummingbird area, and 127,957 acres for the plains titmouse/gray vireo analysis area. Within these potential disturbance zones, motorized routes continue to cause the potential for disturbance, displacement, avoidance, and harassment. Increases in the level of use on these routes through time would increase the potential for indirect effects.

Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval would continue to be allowed across the Gila National Forest. These three types of use continue to have potential effect on nongame upland birds. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road density. Under the no action alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to these species.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel would no longer be allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. In the burrowing owl analysis area, motorized dispersed camping is reduced by 93 to 100 percent under all action alternatives; 94 to 100 percent in the Costa's hummingbird analysis area; 95 to 100 percent in the white-eared hummingbird analysis area; and 96 to 100 percent in the plains titmouse/gray vireo analysis area. For these focal species, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 94 to 97 percent under alternative D, 20 to 47 percent under alternative F, 93 to 97 percent under alternative G, and 5 to 19 percent under alternative C.

Motorized areas are locations where there have been traditional uses like motorized camping and OHV use. In the burrowing owl analysis area, there are 3 acres of habitat being affected by motorized areas; 9 acres of habitat in the white-eared hummingbird area; and 17 acres of habitat in the plains titmouse/gray vireo analysis area. Alternatives E and D eliminate these acres of affected habitat, and the remaining action alternatives propose no change from the existing condition.

Under alternatives D, E, F, and G, miles of motorized routes and trails and acres of potentially affected habitat are reduced by 17, 25, 13, and 14 percent, respectively, in the burrowing owl analysis area; 21, 34, 19, and 19 percent, respectively, in the Costa's analysis area; 30, 48, 20 and 21 percent, respectively, in the white-eared analysis area; and 22, 36, 15, and 16 percent, respectively in the plains titmouse/gray vireo analysis area. Alternative C adds 1 mile of unauthorized routes in the Costa's analysis area, 14 miles in the white-eared analysis area, and 30 miles in the plains titmouse/gray vireo analysis area. In the burrowing owl analysis area, alternative C reduces the miles of motorized routes by 7 miles. Alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis

areas. Because the Gila National Forest allows motorized cross-country travel, most proposed routes, even though unauthorized, are currently being used.

For the focal species and their associated analysis areas, alternative E adds 0 to 5 miles of unauthorized routes, alternative D adds 3 to 46 miles, alternative F adds 1 to 59 miles, alternative G adds 1 to 57 miles, and alternative C adds 1 to 97 miles of unauthorized routes. Alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis areas. Because the Gila National Forest allows motorized cross-country travel, most proposed routes, even though unauthorized, are currently being used.

Table 124. Upland nongame and songbirds Forest Service sensitive species determination by alternative

Sensitive Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Burrowing owl		MI	MI	MI	MI	MI
White-eared hummingbird		MI	MI	MI	MI	MI
Costa's hummingbird		MI	MI	MI	MI	MI
Gray vireo		MI	MI	MI	MI	MI
Rationale for Determination	Under alternatives D, E, F, and G, the potential effects to upland nongame birds are reduced. Alternative C slightly increases the overall miles of motorized routes, but reduces the effects of motorized cross-country travel. The potential to affect individuals under all action alternatives still exists; therefore, a determination of "may impact" is made for all action alternatives. None of the alternatives would affect the viability of these species or cause a trend toward Federal listing.					

*MI – may impact

Table 125. Plain titmouse Gila National Forest management indicator species determination by alternative

Management Indicator Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Plain titmouse		*NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives D, E, F, and G, the potential effects to this focal species are reduced. Alternative C slightly increases the overall miles of motorized routes, but reduces the effects of motorized cross-country travel. The potential to affect individuals under all action alternatives exists. Population and habitat trends for the Plain titmouse would not be affected by any of the action alternatives.					

*NA – no adverse effects to the population or habitat trends

Table 126. Upland nongame and songbirds New Mexico Partners in Flight high priority species determination by alternative

NMPIF High Priority Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
White-eared hummingbird		*NA	NA	NA	NA	NA
Greater pewee		NA	NA	NA	NA	NA
Olive warbler		NA	NA	NA	NA	NA
Virginia's warbler		NA	NA	NA	NA	NA
Grace's warbler		NA	NA	NA	NA	NA
Costa's hummingbird		NA	NA	NA	NA	NA
Long-billed curlew		NA	NA	NA	NA	NA
Gray vireo		NA	NA	NA	NA	NA
Scott's oriole		NA	NA	NA	NA	NA
MacGillivray's warbler		NA	NA	NA	NA	NA
Green-tailed towhee		NA	NA	NA	NA	NA
Black-chinned sparrow		NA	NA	NA	NA	NA
Ferruginous hawk		NA	NA	NA	NA	NA
Black-throated gray warbler		NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives D, E, F, and G, the potential effects to these focal species are reduced. Alternative C slightly increases the overall miles of motorized routes, but reduces the effects of motorized cross-country travel. The potential to affect individuals under all action alternatives exists. There will be no measurable negative effects on this focal group of migratory species. Unintentional take of individuals may occur, but these alternatives will not negatively affect population levels.					

*NA – no adverse effects to the population or habitat trends

Game Birds

Game birds may be affected by roads as they may cause habitat fragmentation, increased access by poachers, collisions, edge effects, displacement or avoidance, increased routes for competitors and predators, disturbance at specific sites, and physiological response to vehicles. Hamann et al. (1999) discuss sharp-tailed grouse leks (concentrated breeding sites) and recommend buffering these specific sites up to 2 kilometers to minimize effects at these important reproductive locations. This upland game species does not occur on the Gila National Forest, and no federally listed game birds are found on the forest. Wild turkeys have been documented to avoid roads during nesting (Badyaev and Faust 1996). Besides roads allowing access to poaching (Hurst and Dickson 1992), roadway development has a negative influence in turkey habitat (Beasom and Wilson 1992). Upland game species can be negatively influenced by habitat fragmentation from road networks (Brennan et al. 2008). The blue grouse, present on the Mogollon Rim and in larger mountain ranges where spruce-fir vegetation cover type occurs, will nest in montane forest

communities with relatively open tree canopies out to 2 kilometers from the forest edge (New Mexico Partners in Flight 2010). They prefer forests dominated by ponderosa pine or Douglas-fir, and New Mexico Partners in Flight recommends maintaining open meadows and more open canopy within a 1-mile zone surrounding meadows. In areas managed for wild turkey, Hamann et al. (1999) suggest that managers minimize the number of roads open to public use. Holbrook and Vaughan (1985) suggested that managers should consider minimum road alternatives for meeting forest objectives. They concluded that the difference between turkey mortality and proximity to roads in the hunting season verses the off season was 95 meters.

Roberts and Porter (1998) state that nesting success is the most important demographic parameter affecting wild turkey population sizes. Badyaev and Faust (1996) found that successful nests were located an average of 290 m. from roads, + 50 m. To analyze effects to this guild of species from the proposed action and each alternative of the travel management project on the Gila National Forest, analysis will focus on two factors:

1. To analyze the potential for harvest/direct disturbance effects of motorized activities to game birds, road densities were measured, as these densities pertain to the proposed action and each alternative.
2. To analyze disturbance/indirect effects, a disturbance zone of 300 meters from roads was used as it pertains to the proposed action and to each alternative.

Table 127. Game bird species selected to be analyzed and rationale for selection

Species Analyzed	Rationale for Selection
Mearn’s quail	Gila MIS
Merriams’ wild turkey	Game species identified as species of concern during scoping
Blue grouse	NMPIF high priority species representative of spruce fir vegetation

Table 128. Summary of the harvest indicator, disturbance indicator, and analysis area that was used to analyze the effects of the different alternatives to game birds

Focal Species	Motorized Activity	Harvest Indicator	Disturbance Zone	Analysis Area
Mearn’s quail	Motorized trail or OHV Use	Route Miles	300 m	Plains and mountain grassland
Merriam’s wild turkey	Motorized trail or OHV and roads	Route Miles	300 m	Ponderosa pine Mixed conifer
Blue grouse	Motorized trail or OHV and roads	Route Miles	300 m	Spruce fir

Game Birds – Effects by Alternative

Mearn's Quail (Gila Management Indicator Species and Grassland Game Bird Focal Species)

Table 129. Mearn's quail habitat (plains and mountain grassland) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS lands = 227,232 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	622	615	517	469	540	537
Percent in miles of alt. B (Existing)		-1%	-17%	-25%	-13%	-14%
Motorized dispersed camping acres	216,904	-200,953	-204,062	-216,904	-201,071	-202,386
Percent in acres of alt. B (Existing)		-93%	-94%	-100%	-93%	-93%
Motorized areas in acres - all vehicles	3	NC	-3	-3	NC	NC
Motorized area in acres - OHV only	3	NC	-3	-3	NC	NC
Motorized big game retrieval acres	216,904	-11,665	-204,062	-216,904	-42,912	-202,386
Percent in acres of alt. B (Existing)		-5%	-94%	-100%	-20%	-93%

Merriam's Wild Turkey (Ponderosa Pine and Mixed Conifer Game Bird Focal Species)

Table 130. Merriam's wild turkey habitat (ponderosa pine and mixed conifer) analysis area - existing condition and proposed change by alternative

Analysis Area on NFS lands = 1,341,662 acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	2,099	2,114	1,461	1,089	1,680	1,668
Percent in miles of alt. B (Existing)		1%	-30%	-48%	-20%	-21%
Motorized dispersed camping acres	987,532	-938,273	-949,919	-987,532	-940,746	-945,249
Percent in acres of alt. B (Existing)		-95%	-96%	-100%	-95%	-96%
Motorized areas in acres - all vehicles	9	NC	-9	-9	NC	NC
Motorized big game retrieval acres	987,532	-112,610	-949,919	-987,532	-333,214	-945,249
Percent in acres of alt. B (Existing)		-11%	-96%	-100%	-34%	-96%

No Action Alternative (Alternative B): Under the existing condition for game birds, there are 622 miles of motorized routes in the Mearn's quail analysis area, and 2,087 miles of motorized routes in the Merriam's wild turkey analysis area. Habitat associated with these routes has been lost and will not recover unless the route is closed and possibly decommissioned, and the potential for direct effects like collision, hunting, and poaching would continue. The potential disturbance zone for Mearn's quail is 98,644 acres, and 401,347 acres in the Merriam's wild turkey analysis area. Within these potential disturbance zones, motorized routes continue to cause the potential for disturbance, displacement, avoidance, and harassment. Increases in the level of use on these routes through time would increase the potential for indirect effects.

Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval would continue to be allowed across the Gila National Forest. These three types of use continue to have potential effects to upland game birds. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road density. Under the no action alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to these species.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel is no longer allowed. The change from the existing condition is a 100 percent reduction in motorized cross-country travel. In the Mearn's quail analysis area, motorized dispersed camping is reduced by 93 to 100 percent under all action alternatives; and 95 to 100 percent in the Merriam's wild turkey analysis area. For these focal species, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 94 to 96 percent under alternative D, 20 to 95 percent under alternative F, 93 to 96 percent under alternative G, and 5 to 95 percent under alternative C.

Motorized areas are locations where there have been traditional uses like motorized camping and OHV use. In the Merriam's turkey analysis area, currently there are 3 acres of habitat being affected by a motorized area; and 9 acres of habitat in the Merriam's wild turkey analysis area. Alternatives E and D eliminate these acres of affected habitat, and the remaining action alternatives propose no change from the existing condition.

Under alternatives D, E, F, and G, miles of motorized routes and trails and acres of potentially affected habitat are reduced, by 17, 25, 13, and 14 percent, respectively in the Mearn's quail analysis area, and 30, 48, 20, and 21 percent, respectively in the Merriam's wild turkey analysis area. Alternative C adds 15 miles of unauthorized routes in the Merriam's wild turkey analysis area. In the Mearn's quail analysis area, in alternative C, the miles of motorized routes are reduced by 7 miles. Alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis areas. Because the Gila National Forest allows motorized cross-country travel, most proposed routes, even though unauthorized, are currently being used.

For the focal species and their associated analysis areas, alternative E adds 0 to 2 miles of routes, alternative D adds 3 to 8 miles, alternative F adds 1 to 22 miles, alternative G adds 2 to 23 miles, and alternative C adds 3 to 53 miles of unauthorized routes. Alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis areas. Because the Gila National Forest allows motorized cross-country travel, most proposed routes, even though unauthorized, are currently being used.

Table 131. Mearn's quail Gila National Forest management indicator species determination by alternative

Management Indicator Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Mearn's quail		*NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives C, D, E, F, and G, the potential effects to upland game birds are reduced. The potential to affect individuals under all action alternatives still exists. Population and habitat trends for this species would not be affected by any of the action alternatives.					

*NA – no adverse effects to the population or habitat trends

Table 132. Merriam's wild turkey determination by alternative

Game Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Merriam's wild turkey		*NA	NA	NA	NA	NA
Rationale for Determination	Under alternatives C, D, E, F, and G, the potential effects to this upland game bird are reduced. The potential to affect individuals under all action alternatives still exists. Population and habitat trends for this species would not be affected by any of the action alternatives.					

*NA – no adverse effects to the population or habitat trends

Table 133. Blue grouse New Mexico Partners in Flight high priority species determination by alternative

NMPIF High-Priority Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
Blue grouse		*NE	NE	NE	NE	NE
Rationale for Determination	No motorized routes occur in spruce fir habitat; therefore, there would be no effect to this New Mexico Partners in Flight high priority migratory bird species or any other bird species that occurs in this vegetation type.					

*NE – no effect

Insects

Roads and trails create edge habitats (Johnson et al. 1975, Adams and Geis 1983, Holzapfel and Schmidt 1990, Lightfoot and Whitford 1991, and Reed et al. 1996), resulting in a variety of effects, including changes in vegetation and encroachment of nonnative and invasive species (Huey 1941). The impermeable surfaces of roads and OHV routes shed precipitation, thereby increasing overall moisture availability in the immediate vicinity of the road or route (Ouren et al. 2007). The increased moisture availability may promote greater plant vigor along roadsides than in surrounding areas (Johnson et al. 1975), and Angold (1997) indicated that such effects may extend as far as 200 m. from road edges. The greater vegetation cover typically observed along roadsides also is often due, in part, to greater species richness in those areas (Holzapfel and Schmidt 1990). Interestingly, increased vegetation cover along roadsides may attract more

invertebrates and other organisms. For example, Lightfoot and Whitford (1991) found that shrubs along a road supported greater numbers of foliage arthropods.

Invertebrates may be precluded from crossing various road types, including those considered relatively narrow; however, there are species differences that may be influenced by their ecologies and physical capabilities (Ouren et al. 2007). For example, Samways (1989) found that both “tarred” (paved) and “untarred” roads were almost complete or partial barriers to three species of bush crickets, but roads were only minor, very minor, or did not serve as barriers to the movements of six other bush cricket species, five of which readily fly across roads. On the other hand, Munguira and Thomas (1992) found that wide highways did not affect the movements of butterflies in open populations; movements of butterflies in closed populations, however, were slightly impeded by roads. Other butterfly species may not even attempt to fly across roads (described by authors as 2-lane highways and secondary roads); possibly due to the extreme changes in microclimate over roads (including columns of warm air rising above roads (Van der Zande 1980). Mader (1984) reported that in a 5-year mark-recapture-release study involving 10,186 carabid beetles representing nine species, three species were never recaptured on the opposite side of study area roads (1- or 2-lane paved roads) or parking loops, and the remainder were recaptured across the road only rarely. However, some individuals of a Swedish snail species (*Arianta arbustorum*) that were captured and translocated to the opposite sides of narrow paths or relatively wider roads did return to the capture sides of paths (Baur and Baur 1990).

Luckenbach and Bury (1983) found that in OHV play areas, there were marked declines in herbaceous and perennial plants, arthropods, lizards, and mammals when compared to nearby controls. The biota was affected even by relatively low levels of OHV activity, while areas heavily used by OHVs had virtually no native plants or wildlife. Hess (1969) found that in areas where roads were built along stream courses and crossed the stream courses, there was an increase in the biomass of aquatic insects at the disturbed sites than the undisturbed control site. However, the diversity of insects was greatly reduced. The order Diptera was the only order of insects to show a significant increase in numbers, while all other orders declined. In the undisturbed areas (no roads within 300 feet of a stream course), all insect orders showed an increase in numbers. All mayfly species also showed an increase in numbers from predisturbance conditions to postdisturbance conditions, but the increase was not significant (Hess 1969). Habitat may not be reduced, but possibly even enhanced along road edges for insect species (Johnson et al. 1975, Holzapfel and Schmidt 1990, Lightfoot and Whitford 1991, Angold 1997, and Ouren et al. 2007). Hess (1969) found that stream turbidity returned to precrossing turbidity within 700 feet (approx. 215 m) of the stream crossing.

As with other groups of terrestrial wildlife, motorized/recreation effects to insects can be grouped into two analysis factors; to analyze effects to this guild of species from the proposed action and each alternative of the travel management project on the Gila National Forest, analysis will focus on two factors:

1. To analyze the potential for harvest effects of motorized activities to insects, road miles were measured as these miles pertain to the proposed action and each alternative.
2. To analyze disturbance/indirect effects, a disturbance zone of 250 meters from roads was used as it pertains to the proposed action and to each alternative.

Table 134. Insect species selected to be analyzed and rationale for selection

Species Analyzed	Rationale for Selection
A notodontid moth	FS sensitive
Nitocris fritillary	FS sensitive
A may fly	FS sensitive
Dashed ringtail	FS sensitive

Table 135. Summary of the harvest indicator, disturbance indicator, and analysis area used to analyze the effects of the different alternatives to insects

Focal Species	Motorized Activity	Harvest Indicator	Disturbed Zone	Analysis Area
A Notodontid moth	Motorized trail or OHV use	Route Miles	215 m	Desert shrub or piñon-juniper or shrub oakland or ponderosa pine
Nitocris fritillary (butterfly)	Motorized trail or OHV and roads	Route Miles	215 m	Wet meadow, wetland, and high elevation riparian
A May fly	Motorized trail or OHV and roads	Route Miles	215 m	Middle elevation riparian (only within the Gila drainage)
Dashed ringtail (Dragonfly)	Motorized trail or OHV and roads	Route Miles	215 m	Wet meadow, wetland, and high elevation riparian

Insect – Effects by Alternative

A May Fly (Forest Service Sensitive Species)

Table 136. A May Fly habitat (low elevation riparian) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS land = 10,862.33 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	42	43	27	24	38	33
Percent in miles of alt. B (Existing)		+3%	-34%	-43%	-9%	-20%
Motorized dispersed camping acres	6,037	-5,427	-5,775	-6,037	-5,701	-5,758
Percent in acres of alt. B (Existing)		-90%	-96%	-100%	-94%	-95%
Motorized areas in acres - all vehicles	0	0	0	0	0	0
Motorized big game retrieval acres	6,037	-1,210	-5,775	-6,037	-2,890	-5,758
Percent in acres of alt. B (Existing)		-20%	-96%	-100%	-48%	-95%

Nitocris Frtillary (Forest Service Sensitive Species)

Table 137. Nitocris fritillary habitat (wet meadow or wetland and high elevation riparian) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS land = 6,811 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	42	40	29	18	35	35
Percent in miles of alt. B (Existing)		-4%	-31%	-56%	-17%	-17%
Motorized dispersed camping acres	3,828	-3,408	-3,616	-3,828	-3,412	-3,523
Percent in acres of alt. B (Existing)		-89%	-94%	-100%	-89%	-92%
Motorized areas in acres - all vehicles	0	0	0	0	0	0
Motorized big game retrieval acres	3,828	-443	-3,616	-3,828	-992	-3,523
Percent in acres of alt. B (Existing)		-12%	-94%	-100%	-26%	-92%

Dashed Ringtail (Forest Service Sensitive Species)

Table 138. Dashed ringtail habitat (wet meadow or wetland and high, middle, and low elevation riparian) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS land = 28,543.54 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	139	137	88	68	110	106
Percent in miles of alt. B (Existing)		-1%	-37%	-51%	-21%	-24%
Motorized dispersed camping acres	16,681	-15,379	-16,019	-16,681	-15,660	-15,826
Percent in acres of alt. B (Existing)		-92%	-96%	-100%	-94%	-95%
Motorized areas in acres - all vehicles	0	0	0	0	0	0
Motorized big game retrieval acres	16,681	-3,619	-16,019	-16,681	-7,469	-15,826
Percent in acres of alt. B (Existing)		-22%	-96%	-100%	-45%	-95%

A Notodontide Moth (Forest Service Sensitive Species)

Table 139. A Notodontide moth habitat (desert shrub or grassland, piñon-juniper or shrub oak woodland, ponderosa pine) analysis area - existing condition and proposed change by issue and alternative

Analysis Area on NFS land = 2,838,981 Acres	Existing Effects Alt. B (No Action)	Change in Effects by Alternative				
		C	D	E	F	G
Total FS routes and trails in miles	3,664	3,697	2,703	2,109	3,009	2,995
Percent in miles of alt. B (Existing)		+3%	-26%	-42%	-18%	-18%
Motorized dispersed camping acres	2,117,586	-2,026,532	-2,047,071	-2,117,586	-2,032,390	-2,039,040
Percent in acres of alt. B (Existing)		-96%	-97%	-100%	-96%	-96%
Motorized areas in acres - all vehicles	25	0	-25	-25	0	0
Motorized big game retrieval acres	2,117,586	-334,734	-2,047,071	-2,117,586	-851,551	-2,039,040
Percent in acres of alt. B (Existing)		-16%	-97%	-100%	-40%	-96%

No Action Alternative (Alternative B): Under the existing condition for insects, there are 42 miles of motorized routes in the A May Fly analysis area, 42 miles of motorized routes in the Nitocris fritillary analysis area, 138 miles of motorized routes in the dashed ringtail analysis area, and 3,652 miles of motorized routes in the A Notodontide moth analysis area. Habitat associated with these routes has been lost and will not recover unless the route is closed and possibly decommissioned, and the potential for direct effects like collision and collection would continue. The potential disturbance zone for A May Fly is 2,173 acres, 2,150 acres in the Nitocris fritillary area, 6,626 acres in the dashed ringtail area, and 562,942 acres in the A Notodontide moth analysis area. Within these potential disturbance zones, motorized routes continue to cause the potential for disturbance, displacement, avoidance, and harassment. Increases in the level of use on these routes through time would increase the potential for indirect effects (table 140).

Under this alternative, motorized cross-country travel, motorized dispersed camping, and motorized big game retrieval would continue to be allowed across the Gila National Forest. These three types of use continue to potentially affect insects. Additionally, these three types of use may perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road density. Under the no action alternative, through time, the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance effects to these species.

Action Alternatives (C, D, E, F, and G): Under all action alternatives, motorized cross-country travel would no longer be allowed. The change from the existing condition is a 100 percent

reduction in motorized cross-country travel. In the A May Fly analysis area, motorized dispersed camping is reduced by 90 to 100 percent under all action alternatives; 89 to 100 percent in the Nitocris fritillary analysis area; 92 to 100 percent in the dashed ringtail analysis area; and 96 to 100 percent in the A Notodontide moth analysis area. For these focal species, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 94 to 97 percent under alternative D, 26 to 48 percent under alternative F, 92 to 96 percent under alternative G, and 12 to 22 percent under alternative C.

Motorized areas are locations where we have had traditional uses like motorized dispersed camping and OHV use. In the A May Fly, Nitocris fritillary, and dashed ringtail analysis areas, there are no acres of habitat being affected by a motorized area under all alternatives. In the A Notodontide moth analysis area, 25 acres of habitat are being affected by motorized areas under alternatives B, C, F and G. Alternatives E and D eliminate these acres of affected habitat for A Notodontide moth.

Under alternatives D, E, F, and G, miles of motorized routes and trails and acres of potentially affected habitat are reduced by 34, 43, 9, and 20 percent, respectively, in the A May Fly analysis area; 31, 56, 17, and 17 percent, respectively, in the Nitocris fritillary area; 37, 51, 21 and 24 percent, respectively, in the dashed ringtail analysis area; and 26, 42, 18, and 18 percent, respectively in the A Notodontide moth analysis area. Alternative C adds 1 mile of unauthorized routes in the A May Fly analysis area, eliminates 2 miles in the Nitocris fritillary analysis area, eliminates 2 miles in the dashed ringtail analysis area, and adds 33 miles in the A Notodontide moth analysis area. Alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis areas. Because the Gila National Forest currently allows motorized cross-country travel, most proposed routes, even though unauthorized, are currently being used.

For the different focal species, alternative E adds no miles of unauthorized routes in the A May Fly, Nitocris fritillary, and dashed ringtail analysis areas, and 6 miles of unauthorized routes in the A Notodontide moth analysis area. Alternative D adds 1 mile of unauthorized routes in the A May Fly analysis area, 0 miles in the Nitocris fritillary analysis area, 2 miles in the dashed ringtail analysis areas, and 55 miles of unauthorized routes in the A Notodontide moth analysis area. Alternatives F and G add 1 mile of unauthorized routes in the A May Fly analysis area, 0 miles in the Nitocris fritillary analysis area, 2 miles in the dashed ringtail analysis area, and 80 miles of unauthorized routes in the A Notodontide moth analysis area. Alternative C adds 3 miles of unauthorized routes in the A May Fly analysis area, 0 miles in the Nitocris fritillary analysis area, 12 miles in the dashed ringtail analysis area, and 140 miles of unauthorized routes in the A Notodontide moth analysis area. Alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis areas. All action alternatives allow use on routes that have not previously been recognized as a designated route. These new routes have the potential to cause new disturbance.

Table 140. Insect Forest Service sensitive species determination by alternative

Sensitive Species	Determination by Alternative					
	B - Existing Condition	C	D	E	F	G
A Notodontide moth		*MI	MI	MI	MI	MI
Nitocris fritillary		MI	MI	MI	MI	MI
A May fly		MI	MI	MI	MI	MI
Dashed ringtail		MI	MI	MI	MI	MI
Rationale for Determination	Under alternatives D, E, F, and G, the potential effects to insects are reduced, particularly under alternatives E and D. Under alternative C, there is an increase in motorized routes in both A May Fly and A Notodontide Moth analysis areas, and a small decrease in the Nitocris fritillary and dashed ringtail analysis areas. The potential to affect individuals under all action alternatives still exists; therefore, a determination of "may impact" is made for all action alternatives. None of the alternatives would affect the viability of these species or the viability of any other insect that occurs on the Gila National Forest. None of the alternative would cause a trend toward Federal listing.					

*MI – may impact

Cumulative Effects

Cumulative wildlife assessments address the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions. This assessment analyzes effects regardless of who has undertaken the action(s) (i.e., private roads within or adjacent to a project area). Cumulative effects to wildlife are assessed by the area of potentially affected habitat in relationship to the project(s). In this case, the area of potentially affected habitat is the entire Gila National Forest. Activities that influence effects to wildlife can include timber harvest, grazing, roads, wildland fire, mining, recreational activities, game management, and other land-disturbing actions that remove vegetation and cause direct or indirect effects to species and/or their habitat.

The watershed cumulative effects analysis compiled a list of these different types of activities within each 5th-code watershed. This analysis reviewed this list of past, present and reasonable foreseeable projects within each 5th-code watershed, and used the results of the watershed cumulative effects analysis to help focus in on areas of potential wildlife concern: areas with the potential for higher levels of disturbance for threatened and endangered species, sensitive species, high priority migratory bird species, forest management indicator species, and other wildlife.

The watershed cumulative effects section looked at activities within Gila National Forest watersheds to assess if these activities had resulted in land disturbance that had reached or exceeded a disturbance threshold (USDA Forest Service 2010d). The amount of disturbance within each 5th-code watershed was used to determine how much potential wildlife habitat was being affected.

Where the 5th-code watershed analysis indicated higher levels of disturbance, a closer look/analysis was completed at the 6th-code level.

Of the 33 5th-code watersheds analyzed, none approached the 15 percent disturbance level identified as the threshold level of concern in the watershed cumulative effects analysis (watershed specialist report). Under the existing condition (alternative B) the three 5th-code

watersheds with the highest disturbance level were: Corduroy Canyon at 8.6 percent, Negrito Creek at 5.7 percent, and the Upper San Francisco at 3.4 percent. Of the remaining 5th-code watersheds analyzed, 20 had a disturbance level of less than 1 percent and 10 had a disturbance level of 1 to 2.9 percent. Under most action alternatives except alternative C, the overall disturbance level across the Gila National Forest is reduced.

The overall analysis of all the activities discussed above by 5th-code watershed shows that the amount of directly affected habitat for wildlife is low in comparison to the availability of habitat.

To help determine if localized problems exist related to cumulative wildlife effects, we looked at how roads were contributing to the disturbance level in the three watersheds with the highest disturbance levels. Road densities (all ownerships) where reviewed within the boundary of these watersheds. For the wildlife cumulative effects analysis, we considered open roads, not closed roads like the watershed analysis, since it is the traffic level not the actual roadbed that continues to cause disturbance effects. The Corduroy 5th code has an open road density of 1.2 mi/mi². The Upper San Fransico River 5th code has an open road density of 1.58 mi/mi², and Negrito Creek 5th code a road density of 1.36 mi/mi². The 5th-code analysis also determined that the Alamocito 5th-code watershed has a high road density within the boundary of the Gila National Forest (1.93 mi/mi²).

Since effects at a larger scale like the 5th-code level can sometimes hide localized cumulative effects, a 6th-code level in areas with potential concern was also examined.

Within the Corduroy 5th-code watershed, no 6th-code watersheds have a road density greater than 2 mi/mi², three 6th-code watersheds have a road density of between 1.1 to 1.8 mi/mi², and four 6th-code watersheds have a road density of less than 1 mi/mi². Of the three 6th-code watersheds between 1.1 to 1.8 mi/mi², all action alternatives reduce road densities or maintain them at the lower end of this scale. One of the 6th-code watersheds is even reduced to a density below 1.0 mi/m², except under alternative C. Of the four 6th-code watersheds that have density of less than 1 mi/mi², all action alternatives reduce the road densities, except in one under alternative C, which maintains a density of 1.0 mi/mi².

Within the Negrito 5th-code watershed, three 6th-code watersheds have a road density of less than 1mi/mi², four have road densities between 1.2 to 1.7 mi/mi², and one greater than 2 mi/mi². In the one 6th-code watershed that has a road density of greater than 2 mi/mi², alternative E reduces it to below 1 mi/mi²; Alternative D reduces it to 1.8 mi/mi²; and under the remaining action alternatives (C, F, and G) it remains above 2. In the four 6th-code watersheds that are between 1.2 to 1.7 mi/mi², all action alternatives except C reduce road densities; most below 1.5 mi/mi² except in alternative G in one 6th-code watershed.

Within the Upper San Francisco River 5th-code watershed, one 6th-code watershed has a road density of less than 1 mi/mi², eight are between 1.1 to 2.0 mi/mi², and one is greater than 2 mi/mi². In the one 6th-code watershed that has a road density of greater than 2 mi/mi², alternative E reduces it to below 2 mi/mi²; under alternative D it is reduced to 1.9 mi/mi²; and it remains above 2 under the other action alternatives. Of the eight 6th-code watersheds that are in the 1.1 to 1.9 mi/mi² range, three of these are in the upper end of this range and remain so (1.5 to 1.9) for most alternatives except under alternative E for two of the 6th-code watersheds; and the remaining five are reduced to the lower end of this range under all action alternatives (C, D, E, F, and G).

In addition to the two 5th-code watersheds listed above, eight other 5th-code watersheds have 6th-code watersheds with road densities that are greater than 1.9 mi/mi² under existing conditions (Silver City four 6th-code watersheds; Ft. Bayard one 6th-code watershed, Mangas Valley one 6th-code watershed; Tularosa River four 6th-code watersheds; Middle Fork of the Gila River three 6th-code watersheds; Alamocito three 6th-code watersheds; Mangas Creek one 6th-code watershed; and Coyote Creek one 6th-code watershed). Two of the 6th-code watersheds in the Silver City 5th-code watershed and the one Fort Bayard 6th-code watershed remain above this level under all action alternatives. One 6th-code watershed in Mangas Valley and Tularosa River remains above this level in all action alternatives except alternative E. In one of the Alamocito 6th-code watersheds, road densities remain between 1.9 to 2.2 in alternatives C, F, and G, and drop to between 1.2 and 1.5 for alternatives E and D. In the second Alamocito 6th-code watershed, road densities remain between 1.6 and 2.1 under all alternatives. In both the Middle Fork of the Gila 6th-code watersheds, road densities range from 1.6 to over 1.9 mi/mi² in alternatives C, F, and G, and drop below 1.4 mi/mi² under alternatives D and E. The one Coyote Creek 6th-code watershed stays above 1.9 mi/mi² under all action alternatives. In the three Tularosa 6th-code watersheds that are above 1.9 mi/mi², one remains above 2.0 mi/mi², one remains above 1.6 mi/mi², and the third remains above 1.5 mi/mi² under all action alternatives. The Mangas Creek 6th-code watershed remains between 1.5 to 2 mi/mi² under all action alternatives except alternative C.

The 6th-code watersheds within the Silver City, Fort Bayard, and Mangas Valley watersheds that have high road densities are associated with places like the community of Silver City. The effects from these areas to wildlife on the Gila National Forest will not be significant because these areas are primarily off the forest.

The Coyote 6th-code watershed occurs primarily on the adjoining national forest. The effects from this watershed to wildlife on the Gila National Forest will not be significant because most of this watershed occurs off the forest.

The Negrito Creek, Upper San Francisco, Tularosa, Middle Fork of the Gila, Alamocito, and Mangas Creek 5th-code watersheds have hosted the majority of past and present timber harvesting activities on the forest, with roads having been constructed to accommodate this action. Timber harvesting activities are no longer common, but they were prevalent in the 1980s and 1990s. A majority of the timber related roads are still in use and are contributing to cumulative wildlife impacts. The disturbance acres in both watersheds are primarily a result of past and present vegetation treatment activities, the roads associated with these treatments, and disturbance caused by wildfire. These watersheds have localized areas of concern.

Additionally, to help determine potential cumulative effects to federally listed species, open road densities (all ownership) where analyzed within the analysis area of each species.

For the Chiricahua leopard frog and southwestern willow flycatcher, the analysis also looked at number of stream crossings (all ownership) within the analysis area. Again, the overall analysis of all the activities discussed above by 5th-code watershed shows that the amount of directly affected habitat for wildlife is low in comparison to the availability of habitat.

Cumulative Effects Findings

Across the Gila National Forest, the incremental impacts of the proposed project and its associated alternatives, when added to other past, present, and reasonably foreseeable future

actions, are at levels that do not cause significant effects to wildlife species or their habitat on the forest.

This analysis shows that if the effects of all open roads are considered (private, county, State, and Federal), there are localized areas of concern under several of the action alternatives for species like ungulates, wide ranging carnivores, and the Chiricahua leopard frog.

Ungulates: Increases in ungulate harvest are associated with increased access. Rowland et al. (2005) states that elk vulnerability to harvest increases as open road density increases. This statement is supported by the literature (Unsworth et al. 1993, Gratson and Whitman 2000, and Hayes et al. 2002). Lyon et al. 1997, document bull elk vulnerability is highest in areas with open roads, reduced in areas with closed roads, and lowest in roadless areas. Watson (2005) reported that roads facilitate poaching of pronghorn.

Localized 6th-code watersheds with higher road densities will continue to maintain higher exposure rates between humans and wild ungulates facilitating the potential for additional harvest of these species. Alternatives that maintain higher road density levels will continue to facilitate this exposure; table 141 identifies the alternatives of concern in dark grey. These localized areas of higher road densities would not cause a significant effect to wild ungulates on the Gila National Forest.

Carnivores: Claar et al. (1999) document that research related to recreational impacts on carnivores is lacking. They go on to state that increased access into remote habitats is a concern, particularly to carnivore species that usually seek secluded areas. Claar et al. (1999) state that wolves are habitat generalists and are a very resilient species that can coexist with people if they are tolerated by humans. They are an intelligent species, which allows individuals to adapt to different levels of disturbance. Individuals may be very sensitive to human disturbance, but others tolerate disturbance. These traits between different individuals make it difficult to evaluate the overall effects of recreational activities (Claar et al. 1999). Much of the literature shows a strong negative relationship between wolves and increased road densities (Claar et al. 1999, Thiel 1985, and Mech et al. 1988). Researchers have found that when road densities exceed about 1 mile/mi^2 (1.6 km/0.9 km radius circle) wolves were displaced or avoided the area (Mech et al. 1988 and Thiel 1985). However, Claar et al. (1999) state that findings from many of these studies that looked at large, well established wolf populations may not be applicable to fragmented, recovering populations in western states. Wolf populations in Wisconsin, Minnesota, and Montana have become more habituated to humans through time since recolonization has occurred in these recovering populations (Claar et al. 1999 and Thiel et al. 1998).

The “Mexican Wolf Reintroduction EIS” did not recognize road densities on the Gila National Forest as a problem; however, since the start of the reintroduction project in 1998, illegal shootings and vehicle collisions have been the greatest source of wolf mortality within the recovery area in Arizona and New Mexico. Of the 68 wolf deaths between 1998 and June 1, 2009, 31 are associated with shooting and 12 with vehicle collision (U.S. Fish and Wildlife Service 2010).

Localized 6th-code watersheds with higher road densities will continue to maintain higher exposure rates between humans and wide ranging carnivores, facilitating the potential for additional harvest of these species. Alternatives that maintain higher road densities will continue to facilitate this exposure. Table 141 identifies the alternatives of concern in grey. The potential to

adversely affect wide ranging carnivores like the wolf would be expected to continue under the alternatives that maintain higher road densities in the localized areas, as identified in the table.

Table 141. Comparison of 6th-code watershed road densities by alternative

5th-Code Watershed	6th-Code Watershed within Each 5th-Code Watershed	Road Density	Alternative					
			B	C	C	E	F	G
Negrito Creek	150400040602	**mi/mi²**	2.85	2.85	1.79	0.99	2.31	2.31
Upper San Francisco River	150400040106	**mi/mi²**	2.52	2.51	1.97	1.79	2.03	2.07
	150400040109	**mi/mi²**	1.98	1.99	1.65	1.38	1.79	1.79
	150400040102	**mi/mi²**	1.90	1.90	1.84	1.80	1.84	1.84
	150400040107	**mi/mi²**	1.78	1.77	1.56	1.34	1.61	1.57
Tularosa River	150400040207	**mi/mi²**	2.38	2.34	2.03	1.85	2.09	2.03
	150400040201	**mi/mi²**	2.01	2.01	1.54	1.54	1.73	1.54
	150400040203	**mi/mi²**	1.89	1.88	1.66	1.58	1.69	1.66
Alamocito	130202080401	**mi/mi²**	2.25	2.25	1.53	1.22	1.99	1.92
	130202080404	**mi/mi²**	2.14	2.13	1.63	1.63	1.63	1.63
	130202080403	**mi/mi²**	1.91	1.84	1.38	1.16	1.35	1.35
Middle Fork Gila River	150400010302	**mi/mi²**	2.13	2.13	1.30	0.84	1.55	1.81
	150400010301	**mi/mi²**	2.05	2.05	1.43	1.09	1.55	1.55
	150400010303	**mi/mi²**	1.93	1.93	1.36	0.71	1.69	1.69
Mangas Creek	150200030701	**mi/mi²**	1.98	1.91	1.50	1.31	1.50	1.50

Grey areas denote alternatives with higher road densities and potentially higher rates of exposure between humans and wide ranging carnivores.

Chiricahua Leopard Frog: The literature documents that amphibians are killed on roadways. Fahrig et al. (1995) documented that the higher the traffic intensity, the greater the number of dead frogs and toads. Voss and Chardon (1998) documented that Moor Frog populations were negatively affected by density of roads within 250 meters of riparian, wetland, and aquatic habitats.

On the Gila National Forest, there were 15 occupied sites in 2009. Compared to many of the other federally listed species in the region, the concern for this species within its historic range is relatively high. The low number of occupied sites on the Gila adds to this concern.

Movement patterns by Chiricahua leopard frogs are not well understood. Based on observations of various ranids in Arizona and New Mexico (Southwest Endangered Species Act Team 2008), reasonable dispersal distances for the species are: (1) 1 mile overland, (2) 3 miles along intermittent drainages, and (3) 5 miles along permanent watercourses (Southwest Endangered

Species Act Team 2008), or some combination thereof. For this species, the miles of road and number of road crossings (all ownership) within the reasonable dispersal distance from occupied sites were examined for this cumulative effects analysis.

The higher road density and number of stream crossings, the greater the exposure rate between vehicles and the Chiricahua leopard frog, which facilitates the potential for harvest of this species. Alternatives C, D, F, and G maintain higher road density levels and a high number of stream crossings, which continue to facilitate the potential for harvest. The potential to have a higher level of adverse effects to the Chiricahua leopard frog would be expected to continue under alternatives C, D, F, and G.

Sensitive Plants

This section is a summary of the sensitive plant species specialist report (USDA Forest Service, 2010g).

Affected Environment

There are currently no threatened, endangered, proposed, or species of concern found within the Gila National Forest boundary. Twenty-two species on the Southwestern Regional Forester's sensitive species list have the potential to occur within the forest (table 142).

Methods

Analysis for effects of motorized travel within areas of sensitive plants was conducted using GIS analysis, data, and data sources that were put into road and vegetation layers to identify corridors through sensitive plant habitat. The only spatial data the Gila National Forest had was a spreadsheet with legal locations to the section level of plant observations. Indicators used to measure impacts to designated plants are corridor acres within 6th-code watersheds that are within habitat types where sensitive plants have been recorded or found. This survey information and or distribution within sensitive plant habitat was overlaid on proposals for alternatives to reflect the increase or decrease of acreage being impacted by motorized dispersed camping and motorized big game retrieval.

Table 142 provides a brief description of each plant's reported location in relation to the forest and its habitat association. Effects determinations are displayed by alternative for each species. The percentages reflect the increase or decrease of acreage within habitat types for sensitive plants for motorized dispersed camping and motorized big game retrieval.

Table 142. Southwestern Region sensitive plant species (USDA Forest Service 2007) known or having the potential to occur on the forest

Common Name	Reported Occurrences	Habitat Association	Alternative						Percentages reflect +/- change of acreage within habitat association for the species
			B	C	D	E	F	G	
Wright's Dogweed *Adenophyllum wrightii var. wrightii*	Pinos Altos Range; Grant County; 3 occurrence records on Gila from Wilderness and Silver City Ranger Districts	Drainages within piñon-juniper woodlands (sandy or silty soils)	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -97 percent for motorized dispersed camping and -27 percent for motorized big game retrieval. Alt. D identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact but, risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval. Alt. F identifies -97 percent for motorized dispersed camping and -56 percent for motorized big game retrieval. Alt. G identifies -97 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.
Goodding's Onion *Allium gooddingi Ownbey*	Occurrence records on Quemado, Glenwood, Wilderness and Reserve Ranger Districts, but also has the potential to occur on Black Range and Silver City Ranger Districts.	Mixed conifer and spruce-fir zones, generally in north trending drainages	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -95 percent for motorized dispersed camping and -11 percent for motorized big game retrieval. Alt. D identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact but, risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and/or motorized big game retrieval. Alt. F identifies -97 percent for motorized dispersed camping and -56 percent for motorized big game retrieval.

Table 142. Southwestern Region sensitive plant species (USDA Forest Service 2007) known or having the potential to occur on the forest

Common Name	Reported Occurrences	Habitat Association	Alternative						Percentages reflect +/- change of acreage within habitat association for the species
			B	C	D	E	F	G	
									Alt. G identifies -97 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.
Mogollon Death Camas *Anticlea mogollonensis*	Most of its range within Gila Wilderness, around the area of White Water Baldy.	Understory of upper montane and subalpine coniferous forest. Often found with aspen.	NI	NI	NI	NI	NI	NI	Species has only been documented within Gila Wilderness.
Greene Milkweed *Asclepias uncialis uncialis*	No occurrence records on the forest. Two occurrence records north of Silver City on private land.	Yucca grasslands with scattered juniper trees	NI	NI	NI	NI	NI	NI	Species documented within private property.
Villous Groundcover *Milkvetch Astragalus humistratus var. crispulus*	Occurrence record from Quemado RD, and private land adjacent to Quemado RD. No other occurrence records on Gila.	Pine forest on slopes, benches, and ledges. Vegetated roadbanks.	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -95 percent for motorized dispersed camping and -1 percent for motorized big game retrieval. Alt. D identifies -95 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact but, risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval. Alt. F identifies -95 percent for motorized dispersed camping and -22 percent for motorized big game retrieval. Alt. G identifies -95 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.

Table 142. Southwestern Region sensitive plant species (USDA Forest Service 2007) known or having the potential to occur on the forest

Common Name	Reported Occurrences	Habitat Association	Alternative						Percentages reflect +/- change of acreage within habitat association for the species
			B	C	D	E	F	G	
Gila Thistle *Cirsium gilense*	Two occurrence records on the forest. One on the Glenwood Ranger District within the wilderness, and one on the Reserve Ranger District outside wilderness.	Moist mountain meadows in coniferous forests.	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -95 percent for motorized dispersed camping and -7 percent for motorized big game retrieval. Alt. D identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval. Alt. F identifies -94 percent for motorized dispersed camping and -19 percent for motorized big game retrieval. Alt. G identifies -95 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.
Wooton's Hawthorn *Crataegus wootoniana*	Occurrence records for Grant and Catron Counties on the Glenwood, Wilderness, and Silver City Ranger Districts. Populations occur on the forest in Cherry Creek and Telephone Canyon within the Pinos Altos Mtn. Range.	Canyon bottoms and forest understory in lower montane coniferous forests	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -98 percent for motorized dispersed camping and -31 percent for motorized big game retrieval. Alt. D identifies -99 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval. Alt. F identifies -98 percent for motorized dispersed camping and -71 percent for motorized big game retrieval.

Table 142. Southwestern Region sensitive plant species (USDA Forest Service 2007) known or having the potential to occur on the forest

Common Name	Reported Occurrences	Habitat Association	Alternative						Percentages reflect +/- change of acreage within habitat association for the species
			B	C	D	E	F	G	
									Alt. G identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.
Yellow Lady's Slipper *Cypripedium parviflorum pubescens*	Occurrence records for Grant County within the Gila Wilderness, on Little Creek and Little Turkey Creek. Not documented outside of wilderness.	Middle to high elevation riparian (50 to 100 yards from water in nearly full sunlight). Seeps. fir, aspen, and pine forest in full sunlight. Mesic slopes up to 60 degrees.	NI	NI	NI	NI	NI	NI	Species has only been documented within the Gila Wilderness.
Mogollon Hawkweed *Hieracium fendleri var. mogollense*	Catron County; no known occurrence records on the Gila NF.	Understory plant in montane coniferous forest.	NI	NI	NI	NI	NI	NI	Records indicate no known occurrences within the forest.
Metcalfe's Tick – Trefoil *Desmodium metcalfei*	Historically, in Grant and Sierra Counties in Cabello watershed. No recent occurance records.	Rocky slopes, in canyons, and in ditches within oak/piñon-juniper woodlands/ grasslands	NI	NI	NI	NI	NI	NI	Records indicate no recent occurrences within the forest.
Hess' Fleabane *Erigeron hessii*	All known populations are within the Gila Wilderness, in the area of White Water Baldy.	Grows from bedrock cracks in open areas in upper montane to subalpine conifer forests.	NI	NI	NI	NI	NI	NI	Species has only been documented within the Gila Wilderness.

Table 142. Southwestern Region sensitive plant species (USDA Forest Service 2007) known or having the potential to occur on the forest

Common Name	Reported Occurrences	Habitat Association	Alternative						Percentages reflect +/- change of acreage within habitat association for the species
			B	C	D	E	F	G	
Arizona Coralroot *Hexalectris spicata var. arizonica*	Hidalgo and Sierra Counties. No known occurrence records on the Gila NF.	Heavy leaf litter under the drip line of oaks, pines, and junipers. Canyon bottoms and wooded canyon sides most commonly over limestone.	NI	NI	NI	NI	NI	NI	Records indicate no known occurrences within the forest.
Rusby Hawkweed *Hieracium abscissum* *H. rusbyi*	All known populations are within the Gila Wilderness.	Mixed conifer forest. Associated genera and species include: Pinus (pine), Alnus (alder), Quercus spp. (oak), and Juniperus deppeana (alligator juniper	NI	NI	NI	NI	MI	MI	Species has only been documented within the Gila Wilderness.
Heartleaf Groundsel *Packera cardamine* *Scenecio cardamine*	Mogollon Mountains of Catron County. Nine occurrence records on Gila. More specifically all east of the Silver Creek Divide, south of Bursum around the area of trail 182.	Understory of late seral spruce-fir	NI	NI	NI	NI	NI	NI	Species has only been documented within the Gila Wilderness.
Maguire's Beardtongue *Penstemon linarioides ssp.maguirei*	Not seen in NM in over 100 years. Mining was cited as threat to the only known population in Arizona.	Limestone cliffs in piñon-juniper woodlands.	NI	NI	NI	NI	NI	NI	Plant has not been documented in over 100 years in New Mexico, and limited information is available on the species. Habitat may be found in the Gila River Valley in Grant County.

Table 142. Southwestern Region sensitive plant species (USDA Forest Service 2007) known or having the potential to occur on the forest

Common Name	Reported Occurrences	Habitat Association	Alternative						Percentages reflect +/- change of acreage within habitat association for the species
			B	C	D	E	F	G	
Metcalfe's Penstemon *Penstemon metcalfei*	Thirteen occurrence records on Gila primarily on Black Range Ranger District in remote areas, one record on Wilderness Ranger District.	Mixed conifer and spruce fir - all stages.	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -98 percent for motorized dispersed camping and -18 percent for motorized big game retrieval. Alt. D identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval. Alt. F identifies -98 percent for motorized dispersed camping and -52 percent for motorized big game retrieval. Alt. G identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.
Davidson's Cliff Carrot *Pteryxia davidsonii*	Grant and Catron Counties. One pre-1970 record in the Gila NF files, at 4,880 feet in a gray oak dominated west-facing slope adjacent to a tributary to Mangus Creek.	Moist rocky areas seem to be important to this species. This species has been documented to occur on sheer cliffs; in rocky, damp, drainages; and mountainsides. The literature also documents that the species grows in wet areas (potentially wetlands, seeps, springs, and riparian areas).	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -96 percent for motorized dispersed camping and -16 percent for motorized big game retrieval. Alt. D identifies -97 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval. Alt. F identifies -96 percent for motorized dispersed camping and -41 percent for motorized big game retrieval.

Table 142. Southwestern Region sensitive plant species (USDA Forest Service 2007) known or having the potential to occur on the forest

Common Name	Reported Occurrences	Habitat Association	Alternative						Percentages reflect +/- change of acreage within habitat association for the species
			B	C	D	E	F	G	
									Alt. G identifies -96 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.
Blumer's Dock *Rumex orthoneurus*	Has been documented in Grant and Catron Counties on the forest; and probably occurs on all ranger districts.	Middle to high elevation wetlands with moist, organic soil adjacent to perennial springs or streams in canyons or meadow situations.	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -95 percent for motorized dispersed camping and -15 percent for motorized big game retrieval. Alt. D identifies -99 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval. Alt. F identifies -97 percent for motorized dispersed camping and -28 percent for motorized big game retrieval. Alt. G identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.
Mimbres Figwort *Scrophularia macrantha*	Thirty-five occurrence records on Gila, all flow into the Mimbres watershed. Noonday, Railroad, and Upper Gallinas Canyons. These occurrences' are on both the Silver City and Wilderness Ranger Districts.	Typically steep, rocky, usually north-facing igneous cliffs and talus slopes.	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -98 percent for motorized dispersed camping and -52 percent for motorized big game retrieval. Alt. D identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval.

Table 142. Southwestern Region sensitive plant species (USDA Forest Service 2007) known or having the potential to occur on the forest

Common Name	Reported Occurrences	Habitat Association	Alternative						Percentages reflect +/- change of acreage within habitat association for the species
			B	C	D	E	F	G	
									Alt. F identifies -98 percent for motorized dispersed camping and -73 percent for motorized big game retrieval. Alt. G identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.
Porsild's Starwort *Stellaria porsildii*	Pinos Altos Mountains of NM, Grant County. On Gila occurs just below Signal Peak on a west-facing slope on the Silver City Ranger District.	Mixed conifer and aspen forests.	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -98 percent for motorized dispersed camping and -25 percent for motorized big game retrieval. Alt. D identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval. Alt. F identifies -98 percent for motorized dispersed camping and -57 percent for motorized big game retrieval. Alt. G identifies -98 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.
Pinos Altos Flame Flower *Talinum humile*	Grant and Hidalgo Counties in NM. Six occurrence records on Gila. Cherry Creek, Beartooth drainages on the Silver City Ranger District, and Noonday drainage	Madrean grassland, oak woodland, piñon-oak woodland or piñon-juniper woodland.	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -99 percent for motorized dispersed camping and -51 percent for motorized big game retrieval. Alt. D identifies -99 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.

Table 142. Southwestern Region sensitive plant species (USDA Forest Service 2007) known or having the potential to occur on the forest

Common Name	Reported Occurrences	Habitat Association	Alternative						Percentages reflect +/- change of acreage within habitat association for the species
			B	C	D	E	F	G	
	on the Wilderness Ranger District.								Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval. Alt. F identifies -99 percent for motorized dispersed camping and -77 percent for motorized big game retrieval. Alt. G identifies -99 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.
Mogollon Clover *Trifolium longipes spp. Neurophyllum*	Catron County, NM; documented on the Black Range, Quemado, Glenwood, Wilderness, and Reserve Ranger Districts.	Riparian zones in mixed conifer forest. High elevation permanently wet meadows along streams and springs	MI	MI	MI	NI	MI	MI	Alt. B includes cross-country travel which may impact the species. Alt. C identifies -93 percent for motorized dispersed camping and -3 percent for motorized big game retrieval. Alt. D identifies -94 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low. Alt. E NI -100 percent decrease in acreage. Doesn't allow for motorized dispersed camping and or motorized big game retrieval. Alt. F identifies -93 percent for motorized dispersed camping and -23 percent for motorized big game retrieval. Alt. G identifies -94 percent for both motorized dispersed camping and motorized big game retrieval. Chance for potential impact, but risk is very low.

Environmental Consequences

General Effects to Plants

Motorized travel includes motorized travel on roads, motorized travel on trails, cross-country motorized travel (includes motorized big game retrieval), and motorized dispersed camping. The development of unauthorized routes has grown during the last 2 decades and some are causing natural resource damage within the forest. The amount of unauthorized routes is difficult to measure accurately. Since unauthorized routes are not engineered, some are having direct habitat damage such as soil disturbance, which can result in decreased vegetation cover and density. As soil compacts and erodes, roots can be exposed and eventually killed, which can then lead to the establishment of weed species (Joslin and Youmans 1999). Loss of vegetation cover increases exposure of soil to wind and water erosion, which reduces the ability of plants to reestablish an area. These effects can last decades or even centuries (Joslin and Youmans 1999). Plants are also vulnerable to direct damage from off-highway vehicles (OHVs) by crushing, shearing and uprooting which can change plant characteristics by reducing flower and seed production and carbohydrate reserves, which reduces plant vigor and recruitment (Cole and Landres 1995). Motorized routes can create edge habitat that promotes nonnative encroachment and invasive plant species (Ouren et al. 2007).

There is limited information associated with the plant species discussed in this document, both rangewide and site specific for the Gila National Forest. Global and State population rankings were used when available to identify the overall status of the species. Effects to sensitive plant species are summarized in table 143.

Summary

Motorized routes and trails were not included in this analysis. The effects of road systems and sensitive plants are discountable due to the disturbance that already exists with the roads and or trails. Sensitive plants do not occur within a designated roadway or trail. Percents indicate the reduction of acreage within associated habitat types for sensitive plant species within 6th-code watersheds. Alternative C has the greatest amount of acreage available for motorized dispersed camping and motorized big game retrieval. Corridors associated with motorized dispersed camping include a 300-foot corridor off designated routes and 1 mile of cross-country travel from designated routes. With the elimination of cross-country travel (alternative B), the effects of motorized dispersed camping and motorized big game retrieval are virtually eliminated in alternatives D and G. Alternative F reduces a greater amount of acreage for motorized dispersed camping compared to motorized big game retrieval. It should be noted that although motorized big game retrieval is reflected as open in the analysis, the use would be seasonal in conjunction with hunting season and would be random with regard to location of harvest. Alternative E is limited to road systems and roadside parking. This alternative also eliminates cross-country motorized travel, motorized dispersed camping, and motorized big game retrieval, which would have the greatest benefit for sensitive plant populations on the Gila National Forest.

Cumulative Effects

Cumulative effects are the incremental environmental impacts or effects of the action together with impacts of past, present, and reasonably foreseeable future actions. The geographic scope for the cumulative effects assessment for sensitive plants includes the entire Gila National Forest.

The percentage of acreage indicates habitat types associated with sensitive plants and the motorized opportunity in each 6th-code watershed within the vegetation type. All action alternatives except alternative B reduce the miles available for motorized use and eliminate motorized access off designated system routes which, in return, decreases the acreage that could be affected.

Reasonable foreseeable actions that contribute to increased cumulative effects to sensitive plants within the Gila National Forest include: firewood gathering, livestock grazing, road maintenance, OHV use, hunting/camping, mining and other recreational uses. OHV use associated with cross-country travel poses the biggest threat to sensitive plants. With the elimination of cross-country travel through all alternatives, these effects would be eliminated. However, alternatives C, D, F and G allow for motorized dispersed camping and motorized big game retrieval. Alternative E eliminates both motorized dispersed camping and motorized big game retrieval. This alternative has the greatest benefit for sensitive plants. Alternatives D and G also decrease acreage available for motorized dispersed camping and motorized big game retrieval and would be beneficial. Alternative F allows for a greater amount of acreage available for motorized big game retrieval, but averages the same for motorized dispersed camping. Overall, there wouldn't be an increase in adverse cumulative impacts to sensitive plants with the action alternatives listed.

Invasive Species

This section is a summary of the invasive species specialist report (USDA Forest Service 2010h).

Affected Environment

Invasive species are plant and animal species not native to a region, which when introduced either accidentally or intentionally, out-compete native plants or animals for available resources, may reproduce prolifically, and can potentially dominate regions and ecosystems. No invasive animal species are known to occur in the project area and will not be addressed further. Invasive plant seeds and spores can travel by wind, in water or by animals and people in fur or feathers, clothing, or the tires of vehicles. Roads and trails are one pathway through which seeds may spread. Plant seeds may get lodged in the mud, grease, and crevices of vehicles and may travel as far as the vehicle itself. Because they often arrive in new areas unaccompanied by their native predators, there are no natural agents to restrain their establishment and spread. The Gila National Forest has focused on four major areas for management of invasive plant species: (1) prevention, (2) detection and recognition, (3) control to keep populations under control, and (4) cooperation with Federal, State, counties, and weed control districts.

Three categories of noxious weeds have been identified for the State of New Mexico (Class A, B, and C weeds). Refer to the invasive species specialist report (USDA Forest Service 2010h) for the New Mexico Noxious Weed plant list by category. As of April 2009, approximately 21 species were identified as Class A, 10 species as Class B, 6 species as Class C, and 8 species in the "Watch List" category. The categories and invasive plant species are also addressed in detail in three additional publications: 1999 New Mexico Invasive Weeds, 2006 Troublesome Weeds of New Mexico, and 2007 Roadside Weed Management.

The major invasive plants known to occur within the analysis area include bull thistle, cheatgrass, musk thistle, purple loosestrife, Russian olive, salt cedar, scotch thistle, Siberian elm, spotted

knapweed, tree of heaven, and yellow starthistle. These species are generally associated with ground disturbance on roads, trails, utility corridors, developed campgrounds, timber sale areas, wildland burns, and developed rangeland structural improvements such as stock ponds and pipelines. Some invasive species are limited to specific areas, while others are common at all major river systems.

Methodology to Estimate Effects

Electronic databases and forest files for invasive plant inventory and treatment records were reviewed for the analysis area. Professional judgment was used to estimate effects of the alternatives. The total amount of proposed miles for roads and trails was determined for this proposed project to compare the estimated effects for each alternative.

Direct and Indirect Effects

The direct and indirect effects in this analysis are related to percent of change of road miles from alternative B, the no action alternative. Percentages of change within the analysis area are displayed in table 143 by alternative.

Table 143. Proposed total roads and trails displayed in miles for each alternative

Description	B	C	D	E	F	G
Proposed total roads (miles)	4,602	4,269	2,980	2,334	3,346	3,325
Proposed total trails (miles)	16	202	124	1	180	180
Proposed combined totals (miles)	4,618	4,471	3,104	2,335	3,526	3,505
Percent change from alternative B		- 3%	-33%	-49%	-24%	-24%

Alternative B (No Action)

Under this alternative, motorized travel within the analysis area would continue to occur at the current level on all National Forest System lands for any activity, and would have the largest amount of potential invasive plant species that would occur within the analysis area when compared to all the proposed alternatives. As a result, the number of invasive plant species that would go to seed and spread by motorized and nonmotorized use is expected to remain about the same. The rate of establishment of new infestations would be expected to increase, since seed would continue to be spread via uncontrolled motorized travel within the analysis area. In summary, alternative B would allow for the largest amount of potential for invasive plant species that would occur within the analysis area when compared to all the proposed alternatives.

Alternative C

This alternative would be very similar to the no action alternative (alternative B). Under this alternative, the amount of motorized travel would be reduced with the restriction of authorized cross-country travel and access for game retrieval limited to “1 mile” within the analysis area. As a result, a 3 percent difference from alternative B would occur in the amount of invasive plant species that would continue to go to seed and spread. The rate of establishment of new infestations would be expected to continue to increase through other uses such as designated

motorized and nonmotorized travel, proposed “areas” would be recognized within the analysis area, restricted access of “1 mile” for game retrieval, and restricted access of motorized dispersed travel of “300 feet.” No cross-country travel would be authorized. In summary, alternative C would be very similar to alternative B, and when compared with all the proposed alternatives, would have the second largest amount of potential for invasive plant species within the analysis area.

Alternative D

This alternative displays a moderate amount of change when compared to the no action alternative (alternative B). Under this alternative, the amount of motorized travel would be reduced with the restriction of authorized cross-country travel. Access for game retrieval and motorized travel would be limited to “300 feet” within the analysis area. No proposed “areas” would occur under this alternative. As a result, a 33 percent difference from alternative B would occur in the amount of invasive plant species that would continue to go to seed and spread. The rate of establishment of new infestations would be expected to decrease, since the amount of uncontrolled motorized travel within the analysis area would also be moderately decreased as compared to alternative B, including no cross-country travel, no recognized “areas,” and restricted motorized dispersed travel and access for game retrieval limited to “300 feet.” In summary, alternative D would have a moderate amount of invasive plant species compared to alternative B, and when compared with all the proposed alternatives, would have the second smallest amount of potential for invasive plant species within the analysis area.

Alternative E

This alternative displays the most amount of change when compared to the no action alternative (alternative B). Under this alternative, no authorized cross-country travel would be allowed within the analysis area. No proposed “areas,” motorized dispersed travel or access for big game retrieval would occur. As a result, a 49 percent difference from alternative B would occur in the amount of invasive plant species that would continue to go to seed and spread. The rate of establishment of new infestations would also be expected to decrease, since the amount of uncontrolled motorized travel within the analysis area would be decreased the most as compared to alternative B, including no cross-country travel, no recognized “areas,” no motorized dispersed travel, and no access for big game retrieval. In summary, alternative E would have the least amount of invasive plant species compared to alternative B, and when compared with all the proposed alternatives, would have the least amount of potential for invasive plant species within the analysis area.

Alternative F

This alternative displays some change when compared to the no action alternative (alternative B). Under this alternative, no authorized cross-country travel would be allowed within the analysis area. Proposed “areas” would be recognized, motorized dispersed travel would be limited to “300 feet,” and access for big game retrieval would be limited to “½ mile.” As a result, a 24 percent difference from alternative B would occur in the amount of invasive plant species that would continue to go to seed and spread. The rate of establishment of new infestations would also be expected to decrease, since the amount of uncontrolled motorized travel within the analysis area would be decreased the most as compared to alternative B, including no cross-country travel,

authorized motorized dispersed travel restricted to “300 feet,” and authorized access for big game retrieval restricted to “½ mile.” In summary, alternative F would have a lower amount of invasive plant species compared to alternative B, and when compared with all the proposed alternatives, would have a lower amount of potential for invasive plant species within the analysis area.

Alternative G

This alternative displays the same amount of change as alternative F, and some change when compared to the no action alternative (alternative B). Under this alternative, no authorized cross-country travel would be allowed within the analysis area. Proposed “areas” would be recognized, motorized dispersed travel and access for game retrieval would be limited to “300 feet.” As a result, a 24 percent difference from alternative B would occur in the amount of invasive plant species that would continue to go to seed and spread. The rate of establishment of new infestations would also be expected to decrease, since the amount of uncontrolled motorized travel within the analysis area would be decreased the most as compared to alternative B, including no cross-country travel, authorized motorized dispersed travel, and authorized access for big game retrieval restricted to “300 feet.” In summary, alternative G would have a lower amount of invasive plant species compared to alternative B, and when compared with all the proposed alternatives, would have a lower amount of potential for invasive plant species within the analysis area, except for alternative E.

Cumulative Effects

An assortment of past and present ground-disturbing activities such as utility corridors, roads, trails, developed campgrounds, livestock grazing, timber removal, recreation uses, wildland burning, road construction, and developed rangeland structural improvements such as stock ponds and pipelines, have contributed to the spread of invasive plants. These types of ground disturbance in conjunction with other forest uses and activities from other vectors (such as animals, hiking, mountain biking, and motorized use) will cumulatively affect the spread of invasive plant species within the analysis area. Alternative B would contribute the most toward cumulative effects because it provides the most favorable conditions for the spread and establishment of invasive plants with its uncontrolled motorized use, and alternative E would contribute the least. Alternatives C, D, F and G would continue to contribute to cumulative effects for invasive species, but at a much lower level when compared with the no action alternative because of reduced number of authorized roads and trails associated with forest uses and activities.

Cultural Resources

This section is a summary of the cultural resources specialist report (USDA Forest Service, 2010i).

Gila National Forest History and Prehistory

The Gila National Forest has a rich archaeological and cultural history. The forest includes lands that have been used and occupied by humans throughout the prehistoric era, beginning with the Paleoindian Period (<9,500 B.C.–5,500 B.C.) (ARMS 2009). Paleoindian peoples were highly mobile hunters and gatherers who hunted megafauna (now extinct large mammals such as

mammoths) (Cordell 1997). The Archaic Period (5,500 B.C.–A.D. 200) follows the Paleoindian Period (ARMS 2009). Archaic peoples were also mobile and relied on hunting and gathering. However, in this period people began to rely more on plants and horticulture began (Cordell 1997). The Mogollon Culture (A.D. 200–A.D. 1400) spanned about 1,200 years during which people relied more on horticulture, followed by predominance of agriculture. Pottery and more permanent dwellings (pithouses, A.D. 200–A.D. 1000, and then pueblos, A.D. 1000–A.D.1400) were hallmarks of the period (ARMS 2009, Cordell 1997, Diehl and LeBlanc 2001, and Martin 1979). Phases of the Mogollon Culture are primarily defined by pottery and dwelling types (see Anyon and LeBlanc 1984, LeBlanc 1980a, LeBlanc 1980b, Lekson 1992, Berman 1989, and Martin and Rinaldo 1950). The Mogollon people are the most widely studied on the forest. Most prehistoric sites found on the forest are Mogollon, including habitation remains in the form of pithouses or masonry dwellings, roasting pits, lithic (stone) and pottery artifact scatters, and some agricultural features like check dams, cultural landscapes, etc.

The historic period began in New Mexico with Spanish contact in 1539. On forest and elsewhere in New Mexico, the historic period is divided by the rise and fall of political control by the Spanish (A.D. 1539–1821), Mexican (A.D. 1821–1848), and American (A.D. 1848–present) periods (Opler 1983). From the Spanish Period through the first several decades of the American Period, the goal of each political entity was to secure safe passage through this area and/or provide access to its resources for mining, ranching, and grazing. During the American Period, overlapping interests of Apache peoples and settlers of the area led to conflict between the two groups. Eventually, the U.S. Government turned to the removal of Apache peoples to reservations. Most resisted as long as possible, but eventually most Apache tribal people were removed to several reservations within and outside New Mexico (Opler 1983).

Contemporary and historic land uses include mining, ranching, grazing, logging, frontier settlement, frontier military activities, and government land management. Evidence of these activities persists in the archaeological record today in the form of the remains of forts, cabins, corrals, windmills, abandoned mines, military reservations, water wells, irrigation ditches, check dams, bridges, sawmills, homesteads, historic roads and trails, and Forest Service administrative sites. Other site types include rancherias, camps, battle sites (Indian Wars in particular), and trash dumps. Since the establishment of the forest in 1905, ranger stations, administrative sites, lookouts, and recreational areas have been built as well. Finally, Civilian Conservation Corps (CCC) associated camps and infrastructure like roads, bridges and campgrounds are found on the forest.

Today, land use in the forest continues to follow the multiple-use mission of the Forest Service, including grazing, mining, ranching, and vegetation and fuels management. Native American tribes also continue to intermittently use the forest for traditional activities including plant gathering and visits to special places. A very few places on the forest are recognized by tribes as traditional cultural properties, though none have been identified in the travel management project area.

Affected Environment

For the past 35 or more years, forest cultural resource specialists (archaeologists), in compliance with Sections 106 and 110 of the National Historic Preservation Act of 1966, as amended, have

inventoried about 384,267 acres (11.6 percent) of the forest's 3.3 million acres to professional standards. A total of 5,932 cultural sites are in the Gila National Forest databases.

For the forest and Region 3 of the Forest Service, a cultural resource site is defined as "a locus (location) of purposeful human activity which has resulted in a deposit of cultural material beyond one or a few accidentally lost artifacts." (USDA Forest Service, Southwestern Region. 1987, FSH 2309.24, pp. 2–3). In practical terms, this means a cultural resource site can include things like ancient pueblo structures, broken pottery sherds, grinding stones, arrowheads or other stone tools scattered on the ground, rock walls, or the remains of historic homesteads or mines.

Eight sites or groups of sites known as "districts" are listed on the National Register of Historic Places; 1,118 sites have been determined eligible for the National Register of Historic Places, and 294 have been determined ineligible. The other 4,512 sites are unevaluated for National Register of Historic Places eligibility, and must be treated as if they are eligible until an official determination is made in consultation with the New Mexico State Historic Preservation Officer. An unevaluated site requires more study before it can be determined whether the site is eligible for the National Register of Historic Places.

Cultural Resource Consultation and Travel Management

In lieu of using the 36 CFR 800 regulations of the National Historic Preservation Act, the forest is complying with this law by following the USDA Forest Service, Region 3 Protocol regarding Section 106 consultation for Travel Management Route Designation (TM protocol) (USDA Forest Service, Southwestern Region; New Mexico State Historic Preservation Officer; Appendix I; 2007). The TM protocol is appendix I of the Southwestern Region Programmatic Agreement between the State Historic Preservation Officer, Advisory Council on Historic Preservation, and USDA Forest Service. Both the cultural resource programmatic agreement and TM protocol streamline and standardize the Section 106 consultation process for the forest. For example, the protocol stipulates that in some cases, archaeological surveys will not be required or can be conducted at less than 100 percent coverage. In many instances, the protocol also eliminates the need for pre-consultation with the State Historic Preservation Officer for sample surveys.

The TM protocol exempts existing road prisms and/or associated constructed features from Section 106 compliance and consultation. It is agreed that impacts to cultural resource sites may have occurred when these roads were created, and that disturbance from continued use of these roads is acceptable if the portion of the site within the road has already been disturbed to a substantial degree. Therefore, cultural sites or portions of sites within road prisms and/or associated constructed features are exempt from further consideration and consultation, resulting in an overall determination of no adverse effect for travel management.

Actions considered new undertakings under the National Historic Preservation Act will go through Section 106 consultation and compliance (per Southwestern Region Programmatic Agreement, TM protocol, or 36 CFR 800) before they appear on the motor vehicle use map. These include: motorized dispersed camping corridors, areas, and route designations such as adding unauthorized routes to the NFS road and trail system, re-opening closed roads, and converting closed roads to NFS trails. If potential effects are identified, they will be addressed by the forest in consultation with the State Historic Preservation Officer. Under the TM cultural resource protocol, the Travel Management Rule NEPA decision can be signed based on existing

cultural resource data. Additional cultural surveys may be phased up to 3 years after the decision has been signed.

Environmental Effects

For all alternatives, effects on cultural resources (heritage resources) have been analyzed with respect to four issues: motorized routes, motorized dispersed camping, motorized big game retrieval, and motorized areas. Because not all cultural surveys for the Travel Management Rule have been completed, existing survey data and known sites are used in this analysis.

Background Assumptions

- Cultural resource sites adjacent to locations having motorized access, including cross-country travel, routes, areas, motorized big game retrieval, and motorized dispersed camping corridors, may be easier to access and have potential for existing and ongoing disturbances from recreational activities like motorized camping.
- Some data suggest that cultural sites located near routes may be more susceptible to looting (Spangler 2006).
- On the Gila National Forest, most cultural sites exhibit some level of vandalism or looting, so the presence of this type of disturbance is not necessarily related to access provided by motorized routes or motorized dispersed camping.

Effects Common to All Alternatives

Roadside Parking

For all alternatives, vehicles will be able to park adjacent to roads within one vehicle length for dispersed camping purposes and other outdoor activities. The forest plan has always allowed this type of roadside parking, so there is no change from current condition. In addition, roadside parking is exempt from Section 106 consultation under the TM protocol, because continued motor vehicle use is considered acceptable where the integrity of cultural sites has already been disturbed and compromised (Appendix I, Stipulation II.C.; USDA Forest Service, Southwestern Region; New Mexico State Historic Preservation Officer 2007).

While Section 106 consultation is not required for roadside parking, it was analyzed within motorized routes. Roadside parking has potential to cause direct and indirect effects to cultural resources near roads. Direct effects may include, but are not limited to, vehicular impacts. Vehicles may be driven over sites causing disturbance to features and artifact displacement. In wet weather or sensitive soils, vehicles may cause rutting, compaction, and erosion which could disturb cultural deposits. Indirect effects of roadside parking may include parking within walking distance of a site or within a site boundary, which can lead to dispersed camping in cultural sites, looting (opportunistic, inadvertent or purposeful), graffiti, and other site damage or destruction.

These effects may occur in all alternatives, but are correspondingly reduced as miles of designated roads are reduced. All action alternatives will substantially benefit the condition of cultural resources on the forest by greatly reducing miles of roads and roadside parking as compared to current conditions open to cross-country travel. Many fewer cultural resources will

be subject to indirect effects from roadside parking, because parking may occur only along designated roads.

Motorized Cross-Country Travel

Motorized cross-country travel is prohibited under all action alternatives. This means that vehicular off-road travel will not be permitted, except in appropriate motorized dispersed camping corridors, areas, or for motorized big game retrieval. Vehicles must stay in the confines of routes for driving, and access outside of these routes will be reduced to foot traffic or other authorized access (pack animals, for example).

Studies in California, Utah, and national parks demonstrate that off-road vehicle travel can result in direct and indirect effects to cultural resources (Long et al. 1999, Sampson 2007, and Schiffman 2005). These may include, but are not limited to, vehicular contact with site features, artifact scatters and cultural deposits, deliberate or opportunistic looting, rutting or trail creation, and artifact collecting. These studies cover much smaller areas than the forest, with much more concentrated use of off-highway vehicles, and different environmental conditions than those found on the forest.

On the forest, prohibiting cross-country travel under action alternatives will be highly beneficial to cultural resources by reducing ease of access to sites located in areas that do not have designated routes. The number of known sites that will no longer be accessible through blanket cross-country travel ranges from 3,512 to 3,862 depending on the action alternative. This will considerably reduce the potential for direct and indirect effects from motorized use. The potential risk of other indirect effects associated with recreational use of National Forest System lands may be reduced because access will be limited to nonmotorized traffic. Foot traffic off routes can result in some indirect effects like looting or camping within a cultural site (Schiffman 2005). However, restrictions on vehicle use are cited as one way to protect cultural resources (Spangler et al. 2006).

Effects from Motorized Routes

Motorized routes provide ease of access to National Forest System lands and the cultural resources located within them. Reduction of miles/acres of motorized routes and prohibition of cross-country travel are highly beneficial to cultural resources by reducing the number of cultural resources exposed to direct and indirect effects of motorized vehicle use.

Analysis for routes focused on the comparison to existing condition of the number of miles/acres proposed per alternative, and the number of cultural sites within areas of potential effect (buffers) for trails (10 feet either side of center line) and roads (50 feet either side of center line). These buffers represent land that may be disturbed by motorized use authorized under this decision, including roadside parking.

Analysis

The number of miles for cultural resource analysis includes Forest Service, county, State, and Federal highway jurisdictions. Because the number of miles and acres associated with county, State, and Federal highway routes remain the same throughout cultural resource analysis, the numbers of known sites located within them are also static. Differences in miles or acres for

cultural resources analysis reflect the differences between routes under and not under Forest Service jurisdiction. Routes under other jurisdictions were included in this analysis because they are adjacent to National Forest System lands, providing access to these lands and the cultural resources within them.

Alternative B

Alternative B has about 5,320 miles/63,726 acres of routes (table 144). There are 1,274 known sites within these routes. Types of potential direct and indirect effects are discussed below, and these types of effects will be the same for each alternative.

Cultural sites found within buffered route acres and cross-country travel acres for alternative B may be at risk for direct effects related to vehicular contact. Vehicles may be driven over sites causing disturbance to features and artifact displacement. In wet weather or sensitive soils, vehicles may cause rutting, compaction, and erosion which could disturb cultural deposits.

Additional direct and indirect effects of motorized route designation include activities that recreationalists may participate in once they have reached their destination. These may include, but are not limited to, dispersed camping, firewood collection, hiking, etc. These kinds of activities may result in damage, dismantling or scavenging of historic or prehistoric sites for structural materials that can be used for fire rings or wood for fire; deliberate or opportunistic looting and artifact collecting; graffiti on historic and prehistoric features; and mixing of modern trash litter with historic artifacts or collection of historic trash mistaken for modern trash.

Also, use of vehicles within sites may cause vegetation to become disturbed, thereby exposing soils. This may cause erosion, which can displace artifacts and cultural deposits.

Table 144. Summary of miles, acres, and number of sites in motorized routes by alternative

	Alternative					
	B	C	D	E	F	G
Changes in route system in miles	0	412	515	468	501	502
Miles of existing routes	5,320	4,941	3,648	3,011	4,029	4,006
Total miles	5,320	5,353	4,163	3,478	4,530	4,508
Change in number of miles of NFS motorized routes expressed as a percent (+ or -) of alternative B		+0.6%	-21.7%	-34.6%	-14.8%	-15.3%
Acres for routes	63,726	62,268	48,796	41,769	52,677	52,430
Change in number of acres of NFS motorized routes as expressed as a percent (+ or -) of alternative B		-2.3%	-23.4%	-34.5%	-17.3%	-17.7%
Known cultural sites	1,274	1,262	1,084	912	1,131	1,129

	Alternative					
Change in number of known sites within NFS motorized routes as expressed as a percent (+ or -) of alternative B		-0.5%	-15.0%	-28.4%	-11.2%	-11.4%

Effects Common to Alternatives C, D, E, F, and G

Motorized route designation effects are common to all alternatives, however, the number of cultural sites that may be at risk will change as cross-country motorized travel is restricted and the number of miles/acres and sites are reduced. Beneficial effects will increase as cross-country travel is prohibited and route mileage/acreage is reduced. Prohibition of cross-country travel should reduce indirect effects to cultural sites, especially erosion and rutting. Closure of routes may promote natural reclamation of the routes themselves. As miles/acres of routes close, indirect effects like looting and camping related impacts should also reduce as sites outside the route system will be harder to access.

Alternative C

Changes under alternative C result in 5,353 miles or 62,268 acres of routes. This is a 0.6 percent increase in miles from alternative B, but a decrease of 2.3 percent in acreage. Although the mileage for alternative C is greater than alternative B, most of the additional miles are proposed new trails, which are narrower. Therefore, the available acreage for routes is less. There is a 0.5 percent decrease in the number of known sites from alternative B (table 144). Alternative C does not allow cross-country travel.

Possible types of direct and indirect effects seen in alternative B are the same in alternative C, but there is less potential of risk for such effects to a fewer number of sites given the prohibition of cross-country travel. Also, prohibition of cross-country travel should provide beneficial effects to cultural sites located outside of routes. Effects to cultural sites outside the route buffers are considered in sections on motorized dispersed camping, motorized big game retrieval, and areas.

Alternative D

Changes under alternative D result in 4,163 miles and 48,796 acres of routes. This is a decrease of 23.4 percent in miles and a decrease of 23.4 percent in acres from alternative B. There is a decrease of 15.0 percent in the number of known sites from alternative B (table 144). Alternative D does not allow cross-country travel.

Alternative D provides less access to sites than do alternatives B and C. Possible effects are the same, but the potential for these effects is decreased greatly from alternative B because access to sites is greatly reduced with the prohibition of cross-country travel. The potential for effects and access to sites is decreased from alternative C.

Beneficial effects of this alternative increase from alternatives B and C because the number of sites outside of routes also increases. These cultural sites should not be exposed to direct vehicular impacts. Because the numbers of miles/acres have decreased from alternatives B and C, cultural sites that are located farther from the route system should also see a decrease in indirect

impacts. This should occur because access to these sites will be reduced to widely dispersed foot traffic and other authorized access (like equestrians and pack animals).

Alternative E

Changes under alternative E result in 3,478 miles and 41,769 acres of motorized routes. This is a decrease of 34.6 percent in miles and a decrease of 34.5 percent in acres from alternative B. There is a decrease of 28.4 percent in the number of known sites from alternative B. Alternative E does not allow cross-country travel. When compared to alternative B and all other alternatives, changes in alternative E result in the least number of miles/acres for routes, which equates to the least access to cultural sites both within the route system and outside of routes (table 144).

While the types of effects remain the same as alternative B, the reduction in miles in alternative E should decrease the potential risk of direct and indirect effects to cultural resources. Alternative E should provide the most beneficial or protective effects to cultural sites. A much smaller number of known cultural sites (alternative E's 912 vs. alternative B's 1,274) will have potential to be affected by direct vehicular impact. Sites outside of alternative E's routes should not be exposed to this type of impact through route designations. The reduction of miles/acres will reduce overall access to sites outside the route system, decreasing the potential for indirect impacts to cultural sites outside the route system.

Alternative F

Changes under alternative F result in 4,530 miles and 52,677 acres of routes. This is a decrease of 14.8 percent in miles and a decrease of 17.3 percent in acres from alternative B. There is a decrease of 11.2 percent of known sites from alternative B (table 144). Alternative F does not allow cross-country travel.

Alternative F greatly reduces access to sites when compared to alternative B because of the prohibition of cross-country travel. Alternative F provides less access to sites than alternative C, but an increase from alternatives E and D.

The types of effects for alternative F are the same as for alternative B and all other alternatives, but the potential for effects to cultural sites in alternative F should be greater than in alternatives E and D and less than in alternatives B and C. The beneficial effects of alternative F are higher than in alternatives B and C, but a decrease from alternatives E and D.

Alternative G

Changes under alternative G result in 4,508 miles and 52,430 acres of routes. This is a decrease of 15.3 percent in miles and a decrease of 17.7 percent in acres when compared to alternative B. There is an 11.4 percent reduction of known sites from alternative B (table 144). Alternative G does not allow cross-country travel.

This alternative is very similar to alternative F in access to sites, but provides more access than alternatives E and D; and less access than alternatives B and C. The effects for alternative G will be the same as in all other alternatives, but the potential for effects should be greater than in alternatives E and D; comparable to alternative F; and less than in alternatives B and C. The

beneficial effects of alternative G are higher than in alternatives B and C, comparable to alternative F, but a decrease from alternatives E and D.

Motorized Dispersed Camping Corridors

Motorized dispersed camping corridors may be allowed up to 300 feet on either side of designated roads. These corridors are meant solely for motorized dispersed camping. This means driving into a camping spot, setting up camp, and using that camp as a base from which to recreate. This is a traditional use of places adjacent to National Forest System roads. All camping corridors with high cultural site density have received or will receive 100 percent survey of the total 600-foot corridor (300 feet on either side of the road's centerline) (USDA Forest Service, Southwestern Region; New Mexico State Historic Preservation Officer; Appendix I 2007). Sample surveys will take place in camping corridors with low site density. Previously recorded sites within the camping corridors will be revisited. Sites located within proposed camping corridors will be assessed for existing disturbances and continued risk potential. Individual camping corridors will not appear on the motor vehicle use map until Section 106 compliance and consultation is complete.

Alternative B

Alternative B allows motorized dispersed camping on 2.44 million acres of National Forest System lands managed by Gila National Forest (table 145). There are about 4,774 known cultural sites in this area.

Table 145. Motorized dispersed camping corridor acres available by alternative

	Alternative					
	B	C	D	E	F	G
Number of acres available	2.44 million	110,780	85,921	0	104,390	95,994
Change in number of acres of motorized dispersed camping corridors expressed as a percent (+ or -) of alternative B		-95.5%	-96.5%	-100%	-95.7%	-96.1%
Number of known cultural sites	4,774	806	474	0	670	546
Change in number of known cultural sites within motorized dispersed camping corridors expressed as a percent (+ or -) of alternative B		-83.1%	-90.1%	-100%	-86.0%	-88.6%

Cultural resources located near or within places available for recreation, like motorized dispersed camping, may have potential for direct and indirect effects relating to that type of recreation. In some cases, cultural resources within recreational locations like those for motorized dispersed camping have ongoing potential for disturbances related to that activity. Therefore, it is assumed

that cultural resources near or within motorized dispersed camping corridors may have a potential risk of new or ongoing recreational disturbances.

A risk assessment study was conducted to determine what types of disturbances occur on sites within areas that allow motorized dispersed camping. This assessment's purpose was to tally the number of disturbances related to camping and sources of disturbance. The total number of disturbances allows specialists to gauge the site's level or degree of disturbance at the time of most recent field recordation. This number is also used to gauge whether or not continued exposure to camping or other activities may cause adverse effects to the cultural site in question. The risk assessment was conducted on a sample of the total 4,774 known sites. The risk assessment may be found in its entirety in the cultural resource specialist report (USDA Forest Service 2010).

The risk assessment sample included 1,019 (about 21.3 percent) of known sites in the portion of the forest open to motorized camping in alternative B. Each total given for analyzed sites by alternative is a subset of the 1,019 analyzed for alternative B (table 146). The risk assessment relied on a literature search of hard copy site records to determine their condition at the time of recording. This information was then used to determine the known effects of motorized dispersed camping.

Table 146. National Register of Historic Places status of sites within motorized dispersed camping corridors by alternative

National Register Status	Alternative					
	B	C	D	E	F	G
Eligible	1,008	212	139	0	180	147
Unevaluated	3,755	594	335	0	490	399
Not eligible	277	63	42	0	60	46
Listed	11	0	0	0	0	0
Total number of sites	5,051	869	516	0	730	592
Total number of sites in corridors	4,774	806	474	0	670	546
Total number of sites analyzed for risk	1,019 (21.3% of all known sites)	716 (88.9%)	417 (88.0%)	N/A	592 (88.4%)	482 (88.3%)

Key: ( ) indicates percentage of sites within corridors that were analyzed through the literature search.

There are limitations to this analysis method that may affect results. The risk assessment relied on a literature search based on information collected over a period of more than 30 years for timber sale, range improvement, road maintenance, and other projects where recording the effects of motorized dispersed camping may not have been paramount. Limitations include the fact that sites may not have been visited in several years, site reports may not contain information specific to this analysis, and site conditions may have changed. Heritage specialists recorded whether site documentation was adequate for each site based on the completeness of site records. To be

considered complete, the documentation should have included a full description of the site, site condition, and site maps. Sometimes the year of recordation was considered in this equation. A site that had not been visited in 20 to 30 years may have been adequately documented at the time, but the lack of more current information warranted the determination that the documentation was inadequate.

Adequate site documentation was reported for about 51.7 to 54.6 percent of the sites within alternatives C, D, F, and G. About 46.1 percent were reported adequate for alternative B (table 147).

Table 147. Adequacy of site documentation by alternative for hard copy literature search of site records

Adequate Site Documentation	Alternative					
	B	C	D	E	F	G
Yes	470 (46.1%)	370 (51.7%)	226 (54.2%)	N/A	307 (51.9%)	263 (54.6%)
No	549 (53.9%)	346 (48.3%)	191 (45.8%)	N/A	285 (48.1%)	219 (45.4%)
Total	1,019	716	417	N/A	592	482

Cultural sites in which motorized dispersed camping occurs could be directly affected through vehicular contact. Vehicles may be driven over sites causing disturbance to features and artifact displacement. In wet weather or sensitive soils, vehicles may cause rutting and erosion that could disturb cultural deposits.

Additional direct and indirect effects of motorized dispersed camping surround camping activities that include, but may not be limited to: dismantling or scavenging of historic or prehistoric sites for structural materials that can be used for fire rings or wood for fire; deliberate or opportunistic looting and artifact collecting; graffiti on historic and prehistoric features; and mixing of modern trash litter with historic artifacts or collection of historic trash mistaken for modern trash.

Also, use of vehicles within sites may cause vegetation to become disturbed in some areas, exposing soils. This may cause erosion which may displace artifacts and cause impacts to cultural deposits.

Motorized dispersed camping effects are common to all alternatives. However, the number of sites impacted by these effects will change as the number of acres and sites per alternative also change. The risk assessment is used to show these trends. The result of this risk assessment study for alternative B shows that of the 1,019 sites, 104 show impacts attributable to camping, while 919 have no impacts (table 148).

Beneficial effects will increase as acres available for motorized dispersed camping are reduced and motorized dispersed camping corridors are designated. Reducing motorized dispersed camping to specific corridors will help reduce the potential of direct and indirect effects and access to cultural sites. Sites located outside motorized dispersed camping corridors should benefit from this action because vehicles will not be allowed to drive outside the corridor except

for motorized big game retrieval or with special forest authorization. This should reduce any potential direct and indirect effects from motor vehicle use on those sites.

Table 148. Sites with motorized dispersed camping impacts per alternative

Sites with Motorized Dispersed Camping Impacts Only	Alternative					
	B	C	D	E	F	G
No impact	915	634	363	N/A	527	421
Low, moderate, or severe impacts	104	82	54	N/A	65	61
Total Sites	1,019	716	417	N/A	592	482

Alternative C

Changes under alternative C result in about 110,780 acres being available for motorized dispersed camping corridors, a reduction of 95.5 percent in acres from alternative B (table 145). This is a reduction of 83.1 percent from the number of known sites within alternative B. Alternative C limits vehicular access to sites within motorized dispersed camping corridors. The number of cultural resources having potential for direct and indirect effects related to motorized dispersed camping is reduced from 4,774 to 806 known sites, when comparing alternative B to C.

The types of direct and indirect effects seen in alternative B will remain the same in alternative C. However, with the reduction in acres available for motorized dispersed camping, there is less potential risk for such effects.

Common to alternatives C, D, E, F, and G is a potential for more concentrated motorized use within motorized dispersed camping corridors. This could increase the potential risk of direct and indirect effects to sites within the corridors.

Common to alternatives C, D, E, F, and G, sites outside of motorized dispersed camping corridors may see a reduction in potential for direct and indirect effects of motorized dispersed camping, as driving will be restricted to the corridors. Cultural sites will benefit from this action because vehicular impacts should not occur outside of the camping corridors, except in cases of roadside parking, areas, and motorized big game retrieval. This may reduce potential risk for direct and some indirect effects of motorized dispersed camping to those areas. Access to sites outside these corridors should be limited as walking or pack animals will be the only mode of transportation. Controlled vehicular access to sites has been shown to protect cultural resources (Spangler et al. 2006).

The number of sites reported as having low, moderate, or severe motorized dispersed camping impacts in alternative C is 82 (table 148). This is a slight reduction from alternative B. The types of impacts to sites in alternative C are the same as in alternative B, but the risk analysis does show a general trend in reduction of number of sites with these types of impacts.

Alternative D

Changes under alternative D result in 85,921 acres of motorized dispersed camping corridors, a reduction of 96.5 percent of the acres in alternative B (table 145). This is a reduction of 90.1 percent from the number of known sites within alternative B. Both are a great reduction from

alternative B and a moderate reduction from alternative C. The number of cultural resources that have the potential of direct effects related to vehicles and indirect effects related to camping is greatly reduced from alternative B and moderately reduced from alternative C. Alternative D further reduces access to sites within and outside corridors, which will benefit cultural resources.

The types of direct and indirect effects seen in alternatives B and C will remain the same in alternative D. However, with the reduction in acres available for motorized dispersed camping and number of known sites, there is less potential risk for such effects.

The risk assessment indicates that about 54 sites in alternative D show low, moderate, or severe motorized dispersed camping impacts (table 148). This is a great reduction from both alternatives B and C.

Alternative E

Changes in alternative E result in no motorized dispersed camping corridors (table 145). This would be a 100 percent reduction in acres and known sites from alternative B. This alternative provides the least access to sites of all alternatives. Dispersed camping may still occur because of roadside parking, but no driving should occur elsewhere. Potential effects related to camping would still occur in alternative E. However, because there are no associated motorized dispersed camping corridors, this risk should be greatly reduced from all other alternatives, especially alternative B.

Alternative E should provide the most beneficial effects to cultural resources. Direct and indirect effects from vehicular access to sites should not occur outside of roadside parking.

Alternative F

Changes in alternative F result in about 104,390 acres for motorized dispersed camping corridors, a 95.7 percent reduction in acres from alternative B (table 145). This is a reduction of 86 percent from the number of known sites in alternative B. This alternative reduces acres to motorized dispersed camping and, therefore, access to sites when compared with alternatives B and C, but increases acres and access when compared to alternatives D and E. Alternative F provides some beneficial effects, given the reduction in number of sites that could potentially be at risk for direct and indirect effects, but these beneficial effects are not as great as in alternatives D and E.

The types of direct and indirect effects will remain the same in alternative F as in alternative B. With the reduction of access from alternatives B and C, there is less potential risk for such effects. With the increase of access from alternatives D and E, there is more potential risk for these types of effects.

The risk analysis reports that about 65 sites had low, moderate, or severe motorized dispersed camping impacts (table 148). This is a great decrease from alternative B, and a moderate increase from alternatives C and D.

Alternative G

Changes to alternative G result in about 95,994 acres for motorized dispersed camping corridors, a 96.1 percent reduction from alternative B (table 145). This is a reduction of 88.6 percent from the number of known cultural sites in alternative B. This alternative reduces access to sites when

compared to alternatives B, C, and F, slightly increases access from alternative D, and greatly increases access from alternative E. Alternative G provides some beneficial effects, given the reduction in the number of sites that could potentially be at risk for direct and indirect effects, but these beneficial effects are not as great as in alternatives D and E.

The types of direct and indirect effects will remain the same in alternative G as in alternative B. With the reduction of access from alternatives B, C, and F, there is less potential risk for such effects. With the increase of access from alternatives D and E, there is more potential risk for these types of effects.

The risk assessment analysis shows that 61 sites from those analyzed for alternative G have reported low, moderate, or severe motorized dispersed camping impacts (table 148). This is comparable to alternative F, a decrease from alternatives B and C, and an increase from alternative D.

Motorized Big Game Retrieval

Motorized big game retrieval allows hunters to retrieve downed animals through cross-country travel. Hunters cannot hunt from their vehicles, so they are limited to using the vehicle for retrieval. Because this action is limited, seasonal, and occurs over a vast area, the probability of any one site being driven over by any one hunter is minimal, even in alternative B. Therefore, this action poses only a slight potential of risk to cultural resources.

However, this action provides ease of access to National Forest System lands and cultural resources located within them. Each alternative has a proposed distance for motorized big game retrieval. The reduction of acres for this activity through alternatives will directly relate to the reduction of cultural resources that have potential risk for direct and indirect effects associated with this action. Analysis for motorized big game retrieval focused on the number of acres proposed per alternative and the number of cultural sites within that area. It also focused on the number of potential acres of disturbance from this action for each alternative. This information is outlined at the beginning of chapter 3 in the “Assumptions and Limitations Common to All Resources” section.

Alternative B

Alternative B allows unlimited motorized access for game retrieval on 2.44 million acres containing 4,774 known sites (table 149). Disturbance acreage per year was not determined for alternative B. However, general information can lead to an estimate when compared to alternative C. For alternative B, game retrieval is not limited by any species or distance from a road. In the current condition, there are no guidelines on how to use the retrieval vehicle. A hunter is allowed to meander through the forest to get to the downed animal. This is not the case in alternative C where species and distance from the road are limited. Also, alternative C provides guidance on how a hunter should use their retrieval vehicle. This provides some indication that disturbance acreage should be slightly larger than that seen in alternative C.

These conditions also provide some indication of the types of potential risk to cultural resources within areas that allow motorized big game retrieval. Vehicles may be driven over sites causing disturbance to features and artifact displacement. In wet weather or sensitive soils, vehicles may cause rutting, compaction, and erosion which could disturb cultural deposits. The nature of

motorized big game retrieval should not bring about continued use of a vehicle in one place, however, there is a potential for the disturbance of vegetation within a site. This may cause erosion which may displace artifacts and cause impacts to cultural deposits. Motorized big game retrieval does provide access to remote places on the forest. This access could potentially result in deliberate or opportunistic looting and artifact collecting.

If an animal is killed near or on a site, hunters could potentially displace artifacts, features, or cultural sediments while dragging or dressing the animal. Dressing the animal within a cultural site may attract other animals to the site, causing bioturbation.

Table 149. Comparison of acreage available for motorized big game retrieval, disturbance, and known sites by alternative

	Alternative					
	B	C	D	E	F	G
Acreage available for motorized big game retrieval	2.44 million	2.08 million	85,921	0	1.50 million	95,994
Change in number of acres of motorized big game retrieval expressed as a percent (+ or -) of alternative B		-14.8%	-96.5%	-100%	-38.5%	-96.1%
Possible disturbance acreage per year		4,852.5	220	0	953.3	220
Known sites within motorized big game retrieval areas	4,774	4,607	474	0	4,180	546
Change in number of known sites within motorized big game retrieval areas expressed as a percent (+ or -) of alternative B		-3.5%	-90.1%	-100%	-12.4%	-88.6%

Alternative C (One Mile from Roads, Elk, Deer, Bear, Mountain Lion, Javelina, and Antelope)

Changes in alternative C limit motorized retrieval to six species within 1 mile of open roads. About 2.08 million acres are available for motorized big game retrieval, a reduction of 14.8 percent of National Forest System lands available for this action, and a reduction of 3.5 percent of known sites when compared to alternative B. Possible total disturbance acreage per year is about 4,852.5 acres (table 149).

Possible types of effects to cultural resources in alternative C are the same as seen in alternative B. Alternative C does limit some access to sites, but the numbers show only a small reduction in potential risk when compared to alternative B.

Alternative D (300 Feet from Open Roads, Deer and Elk)

Changes to alternative D result in motorized big game retrieval in areas within motorized dispersed camping corridors. This includes about 85,921 acres. This is a reduction of 96.5 percent

of National Forest System lands available for this action, and a reduction of 90.1 percent of known sites when compared to alternative B. Because harvest is limited to deer and elk, the possible acreage disturbance is 220 acres per year (table 149).

The types of effects that are seen in alternative B would be the same as in this alternative. Alternative D limits access to sites and greatly reduces the number of sites that have a potential for effects when compared to alternatives B and C.

In alternative D, motorized big game retrieval will only be allowed in motorized dispersed camping corridors, which will go or have gone through Section 106 consultation and compliance. Some of the motorized dispersed camping corridors will be sampled while others have 100 percent cultural resource inventory. Cultural sites located in motorized big game retrieval and motorized dispersed camping corridors in this alternative would be avoided by effects associated with these activities.

Alternative E (No Motorized Big Game Retrieval)

Alternative E does not permit motorized big game retrieval (table 149). This alternative poses no potential risk to cultural resources, and is a complete reduction in potential effect from alternative B and all other alternatives.

Alternative F (One-half Mile from Open Roads, Elk Only)

Changes in alternative F result in motorized retrieval of elk only from within one-half mile of open roads. Alternative F reduces motorized big game retrieval to 1.5 million acres. This is a reduction of 38.5 percent of National Forest System lands available for motorized big game retrieval, and a reduction of 12.4 percent of known sites when compared to alternative B. Because retrieval is reduced to elk, the possible disturbance acreage per year is 953.3 acres (table 149).

The types of effects that are seen in alternative B would be the same in this alternative. Alternative F limits some access to sites when compared to alternatives B and C, but when compared to alternatives E and D, provides access to a larger number of sites. This alternative should reduce the potential risk of effects when compared to alternatives B and C, but increase the potential risk of effects when compared to alternatives E and D.

Alternative G (300 Feet on Roads where Motorized Dispersed Camping is Allowed, Deer and Elk)

Changes in alternative G result in motorized big game retrieval within 95,994 acres of land. This is a 96.1 percent reduction of Gila National Forest lands available and an 88.6 percent reduction of known sites when compared to alternative B. Possible disturbance acreage at this distance is about 220 acres per year (table 149).

The types of effects seen in alternative B would be the same for this alternative. Alternative G limits much more access to sites than do alternatives B, C, and F. Access to sites between alternatives G and D are comparable, but alternative G allows access to a few more cultural sites. When compared to alternative E, alternative G provides access to many more sites. This should reduce the potential risk of effects when compared to alternatives B and C, but increase the potential risk of effects when compared to alternatives D and E.

In alternative G, motorized big game retrieval will only be allowed in motorized dispersed camping corridors, which will go through Section 106 consultation and compliance. Some of the motorized dispersed camping corridors will be sampled, while others will go through a 100 percent inventory. This will help identify cultural sites and allow effects to be mitigated through avoidance. This may mean dropping motorized dispersed camping corridors, which will also mean motorized big game retrieval activities will not be allowed to take place in that area. This may benefit cultural sites within some motorized big game retrieval areas, because they will be avoided.

Areas

Thirty-nine areas have been proposed for alternatives C, F, and G. These areas allow any motorized vehicle activity within them, but 38 of the 39 have traditionally been used as camping areas and this is the expected ongoing use. The remaining area is an area open to motorcycles and ATV use located on the Reserve Ranger District. The area is located within a borrow pit near an old landfill. Analysis for areas focused on the number of acres per alternative and the number of sites within that area. Also, sites within the traditional camping areas were analyzed similarly to those within motorized dispersed camping corridors, and the potential effects to cultural resources are the same as those seen in motorized dispersed camping.

Alternative B

There are no designated areas in alternative B. However, cross-country travel and motorized dispersed camping are allowed in alternative B, and these activities are similar in scope to areas. There are 2.44 million acres and 4,774 known sites within the areas that allow cross-country travel and motorized dispersed camping in alternative B. Effects of these actions are similar in scope. Effects include, but are not limited to, vehicular contact. Vehicles may be driven over sites, causing disturbance to features and artifact displacement. In wet weather or sensitive soils, vehicles may cause rutting and erosion that could disturb cultural deposits.

Additional direct and indirect effects of motorized dispersed camping in areas include, but may not be limited to: dismantling or scavenging historic or prehistoric sites for structural materials that can be used for fire rings or wood for fire; deliberate or opportunistic looting and artifact collecting; graffiti on historic and/or prehistoric features; and mixing of modern trash litter with historic artifacts or collection of historic trash mistaken for modern trash.

Alternatives C, F, and G

Changes incorporated in alternatives C, F, and G result in 38 areas traditionally used for camping. These areas comprise a total of 28.02 acres; the majority of them are less than 1 acre in size. Only three cultural sites are known to be within these areas, each in a different area. Changes represented in alternatives C, F, and G result in a great reduction in number of acres and sites from alternative B for similar activities.

The three known sites within these areas were assessed and only one site reportedly had camping impacts. The types of effects of camping in areas are the same as seen in motorized dispersed camping. However, sites within areas may be completely avoided by changing the shape or eliminating the area. This reduces the potential for direct and indirect effects for alternatives C, F, and G.

The 3.31-acre area for ATV and motorcycle use has been surveyed and does not have any cultural resources. There will be no potential for damage to cultural resources in this area or surrounding Gila National Forest System lands due to motorized activities being limited to a specific location.

Alternatives D and E

Alternatives D and E do not permit areas. These alternatives pose no potential risk to affect cultural resources, and are a complete reduction in potential effect compared to alternatives B, C, F, and G.

Conclusions on Direct and Indirect Travel Management Effects to Cultural Resources

Alternative B provides maximum access to the most number of cultural sites because it permits motorized cross-country travel. All other alternatives prohibit motorized cross-country travel (except for motorized big game retrieval and administrative use or written authorization), which limits access to sites in less roaded areas and decreases the potential for direct and indirect effects to cultural resources when compared to alternative B.

Changes presented in alternative C result in the most mileage/acreage for routes, the greatest acreage for motorized dispersed camping corridors, the greatest distance for motorized big game retrieval, and the presence of areas. Outside of alternative B, alternative C provides the most potential for relative risk of direct and indirect effects to cultural resources because it allows more access to more cultural sites than alternatives D, E, F, and G.

Changes presented in alternative D result in the second least potential for direct and indirect effects to cultural resources. Alternative D has fewer route miles and acres, less acreage for motorized dispersed camping corridors and motorized big game retrieval than do alternatives B, C, F, and G. Alternative D does not have any areas, unlike alternatives C, F, and G. This means alternative D provides less access to a lower number of sites, lowering the potential for effects to cultural resources.

Changes presented in alternative E result in the least potential for direct and indirect effects to cultural resources of all alternatives. Alternative E has the lowest number of miles/acres for routes, no motorized dispersed camping corridors, no motorized big game retrieval, and no areas. This provides the least access to the fewest number of sites.

Changes presented in alternative F result in less potential risk for direct and indirect effects to cultural resources than do alternatives B and C, but a higher potential for risk than alternatives D, E, and G. Alternative F has less mileage and acreage for routes than alternatives B and C, comparable to alternative G, and more than alternatives D and E. Alternative F has less motorized dispersed camping corridors than alternatives B and C, and more than alternatives D, E, and G. Alternative F has less motorized big game retrieval acreage than alternatives B and C, and more than alternatives D, E, and G. Alternative F proposes the same acreage of areas as do alternatives C and G. Alternative F provides less access to fewer sites than do alternatives B and C, but more access to more sites than do alternatives D, E, and G.

Changes presented in alternative G result in less potential risk for direct and indirect effects to cultural resources than do alternatives B, C, and F, but a higher potential for risk than alternatives

D and E. Alternative G has less mileage and acreage for routes than alternatives B and C, is comparable to alternative F, and has more than alternatives D and E. Alternative G has less motorized dispersed camping corridors than alternatives B, C, and F, is comparable to alternative D, and has more than alternative E. Alternative G has less motorized big game retrieval acreage than alternatives B and C, is comparable to alternative D, and has more than alternative E. Alternative G has the same acreage of areas as do alternatives C and F. Alternative G provides less access to fewer sites than do alternatives B, C, and F, but more access to more sites than do alternatives D and E.

Cumulative Effects

Cumulative effects to cultural resources relate to potential effects to National Register eligible or unevaluated properties resulting from impacts of actions in the past, present, and reasonably foreseeable future from ground-disturbing activities. Since the passage of the National Historic Preservation Act, cultural resource surveys have been conducted and effects addressed through consultation between the Gila National Forest and the State Historic Preservation Officer. Future projects occurring on forest lands will require appropriate compliance with the National Historic Preservation Act, including cultural resources inventories. If potential effects are identified, they will be addressed by the forest in consultation with the State Historic Preservation Officer under the Section 106 process of the National Historic Preservation Act.

Past Projects

A list of about 3,830 past projects dating from 1980 to April 2010 was generated from various Forest Service databases. This list of projects represents an overview of the magnitude of past archaeological work on the Gila National Forest. Most of these projects can be divided into a number of project types including: heritage/archaeology; construction and maintenance; fire; land/survey; mining; range; roads; soil/watershed; timber; utilities; and wildlife. Table 150 lists these project types along with some examples of some of the projects seen on the forest.

Table 150. Types of projects that have occurred on the forest with National Historic Preservation Act compliance since 1980

Project Type	Project Examples
Heritage or archaeology	Section 110; inventory; deferred maintenance; NAGPRA; ARPA investigations; interpretation; data recovery; Passport in Time; education outreach; field schools; FOIA searches; damage assessments; special use permits
Fire	Prescribed burns; fire lines; heliport; landing strip; training area; handlines
Construction and maintenance	Administrative site improvement; demolition of buildings; parking lots; landfill extension
Lands or survey	Acquisition; exchanges; FS property fence lines
Mining	Exploration; closures/waste removal
Range	Allotments; fences; cattle guards; corrals; traps; water/drink tanks
Recreation	Trail building/maintenance; campground improvements; toilet installations; signing
Roads	Opening; closing; bridges; culverts; easements; quarries; erosion controls; temporary road

Table 150. Types of projects that have occurred on the forest with National Historic Preservation Act compliance since 1980

Project Type	Project Examples
	closures and openings; plating; ROW work
Soil or watershed	Soil terrestrial ecosystem survey; watershed improvements; water gap fences; channel alignments; ground water monitoring; well drill pads; spring/seep development
Timber	Tree planting; reforestation; thinning; timber/salvage sales; vegetation control; Christmas trees
Wildlife	Wildlife studies/improvements; fish structures; enclosures
Utilities	Pipelines; phone lines; fiber optic cable lines

The National Historic Preservation Act became law in 1966, and was not fully implemented until the mid-1970s. Ground-disturbing projects since this time have gone through Section 106 consultation and compliance. Potential effects to cultural resources were addressed through this process, thereby eliminating or reducing the likelihood of any cumulative effects.

The forest did not have to conduct cultural resource compliance on projects before this time. Therefore, activities taking place on the forest before this time and even before the forest was established in 1905, could have impacted cultural resources, or could now be considered historic resources themselves (roads, mines, sawmills, forts, homesteads, etc.).

Before implementation of Section 106, motorized routes were created without consideration of cultural resources. This resulted in motorized routes intersecting sites. In some cases, cultural features and artifacts are within the route prism and may have been damaged by vehicular contact or route maintenance. Today, about 1,274 known sites are intersected by motorized routes and/or associated constructed features. An unknown percentage of these sites may also be at risk for erosion related to this previous construction in combination with environmental factors. As stated above, these existing routes and their associated constructed features are exempt from Section 106 compliance and consultation through the TM protocol (USDA Forest Service, Southwestern Region; New Mexico State Historic Preservation Officer; Appendix I 2007).

Grazing has been practiced on the forest for more than 100 years. This activity has the potential to cause cumulative effects on cultural sites, including erosion. When an area is overgrazed, there is not enough vegetation to prevent wind and water erosion. This may cause erosion of cultural deposits and displacement of artifacts. However, current management practices on grazing allotments minimize overgrazing and effects to known sites. All range improvements (fences, pipelines, drinkers, etc.) and range allotments or allotment management plans receive separate and individual Section 106 compliance unrelated to travel management.

Cross-country travel and motorized dispersed camping have been authorized through the forest plan for decades. These actions have the potential to cause direct and indirect effects that, over time, could be considered cumulative for some cultural resources on the forest.

The risk assessment completed for motorized dispersed camping provides information on 1,019 cultural sites (about 21.3 percent of all known eligible and unevaluated sites) that relates to

cumulative effects. Several categories of the assessment (motorized dispersed camping disturbances, route-site intersections, and FS authorized) have been quantified (table 151). These disturbances are related to Forest Service projects or policies.

Cultural sites with motorized dispersed camping disturbances range from 104 in alternative B to 54 in alternative D; cultural sites that are intersected by a route range from 268 in alternative B to 140 in alternative D; and with authorized disturbances, range from 391 in alternative B to 184 in alternative D.

This indicates that past activities have impacted some cultural resources across the forest, confirming potential risk of cumulative effects from past activities. As explained above, such cumulative effects may have already occurred before Section 106 of the National Historic Preservation Act was fully implemented on the forest in the mid-1970s.

Table 151. Number of sites per alternative that have at least one point in each of the impact categories

Types of Impacts	Alternative					
	B (1,019 sites)	C (716 sites)	D (417 sites)	E (0 sites)	F (592 sites)	G (482 sites)
Motorized dispersed camping disturbance	104	82	54	N/A	65	61
Route-site intersections	268	217	140	N/A	184	160
FS authorized	391	294	184	N/A	243	202

The number of sites in each alternative is a subsample of the sites in alternative B. If the site is in one of the other alternatives, it is also in alternative B.

Present and Reasonably Foreseeable Projects

A list of 119 present and foreseeable projects is provided in the cultural resources report (USDA Forest Service 2010i). These projects will go (or have gone) through Section 106 consultation and compliance using the Southwestern Region Heritage PA before the project is (or was) implemented. Effects to cultural resources will be addressed via the PA or Section 106 process, with the intent of avoiding or minimizing effects, resulting in determinations of “no effect” or “effects not likely to be adverse.” Therefore, cumulative effects should be reduced and likely not be adverse when added to effects of travel management designation, which also goes through the Section 106 process. Effects accumulated from past projects implemented prior to the requirements of National Historic Preservation Act should not be exacerbated by effects of the travel management project, so these cumulative effects are also not likely to be adverse.

For travel management alternatives C, D, E, F, and G, cultural sites within existing road and trail prisms and/or associated features are exempt from Section 106 compliance and consultation, and will not be considered in the overall determination of effect for travel management. However, actions considered new undertakings under the National Historic Preservation Act will go through consultation and compliance as appropriate, before they appear on the motor vehicle use map. These include: motorized dispersed camping corridors, areas, route designations like adding

unauthorized routes to the NFS road and trails system, re-opening closed roads, and converting closed roads to NFS trails. If potential effects to cultural resources are identified, they will also be addressed using available National Historic Preservation Act compliance processes to avoid or minimize effects. Therefore, any cumulative effects resulting from travel management alternatives C, D, E, F, and G will be reduced and likely not adverse.

In summary, when the cumulative effects of travel management are added to effects of past, present, and reasonably foreseeable projects, there should not be an increase in effects to cultural resources across the forest, and these effects should not be adverse.

Social and Economic

The study area for the social and economic analysis includes Catron, Grant, Hidalgo, and Sierra Counties in New Mexico. These four counties contain the vast majority of Gila National Forest lands. Catron County contains the largest share of the forest, with more than 2 million acres (62 percent of the 4-county total). The next highest forest acreage is in Grant County, with 27 percent of the total. Sierra County contains 11 percent, while Hidalgo County is home to just 0.6 percent of the forest.

Methodology and Assumptions

Assumptions

1. The economic impacts are analyzed using miles of road as a proxy for estimated employment and income by alternative. The relationship between miles of road and economic impacts is not known. For this analysis, it is assumed that the relationship is linear (i.e., that the economic impacts will change at a constant rate per mile of road).
2. The analysis assumes that counties with more Gila National Forest land are more dependent on the forest's resources. Therefore, it is assumed that social and economic effects would be more significant in counties with higher percentages of the Gila National Forest within their boundaries. In this analysis, Catron and Grant Counties contain the bulk (89 percent) of the forest. Nevertheless, potential impacts are analyzed for all four counties.
3. The "Lifestyles, Values, Beliefs, and Attitudes," section is primarily informed by public comments. Public comments are not a random sample of the public's opinion of potential Forest Service management actions. It is plausible that people who choose to comment are systematically different than those who do not, which suggests that public comments will not be representative of the population at large. Therefore, while the analysis aims to be inclusive, it is inevitable that not all unique perspectives will be captured.

Data Sources

The U.S. Census Bureau, Bureau of Economic Analysis, Headwaters Economics, U.S. Census of Agriculture, National Visitor Use Monitoring Study, and Recreation Economic Contribution Analysis provide most of the data for the social and economic analysis. These data sources are used to inform existing conditions, trends, and anticipated impacts from the alternatives.

Affected Environment

The Gila National Forest is located in southwestern New Mexico. The forest lies within portions of Catron, Grant, Hidalgo, and Sierra Counties. All counties in the 4-county assessment are rural. The largest incorporated areas within the assessment area are Silver City (10,330) in Grant County, Truth or Consequences (7,111) in Sierra County, Lordsburg (2,882) in Hidalgo County, and Bayard (2,401) and Hurley (1,411), both in Grant County. The one incorporated area in Catron County is Reserve, with a population of only 388 (U.S. Census Bureau 2009).

Population and Demographics

All four counties in the study area are sparsely populated. However, Grant County is by far the largest—it has more than double the population of the second largest county in the planning area (Sierra), and Grant County is nearly 10 times more populous than the least populated county (Catron). Table 152 provides a breakdown of population changes in the study area as well as the State and Nation.

Table 152. Population data for study area, New Mexico, and the United States

Area	1980 Census	1990 Census	2000 Census	2009 Estimate	Change from 2000 to 2009
Catron County	2,720	2,563	3,543	3,405	- 4.1%
Grant County	26,204	27,676	31,002	29,903	- 3.7%
Hidalgo County	6,049	5,958	5,932	5,057	- 17.3%
Sierra County	8,454	9,912	13,270	12,886	- 3.0%
Total Gila NF Counties	**43,427**	**46,109**	**53,747**	**51,251**	**-4.6%**
New Mexico	1,303,303	1,515,069	1,819,041	2,009,671	10.5%
United States			281,424,602	307,006,550	9.1%

Source: U.S. Census Bureau 2009

Nearly all of the planning area counties experienced positive population growth rates between 1980 and 2000. However, between 2000 and 2009, all four counties lost population. Decreasing populations may be due to aging populations (deaths exceed births) and out-migration. In recent years, layoffs in the mining sector decreased available economic opportunities in the area, which may have spurred out-migration. However, positive population growth rates are expected to return as a result of the anticipated influx of amenity retirees (Council of Governments 2010).

The median age of a population is relevant for social and economic analysis of travel management planning. Older populations are likely to have different needs and preferences related to forest use than younger populations. Table 153 lists the median age for planning area counties, the State, and the nation in 2000. The table also provides a comparison with the 1990 median age to identify trends.

The populations in Catron and Sierra Counties are substantially older than the other planning area counties, the State, and the nation. Sierra County has the highest median age of any of the considered areas. However, Catron County experienced the most striking change between 1990 and 2000—the median age in the county increased by 27 percent during the decade. Grant and Hidalgo Counties, in contrast, have age structures similar to the State and the Nation. Issues concerning elderly and aging populations, particularly related to access to forest resources, are likely to be most pronounced in Catron and Sierra Counties.

Table 153. Median age trends, 1990–2000

Area	1990 Census	2000 Census	Percent Change
Catron County	37.7	47.8	27%
Grant County	33.2	38.8	17%
Hidalgo County	30.7	34.8	13%
Sierra County	51.1	48.9	-4%
New Mexico	31.2	34.6	11%
United States	32.9	35.3	7%

Source: U.S. Census Bureau, 1990 and 2000

The racial and ethnic composition of the study area offers context for the social analysis. Table 154 compares the racial and ethnic breakdown of the counties in 1990 and 2000. The majority of residents self-identify as white, however, all planning area counties became more racially diverse between 1990 and 2000. Whereas in 1990, the planning area was 93 percent white; by 2000, it was only 80 percent white. This difference is due to an increase in the number of people who identify their race as “other.” Although racial identification is similar across the planning area, the ethnic composition of the counties is more variable. In both Grant and Hidalgo Counties, approximately half of the residents are Hispanic.

Table 154. Racial and ethnic breakdown of study area and New Mexico

Area	Ethnicity		Race					Total
	Non-Hispanic	Hispanic	White	African American	American Indian	Asian Pacific Islander	Other	
Year 1990								
Catron County	72%	28%	98%	0%	1%	0%	1%	100%
Grant County	49%	51%	93%	0%	1%	0%	5%	100%
Hidalgo County	50%	50%	92%	0%	0%	1%	7%	100%
Sierra County	76%	24%	93%	0%	1%	0%	5%	100%
Total Gila Counties	**56%**	**44%**	**93%**	**0%**	**1%**	**0%**	**5%**	**100%**
New Mexico	62%	38%	76%	2%	9%	1%	13%	100%
Year 2000								
Catron County	81%	19%	88%	0%	2%	1%	9%	100%

Grant County	51%	49%	76%	1%	1%	0%	22%	100%
Hidalgo County	44%	56%	84%	0%	1%	0%	15%	100%
Sierra County	74%	26%	87%	0%	1%	0%	11%	100%
Total Gila Counties	**58%**	**42%**	**80%**	**0%**	**1%**	**0%**	**18%**	**100 %**
New Mexico	58%	42%	67%	2%	10%	1%	21%	100%

Source: U.S. Census Bureau, Decennial Census, 1990 and 2000. Calculations were prepared by University of New Mexico, Bureau of Business and Economic Research. Note: Ethnicity can be of any race. The "Other" group includes two or more races.

The racial and ethnic composition of the four counties is roughly equivalent to State averages. The ethnic breakdown of the planning area precisely mirrored the State in 2000. The key difference between the planning area and the State is the American Indian population. The State has a much higher percentage of American Indians than the planning area, where they only make up 1 percent of the 4-county population.

Lifestyles, Values, Beliefs, and Attitudes

Most public comments express values related to forest resources and management. However, the identified values vary considerably among the public. Some members of the public believe that unhampered motorized access improves public use and enjoyment of the forest. On the other hand, some comments express frustration with motorized use on the forest. These comments often identify resource conservation and the preservation of solitude as forest values that motorized use diminishes. In the context of travel management planning, these two value groups are the main source of conflict. However, within these overarching groups, a number of beliefs and attitudes about how the Forest Service should manage forest resources are present. Group definition is not rigid—many forest users value elements of both motorized and nonmotorized uses. In addition, substantial diversity among specific beliefs and attitudes exist within each group. The preceding description is meant to clarify primary uses and values attached to the forest, not to provide a definitive explanation of the public's lifestyles, values, beliefs, and attitudes.

Within the group that primarily values uninhibited motorized access, some members believe that motorized access to public lands is a right, regardless of whether they choose to exercise it. They are likely to have a negative attitude toward regulations that constrain their behavior. This group also contains people who engage in activities on the forest that require or benefit from motorized access. Firewood and piñon nut gathering, access for the elderly and disabled, motorized big game retrieval, and dispersed motorized camping are the primary forest uses that rely on motorized access.

A more detailed discussion of recreation opportunities, values and beliefs can be found in the "Recreation Effects" section.

Firewood gathering on the forest is particularly tied to livelihoods in some of the surrounding communities. Wood for fires continues to be widely used either aesthetically or as the primary heat source within homes. Approximately 48 percent of the housing units in Catron County rely on wood as the primary heating fuel. In Grant, Hidalgo, and Sierra Counties, approximately 5 to 12 percent of the housing units use wood for heat (U.S. Census Bureau 2000). The use of wood

for heating homes may be tied to long-term customs, traditions, and culture of the community. Much of the firewood gathering on the forest relies on motorized access for transport.

Members of the public who oppose unregulated motorized use are likely to believe that the forest has intrinsic value, particularly tied to wilderness, that motorized uses disrupt and compromise. Wildlife habitat and pristine areas are generally more important than access to this group. Members of this group may also participate in activities on the forest that compete with motorized uses, such as bird watching or wilderness solitude. Members of this group may emphasize the nonmarket values that the forest provides—for instance, the benefits that well-functioning ecosystems offer, such as nutrient cycling and wildlife habitat.

Environmental Justice

In 1994, President Clinton issued Executive Order 12898. This order mandates that all Federal agencies analyze the potential for their actions to disproportionately affect minority and low-income populations. The Council on Environmental Quality (CEQ) issued supplemental guidance to assist agencies' compliance (CEQ 1997). The CEQ suggests the following criteria for identifying populations potentially affected by environmental justice concerns:

- "Minority population: Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis..."
- "Low-income population: Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect."

Table 154 indicates that the racial and ethnic breakdown in the planning area counties is consistent with the racial and ethnic composition in the State. This suggests that the minority population in the affected area is not meaningfully greater than the minority population percentage in the general population (of New Mexico). However, the sizeable Hispanic populations in Grant and Hidalgo Counties may merit consideration as potential environmental justice populations.

In 1999, the poverty rate in the planning area exceeded the poverty rate of the State (table 155). Among the four counties, the poverty rate varies substantially. In Hidalgo and Catron Counties, approximately one-quarter of the residents live below the poverty rate. Although Catron County's poverty rate remained fairly level between 1989 and 1999, the poverty rate in Hidalgo County increased by more than 6 percentage points. The poverty rates in Catron and Hidalgo Counties merit particular attention, particularly where Forest Service management actions may affect employment, income, and other sources of well-being attached to the forest.

Table 155. Per capita income and persons in poverty, 1989 and 1999

Area	1989			1999		
	Per Capita Income	Persons Below Poverty Line	Percent of Persons Below Poverty Line	Per Capita Income	Persons Below Poverty Line	Percent of Persons Below Poverty Line
Catron County	11,080	657	25.6%	13,951	860	24.3%
Grant County	12,175	5,731	20.7%	14,597	5,676	18.3%
Hidalgo County	13,098	1,212	20.3%	12,431	1,591	26.8%
Sierra County	13,140	1,882	19.0%	15,023	2,706	20.4%
Total Gila Counties	**12,441**	**9,482**	**20.6%**	**14,421**	**10,833**	**20.2%**
Total New Mexico	14,596	305,934	20.6%	17,261	328,933	18.4%

Source: U.S. Census Bureau, Decennial Census, 1990 and 2000. Calculations were prepared by University of New Mexico, Bureau of Business and Economic Research.

Note: The poverty line is the federally established poverty level. Per capita income is in 1990 dollars. The 1989 per capital income figures were adjusted for the effects of inflation using the Consumer Price Index (CPI-U-RS).

Employment and Income

The 4-county planning area has experienced changing economic fortunes. Many of these changes relate to the use of natural resources from the Gila National Forest and other public lands. During the past 2 decades, much of the logging industry in this part of New Mexico was eliminated—the largest sawmill closed in Reserve in 1993 (USDA Forest Service 2001). Grazing is another source of income tied to public lands. Recently, grazing policies have moved toward encouraging sustainable grazing practices. Restrictions on grazing can compound the adverse economic impacts of drought and unfavorable market conditions (University of New Mexico, Bureau of Business and Economic Research 2007, pp. 26–27). The Council of Governments (Southwest New Mexico Council of Governments 2010) notes that a number of communities in the planning area counties have traditionally had economies based on agriculture, wood products, and mining. Major layoffs have affected Grant County, in particular. Elsewhere, wood product jobs have declined and some private agricultural lands have been converted for other uses.

The recreational opportunities the forest provides and the rural character of the planning area can spur amenity-driven economic growth. Tourism and amenity migration bring money into the local economy, which supports growth in related and supporting industries (e.g., the accommodation and food service sector). The importance of amenity migrants is borne out in the data—nearly a quarter of Catron County residents had lived in another state prior to the 2000 Census. The housing stock in the planning area expanded by about 6,500 units between 1990 and 2000, an increase of approximately one-third. The 2000 Census found a very large number of vacant homes in Catron (38 percent) and Sierra (30 percent) Counties. Sixty-six percent of the vacant homes in Catron and 59 percent of those in Sierra County were seasonal or vacation homes. Although Sierra County has other attractions, like Elephant Butte, the major attraction in Catron County is the Gila National Forest (UNM BBER pp. 26–27).

Table 156 disaggregates total employment to its component parts: private sector, public sector, and the industries within these sectors.

Table 156. County employment by industry

	County				Total	Percent of Total
	Catron	Grant	Hidalgo	Sierra		
Total Private Sector	**267**	**6,847**	**850**	**2,315**	**10,279**	**66**
Goods Producing (Total)	**30**	**1,998**	**189**	**556**	**2,773**	**18**
Agriculture, forestry, fishing and hunting	19	28	137	248	432	3
Construction	11	548	52	304	915	6
Mining	0	1,422	*	4	1,426	9
Service Providing (Total)	**237**	**4,849**	**661**	**1,759**	**7,506**	**48**
Accommodation and food services	38	916	198	390	1,542	10
Administrative and waste services	*	307	0	23	330	2
Arts, entertainment and recreation	*	56	*	*	56	0
Educational services	*	58	*	*	58	0
Finance and insurance	*	185	*	71	256	2
Health care and social services	78	842	117	464	1,501	10
Information	*	117	15	14	146	1
Management of companies and enterprises	0	249	*	0	249	2
Manufacturing	13	154	*	128	295	2
Other services, except public administration	12	221	*	68	301	2
Professional, scientific and technical services	*	166	59	134	359	2
Real estate and rental	10	108	*	24	142	1
Retail trade	50	1,234	243	420	1,947	13
Transportation and warehousing	*	135	29	16	180	1
Utilities	7	*	*	*	7	0
Wholesale trade	29	101	*	7	137	1
Total Public Sector	**326**	**3,390**	**651**	**893**	**5,260**	**34**
Federal government	113	206	229	115	663	4
State government	56	1,212	80	291	1,639	11
Local government	158	1,972	342	487	2,959	19
Grand Total	**593**	**10,237**	**1,501**	**3,208**	**15,539**	**100**

Source: Bureau of Labor Statistics 2008

Of these industries, travel management on National Forest System lands is most likely to affect: agriculture, forestry, fishing and hunting; accommodation and food services; arts, entertainment, and recreation; and public sector employment. A detailed analysis of the extent to which the forest contributes to the economy of the local area is included in the social and economic specialist report.

Total personal income may come from both labor and non-labor sources. Labor income is derived from employment in the sectors identified in table 154. Non-labor income comprises dividends, interest, transfer payments (e.g., Social Security), and rent. Table 157 lists median household income for the planning area, as well as the State and Nation.

Table 157. Median household income

Area	Median Household Income (2008)
Catron County	$29,127
Grant County	$36,239
Hidalgo County	$34,236
Sierra County	$27,580
4-county Average	**$31,795**
New Mexico	$43,719
United States	$52,029

Source: New Mexico Department of Workforce Solutions 2008

All counties in the planning area have median household incomes below the State and Nation. The average household income in the 4-county area is more than $10,000 below the State average and $20,000 below the national average. These data suggest that planning area residents are more likely to be on the economic margins of society. Economic changes (either positive or negative) may have a more pronounced effect on the economic well-being of the area.

Table 158 identifies the division of labor and non-labor income in planning area counties, the State, and the Nation.

Table 158. Share of labor and non-labor income

Area	Labor Income (%)	Non-Labor Income (%)
Catron County	39	61
Grant County	49	51
Hidalgo County	56	44
Sierra County	40	60
4-County Average	**46**	**54**
New Mexico	65	35
United States	68	32

Source: Bureau of Economic Analysis, REIS Table CA30, 2006

The 4-county planning area is much more reliant on non-labor income than the State and the Nation. Total personal income in New Mexico and the United States is composed of approximately two-thirds labor income and one-third non-labor income. In contrast, three planning area counties receive more non-labor income than labor income. Catron and Sierra Counties are particularly skewed toward non-labor income. These data suggest that the planning area has a high concentration of retirees. The reliance on non-labor income may also indicate dependence on government transfer payments. Non-labor income may help to stabilize the economy, as it is not tied to employment status. However, non-labor income may fluctuate based on asset markets (e.g., investments in stocks and bonds) or changes in government policy.

Payments to the State and Counties

The Forest Service provides payments and other economic opportunities to the State and counties through the following programs.

Payments in Lieu of Taxes

Payments in lieu of taxes are Federal payments to local governments that help offset losses in property taxes due to nontaxable Federal lands within their boundaries. Payments in lieu of taxes payments help local governments provide services such as firefighting and police protection, construction of public schools and roads, and search-and-rescue operations. Payments are made annually for tax-exempt Federal lands administered by the Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, USDA Forest Service, and for Federal water projects and some military installations. Payments to counties are based on population, receipt sharing payments, and the amount of Federal land within a county (table 159).

Table 159. Payments in lieu of taxes to the State and local counties for fiscal year 2010

Area	Payment	Total Acres
Catron County	$555,090	2,746,752
Grant County	$1,654,713	1,178,886
Hidalgo County	$681,421	823,734
Sierra County	$896,178	1,299,512
Statewide Total	$32,205,935	22,510,697

Source: U.S. Department of the Interior 2010

Secure Rural Schools Program, 2008–2011

The Secure Rural Schools and Community Self-Determination Act of 2000 (SRS Act) was amended and reauthorized in P.L. 110-343 on October 3, 2008. This law ensures counties across the country can receive payments that provide funding for schools and roads and make additional investments in projects that enhance forest ecosystems. The SRS Act authorizes the use of resource advisory committees as a mechanism for local communities to collaborate with Federal land managers in recommending projects on Federal lands or that will benefit resources on Federal lands. For the Gila National Forest, the resource advisory committee has just been newly formed and project proposals were recently requested, so no payments have been allocated yet. Projected payments to the counties and State are summarized in table 160.

Table 160. Secure Rural Schools Act, PL 110-343, projected FY 2009–2011 Forest Service payments to counties as of July 20, 2009

Eligible New Mexico County	Projected Total State or Transition Payment, 2008 thru 2011
Catron County	$24,146,784
Grant County	$5,164,020
Hidalgo County	$568,833
Sierra County	$2,914,760
Statewide Total	$70,259,993

Source: USDA Forest Service 2010

The collaborative process with the resource advisory committee will provide a source of community input in forest investments. One of the main goals of the projects is to improve and maintain existing infrastructure, particularly roads and trails. Therefore, Secure Rural Schools funding will help provide funds for additional road maintenance.

Environmental Consequences

Social Effects Common to All Alternatives

Firewood Gathering

Eliminating cross-country travel and closing roads to motor vehicle use under all action alternatives may affect the ability of people to collect firewood for their homes. Although firewood gathering would continue under all alternatives, it will be limited to designated areas. Firewood gathering may occur outside of the firewood gathering areas; however, motor vehicle access would be limited to roadside parking along designated open roads. The social and economic specialist report indicates that most of the roads that access the forest will continue to be available within 20 miles of each major community in the forest in all alternatives.

Access for Disabled and Elderly Populations

Some of the comments received during scoping indicated that motorized access, both by motorized routes and cross-country travel, were important to them as they were mobility impaired due to age or disability. All of the action alternatives will affect the ability to travel cross country by motorized vehicle and could have an effect on people with these concerns. The number of miles of motorized routes varies by alternative and could affect the ability of mobility-impaired people to reach their favorite places, where those places are not accessible in any other way.

Cultural and Traditional Practices – Tribes

The 10 federally recognized tribes for the forest described in the “Tribal Consultation and Land Use” section may also have social and economic interests on the forest. As previously stated, these tribes do not have treaty rights on the forest, and the forest is not located adjacent to any tribal lands (trust, reserved, or allotted).

American Indian populations in the four counties where the Gila National Forest is located range from a low of 1.1 percent (Hidalgo) to a high of 2.8 percent (Catron), compared to 9.7 percent for the entire State of New Mexico (table 154).

Because the forest is a greater distance from many tribal lands and reservations, longer drive times are required to access the forest. This creates inherently greater economic costs for tribal members traveling to the forest (gas, vehicle, motel, food, etc.). This situation will remain essentially unchanged under all alternatives, including the existing condition.

Data on local tribal businesses are unavailable; such businesses are not known to contribute to aspects of the local economy supported by the forest. Rather, most tribal members or groups participate in occasional activities on the forest for personal, traditional, community, group or religious reasons and uses. Locations of such activities may fluctuate, and have not been specifically identified by tribes. Gathering forest products, such as piñon nuts or Emory oak, has not been identified as occurring for commercial resale, and sale of forest products is not known to supplement tribal household income.

This information supports a conclusion (and observation based on tribal consultation) that visitation to the forest by tribal members is generally less frequent than to places closer to existing tribal lands, and will continue to be so. This visitation appears to be more socially and culturally driven than economically driven. As such, it is important to maintaining the cultural and social fabric of tribes.

Because very few tribal members live and work in the vicinity of the forest compared to other parts of New Mexico and Arizona, changes to tribal social and economic activities as a result of travel management designation should be minor to none. Tribes will continue to have opportunities to gather culturally important materials on the forest under applicable Forest Service policies (such as FSH 2409.18 on granting permits free of charge to federally recognized tribes to gather forest products for traditional and cultural uses www.fs.fed.us/im/directives/fsh/2409.18/2409.18_80.doc).

Economic Effects Common to All Alternatives

Economic analysis was conducted using the Recreation Economic Contribution Analysis model. As the assumptions section noted at the beginning of the analysis, the precise relationship between miles of road and economic impacts is unknown. It is assumed that jobs and income increase with more miles of road, and decrease with fewer miles of road. However, according to the economic impact analysis, none of the alternatives will significantly affect jobs and income. A more detailed economic analysis is available in the social and economic specialist report. (USDA Forest Service 2010j)

None of the considered alternatives would conflict with the motorized access needed for managing grazing allotments, mining, logging, access to private property, or utilities. Therefore, none of the alternatives are expected to affect these sectors.

Environmental Justice

While low-income populations exist in greater presence in the communities surrounding the Gila National Forest than the general population of the State and Nation, none of the alternatives are expected to have disproportionately high and adverse human health or environmental effects.

However, potential disproportionate impacts on a vulnerable group are possible in Catron County related to firewood gathering. As noted in the "Lifestyles, Values, Beliefs, and Attitudes" section above, approximately half of the homes in Catron County rely on wood as the primary heating source. Additionally, a low median household income and a high poverty rate suggest that affordable energy sources are fundamental to individuals' well-being. Under all action alternatives, motorized gathering would be limited to designated routes. However, the forest is planning designated areas for personal firewood gathering, taking into consideration proximity to community centers. The Forest Service may also provide designated woodcutting areas, with the option of allowing off-road travel within those areas. These actions are likely to mitigate any potentially adverse effects on the low-income populations who depend on firewood from the forest.

Cumulative Effects

All national forests in the Southwestern Region are either in the process of travel management planning or implementing existing travel management plans. The Bureau of Land Management has also made decisions to designate routes for OHV use. All of the new decisions and the implementation of past land use and travel management decisions are generally resulting in fewer opportunities for cross-country OHV uses and fewer open routes for OHV use. These past decisions include the establishment of wilderness and other areas that prohibit motor vehicle recreation, reducing the motor vehicle access to the forest. Although these past decisions are not part of current planning for the Gila National Forest travel management plan, they are relevant because they are part of the cumulative effects of the travel management plan. Additionally, they are relevant to the discussion because much of the use data used in the "Social and Economics" section discussion was collected within these areas previously designated for non-motorized recreation use only. The selection of any of the action alternatives reduces cross-country access (as required by the Travel Management Rule). However, the range of alternatives provides a varying array of motorized travel opportunities.

Cultural and Traditional Practices – Tribes

The 10 federally recognized tribes for the forest described in the "Tribal Consultation and Land Use" section may also have social and economic interests on the forest. As previously stated, these tribes do not have treaty rights on the forest, and the forest is not located adjacent to any tribal lands (trust, reserved, or allotted).

American Indian populations in the four counties where the Gila National Forest is located range from a low of 1.1 percent (Hidalgo) to a high of 2.8 percent (Catron) compared to 9.7 percent for the entire State of New Mexico (table 155).

Because the Gila National Forest is a greater distance from many tribal lands and reservations, longer drive times are required to access the forest. This creates inherently greater economic costs for tribal members traveling to the Gila National Forest (gas, vehicle, motel, food, etc.). This

situation will remain essentially unchanged under all alternatives, including the existing condition.

Data on local tribal businesses are unavailable; such businesses are not known to contribute to aspects of the local economy supported by the forest. Rather, most tribal members or groups participate in occasional activities on the Gila National Forest for personal, traditional, community, group, or religious reasons and uses. Locations of such activities may fluctuate and have not been specifically identified by tribes. Gathering forest products, such as piñon nuts or Emory oak, has not been identified as occurring for commercial resale, and sale of forest products is not known to supplement tribal household income.

This information supports a conclusion (and observation based on tribal consultation) that visitation to the forest by tribal members is generally less frequent than to places closer to existing tribal lands, and will continue to be so. This visitation appears to be more socially and culturally driven, than economically driven. As such, it is important to maintaining the cultural and social fabric of tribes.

Because very few tribal members live and work in the vicinity of the Gila National Forest, compared to other parts of New Mexico and Arizona, changes to tribal social and economic activities as a result of travel management designation should be minor to none. Tribes will continue to have opportunities to gather culturally important materials on the Gila National Forest under applicable Forest Service policies (such as FSH 2409.18 on granting permits free of charge to federally recognized tribes to gather forest products for traditional and cultural uses www.fs.fed.us/im/directives/fsh/2409.18/2409.18_80.doc).

There will be no change in tribal access to the Gila National Forest under the no action alternative (B). There is potential for minor effects to tribal activities under alternatives C through G from reduction in route mileage that reduces motorized access to some locations on the forest. Alternative E is the most restrictive in terms of access, and could have the greatest effects on tribal activities. However, these effects are considered minor due to generally infrequent tribal use and few concerns identified for the Gila National Forest.

Short-term Uses and Long-term Productivity

The change in driving on National Forest System roads and trails created by any of the action alternatives does not jeopardize the long-term productivity of the Gila National Forest. As described throughout chapter 3, implementing the action alternatives would improve resources such as wildlife habitat, cultural resource sites, and others.

Unavoidable Adverse Effects

Designating unauthorized routes could spread invasive plants to new locations and cause a loss of soil productivity. Alternatives C, D, F, and G are expected to result in more bare ground from motorized dispersed camping, and would also result in a loss of soil productivity.

Impact to the Chiricahua leopard frog and its habitat cannot be avoided in any action alternative as the proposed road system in all alternatives will continue to allow road crossings in known Chiricahua leopard frog habitat. Alternative E has the least adverse impact of all the action alternatives. Alternatives D and G, somewhat more than alternative E; alternative F slightly more

than alternatives D and G; and alternative C is similar to the existing condition (USDA Forest Service 2010f).

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as power line rights-of-way or roads or the loss of soil productivity, wildlife habitat, and vegetation when roads are constructed. The loss will be irretrievable for the life of the road. A previous commitment of resources associated with the existing motorized travel system on the forest exists.

All resources were evaluated to determine if there would be irreversible or irretrievable commitment of resources (all specialist reports). Except for the resources described below, no irreversible or irretrievable commitments of resources were found in any action alternative (B through G):

- Soil productivity may be irretrievably lost due to sediment losses resulting from the addition of unauthorized routes to National Forest System roads. These losses are not expected to be significant. Additionally, closure of the forest to cross-country travel is expected to reduce loss of soil productivity, resulting in a net benefit.
- There is a very small risk of irreversible commitment of heritage resources in those alternatives where motorized big game retrieval is proposed. This risk is relative to the amount of motorized big game retrieval proposed by the alternative. Alternative E would pose no risk; the risk increases slightly in alternatives D and G, slightly more in alternative F, and the most risk (similar to the existing condition) in alternative C. (See page 239 for information regarding the acres potentially affected by motorized big game retrieval). The risk is associated with impacts that cross-country travel—for the purposes of motorized big game retrieval—may have if vehicles should unknowingly drive over cultural sites.

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.” We’ve prepared this statement in accordance with the National Historic Preservation Act, which governs ground disturbance in historical places, and the Endangered Species Act, which covers projects that have threatened or endangered species in its boundaries.

Chapter 4. Consultation and Coordination

List of Preparers and Contributors

Christopher D. Adams – Zone Archaeologist, USDA Forest Service, Gila National Forest, Black Range and Wilderness Ranger Districts. Education: B.A. Anthropology. Experience: 24 years of southwestern experience, been with the Forest Service the last 15 years, cultural resource specialist, tribal and SHPO consultation, grant and research proposals, publications and NEPA writing.

Melinda Benton – Wildlife Biologist, USDA Forest Service, Gila National Forest. Education: B.S. Animal Science and Wildlife Management. Experience: habitat and endangered species management, consultation, NEPA writing and reviewing, invasive plant control; with the Forest Service since 1987.

Matthew Boisseau – Landscape Architect and Recreation Specialist, TEAMS. Education: Masters of Landscape Architecture, Texas Tech University, Lubbock; B.S., Recreation, Norwich University, Northfield, Vermont. Experience: landscape architect for the city of San Jose, California; worked for the Lincoln National Forest, New Mexico, and the Tongass National Forest, Alaska. Experience as an accessibility coordinator; project lead on outdoor recreation site, facility improvement, and enhancements projects; and as an interdisciplinary team specialist. Employed with TEAMS since 2008.

Joe Encinas – Forest GIS Coordinator, USDA Forest Service, Gila National Forest. Education: B.S. Forest Science from Oklahoma State University, 1994. Currently enrolled in the post-baccalaureate certificate in geographic information systems (GIS) from Penn State University. Experience: 17 years in GIS and forestry. Employed by the Gila National Forest since 2002. Specialize in data maintenance/management, spatial analysis, cartography, and archaeological GIS.

Gail Firebaugh-Smith – Forest Archeologist and Heritage Program Manager, USDA Forest Service, Gila National Forest. Education: B.A. and M.A. in Anthropology from the University of Colorado at Boulder, specializing in archeology. Experience: 35 years as an archeologist, working in 10 western states for contract firms, BLM and NPS; with the Forest Service since 1988 in Arkansas, Idaho, California and New Mexico; 21 years as forest archaeologist and heritage program manager including 12 years on the Gila.

Albert A. Flores – Acting Assistant NEPA Coordinator, USDA Forest Service, Gila National Forest. Education: B.S. Forestry from Northern Arizona University. Experience: fuels specialist and fire ecologist. Started with USFS in 2000.

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Rene Guaderrama – Wildlife Biologist, USDA Forest Service, Gila National Forest, Black Range Ranger District. Education: B.S. of Agriculture, Wildlife Science; M.S. Forest Resources emphasis in fire ecology. Experience: 8 years in habitat and endangered species management, consultation, NEPA writing and reviewing, inventory and monitoring Mexican spotted owl and northern goshawk, analyzing habitat and wildlife use patterns using GIS and GPS.

Kathleen Hawkos – GIS Specialist, USDA Forest Service, Southwestern Region. Education: M.S. Geography, emphasis in GIS.

Experience: technical background in GIS spatial analysis, wilderness needs and research natural areas assessments, ABV survey; GIS data collection, organization, maintenance and distribution with the Forest Service since 2004.

Debby Hyde-Sato – Forest NEPA Coordinator, USDA Forest Service, Gila National Forest. Education: B.S. Fish and Wildlife Biology. Experience: aquaculture in Philippines; threatened and endangered species recovery, interdisciplinary team leader and member; stream inventory; wildlife surveys; wildlife and fish habitat improvement; forest planning teams; appeals and litigation. Wildlife biologist, Umpqua and San Bernardino National Forests, 9 years combined; fisheries biologist, Siskiyou, Umpqua, Inyo and San Bernardino National Forests, 10 years combined; civil rights, Inyo National Forest, 3 years; NEPA program manager, Gila National Forest, 7 years.

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Erin Knolles – Assistant Forest Archaeologist, USDA Forest Service, Gila National Forest. Education: BA in Anthropology. Experience: archaeological fieldwork; literature, record and archive searches; and report writing for 2.5 years in the Forest Service.

Steven Kozlowski – Wildlife Biologist, USDA Forest Service, TEAMS Enterprise Unit. Education: B.S. Wildlife Biology, Colorado State University. Experience: Forest Service district fish and wildlife biologist, various positions in Rocky Mountain Region and Pacific Northwest Region since 1989. Work experience includes NEPA, endangered species consultation, field surveys, habitat improvement, land stewardship, environmental education, and habitat improvement.

Carolyn Koury – Hydrologist, USDA Forest Service, Southwestern Region, Gila National Forest. Education: B.S. Speech Communication, Northern Arizona University, 1991; M.S. Hydrology, University of Arizona, 1998. Experience: forest hydrologist on Gila National Forest 2002-present (2009); hydrologist on Apache-Sitgreaves National Forests, 1998-2002; hydrologist trainee on Apache-Sitgreaves National Forests 1994-1998.

Lisa Mizuno – Environmental Coordinator - Forest Travel Management Coordinator, USDA Forest Service, Gila National Forest. Education: B.S. Oceanography with a minor in biology; M.S. Interdisciplinary degree in fisheries and estuaries. Experience: fisheries biologist on the Six Rivers (1991-1999) and San Bernardino (1999-2003) National Forests. Interdisciplinary planner and assistant NEPA coordinator on the Gila National Forest since 2003, assisting, reviewing, and team leading various forest projects. Forest travel management coordinator since November 2005.

Jerry A. Monzingo – Fishery Biologist, USDA Forest Service, Gila National Forest. Education: B.S. Forest and Wildlife Biology with graduate work in fisheries. Experience: consultation, threatened and endangered species recovery, stream inventory and monitoring, riparian inventory and monitoring. Wildlife biologist, Gila National Forest 8 years, fishery biologist, Gila National Forest 6 years.

Michael Natharius – Soil Scientist, USDA Forest Service, Gila National Forest. Education: B.S. Agriculture with Major in Soil Science. Experience: terrestrial ecological unit inventory, riparian inventory and monitoring, vegetation inventory and

monitoring, burned area emergency response team leader and member, and interdisciplinary team specialist. Soil scientist with the Forest Service in Region 3 since 1991.

Rex A. Null – Civil Engineer, USDA Forest Service, Gila National Forest. Education: B.S. Civil Engineering, New Mexico State University. Experience: project manager for Burn Construction 2 years, civil engineer for Gila National Forest 18 years.

Brian Park – GIS Specialist, USDA Forest Service, Gila National Forest. Education: M.S. Applied GIS emphasis Rural Planning; Certificate in Parks and Recreation emphasis Wilderness Management; B.A. American History; B.A. English Literature. Experience: spatial data collection, management, analysis and presentation; GIS specialist at the Gila NF since Feb. 2009; GIS specialist for the Vale District BLM 2008; cartographer for Yellowstone National Park 2007; GIS technician for the city of Flagstaff 2005-06.

Arthur Telles, Jr. – Wildlife Biologist, USDA Forest Service, Gila National Forest. Education: B.S. in Wildlife Science and Fishery Science. Experience: 21 years with the Forest Service in three regions and five national forests; district fisheries biologist (5 years), forest fisheries biologist (2 years), district wildlife biologist (5 years), district wildlife/range/and watershed staff (3 years), and forest wildlife and fish program manager (6 years).

John Titre – Forest Planner, USDA Forest Service, Southwestern Region. Education: B.S. Natural Resource Management; M.S. Recreation Resource Development. Experience: qualitative and quantitative survey research, sampling, socioeconomic analysis, ROS and SMS analysis, collaboration, negotiation, hydropower licensing, ecotourism, and international development.

Bob Schiowitz – South Zone Archaeologist, USDA Forest Service, Gila National Forest. Education: B.A. Cultural Anthropology/Archaeology. Experience: 31 years as a district and forest archaeologist with the Klamath, Kaibab and Gila National Forests; with Gila NF since 1984.

Jeanne Schofer – Archaeologist, USDA Forest Service, Southwestern Region. Education: B.A. Environmental Studies; M.A. Anthropology. Experience: heritage management, Section 106 consultation, NEPA, public archaeology, geographic information system geodatabases with the Forest Service since 2006.

Justin Schofer – Wildlife Biologist, USDA Forest Service, Gila National Forest. Education: B.S. Wildlife Management; M.S. Biology. Experience: habitat and endangered species management, consultation, NEPA writing and reviewing with the Forest Service since 2008.

Laura Vallejos – Silviculturist, USDA Forest Service, Southwestern Region. Education: B.S. Forest Management; Experience: vegetation effects modeling and NEPA analysis, silviculture vegetation prescriptions for wildlife habitat, fuels reduction, forest health, restoration, watershed improvement, reforestation, invasive and noxious weed control, with the Forest Service since 1991.

David Warnack – Collaborative Forest Restoration Program Manager, USDA Forest Service, Gila National Forest. Education: B.A. English Literature. Experience: Recreation program management for 7 years and trails program management for 6 years on the Black Range and Silver City Ranger Districts, Gila National Forest. Since 2008, managing collaboration and partnership for forest restoration projects.

Antonio Ybarra – Wildlife Biologist, USDA Forest Service, Gila National Forest, Silver City Ranger District. Education: B.S. Forest and Wildlife Biology. Experience: wildlife biologist, Gila National Forest 3 years, wildland firefighter 6 years.

Cooperating Agencies

Catron County Commissioners
Grant County Commissioners
Hidalgo County Commissioners
Sierra County Commissioners

Tribes

Pueblo of Acoma
Alamo Navajo Chapter
Ft. Sill Apache Tribe
The Hopi Tribe
Pueblo of Laguna
Mescalero Apache
The Navajo Nation
Ramah Navajo Chapter
San Carlos Apache
Ysleta Del Sur Pueblo
Pueblo of Zuni

List of Agencies, Organizations, and Persons to Whom Copies of the DEIS Were Sent

This draft environmental impact statement has been distributed to individuals who specifically requested a copy of the document and those who submitted comments during scoping. In addition, copies have been sent, or provided electronically, to Federal agencies, federally recognized tribes, State and local governments, and organizations representing a wide range of views. Federal, State and local governments that were provided with copies of the DEIS include:

Advisory Council on Historic Preservation
Air Quality Bureau
Apache-Sitgreaves National Forests
Bureau of Land Management
Cibola National Forest
Coronado National Forest
Environmental Protection Agency, Region 6
Federal Aviation Administration
Federal Highway Administration
Grant Soil and Water Conservation District
Lincoln National Forest
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
New Mexico Department of Agriculture
New Mexico Department of Game and Fish
New Mexico Department of Transportation
New Mexico Environmental Department
New Mexico Office of Communication
New Mexico State Forestry Division
New Mexico State Highway
New Mexico State Lands Office
New Mexico Tourism Department
Office of Environmental Policy and Compliance, USDI
San Francisco Soil and Water Conservation District
Santa Fe National Forest
State Game Commission
State Highway Commission
State Historic Preservation Office
U.S. Army Engineer Division
U.S. Coast Guard
U.S. Customs Service (U.S. Department of Treasury)
U.S. Department of Energy
U.S. Fish and Wildlife Service
USDA APHIS PPD/EAD
USDA National Agricultural Library
USDA Natural Resource Conservation Service

Glossary

5th- or 6th-code Watershed – Watersheds across the Nation are classified in a nested hydrologic unit hierarchy consisting of regions, subregions, basins, subbasins, watersheds and subwatersheds. Regions are the largest unit. Regions are composed of subregions; subregions are composed of basins, and so on. A 5th-code watershed is a subdivision of subbasin and is the unit labeled as "watershed." A watershed is the 5th-level (code), 10-digit unit of the hydrologic unit hierarchy. Fifth-code watersheds range in size from 40,000 to 250,000 acres. A 6th-code watershed is the unit labeled as subwatershed, a subdivision of a watershed. A subwatershed is the 6th-level (code), 12-digit unit and smallest of the hydrologic unit hierarchy. Subwatersheds generally range in size from 10,000 to 40,000 acres.

Administrative use – Authorized motor vehicle use on roads or trails to carry out forest management activities. This also includes use by permittees as authorized by permit to conduct authorized activities.

Affected environment – A description of the area affected by the proposed action as it exists now. Existing condition (existing condition) is described as a baseline for comparison of the effects of the alternatives. This is the condition described in the no action alternative.

All-terrain vehicle (ATV) – A type of off-highway vehicle that travels on three or more low-pressure tires; has handlebar steering; is less than or equal to 50 inches in width; and has a seat designed to be straddled by the operator (FSM 2353.05).

Area – (1) An area on National Forest System lands that is designated for motor vehicle use pursuant to §212.51 on a motor vehicle use map (36 CFR § 212.1), and (2) A discrete, specifically delineated space that is smaller and, in most cases much smaller, than a ranger district (36 CFR § 212.1).

Consultation – Consultation with other Federal or State agencies is required by two different acts whenever there may be a potentially adverse effect on threatened or endangered wildlife, fish or plant species, or on historic or cultural resources. For wildlife, fish, and plant species, the Endangered Species Act requires that Section 7 consultation with the U.S. Fish and Wildlife Service be conducted whenever Federal agencies actions may have an impact on a threatened, endangered, or proposed (for listing) species of wildlife, fish or plants. For historical and cultural resources, Section 206 of the National Historic Preservation Act requires that a Federal agency consult with the State Historic Preservation Officer (SHPO). Programmatic agreements are in place with SHPO describing the process for Section 206 consultation.

Critical habitat – Habitat that has been designated by the U.S. Fish and Wildlife Service to aid in the recovery of threatened or endangered species. Consultation is required whenever there is a potential for impacts to critical habitat from management activities.

Cumulative effects – The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 220.3).

Deciding official – The Forest Service employee who has the authority to select and carry out a specific planning action.

Decommissioning –Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR § 212.1).

Designated fixed-distance corridors – A distance designated off of roads or trails where motorized vehicle use may be allowed for specific purposes.

Designated for motorized use – Roads, trails or areas where motor vehicles may be operated.

Designated road, trail, or area – A National Forest System road, a National Forest System trail, or an area on National Forest System lands that is designated for motor vehicle use pursuant to §212.51 on a motor vehicle use map (36 CFR § 212.1).

Dispersed recreation – Recreational activities conducted outside of developed sites such as developed campgrounds or picnic areas.

Eligible sites – A cultural site is considered eligible for the National Register if it meets the National Register Criteria for Evaluation. Evaluation of a site's eligibility involves considering the property's age, significance, and its integrity.

Endemism – Restricted or peculiar to a locality or region.

Ephemeral – Lasting a very short time.

Existing condition – See "Affected environment."

Focal species – A multi-species approach in which the ecological requirements of a suite of species are used to define or evaluate the range of habitat conditions required by many other species. The species thought to be most sensitive to, or having the most stringent ecological requirements for, the particular factor is usually identified as the focal species.

Forest road or trail – A road or trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System, and the use and development of its resources (36 CFR § 212.1).

Highway legal vehicles – Vehicles that are allowed to drive on paved roads according to State laws and regulations.

Interdisciplinary team – A team of specialists from different disciplines such as hydrology, soils science, wildlife and fish biology, archaeology, engineering, etc., convened to conduct and prepare an environmental analysis

Intermittent (Pertaining to streams, lakes, or springs) – Recurrent; showing water only part of the time.

Invasive species – Nonnative species of plants or animals that tend to flourish and displace native species of plants or animals.

Jurisdiction – Agency authority to approve, veto, or finance all or part of the proposal (40 CFR 1508.15). The territory or facilities over which authority is exercised.

Maintenance level (operation maintenance level) – Maintenance levels define the level of service provided by, and maintenance required for, a specific road. Maintenance levels must be consistent with road management objectives and maintenance criteria. Maintenance levels 1-5 (operational and objective) are described in the following paragraphs (FSH 7709.59, 62.32):

1. LEVEL 1. These are roads that have been placed in storage between intermittent uses. The period of storage must exceed 1 year. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate" all traffic. These roads are not shown on motor vehicle use maps.

   Roads receiving level 1 maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic but may be available and suitable for nonmotorized uses.

2. LEVEL 2. Assigned to roads open for use by high-clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations. Warning signs and traffic control devices are not provided with the exception that some signing, such as W-18-1 "No Traffic Signs," may be posted at intersections. Motorists should have no expectations of being alerted to potential hazards while driving these roads. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either to:
   a. Discourage or prohibit passenger cars, or
   b. Accept or discourage high clearance vehicles.

3. LEVEL 3. Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. The Manual on Uniform Traffic Control Devices is applicable. Warning signs and traffic control devices are provided to alert motorists of situations that may violate expectations.

   Roads in this maintenance level are typically low speed with single lanes and turnouts. Appropriate traffic management strategies are either "encourage" or 'accept." "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users.

4. LEVEL 4. Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. Manual on Uniform Traffic Control Devices is applicable. The most appropriate traffic management strategy is "encourage." However, the "prohibit" strategy may apply to specific classes of vehicles or users at certain times.

5. LEVEL 5. Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced

and dust abated. Manual on Uniform Traffic Control Devices is applicable. The appropriate traffic management strategy is “encourage.”

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 § 212.1).

Management indicator species (MIS) – Wildlife, fish, or plant species that represent other species that use the same or similar habitat. These species are used to help determine if management activities may have an effect on the group of species within that habitat. MIS species were determined in the “Gila National Forest Plan” and can be found on p. 289a of the “Environmental Impact Statement for the Gila National Forest Plan.”

Mesic – Of, pertaining to, or adapted to an environment having a balanced supply of moisture.

Migratory bird species – Bird species that overwinter in areas that differ from their nesting and breeding habitats. These birds migrate from their wintering habitat to their summer habitat and back annually.

Mitigation – An action taken to make effects less severe or to eliminate adverse effects.

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 § 212.1).

Motorcycle – A 2-wheeled motor vehicle on which the wheels are situated in a line, rather than side by side (FSM 2353.05).

Motorized big game retrieval (MBGR) – Retrieval of legally taken big game with the use of a motor vehicle.

Motorized dispersed camping (MDC) – Camping that is allowed outside of developed camping sites where a motor vehicle is used to access the site.

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 § 212.1).

National Forest System (NFS) – As defined in the Forest Rangeland Renewable Resources Planning Act, the “National Forest System” includes all National Forest System lands reserved or withdrawn from the public domain of the United States, all National Forest System 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 § 212.1).

National Forest System road – A forest road other than a road which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority (36 CFR § 212.1).

National Forest System trail – A forest trail other than a trail which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority (36 CFR § 212.1).

Nonindigenous – Nonnative; not originating in or characteristic of a particular region or country.

Nonmotorized – Motor vehicle use is not permitted.

Nonnative - See "Nonindigenous."

Notice of availability (NOA) – A term used to describe that a draft environmental impact statement (DEIS) is available for review and the start of the comment period on the DEIS. NOAs are published in the Federal Register. The date of publication in the Federal Register begins the comment period for the DEIS.

Notice of intent (NOI) – A term used to describe that an agency is intending to prepare and consider an environmental impact statement. NOIs are published in the Federal Register. The date of publication in the Federal Register begins the comment period for scoping on the proposed action.

Off-highway vehicle (OHV) – Any motor vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain (36 CFR § 212.1).

Partial retention – In general, human activities may be evident but must remain subordinate to the characteristic landscape.

Perennial – Present at all seasons of the year.

Proposed action – A proposal made by the Forest Service to authorize, recommend, or implement an action to meet a specific purpose and need.

Record of decision (ROD) – A concise public record of the responsible official's decision to implement an action when an environmental impact statement has been prepared.

Recreation opportunity spectrum (ROS) – A land classification system which categorized National Forest System land into six classes, each class being defined by its setting and by the probably recreation experiences and activities it affords. The six classes in the spectrum are: primitive; semiprimitive, nonmotorized; semiprimitive motorized; roaded natural; rural; and urban.

Research natural areas (RNA) – An area in as near a natural condition as possible which exemplifies typical or unique vegetation and associated biotic, soil, geologic and aquatic features. This area is set aside to preserve a representative sample of an ecological community primarily for scientific and educational purposes; commercial and general public use is not allowed.

Retention – In general, human activities are not evident to the casual forest visitor.

Riparian – Of, pertaining to, or situated or dwelling on the bank of a river or other body of water.

Riparian risk zones – Areas within 300 feet of perennial and intermittent streams.

Road – A motor vehicle route over 50 inches wide, unless identified and managed as a trail (36 CFR § 212.1).

Route – A road or trail (FSM 2353.05).

Scoping – An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. Public comments on the proposed action are sought during the scoping process.

Section 7 Consultation – A requirement of the Endangered Species Act. Section 7 consultation with the U.S. Fish and Wildlife Service is required whenever a Federal agency's actions may have an impact on a threatened, endangered or proposed for listing species of wildlife, fish or plant.

Sensitive species – Those plant and animal species identified by a regional forester for which population viability is a concern, as evidenced by:

1. Significant current or predicted downward trends in population numbers or density.
2. Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Significant issue – An issue is defined as a point of disagreement, debate, or dispute with a proposed action, based on some anticipated effect. It is not significant if: it is outside the scope of the proposed action; is already decided by law, regulations, forest plan, or other higher level decision; is irrelevant to the decision to be made; or is conjectural and not supported by scientific (or factual) evidence.

Single-track trails – Motorized trails designated for motorcycles.

Traditional cultural properties – A cultural resource that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. The entity evaluated for eligibility for inclusion in the National Register of Historic Places must be a tangible property; that is, a district, site, building, structure, or object as defined in 36 CFR 64.4.

Trail (motorized) – A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail (36 CFR § 212.1).

Unauthorized road or trail – A road or trail that is not a National Forest System road or trail, or a temporary road or trail and that is not included in a forest transportation atlas (36 CFR § 212.1).

Utility terrain vehicle (UTV) or side-by-side – A type of off-highway vehicle that travels on four or more low-pressure tires, has a steering wheel or tiller, provides side-by-side seating, and is of various widths (FSM 2353.05).

Vehicle class – Type of motor vehicle. Motor vehicles are classified as passenger vehicles, ATVs, UTVs, OHVs, etc.

Visual quality objectives (VQO) – A desired level of excellence based on physical and sociological characteristics of an area. It refers to the degree of acceptable alterations of the characteristic landscape.

Watershed – The region or area drained by a river, stream, etc.; drainage area.

Wetlands – As defined by Executive Order 11990, areas that are inundated by surface or ground water with a frequency sufficient to support.

Wild and scenic rivers – The National Wild and Scenic Rivers System was created by Congress in 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. Wild river areas are those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America. Scenic river areas are those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Wilderness – Per the 1964 Wilderness Act, a wilderness is undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. No motorized activities are permitted in wilderness areas.

Written authorizations – A written document that authorizes specific activities; may be a permit, letter, or other written document.

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