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Travel Management Final Environmental Impact Statement

Gila National Forest

Volume 1 – Chapters 1 through 4, Glossary, and Index

Cover photo: Forest road south of Luna, Quemado Ranger District, Gila National Forest

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Travel Management
Final Environmental Impact Statement
Gila National Forest

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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 (USDA Forest Service 2005). Also proposed are amendments to the "Gila National Forest Plan" (USDA Forest Service 1986) 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 had identified alternative G as the preferred alternative. A full description of the preferred alternative may be found in chapter 2 of this document.

Appeals: Pursuant to the regulations at 36 CFR 215, people and organizations who commented on the draft environmental impact statement during the notice and comment period that ran from January 7 to March 7, 2011, have standing to appeal the forest supervisor's decision. People who commented anonymously or outside of the notice and comment period do not have standing to appeal. Appeals received, including the names and addresses of those who appeal, will be part of the public record.

How to Submit an Appeal: You must submit your appeal within 45 days after the legal notice of decision is published in Silver City Daily Press and The Herald. The publication date of the legal notice is the exclusive means for calculating the time to file an appeal (§215.15 (a)). Do not rely upon dates or timeframe information provided by any other source. The content of your appeal must meet the requirements described in § 215.14.

Appeals may be delivered by facsimile, hand, U.S. mail, express delivery service, or email. Acceptable electronic formats are text in the body of an email or an attachment (.pdf, .doc, .txt, .rtf, or other formats readable by Microsoft Word).

Send Appeals to: Regional Forester, Appeal Deciding Officer
Southwestern Region
333 Broadway Blvd., SE
Albuquerque, NM 87102
Fax number: (505) 842-3173
Email address: appeals-southwestern-regional-office@fs.fed.us

Appeals may be hand delivered to the above address during regular business hours from 8:00 am to 4:30 pm.

Implementation: If no appeal is filed within the 45-day time period, implementation of the decision may begin on, but not before, the 5th business day following the close of the appeal-filing period (§215.15).

When an appeal is filed, implementation may occur on, but not before, the 15th business day following the date of appeal disposition (§215.2). In the event of multiple appeals of the decision, the implementation date is controlled by the date of the last appeal disposition.

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 NFS 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 the Travel Management Rule by providing for a system of NFS roads, NFS trails, and areas on NFS lands that are designated for motor vehicle use by vehicle class, and if appropriate, by time of year (36 CFR 212.51(a)).
- 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, tribes and pueblos, 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.

The Draft Environmental Impact Statement (DEIS) was released to the public on January 7, 2011. The DEIS was released for a 60-day comment period, which ended on March 7, 2011. The DEIS was mailed to 16,513 people and 4 open houses were held. In response, we received more than 2,000 comment letters on the DEIS.

Significant Issues

Significant issues form the basis of alternatives to the proposed action. 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 provides moderate motorized access with additional protection of sensitive resources, such as threatened, endangered, and sensitive species; high density of cultural sites; riparian and wetland areas; low condition watersheds; and inventoried roadless areas.

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

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

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

Figure 1, figure 2, and table 1 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 factors such as 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 environmental impact statement examines effects to these and other resources in detail in chapter 3. This summary highlights the change in motorized opportunities for forest users and effects to natural and cultural resources because the public indicated these 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.

Limiting where people can drive may alter some visitor's ability to enjoy the national forest in the manner they are accustomed to. Being able to drive on fewer roads and trails may result in people not being able to drive to their favorite recreational destination, which can affect both motorized and nonmotorized uses. Therefore, some destinations would 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.

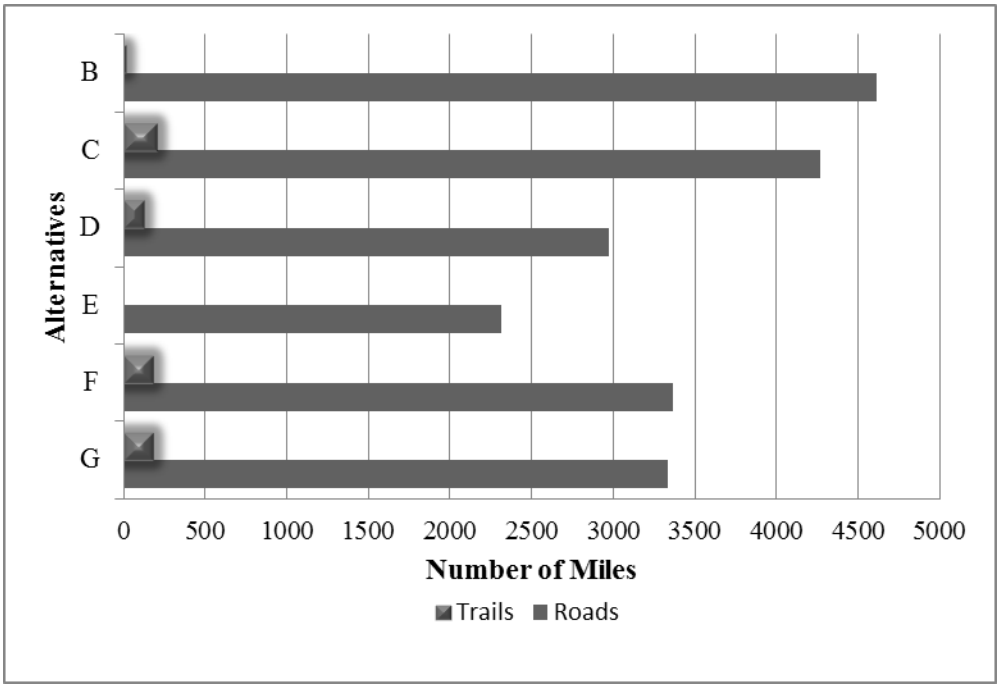

Figure 1. Road and trail miles open to the public for motorized uses that would result from each alternative, and their overall change from alternative B, no action

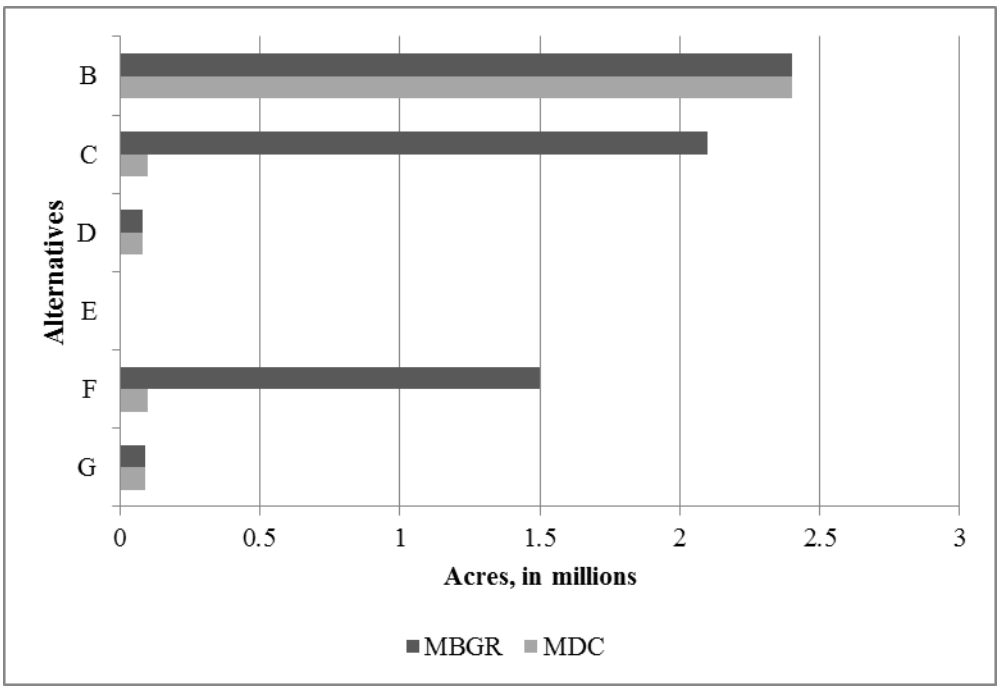

Figure 2. Comparison of acres available for driving off road, by alternative, for motorized dispersed camping (MDC) and motorized big game retrieval (MBGR)

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 public comment, the effects to social, natural, and cultural resources; and the criteria listed in the Travel Management Rule at 36 CFR 212.55, the forest supervisor will decide what changes to make to the current motorized travel system. The "record of decision," will document the decision and the rationale for it.

Table 1. Comparison of motorized system resulting from proposed changes to alternative B, no action

Motorized System	Alternative B (no action)	Alternative C	Alternative D	Alternative E	Alternative F (modified proposed action)	Alternative G (preferred alternative)
Miles of roads designated open to the public for motor vehicle use	4,613	4,272	2,976	2,318	3,363	3,334
Miles of motorized trails (less than 50 inches in width) designated open to the public for motor vehicle use	16	205	125	0	179	179
Miles of single-track motorcycle trails designated open to the public for motor vehicle use	0	64	0	0	0	0
Miles of routes for administrative use or by written authorization only*	0	233	383	440	330	329
Total percent change in motorized roads and trails	0%	-2%	-33%	-50%	-24%	-24%
Miles of forest and county roads designated for motorized dispersed camping (300 feet on each side of the road)	5,076 (no distance limit, forest is open.)	1,524	1,178	0	1,434	1,316
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	36 (24)	0 (0)	0 (0)	36 (24)	36 (24)
Number of areas (acres) restricted to ATVs and motorcycles only	No limit, forest is open	1 (3)	0 (0)	0 (0)	1 (3)	1 (3)

* Item will not be shown on the motor vehicle use map

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Acronyms

ACHP	Advisory Council on Historic Preservation
ARPA	Archaeological Resource Protection Act
ATV	all-terrain vehicles
BLM	Bureau of Land Management
CDNST	Continental Divide National Scenic Trail
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
IRA	inventoried roadless area
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
n.d.	no date
NHD	National Hydrography Dataset
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
ONRW	Outstanding National Resource Waters
ORV	off-road vehicle
P.L.	Public Law
PILT	Payments in Lieu of Taxes
RASES	Riparian Area Survey and Evaluation System
RMAP	Riparian Map
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
WSA	wilderness study area

Chapter 1. Purpose of and Need for Action

Structure of this Document

The Gila National Forest (the forest) has prepared this final environmental impact statement (FEIS) 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**
- **Appendices**

In addition to this document, there are six separate documents of maps. These documents are by alternative and each contains an index and maps displaying how each alternative changes motor vehicle use across the forest.

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)). After their initial publication, motor vehicle use maps will be reissued annually, reflecting any revisions to designations since the last printing.

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 NFS 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 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. The Gila National Forest lies within portions of Catron, Grant, Hidalgo, and Sierra Counties.

Existing Transportation System

In general terms, the existing direction includes the NFS 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 (USDA Forest Service 2008)). Based on these terms, the motorized transportation system consists of roads that are stored in the INFRA database as "existing" and "operational maintenance level 2 through 5." For motorized trails, the INFRA database entries are "existing" and managed or accepted for motorized uses.

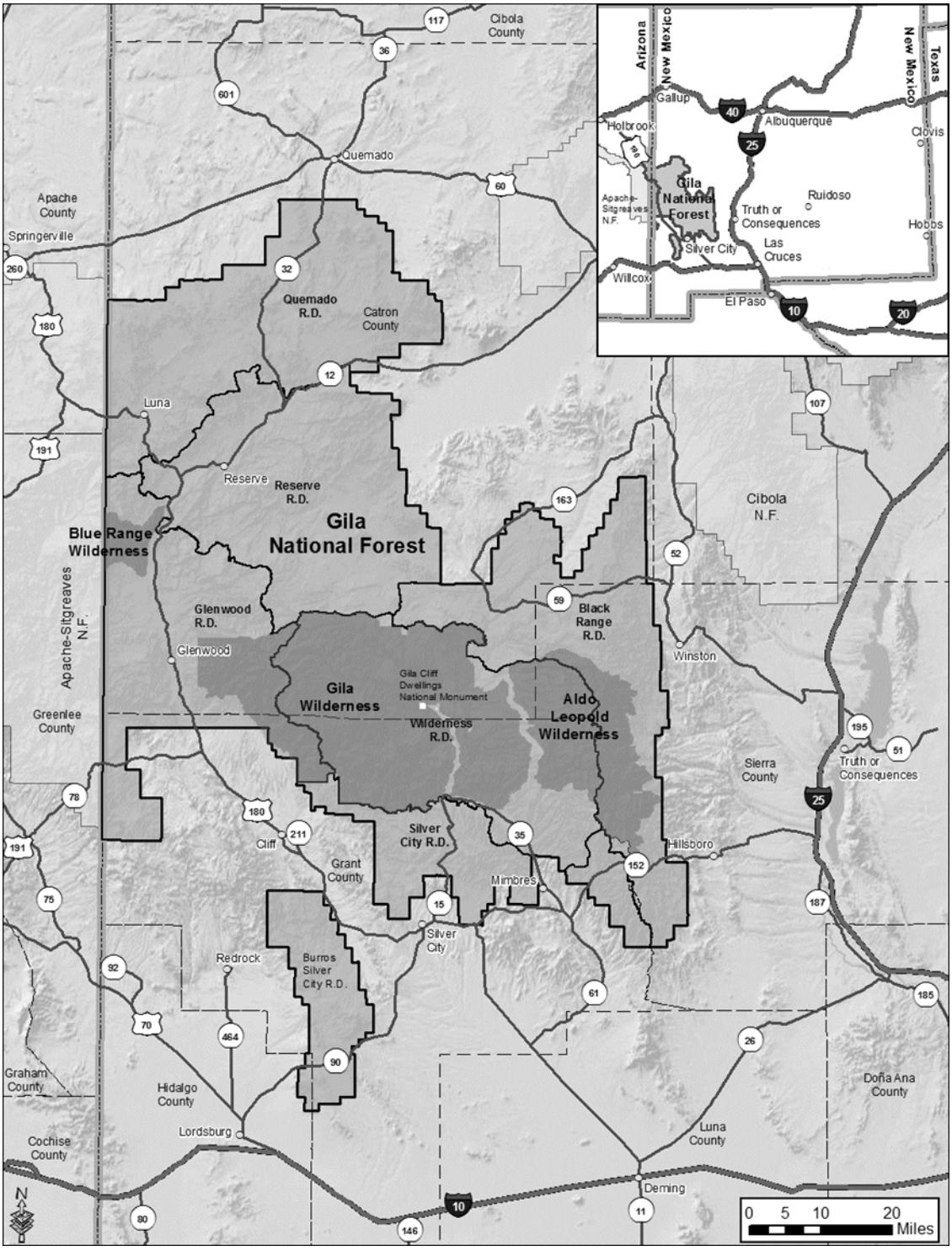

Figure 3. Location of Gila National Forest

The current existing condition of motorized roads and trails on the Forest is displayed in alternative B. It is helpful to display the forest's existing system that is open for motorized uses, 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 condition regarding motorized travel. The roads and trails shown on the alternative B map does not preclude consideration of routes and areas not shown on the maps to be proposed for inclusion into to the motorized transportation system. Conversely, motorized roads and trails shown on the alternative B map does not assure their inclusion in the designation process.

Numerous products 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.

Cross-country Travel

The Gila National Forest has approximately 3.3 million acres of NFS 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, the forest recognizes that 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 where motor vehicle use is prohibited and designated by orders (36 CFR 261.50). 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 for vehicle travel on Public Lands, "It is illegal to drive a motor vehicle off established roads or two-track roads in a hunting, trapping, or fishing area, if the vehicle transports a person licensed to hunt, trap or fish for species which are in open season in the area. It is illegal for a person so licensed to ride in or upon such a vehicle" (New Mexico Department of Game and Fish 2013).

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 the Travel Management Rule by providing for a system of NFS roads, NFS trails, and areas on NFS lands that are designated for motor vehicle use by vehicle class, and if appropriate, by time of year (36 CFR 212.51(a)).

- 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 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, motorized roads or trails that are designated as maintenance level 1 (ML1) closed roads and decommissioned roads are not considered part of the existing open motorized system in alternative B and are not shown on the alternative B maps. Although they are not shown, it does not preclude the Forest from considering these routes during the NEPA process. 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 and motorized big game retrieval 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. This proposal was based on analysis done in the "Travel Analysis Process" (USDA Forest Service 2010). The proposed action was modified after scoping due to such things as technical errors in the route data, conveyances of roads to the counties, and land exchanges. More detail is provided under the discussion of *Alternatives Considered but Eliminated from Detailed Study* – Alternative A (page 31). Alternative F is the modified proposed action. In it, we propose adding approximately 7 miles to the road system; adding approximately 166 miles to the motorized trail system; designating over 1,447 miles of roads for motorized dispersed camping; allowing motorized big game retrieval up to one-half mile from open roads; and designating approximately 36 acres as areas open to motorized use. The forest would be closed to cross-country motorized use.

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

Tribal consultation for the Forest Service is guided by a variety of laws, Executive Orders and Memoranda, as well as case law. Laws include the National Historic Preservation Act of 1966 and subsequent amendments (Public Law 89-665, 15 October 1966), Archaeological Resources Protection Act of 1979 (Public Law 96-95, 16 U.S.C. 470aa-mm, 31 October 1979), American Indian Religious Freedom Act of 1978 (Public Law 95-341, U.S.C. 1996 and 1996a, 11 August 1978), National Environmental Policy Act of 1969 (NEPA) (Public Law 91-190, 42 U.S.C. 4321-4347, 1 January 1970), Native American Graves Protection and Repatriation Act of 1990 (Public Law 101-601, 16 November 1990), and National Forest Management Act of 1976 (NFMA) (Public Law 94-588, 22 October 1976, codified in 36 CFR 219). Executive Orders and Memoranda include a 1994 Memorandum on Government-to-Government Relations with Native American Tribal Governments (59 FR 85, 4 May 1994), E.O. 13007 on Accommodation of Sacred Sites (61 FR 104, 29 May 1996), and E.O. 12898 on Environmental Justice (59 FR 32, 16 February 1994).

Tribal consultation for the Travel Management Project is also guided by Section III of the Forest Service Region 3 Heritage Programmatic Agreement with New Mexico SHPO, and Section V of Appendix I of the Programmatic Agreement, the Standard consultation Protocol for Travel Management Route Designation. These documents ensure that tribes are consulted as early as

possible in the travel management planning process, to identify and address places of traditional and cultural significance, and tribal access to those places.

The Gila National Forest is committed to, and has conducted tribal consultation and provided documents associated with the NEPA during the travel management process. These consultations were carried out at the government-to-government level, ensuring that interested tribes were given the opportunity to participate in the planning process as required in NEPA and elsewhere. Gila National Forest has and will continue to be engaged in ongoing tribal consultation through all phasing work of travel management. The following 11 tribes or chapters were consulted regarding travel management:

- Pueblo of Acoma
- Alamo Navajo Chapter
- Fort 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

Primary methods of consultation included letters, phone calls, providing travel management materials, and face-to-face meetings at tribal offices (USDA Forest Service 2013j). Although all tribes were contacted, not all were available or expressed an interest in consulting at the time.

Tribal Consultation Summary

Of the 11 federally recognized tribes contacted for consultation since 2007 on travel management, three expressed either no concerns, or that the Travel Management Project/decision would have no adverse effects on traditional cultural properties.

Four expressed general concerns about the need for continued access by tribal members for traditional plant gathering and other activities on the Gila National Forest. Three expressed concern about motorized vehicle and all-terrain vehicle (ATV) damage to cultural and natural resources.

Two tribes favored more restrictions on motorized use on the Gila National Forest. One of these favored the most restrictive motorized use alternative, feeling it would provide protection to cultural heritage values. One did not favor motorized big game retrieval saying ATV use should be limited.

No responses were received from two of the tribes.

Based on this information, no traditional cultural properties or sacred sites were identified within the Travel Management Project area, nor were any identified as being affected by the project. Gila National Forest is engaged in ongoing tribal consultation, and will consider additional information received under relevant law, regulation, and policy.

If identified, traditional cultural properties or sacred sites in the project area will be treated as significant historic properties under the provisions of the Forest Service Region 3 Programmatic Agreement and National Historic Preservation Act, similar to other cultural resources.

Comments

The forest 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.

It is recognized 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 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 only in designated

firewood areas, as described in 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.

Forest management – 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 unneeded routes – 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).

Access for emergencies, including fire – Under 36 CFR 212.51: Designations of roads, trails, and areas of the Travel Management Rule: "the following vehicles and uses are **exempted** from these designations: (5) Use of any fire, military, emergency, or law enforcement vehicle for emergency purposes."

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 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.

Notice and Comment Period for the Draft Environmental Impact Statement

The draft environmental impact statement (DEIS) was posted on the Gila National Forest's Web site in December 2010. The forest supervisor notified 16,513 people and organizations via email or letter that the draft was available for review. The people notified were those who commented during scoping, who asked to be kept on the mailing list, or who requested notification of the draft's availability. The notice and comment period—the official time allotted for the public to comment on the DEIS to have standing to appeal—started with the publication of the notice of availability in the Federal Register on January 7, 2011. The notice and comment period ran for 60 days beginning January 7 and ending March 7, 2011.

In conjunction with the notice and comment period, the forest hosted four open houses providing opportunity for the public to review, ask questions about, and comment on the DEIS for travel management.

The forest received more than 2,000 comment letters and emails on the DEIS.

Response to Comments Made during the Notice and Comment Period

The regulations implementing the National Environmental Policy Act provide direction to agencies to review and respond to comments on draft environmental impact statements (40 CFR 1503.4; FSH 1909.15 Chapter 20 Part 25):

> *An agency preparing a final environmental impact statement shall assess and consider comments both individually and collectively, and shall respond by one or more of the means listed below, stating its response in the final statement. Possible responses are to:*
>
> - *Modify alternatives including the proposed action.*
> - *Develop and evaluate alternatives not previously given serious consideration by the agency.*
> - *Supplement, improve, or modify its analyses.*
> - *Make factual corrections.*
> - *Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response.*

Staff of the Gila National Forest read and considered the comments received on the DEIS. Based on comments received, modifications were made to one or more of the action alternatives (appendix A). Because of the high volume of comments received, the forest grouped like comments together and responded to them (appendix B). Copies of the comments received on the DEIS from Federal, State, and local agencies may be found in appendix D.

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 reverses that procedure: the forest will be closed to cross-country motorized use except where specifically designated for motor vehicle use and displayed on the motor vehicle use map. Driving off of designated routes will not 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 show all the roads and trails open to the public for motor vehicle use, fixed-distance corridors for motorized dispersed camping and big game retrieval, and areas shown in the record of decision. This may occur because:

- Under the USDA-Forest Service Region 3 Protocol regarding Section 106 consultation for Travel Management Route Designation (USDA-Forest Service Southwestern Region; New Mexico SHPO 2007), the Travel Management Rule NEPA decision can be signed based on existing cultural resource data. Additional cultural surveys and compliance may be phased up to three years after the decision has been signed.

  While the record of decision may be signed, routes, fixed-distance corridors, and areas requiring Section 106 consultation and compliance may not appear on the motor vehicle use map until this work is completed. It is also possible that certain routes and areas may be modified or eliminated due to resource conflicts, thus not appearing on the motor vehicle use map

  Only a few hundred acres remain to be surveyed for cultural resource evaluation. It is anticipated that phasing will consist only of some loose ends in survey areas, site visits, and report writing. This amount of work may be completed by the development of the first motor vehicle use map.

- Gila National Forest recently experienced heavy rain events, causing flood damage to many roads forestwide. Some of the roads damaged during these events are designated open to motor vehicle use by the public within some or all action alternatives. These roads and any other roads or motorized trails that incur damage from storm or other events may be temporarily closed until maintenance may be performed to repair damage. The forest will work toward having roads designated to be open for motor vehicle use available and on the first motor vehicle use map; however, it is possible some may not be.

Subsequent Motor Vehicle Use Maps

The motor vehicle use map will be reviewed and published annually, even if there are no changes to the system. In subsequent maps, roads, motorized trails, and areas including corridors may be included or removed as long as the proper environmental analysis, documentation, or 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 including corridors as appropriate.

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 these 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, as displayed in alternative B. The action alternatives presented in the draft environmental impact statement incorporated 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 4,613 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. 25);
- continue to allow motorized dispersed camping throughout the forest (except in off-road vehicle restricted areas such as wilderness and research natural areas (table 9and table 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 (table 10 and table 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 (Common to all action alternatives): The conversion of roads to motorized trails would entail such things as signing or restricting access based on vehicle type.

Reopening roads (Common to all action alternatives): Reopening of roads includes both maintenance level 1 closed roads 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 need to be removed or reworked to allow passage and maintain drainage features. If this segment of road is designated as open to motor vehicle use, additional NEPA would be needed to remove the berms and install drainage features.

Changing roads from open to all vehicles to open to highway legal vehicles only (Common to all action alternatives): The prohibition of certain 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.

Table 2. Roads and location descriptions to be open to highway-legal vehicles only that would be implemented under all action alternatives

Road Number	Mile Post (MP) Begin	MP End	Location Description	Ranger District
13	0.0	2.5	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	0.04	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	0.3	Ranger district office parking	Glenwood
141	0.6	18.8	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
627	0.0	0.3	Lake Roberts Boat Ramp	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
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
4187 K	0.0	0.3	Within Quemado Lake Recreation Area boundary	Quemado
4187 L	0.0	0.2	Within Quemado Lake Recreation Area boundary	Quemado
4187 M	0.0	0.1	Within Quemado Lake Recreation Area boundary	Quemado
4187 N	0.0	0.2	Within Quemado Lake Recreation Area boundary	Quemado
4206 P	0.0	0.2	Lake Roberts picnic area	Wilderness
4318 K	0.0	0.04	Accesses airstrip	Reserve

Designating Motorized Dispersed Camping Corridors (Common to alternatives C, D, F, and G): 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)).

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.

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 (Common to alternatives C, D, F, and G): 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, retrieval of game should take a relatively direct and safe route (USDA Forest Service Southwestern Region Travel Management Rule Guidelines, June 2008) and follow applicable laws or regulations, such as:

- Roads should not be damaged or left in a damaged condition (36 CFR 261.12 (c))
- Retrieval of big game should take a relatively direct and safe route
- 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 (Common to all action alternatives): 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."	Use of motor vehicles in Hells Hole is managed by the travel management plan and displayed on the motor vehicle use map.
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 as amended (Amendment #1 1987)) so it is consistent with the

Travel Management Rule and outdated schedules can be removed. The forest plan amendment 7 as shown in table 4 would be implemented in all action alternatives. (Language to be removed is indicated by a strikethrough and language to be added is in italics.). This would be implemented in all action alternatives.

Table 4. Proposed Forest Plan Amendment No. 7 to change recreation standards and guidelines related to the off-road vehicle policy

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.

* Management Prescription Applicable to all Areas Except Wilderness

** Standards and Guidelines Will Apply Uniformly throughout the Gila National Forest

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 7 miles of unauthorized routes and designate these routes as National Forest System (NFS) roads open to all vehicle types (table 5, p. 25).
- Reopen 6 miles of NFS maintenance level 1 roads and change to maintenance level 2 roads open to all vehicle types (table 5, p. 25).
- 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. 25). 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 (table 5 and table 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. 26):
  - Change the use on 173 miles of existing NFS roads currently open to all motorized uses.
  - Add 27 miles of unauthorized routes as roads.
  - Reopen 9 miles of maintenance level 1 closed roads or decommissioned roads and change to maintenance level 2.
  - Change 2 miles of NFS roads to NFS trails.
  - Add 3 miles of unauthorized ATV routes to NFS trails.
- Close 144 miles of open NFS roads to all motorized vehicle uses (table 5, p. 25).
- 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 closed roads or decommissioned roads and designate as NFS trails for motorized vehicles less than 50 inches in width (table 8, p. 26).
- Convert 35 miles of open 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 (table 9 and table 11, p. 27):
  - 1,452 miles of specific designated open forest roads,
  - 0.2 mile of reopened maintenance level 1closed roads or decommissioned roads,
  - 0.9 mile of unauthorized roads proposed to be added to the system, and
  - 70 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 NFS lands. Motorized big game retrieval would be limited to elk, deer, pronghorn, bear, javelina, and mountain lion (table 10 and table 11, p. 27).
- Areas:
  - Designate 36 small areas distributed over 24 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 3 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. 25).
- Reopen 2 miles of NFS maintenance level 1 and change to maintenance level 2 roads open to all vehicle types (table 5, p. 25).
- 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. 25). 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 (table 5 and table 6, p. 25).
- Designate 8 miles of NFS roads to be open seasonally to all vehicle types from September 1 through February 28 (table 5 and table 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. 26):
  - Change the use on 340 miles of existing NFS roads currently open to all motorized uses.
  - Add 27 miles of unauthorized routes as roads.
  - Reopen 9 miles of maintenance level 1 closed roads or decommissioned roads and change to maintenance level 2.
  - Change 4 miles of NFS roads to NFS trail.
  - Add 3 miles of unauthorized ATV routes to NFS trails.
  - Change the use on 1 mile of existing motorized NFS trails.
- Close 1,233 miles of open NFS roads to all motorized vehicle uses (table 5, p. 25).
- 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 14 miles of NFS maintenance level 1 closed roads or decommissioned roads to NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).
- Convert 68 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. 27):
  - 1,143 miles of specific designated open forest roads,
  - 0.2 mile of reopened maintenance level 1 closed roads or decommissioned roads,
  - 0.6 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 (table 10 and table 11, p. 27).

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. 25).
- Reopen 1 mile of NFS maintenance level 1 and change to maintenance level 2 roads open to all vehicle types (table 5, p. 25).
- 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. 25). 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 (table 5 and table 6, p. 25).
- The following changes apply to motorized routes that will open only for periodic administrative use or specific permitted uses only (table 7, p. 26):
  - Change the use on 427 miles of existing NFS roads currently open to all motorized uses.
  - Add 4 miles of unauthorized routes as roads.
  - Reopen 3 miles of maintenance level 1 closed roads or decommissioned roads and change to maintenance level 2.
  - Change 3 miles of NFS roads to NFS trails.
  - Add 3 miles of unauthorized ATV routes to NFS trails.
  - Change the use on 1 mile of existing motorized NFS trails.
- Close 1,866 miles of open NFS roads to all motorized vehicle uses (table 5, p. 25).
- Close 15 miles of open NFS motorized trails to all motorized uses (table 8, p. 26).
- Convert 2 miles of NFS maintenance level 1 closed roads or decommissioned roads to NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).
- No motorized dispersed camping corridors would be designated (table 9 and table 11, p. 27).
- Motorized big game retrieval would not be allowed (table 10 and table 11, p. 27).

Alternative 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. 25).
- Reopen 3 miles of NFS maintenance level 1 roads and change to maintenance level 2 roads open to all vehicle types (table 5, p. 25).
- 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. 25). 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 (table 5 and table 6, p. 25).
- The following changes apply to motorized routes that will open for periodic administrative use or specific permitted uses only (table 7, p. 26):
  - Change the use on 291 miles of existing NFS roads currently open to all motorized uses.
  - Add 25 miles of unauthorized routes as roads.
  - Reopen 9 miles of maintenance level 1 closed roads or decommissioned roads and change to maintenance level 2.
  - Change 2 miles of NFS roads to NFS trails.
  - Add 3 miles of unauthorized ATV routes to NFS trails.
- Close 878 miles of open NFS roads to all motorized vehicle uses (table 5, p. 25).
- 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 22 miles of NFS maintenance level 1 closed roads or decommissioned roads to NFS trails and designate for motorized vehicles less than 50 inches in width (table 8, p. 26).
- Convert 88 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. 27):
  - 1,372 miles of specific designated open forest roads,
  - 0.2 mile of reopened maintenance level 1 closed roads or decommissioned 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 one-half 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 (table 10 and table 11, p. 27).

- Areas:
  - Designate 36 small areas distributed over 24 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 3 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 7 miles of unauthorized routes and designate these routes as NFS roads open to all vehicle types (table 5, p. 25).
- Reopen 3 miles of NFS maintenance level 1 roads and change to maintenance level 2 roads open to all vehicle types (table 5, p. 25).
- 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. 25). 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 (table 5 and table 6 p. 25).
- The following changes apply to motorized routes that will open for periodic administrative use or specific permitted uses only (table 7, p. 26):
  - Change the use on 289 miles of existing NFS roads currently open to all motorized uses.
  - Add 26 miles of unauthorized routes as roads.
  - Reopen 9 miles of maintenance level 1 closed roads or decommissioned roads and change to maintenance level 2.
  - Change 2 miles of NFS roads to NFS trails.
  - Add 3 miles of unauthorized ATV routes to NFS trails.
- Close 908 miles of open NFS roads to all motorized vehicle uses (table 5, p. 25).
- 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 22 miles of NFS maintenance level 1 closed roads or decommissioned 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 (table 9 and table 11, p. 27):
  - 1,267 miles of specific designated open forest roads,
  - 0.2 mile of maintenance level 1 closed roads or decommissioned roads,
  - 0.6 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 (table 10 and table 11, p. 27).
- Areas:
  - Designate 36 small areas distributed over 24 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 3 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[1]	Alt. C	Alt. D	Alt. E	Alt. F[1]	Alt. G
Add unauthorized routes to NFS roads open to all vehicle types[2]	0	7	6	2	6	7
Reopen NFS maintenance level 1 closed or decommissioned roads to all vehicle types[2]	0	6	2	1	3	3
Change allowed vehicle type on NFS roads from all vehicles 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 existing NFS roads that are currently open to all motorized vehicle uses	0	144	1,233	1,866	878	908

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

[2] Appendix E lists the individual routes for this feature of the alternatives

Table 6. Road segments proposed to be designated seasonally open

Road No.	Begin MP	End MP	Total Miles	Description	Ranger District	Dates Open	Alt. B[1]	Alt. C	Alt. D	Alt. E	Alt. F[1]	Alt. 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[1]	Alt. C	Alt. D	Alt. E	Alt. F[1]	Alt. G
Change use on existing NFS roads currently open to all motorized uses	0	173	340	427	291	289
Reopen maintenance level 1 closed roads or decommissioned roads and change to maintenance level 2 [2]	0	9	9	3	9	9
Add unauthorized routes as roads[2]	0	27	27	4	25	26
Total road miles	**0**	**208**	**376**	**433**	**325**	**324**
Change NFS roads to NFS trails (motorized)	0	2	4	3	2	2
Change use on existing motorized NFS trail	0	0	1	1	0	0
Add unauthorized routes to NFS motorized trail system[2]	0	3	3	3	3	3
Total motorized trail miles	**0**	**5**	**8**	**7**	**5**	**5**

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

[2] Appendix E lists the individual routes for this feature of the alternatives

Table 8. Changes to motorized trails in miles

Features of the alternatives	Alt. B[1]	Alt. C	Alt. D	Alt. E	Alt. F[1]	Alt. G
Add unauthorized routes and designate as NFS trails for motorized vehicles less than 50 inches in width[2]	0	61	34	0	53	51
Open and convert NFS maintenance level 1 closed roads or decommissioned roads to NFS trails for motorized vehicles less than 50 inches in width[2]	0	30	14	0	22	22
Convert open NFS maintenance level 1 closed roads or decommissioned roads to NFS trails for motorized vehicles less than 50 inches in width	0	35	68	2	88	90
Allow single-track vehicles (motorcycles) on previously nonmotorized NFS trails. Both motorized and nonmotorized uses would be allowed on the trails. [2]	0	51	0	0	0	0
Add unauthorized routes and designate as NFS trails for motorcycles (single track) [2]	0	13	0	0	0	0
Close open NFS motorized trails to all motorized uses	0	1	7	15	1	1

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

[2] Appendix E lists the individual routes for this feature of the alternatives

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 forest roads	4,613	1,452	1,143	0	1,372	1,267
Unauthorized routes proposed to be added to the road system	0	0.9	0.6	0	0.2	0.6
Re-opened maintenance level 1 closed roads or decommissioned roads	0	0.2	0.2	0	0.2	0.2
County roads	463	70	34	0	64	48
Total miles motorized dispersed camping (300 feet both sides of road)	**5,076**	**1,524**	**1,178**	**0**	**1,434**	**1,316**

[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	2,443,391	108,180	84,388	0	101,916	94,008
Motorized big game retrieval	2,443,391	2,078,666	84,388	0	1,506,576	94.008

* 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 motor vehicle travel except where motor vehicles are prohibited	36	0	0	36	36
Acres	2,443,391	24	0	0	24	24

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

Table 13. Areas open to all vehicle types

Label ID	Township	Range	Section	Associated Road Number or Description	Ranger District	Acres	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. 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	1.9		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	1.9		X			X	X
RA1	6S	19W	34	End of 4161 W	Reserve	3.3		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						
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
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

Label ID	Township	Range	Section	Associated Road Number or Description	Ranger District	Acres	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
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						
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	0.5		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 ATVs 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 motor vehicle travel except where motor vehicles are prohibited	1	0	0	1	1
Acres	2,443,391	3	0	0	3	3

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

Mitigations

The Council on Environmental Quality's regulations for implementing NEPA define a mitigation as 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 impacts that may adversely affect cultural or historical resource sites (as it is defined in the National Historic Preservation Act, 36 CFR 800.5.a.1) from proposed motorized designations, we will apply appropriate mitigations, such as:

- dropping proposed motorized road, trail, area, or corridor designations to avoid or reduce direct or indirect effects on historic properties
- re-routing or modifying designated roads or trails to protect historic properties. Rerouting or modifying roads will be subject to Section 106 compliance prior to ground disturbance, as provided for in the Programmatic Agreement
- using temporary emergency closures, if needed, while unacceptable effects on historic properties are addressed
- revising designations, if determined necessary to protect historic properties from adverse effects
- monitoring to ensure that impacts to historic properties are not occurring or that protection measures are working
- leaving roads, trails, areas off the motor vehicle use map distributed to the public until after all Section 106 compliance needs are met.
- removing fire rings and trash
- using fencing or other barriers
- posting signs

Where we identify impacts that may adversely affect traditional cultural or historical properties from motorized access, appropriate mitigations will be applied, such as:

1. Where motorized access to traditional cultural properties is reduced because of designation, we will grant special use or other authorizations to users. Consultation with appropriate or traditional communities or practitioners may develop other mitigation measures
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. Alternative F is the modified proposed action carried forward in the FEIS. 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 why this alternative was 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 elements of the alternatives that would be open to the public and included in the motor vehicle use map

Key Elements	Alt. B*	Alt. C	Alt. D	Alt. E	Alt. F*	Alt. G
Miles of roads open to the public for motorized use	4,613	4,272	2,976	2,318	3,363	3,334
Miles of motorized trails (less than 50 inches in width)	16	205	125	0	179	179
Miles of single-track (motorcycle) trails	0	64	0	0	0	0
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)	5,076 (no distance limit, forest is open	1,524	1,178	0	1,434	1,316
Motorized big game retrieval (MBGR) description (acres open for MBGR)	No limit on distance or species. Forest is open (approx. 2,443,391 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. 2,078,666 acres)	300 feet using same motorized dispersed camping corridors for retrieving elk and deer (approx. 84,388 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. 1,506,576 acres)	300 feet using same motorized dispersed camping corridors for retrieving elk and deer (approx. 94.008 acres)
Number of areas (acres) open to all vehicles	No limit, forest is open	36 (24)	0 (0)	0 (0)	36 (24)	36 (24)
Number of areas (acres) restricted to ATV and motorcycles only	No limit, forest is open	1 (3)	0 (0)	0 (0)	1 (3)	1 (3)

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

Table 16. Comparison of resources by alternatives

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Roads						
Public safety	Route safety concerns relatively low.	No change.	No change.	No change.	No change.	No change.
Deferred maintenance needs (cost)	$5,169,689	$5,130,016	$4,791,394	$4,616,603	$4,889,869	$4,880,903
Recreation						
Miles of roads open to the public for motorized uses	4,573	4,234	2,943	2,290	3,329	3,300
Miles of motorized trails open to the public (less than 50 inches in width and single-track)	16	204	124	1.6	178	178
Motorized trail maintenance and opportunities (cost)	$14,220	$183,060	$111,150	$1,350	$160,020	$160,020
Miles of motorized routes within 300 feet of eligible wild and scenic rivers	6.0	6.0	5.4	5.4	6.0	6.0
Total number of intermittent and perennial road crossings within eligible wild and scenic rivers	24	24	23	23	24	24
Number of crossings by motorized routes across the Continental Divide National Scenic Trail	73	70	53	41	59	59
Inventoried Roadless Areas						
Miles of roads open to the public for motorized uses within IRAs	362.1	296.7	198.1	156.4	226.4	223.3
Miles of motorized trails (less than 50 inches in width and single-track motorcycles) open to the public within IRAs	4.5	52.4	9.0	0.0	20.9	22.3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Hell Hole Wilderness Study Area						
Motorized routes – miles of roads open to the public for motorized uses within Hell Hole WSA	10.4	5.4	2.1	3.7	1.8	4.1
MDC – miles / acres of MDC corridors within Lower San Francisco WSA	n/a / 19,540	1.4 / 114	0.2 / 21.7	0.0 / 0.0	0.3 / 29.0	0.2 / 21.7
MBGR – miles / acres of MBGR corridors within Lower San Francisco WSA	n/a / 19,540	5.77 / 9,777	0.2 / 21.7	0.0 / 0.0	2.1 / 3,819	0.2 / 21.7
Lower San Francisco Wilderness Study Area						
Motorized routes – miles of roads open to the public for motorized uses within Lower San Francisco WSA	8.2	8.0	0.7	0.0	8.0	0.4
MDC – miles / acres of MDC corridors within Lower San Francisco WSA	n/a / 4,144	8.1 / 580	0.0 / 0.27	0.0 / 0.0	0.5 / 37.7	0.0 / 0.27
MBGR – miles / acres of MBGR corridors within Lower San Francisco WSA	n/a / 4,144	8.1 / 4,063	0.0 / 0.27	0.0 / 0.0	8.1 / 3,329	0.0 / 0.27
Air Quality **Acres (percent change from Alt. B) of motorized routes with potential to contribute to fugitive dust and add to visibility impairment:**						
Forestwide	6,918	9,899 (~0%)	5,240 (-24%)	4,219 (-39%)	5,789 (-16%)	5.746 (-17%)
Gila Wilderness Class 1 Airshed	250	245 (-2%)	203 (-19%)	175 (-30%)	221 (-12%)	221 (-12%)
Aldo Leopold Wilderness Class II Airshed	126	123 (-2%)	96 (-24%)	84 (-33%)	113 (-10%)	113 (-10%)
Blue Range Wilderness Class II Airshed	31	36 (16%)	36 (16%)	30 (-3%)	35 (13%)	36 (16%)

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Soils with Moderate or Severe Erosion Hazard Ratings						
Motorized routes (acres)	2,468	2,504	1,829	1,443	2,099	2,076
MBGR (potential acres)	1,210,241	950,931	28,200	0	605,485	29,914
MDC (potential acres)	1,210,241	34,241	28,200	0	32,442	29,914
Parking (potential acres)	1,210,241	18,712	12,748	10,106	14,724	14,511
Areas (acres)	1,210,241	12	0	0	12	12
Soils with Unsatisfactory or Unsuited Condition Ratings						
Motorized routes (acres)	2,870	2,874	2,282	1,908	2,428	2,403
MBGR (potential acres)	1,161,775	949,094	35,327	0	679,407	39,625
MDC (potential acres)	1,161,775	46,981	35,327	0	43,130	39,625
Parking (potential acres)	1,161,775	23,290	17,474	15,277	18,856	18,658
Areas (acres)	1,161,775	9	0	0	9	9
Riparian Areas						
Motorized routes – acres of disturbance	443	441	330	273	382	374
MDC – acres of potential disturbance	31,581	4,357	3,334	0	3,828	3,568
MBGR – acres of potential disturbance	31,581	27,356	3,334	0	20,565	3,568
Areas – acres of potential disturbance	31,581	0	0	0	0	0
Wetlands/Wet Meadows						
Motorized routes – acres of disturbance	18	17	13	10	14	14
MDC – acres of potential disturbance	1,568	296	239	0	293	265
MBGR – acres of potential disturbance	1,568	1,561	239	0	1,485	265
Areas – acres of potential disturbance	1,568	0	0	0	0	0

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Water Quality						
Number of motorized road/trail stream crossings on perennial, intermittent, and ephemeral channels	8,847	9,088	6,526	4,971	7,516	7,424
Number of motorized road/trail stream crossings on impaired waterbodies	187	165	144	139	148	148
Motorized routes – miles of perennial / intermittent streams within 300 feet of open routes	295	293	297	163	247	240
Motorized routes – miles of ephemeral drainages within 300 feet of open routes	1,771	1,785	1,346	1,069	1,502	1,493
Motorized routes – miles of impaired (303d) streams within 300 feet of open routes	47	43	37	35	38	38
Motorized routes – miles of Outstanding National Resource Waters (ONRW) streams within 300 feet of open routes	0.17	0.05	0.00	0.00	0.05	0.05
Motorized routes – miles of motorized routes within 300 feet of ONRW wetlands	0.75	0.69	0.69	0.69	0.69	0.69
MDC – miles of perennial / intermittent streams within MDC corridors	886	63	32	0	50	42
MDC – miles of ephemeral drainages within MDC corridors	9,410	582	445	0	555	512
MDC – miles of impaired (303d) streams within MDC corridors	132	6	4	0	5	6
MDC – acres of MDC corridors within 300 feet of ONRW streams	91	0	0	0	0	0
MDC – acres of MDC corridors within 300 feet of ONRW welands	96	0	0	0	0	0

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
MBGR – miles of perennial / intermittent streams within MBGR corridors	886	688	32	0	476	42
MBGR – miles of ephemeral drainages within MBGR corridors	9,410	7,996	445	0	5,872	512
MBGR – miles of impaired (303d) streams within MBGR corridors	132	107	4	0	69	6
MBGR – acres of MBGR corridors within 300 feet of ONRW streams	70	67	0	0	28	0
MBGR – acres of MBGR corridors within 300 feet of ONRW wetlands	96	38	0	0	21	0
Areas – miles of perennial / intermittent streams within 300 feet of motorized areas	886	0.03	0	0	0.03	0.03
Areas – miles of ephemeral drainages within 300 feet of motorized areas	9,410	1.86	0	0	1.67	1.67
Areas – miles of impaired (303d) streams within 300 feet of motorized areas	132	0.14	0	0	0.14	0.14
Areas – acres of motorized areas within 300 feet of ONRW streams	0	0	0	0	0	0
Areas – acres of motorized areas within 300 feet of ONRW wetlands	0	0	0	0	0	0
Aquatic Species and Habitat						
Miles of motorized routes within 300 feet of perennial, intermittent, and ephemeral streams and rivers	302	302	209	163	246	242
Total number of intermittent and perennial road crossings	967	882	631	489	805	788

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Total number of ephemeral road crossings	7,880	8,206	5,895	4,482	6,711	6,636
Miles of routes within 300 feet of impaired streams with off-road vehicles or highway/road/ bridge as probable sources of impairment	27.5	26.1	19.7	20.0	21.5	21.5
Miles of motorized routes within 300 feet of loach minnow designated critical habitat	28	27	18	17	26	19
Number of stream crossings within loach minnow designated critical habitat	89	87	53	53	57	54
Miles of motorized routes within 300 feet of spikedace designated critical habitat	26	26	18	17	25	18
Number of stream crossings within spikedace designated critical habitat	85	80	46	46	80	47
Miles of motorized routes within 300 feet of *Gila chub* designated critical habitat	3	3	2	2	2	2
Number of stream crossings within Gila chub designated critical habitat	4	4	3	2	3	3
Miles of motorized routes within 300 feet of Chihuahua chub occupied habitat	2	1	1	1	1	1
Number of stream crossings within Chihuahua chub occupied habitat	15	0	0	0	0	0
Miles of motorized routes within 300 feet of Gila trout occupied habitat	1.29	1.29	1.29	1.22	1.29	1.29
Number of stream crossings within Gila trout occupied habitat	3	3	3	3	3	3

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Wildlife Habitat						
Chiricahua Leopard Frog – Reasonable Dispersal Areas						
Motorized routes – Miles (percent change) of motorized routes within dispersal areas	82	81 (-1%)	70 (-14%)	46 (-43%)	75 (-9%)	78 (-5%)
Motorized routes – Number of stream crossings (percent change) within dispersal areas	76	75 (-1%)	54 (-29%)	33 (-57%)	58 (-24%)	74 (-3%)
MDC – Change in acres (percent change) of MDC corridors within dispersal areas	43,600	-42,102 (-97%)	-42,517 (-98%)	-43,600 (-100%)	-42,224 (-97%)	-42,185 (-97%)
MBGR – Change in acres (percent change) of MBGR corridors within dispersal areas	43,600	-5,489 (-13%)	-42,517 (-98%)	-43,600 (-100%)	-18,499 (-42%)	-42,185 (-97%)
Areas – Acres of motorized areas within dispersal areas	0	0	0	0	0	0
Chiricahua Leopard Frog – Designated Critical Habitat						
Motorized routes – Miles (percent change) of motorized routes within designated critical habitat	5.2	5.2 (0%)	4.8 (-7%)	3.9 (-24%)	4.8 (-7%)	4.8 (-7%)
Motorized routes – Number of stream crossings (percent change) within designated critical habitat	22	22 (0%)	22 (0%)	21 (-5%)	22 (0%)	22 (0%)
MDC – Change in acres (percent change) of MDC corridors within designated critical habitat	1,873	-1,849 (-99%)	-1,868 (-99%)	-1,873 (-100%)	-1,862 (-99%)	-1,849 (-99%)
MBGR – Change in acres (percent change) of MBGR corridors within designated critical habitat	1,873	-227 (-12%)	-1,868 (-99%)	-1,873 (-100%)	-951 (-51%)	-1,849 (-99%)
Areas – Acres of motorized areas within designated critical habitat	0	0	0	0	0	0

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Mexican Spotted Owl – Protected Activity Centers (PACs)						
Motorized routes – Miles (percent change) of motorized routes within PACs	245	252 (3%)	128 (-48%)	80 (-67%)	184 (-25%)	182 (-26%)
MDC – Change in acres (percent change) of MDC corridors within PACs	132,729	-128,782 (-97%)	-131,184 (-99%)	-132,729 (-100%)	-129,261 (-97%)	-130,158 (-98%)
MBGR – Change in acres (percent change) of MBGR corridors within PACs	132,729	-16,388 (-12%)	-131,184 (-99%)	-132,729 (-100%)	-49,901 (-38%)	-130,158 (-98%)
Areas – Acres of motorized areas within PACS	0	0	0	0	0	0
Mexican Spotted Owl – Designated Critical Habitat						
Motorized routes – Miles (percent change) of motorized routes within designated critical habitat	1,310	1,347 (3%)	880 (-33%)	569 (-57%)	1,047 (-20%)	1,043 (-20%)
MDC – Change in acres (percent change) of MDC corridors within designated critical habitat	604,771	-577,378 (-95%)	-584,604 (-97%)	-604,771 (-100%)	-578,283 (-96%)	-580,834 (-96%)
MBGR – Change in acres (percent change) of MBGR corridors within designated critical habitat	604,771	-77,797 (-13%)	-584,604 (-97%)	-604,771 (-100%)	-220,107 (-36%)	-580,834 (-96%)
Areas – Acres of motorized areas within designated critical habitat	1.2	0	-1.2	-1.2	0	0
Southwest Willow Flycatcher – Occupied Areas						
Motorized routes – Miles (percent change) of motorized routes within occupied areas	0.73	0.73 (0%)	0.73 (0%)	0.73 (0%)	0.73 (0%)	0.73 (0%)
MDC – Change in acres (percent change) of MDC corridors within occupied areas	62	-58 (-93%)	-58 (-93%)	-62 (-100%)	-58 (-93%)	-58 (-93%)

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
MBGR – Change in acres (percent change) of MBGR corridors within occupied areas	62	0 (0%)	-58 (-93%)	-62 (-100%)	0 (0%)	-58 (-93%)
Areas – Acres of motorized areas within occupied areas	0	0	0	0	0	0
Southwest Willow Flycatcher – Designated Critical Habitat						
Motorized routes – Miles (percent change) of motorized routes within designated critical habitat	3.0	3.1 (3%)	2.6 (-13%)	2.4 (-20%)	2.6 (-13%)	2.6 (-13%)
MDC – Change in acres (percent change) of MDC corridors within designated critical habitat	949	-895 (-94%)	-896 (-94%)	-949 (-100%)	-896 (-94%)	-896 (-94%)
MBGR – Change in acres (percent change) of MBGR corridors within designated critical habitat	949	-65 (-7%)	-896 (-94%)	-949 (-100%)	-241 (-25%)	-896 (-94%)
Areas – Acres of motorized areas within designated critical habitat	0	0	0	0	0	0
Mexican Gray Wolf						
Motorized routes - Change in average road density-miles/sq miles (percent change) within watersheds	0.98	0.03 (3%)	-0.26 (-26%)	-0.43 (-44%)	-0.19 (-19%)	-0.19 (-20%)
MDC – Change in average acres (percent change) of MDC corridors within watersheds	49,864	-47,656 (-96%)	-48,141 (-97%)	-49,864 (-100%)	-47,784 (-96%)	-47,945 (-96%)
MBGR – Change in average acres (percent change) of MBGR corridors within watersheds	49,864	-7,443 (-15%)	-48,141 (-97%)	-49,864 (-100%)	-19,118 (-38%)	-47,945 (-96%)
Areas – Change in average acres (percent change) of motorized areas within watersheds	27	0 (0%)	-27 (-100%)	-27 (-100%)	0 (0%)	0 (0%)

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Sensitive Plant Species						
Acres of potential disturbance of known sensitive plan locations from MBGR / MDC						
Heartleaf groundsel	0.23 / 0.23	0.23 / 0.0	0.0 / 0.0	0.0 / 0.0	0.23 / 0.0	0.0 / 0.0
Blumer's dock	0.45 / 0.45	0.45 / 0.0	0.0 / 0.0	0.0 / 0.0	0.45 / 0.0	0.0 / 0.0
Davidson's cliff carrot	0.23 / 0.23	0.23 / 0.0	0.0 / 0.0	0.0 / 0.0	0.23 / 0.0	0.0 / 0.0
Gila thistle	0.08 / 0.08	0.08 / 0.0	0.0 / 0.0	0.0 / 0.0	0.08 / 0.0	0.0 / 0.0
Goodding's onion	18.02 / 18.02	17.72 / 0.21	0.08 / 0.08	0.0 / 0.0	13.83 / 0.21	0.21 / 0.21
Villous groundcover milkvetch	0.08 / 0.08	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Metcalf's penstemon	0.40 / 0.40	0.08 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Rusby hawkweed	0.08 / 0.08	0.08 / 0.0	0.0 / 0.0	0.0 / 0.0	0.08 / 0.0	0.0 / 0.0
Mimbres figwort	1.67 / 1.67	1.44 / 0.0	0.0 / 0.0	0.0 / 0.0	1.44 / 0.0	0.0 / 0.0
Pinos Altos flame flower	3.87 / 3.87	3.80 / 0.0	0.0 / 0.0	0.0 / 0.0	3.65 / 0.0	0.0 / 0.0
Porsild's starwort	0.53 / 0.53	0.49 / 0.21	0.21 / 0.21	0.0 / 0.0	0.45 / 0.21	0.21 / 0.21
Mogollon clover	1.89 / 1.89	1.85 / 0.25	0.25 / 0.25	0.0 / 0.0	1.59 / 0.25	0.25 / 0.25
Wooton's hawthorn	1.60 / 1.60	1.60 / 0.0	0.0 / 0.0	0.0 / 0.0	1.60 / 0.0	0.0 / 0.0
Wright's dogweed	0.23 / 0.23	0.23 / 0.23	0.23 / 0.23	0.0 / 0.0	0.23 / 0.23	0.23 / 0.23
Invasive Species						
Amount of potential risk of introduction, establishment and spread of invasive species	Highest level of potential risk of introduction, establishment and spread	Highest potential risk of introduction, establishment and spread amongst the action alternatives because of 1 mile MBGR corridor	Least potential risk of introduction, establishment and spread amongst all action alternatives except alternative E	Greatest decrease in the potenial risk of introduction, establishment and spread because no MDC or MBGR corridors, no areas, and greatest	High potential risk, but less than alternative B and C due to less road miles and ½ mile MBGR corridor. But greater than G due to ½ mile MBGR corridor.	Similar potential risk as alternative F for motorized routes, 4 corridors and areas. But is less due to MBGR corridors being

Resource	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
				reduction of route miles		limited to the same MDC corridors
Cultural Resources						
Motorized routes - Change in number of sites (percent change) within newly proposed motorized routes	5,346	49 (-99.1%)	27 (-99.5%)	6 (-99.9%)	33 (-99.4%)	34 (-99.4%)
MDC – Change in number of sites (percent change) within MDC corridors	5,346	983 (-82%)	657 (-88%)	0 (-100%)	844 (-84%)	755 (-86%)
MBGR – Change in number of sites (percent change) within MBGR corridors	5,346	5,181 (-3%)	657 (-88%)	0 (-100%)	4,721 (-12%)	755 (-86%)
Areas –Number of sites within motorized areas	5,346	1	0	0	1	1
Social and Economic						
Jobs related to motorized recreation activities	73-138	68-128	47-89	37-69	53-101	53-100
Labor income from motorized recreation activities	$1,532,501 - $2,884,365	$1,419,096 - $2,670,922	$988,463 - $1,860,415	$769,316 - $1,447,951	$1,117,193 - $2,102,702	$1,107,998 - $2,085,396

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 final environmental impact statement examines effects on a forestwide scale. Effects are discussed at the national forest level, with analyses displayed as trends or potential effects. This is adequate for assessing effects.

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 "Recreation" section shows 4,572 miles. The numbers may vary due to:

- Forest road management – There are National Forest System (NFS) roads under Gila National Forest management that are outside the forest boundary.
- Resource spatial data compared to road or route data – The 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)
Single-track trails	3
Decommisisoned*	0
Operation maintenance level 1 – Closed	12
Operation maintenance level 2	12
Operation maintenance level 3	14
Operation maintenance level 4	20
Operation maintenance level 5	20
ATV trails	8
Unauthorized roads	16

*Decommissioned is defined as a route in its natural (pre-road) condition

Assumptions and Limitations Common to All Resources

Specialists presented any limitations and assumptions in their analyses in accordance to the Council on Environmental Quality; Regulations for Implementing NEPA; 40 CFR Section 1502.22; Incomplete or unavailable information; [51 FR 15625, Apr. 25, 1986].

The following assumptions apply to all resources analyzed. Some specialists have additional assumptions pertaining to their resource.

- For alternative B, the acreage of NFS land outside of wilderness and other areas restricted to off-road vehicles, approximately 2.44 million acres, was used for 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.

Roads

This section summarizes the roads specialist report (USDA Forest Service 2013a).

Transportation Specific Assumptions

- Motor vehicle use authorized by state law is occurring on NFS roads (NFSRs) unless there are forest-specific prohibitions. Analysis assumes compliance.
- There is some cost for maintenance that will have to be borne by the Forest Service for all NFSRs.
- There will be implementation costs regardless of the alternative selected.

Affected Environment

Public Safety

The majority of national forest visitors travel on NFS roads. In 2011, National Visitor Use Monitoring (NVUM) estimated there were approximately 699,000 site visits (USDA Forest Service 2012) to the Gila National Forest. Forest roads are also used by residents of rural counties

for both recreational and business purposes. NFSRs on the Gila National Forest provide access for research, fish and wildlife habitat management, range management, timber harvesting, fire protection, mining, insect and disease control, and private land use.

Approximately 2,217 miles of roads that access the Gila National Forest are under other Federal, State, county, or private jurisdiction (table 18). Many of these roads provide access to local communities as well as access to and through the Gila National Forest.

Table 18. Roads under other jurisdiction within or accessing the Gila National Forest

Road jurisdiction	Miles
Bureau of Land Management	1.8
County	818.4
Other Forest Service	23.7
Private	349.7
State Highway	686.3
U.S. Highway	337.5
Total Miles	**2,217.4**

Source: INFRA, GIS

NFSRs are managed for the use and administration of NFS lands. Although generally open and available for public use, that use is at the discretion of the Secretary of Agriculture. Through authorities delegated by the Secretary, the Forest Service may restrict or control traffic to meet specific management direction (USDA Forest Service 2008). Roads in the National Forest Transportation System are not public roads in the same sense as roads under the jurisdiction of state and county road agencies. NFSRs are designed, constructed, and maintained to provide access for the utilization and management of the national forest. NFSRs are managed in one of three ways: as closed long-term to motor vehicles (closed roads), roads maintained for high-clearance vehicles only (high-clearance roads), and roads maintained for passenger car vehicles.

The travel management process addresses the roads under the jurisdiction of the Gila National Forest. The forest has approximately 4,613 miles of NFSRs open to motor vehicle use by the public (table 19). Roads are defined as motor vehicle travel ways over 50 inches wide, except those designated and managed as a trail.

Table 19. Existing Gila NFS road miles by operational maintenance level and general description

Operational maintenance level (OML)	Miles
1 - Intermittent service roads during the time they are closed to vehicular traffic	530.9
2 - Roads open for use by high-clearance vehicles	4,196.7
3 - Roads open and maintained for travel by prudent drivers in standard passenger cars	261.6
4 - Roads that provide a moderate degree of user comfort and convenience at moderate travel speeds	130.7
5 - Roads that provide a high degree of user comfort and convenience	24.2
Total miles	5,144.1
Miles open to motor vehicle use (OML 2–5)	4,613.2

Motorized Mixed Use

"Motorized mixed use" is defined as designation of an NFSR for use by both highway-legal and non-highway-legal motor vehicles (USDA Forest Service 2010). The use of motor vehicles on NFSRs 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 State 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. The Gila National Forest considers operation of off-highway vehicles on forest roads that are not paved (i.e., roads that have a native material or gravel surface) to be consistent with State law, with a few exceptions (table 2). Table 2 applies to all action alternatives and lists those roads (28 miles) where motorized use would be restricted to highway-legal vehicles only.

Authorizing motorized mix use on roads or road segments, where it would otherwise be prohibited by state law, requires that the decision be advised by an engineering analysis conducted by a qualified engineer as described in EM-7700-30 (USDA Forest Service 2005a). The analysis involves a technical evaluation of the road or road segment and recommendations regarding motorized mix use of the road including mitigation measures that would reduce the risk associated with designating the road for motorized mixed use.

District rangers had questions concerning the safety of existing motorized mixed use on NFSRs 111, 119, 150, and 209. Analyses, in the form of Engineering Judgments, were completed on segments of NFSRs 111, 119, 150, and 209. The Engineering Judgments determined there would be a low risk to public safety by allowing non-highway-legal motorized vehicle use to continue (Appendix E of the Gila National Forest TAP (USDA Forest Service 2010b)).

Highway Safety Act

Forest Service Handbook (FSH) 7709.59-40 (USDA Forest Service 2009e) 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 2008) associated with design, construction, maintenance, signing and traffic accident surveillance. NFSRs managed as Operational Maintenance Level (OML) 3, 4 or 5 are subject to the Highway Safety Act. The Gila National Forest has completed Traffic Engineering Studies on all its arterial and collector OML 3, 4 and 5 roads and is in the process of implementing the recommendations by way of Manual on Uniform Traffic Control Devices signing.

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). Approximately 70,000 reports are analyzed annually. Due to their guidelines, approximately 49,000 reports meet the criteria and are entered into the master database annually (NMDOT 2010). In 2007, the Gila National Forest requested accident data for the previous five years and found no reportable accidents occurred on NFS roads in the Gila National Forest 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 NFS roads (USDA Forest Service 2010a) where road conditions were a contributing factor.

Based on both databases, safety concerns are relatively low for the current road system under alternative B. Safety-related concerns 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 NFSRs nor does the forest expect the volume, composition or traffic patterns to change after designation with the exception to the proposed motorized mixed use restrictions shown in table 2. Eliminating motorized mixed use on these roads would reduce exposure to risks associated with user conflicts in recreation areas and/or comply with state law.

Cumulative Effects (All Alternatives)

The action alternatives would maintain the same level of safety currently experienced on the forest. Past projects largely shaped the road system in place today, which, according to recent traffic accident data previously cited, is safe. No present or reasonably foreseeable actions would pose any negative effects to public safety while traveling on the Gila's NFSRs.

Affected Environment

National Forest System Roads Maintenance Costs

Maintenance of NFSRs is performed and funded from three sources. First, the Gila National Forest receives an annual appropriation for road maintenance. Secondly, cooperators such as special use permittees and private landowners are given written authorization to use NFSRs. These cooperators contribute funds and/or perform maintenance on the roads they use commensurate with their level of use. Lastly, timber sale purchasers perform maintenance on the roads they use to remove the timber from the sale area. Table 20 shows funding and miles of maintenance accomplished by the Gila National Forest with its annual appropriation from 2006 through 2009. The amount of maintenance accomplished by cooperators and timber purchasers is insignificant and is not included in table 20.

Table 20. Miles and percentage of roads maintained based on annual forest road budget allocations

Year	Miles of road maintained based on road accomplishment reports	Percentage 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

The forest is completing basic custodial maintenance (grading the road surface, maintaining ditch lines, select sign replacement, minor brushing of roadside vegetation, etc.) on approximately 500 miles of the existing roads on an annual basis; approximately 75 percent of those miles are OML 3, 4 and 5 roads and the remaining 25 percent are OML 2 roads. The majority of these miles are not maintained fully, i.e., correcting all deficiencies to ensure the road and all its appurtenances are functioning properly. The result of the forest's inability to perform full maintenance is a maintenance backlog known as deferred maintenance. Examples of deferred maintenance include replacing culverts, cattle guards, surfacing and signs based on their life cycle or when needed and removing all roadside vegetation encroaching into the roadway or that which is limiting site distances. An estimate of the current deferred maintenance for NFS roads on the Gila National Forests is $272,265,429. This number is based on Region 3 (Southwestern Region) 2005 Roads Deferred Maintenance summaries which were compiled from random surveys across various NFS roads within Region 3. The costs are based on a random sample of NFS roads which were then extrapolated across the rest of the road miles to be used as an indicator of maintenance needs for the existing road system. The costs have been adjusted to account for inflation.

Using the forest's road condition survey data, the Southwestern Regional Office developed average costs per mile that would be needed to fully maintain each mile of road (USDA Forest Service 2006). The average road maintenance costs per mile are shown in table 21. These unit costs were applied to the mileages in each alternative to calculate the estimated total costs needed to maintain those NFS roads. The average costs per mile take into account the frequency of maintenance appropriate for each operational maintenance level. The unit costs associated with OML 3, 4 and 5 roads are substantially greater than that of OML 1 and 2 roads. OML 3, 4 and 5 roads generally receive higher traffic volumes at higher speeds, and therefore, need maintenance more frequently. These roads have also received more investment in the way of drainage structures and features, cattle guards, and signing. In addition, OML 4 and 5 roads typically have some form of aggregate or bituminous surfacing that requires routine maintenance. The associated unit costs include amortized costs for the replacement of these features based on the features life cycle. The majority of the road maintenance budget focuses on the higher standard OML 3, 4 and 5 roads. OML 2 roads are maintained for high-clearance vehicles such as pickup trucks and 4-wheel drive vehicles. OML 2 roads receive much lighter traffic volumes. Costs associated with closed OML 1 NFSRs include inspection of the road for resource damage and the costs to correct the identified deficiencies and to maintain closure devices. Even though current funding levels don't support maintaining all NFSRs, the economic comparison of alternatives

assumes all designated NFSRs would be maintained fully to prevent resource damage and ensure public safety.

Table 21. Annual maintenance cost per mile by operational maintenance level*

Operational maintenance level	Annual maintenance cost per mile
1	$55
2	$350
3	$8,282
4	$10,294
5	$6,597

* Annual costs per mile from "Identifying a Financially Sustainable Road System Spreadsheet Tool" (USDA Forest Service 2006)

If the forest were to use its entire road maintenance budget for on-the-ground maintenance activities, the forest would be able to fully maintain approximately 21 percent of its existing road system (table 22). This is assuming an average road maintenance budget of approximately $1.1 million and the costs per mile developed by the regional office. Road maintenance funds are also used to pay for salary, supplies, equipment maintenance, etc., in the form of support services associated with transportation planning, road maintenance, and construction. The portion of the budget that remains to maintain NFSRs is approximately $0.56 million, which the Gila uses to accomplish basic custodial maintenance on approximately 10 percent of its roads (table 20).

Table 22. Costs to fully maintain existing NFS roads

Operation maintenance level	Number of miles	Forest annual maintenance needs (per mile)	Forest annual maintenance impact to forest budget
5	24.2	$6,597	$159,647
4	130.7	$10,294	$1,345,426
3	261.6	$8,282	$2,166,571
2	4,196.7	$350	$1,468,845
1	530.9	$55	$ 29,200
Total:	**5,144.1**		**$ 5,169,689**

Note: Maintenance costs include 18.3 ML 1 and 26.0 ML 2 miles of road on the Apache National Forest managed by the Gila National Forest.

Environmental Consequences

NFSRs Maintenance Costs

The Gila National Forest reviewed the public comments received on the proposed action and identified issues that were used to create the alternatives to the original proposed action. Table 23 portrays a comparison to alternative B, the no action alternative (table 22). The forest will reduce maintenance needs on any roads placed under seasonal restriction (table 6) by keeping traffic off these roads during the rainy season. Other opportunities to reduce road maintenance costs in the

future include potential road conveyances with counties and road maintenance being performed by others on some roads under written authorization.

Table 23. Annual maintenance cost by alternative (miles of existing NFS roads by operational maintenance level (OML))

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	531	29,200	653	35,937	1,755	96,536	2,396	131,780	1,392	76,582	1,422	78,221
2	350	4,197	1,468,845	4,064	1,422,435	2,935	1,027,355	2,335	817,320	3,271	1,144,955	3,241	1,134,350
3	8,282	262	2,166,571	262	2,166,571	261	2,162,430	261	2,162,430	261	2,163,258	261	2,163,258
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		5,144	5,169,689	5,134	5,130,016	5,107	4,791,394	5,147	4,616,603	5,080	4,889,869	5,079	4,880,903
Percent change from Alt. B					-0.8%		-7.3%		-10.7%		-5.4%		-5.6%

Being that the Gila National Forest is an "open unless designated closed" forest, the public has continued to use some roads which were once closed and/or thought to be decommissioned. Users have also continued to create roads through cross-country use. The mileages shown under OML 2 in each of the alternatives in table 23 include the proposed additions of unauthorized and decommissioned roads as well as re-opening closed NFSRs (table 24). Most of these roads do not need any work to allow passage except for NFSR 3050 (0.2 mile) where existing berms would be removed or reworked to allow passage and maintain drainage features (applicable to all action alternatives). There will be some implementation costs associated with the addition of these roads.

Table 24. Addition of proposed road miles by alternative

Type of addition	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Add unauthorized roads to NFSRs open to all vehicle types	0	7.2	5.8	1.8	5.9	6.6
Re-open OML 1 closed NFSRs to all vehicle types	0	3.5	0.9	0.9	1	1
Re-open decommissioned roads to all vehicle types[1]	0	2	1.5	0	1.5	1.5
Total additional roads open to all vehicle types	0	12.7	8.2	2.7	8.4	9.1
Add unauthorized roads to NFSRs for administrative use or by written authorization only	0	26.5	27	3.5	25.2	25.7
Re-open OML 1 closed NFSRs for administrative use or by written authorization only	0	2.7	2.7	0.3	2.7	2.7
Re-open decommissioned roads for administrative use or by written authorization only[1]	0	5.8	5.8	2.9	5.8	5.8
Total additional roads for administrative use or by written authorization only	0	35	35.5	6.7	33.7	34.2
Overall Total	0	47.7	43.7	9.4	42.1	43.3

[1] These roads are currently receiving traffic and are thus not truly decommissioned.

Referring to the annual maintenance needs (maintained fully to standard) by alternative (table 23), it is apparent that no alternative identifies a road system that can be fully maintained with the current funding level. Further, road maintenance budgets are forecasted to decline in the foreseeable future, thereby, making it extremely difficult to provide basic custodial maintenance to all the roads in any of the proposed alternatives. Designating a road system that matches available funding levels would result in a system that would not meet administrative or public access needs. All of the proposed alternatives reduce the number of open NFSR miles. Table 25 provides a summary of the change in miles for maintenance level 2 through 5 roads that are both open to the public and open for administrative uses only.

Table 25. Summary miles of maintenance level 2 through 5 NFS roads by alternative

Operational maintenance level (OML)	Alt. B Miles	Alt. C Miles	Alt. D Miles	Alt. E Miles	Alt. F Miles	Alt. G Miles
2	4,196.7	4,064.1	2,935.3	2,335.2	3,271.3	3,241.0
3	261.6	261.6	261.1	261.1	261.2	261.2
4	130.7	130.7	130.7	130.7	130.7	130.7
5	24.2	24.2	24.2	24.2	24.2	24.2
Total NFS road miles (OML 2 thru 5)*	4,613.2	4,480.6	3,351.3	2,751.3	3,687.4	3,657.2
Percent change from Alt. B (OML 2-5 open NFSRs)	0.0%	-2.9%	-27.4%	-40.4%	-20.1%	-20.7%

Note: Miles by maintenance level include both roads that are open to the public and open for administrative uses only.

*OML 2-5 National Forest System Roads (NFSRs) include 9 miles of roads under Gila National Forest management that are outside the forest boundary.

Referring to table 25 (mileage comparison) and table 23 (cost comparison), alternative C reduces the overall open mileage of the no action alternative B by 2.9 percent, providing a reduction of 0.8 percent in budget needs. Alternatives F and G are very similar in that they both reduce the number of open NFSR miles by approximately 20 percent, which translates to a budget needs reduction of approximately 5.5 percent. The largest open mileage reductions are in alternative E with an open mileage reduction of 40 percent and a needs reduction of nearly 11 percent. Alternative D has a reduction in open mileage of 27 percent and 7 percent in budgetary needs. In the end, the fewer miles of NFSRs designated will result in less miles requiring maintenance, i.e., moving OML 2 roads to an OML 1(closed) status. The majority of the forest's OML 3, 4 and 5 are retained throughout all the alternatives as these are the primary NFSRs on the forest.

Cumulative Effects (All Alternatives)

Congressional appropriations for road maintenance are trending downward while the cost of doing business continues to trend upward. The Gila National Forest will continue to seek opportunities to better balance the NFSR system with available funding. Other opportunities to reduce road maintenance costs in the future include potential road conveyances with counties and road maintenance being performed by others on some roads under written authorization. Along with these opportunities, the forest will also reduce maintenance needs on NFSRs placed under seasonal restriction (table 6) by keeping traffic off these roads during the rainy season. The forest will also initiate the process of identifying which of the non-designated NFSRs would be proposed to move off the system through decommissioning. Tucson Electric Power has completed NEPA for an additional 8 miles of roads that would provide access to their power line located on the west side of the Gila National Forest. The roads will be constructed and maintained by Tucson Electric Power at a time that meets their schedule. The proposed roads would be placed under written authorization. The action alternatives would reduce the mileage of the road system, and thus, the maintenance funds needed. The Gila National Forest will continue to assess the NFSR system for opportunities to make better use of its limited funds.

Effects of Forest Plan Amendments

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the Travel Management Rule.

Recreation

This section summarizes the recreation specialist report (USDA Forest Service 2013b1).

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 semi-arid 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. Twenty-four percent of the forest's land mass is included in congressionally designated wilderness and is managed for primitive and semi-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).

Recreational Opportunities

Developed recreation is defined as recreation that requires facilities that result in concentrated use of an area (USDA Forest Service 1986). The Gila National Forest currently has 27 campgrounds (2 for groups), 7 picnic sites (3 for groups), 42 trailheads, 3 public shooting ranges on the Glenwood, Silver City and Reserve Ranger Districts, an observation site, and an Interpretive Site Visitor Center at Gila Cliff Dwellings. 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 250-mile segment of the Continental Divide National Scenic Trail (CDNST), the Catwalk National Recreation Trail and Whitewater Picnic Area, the Gila Cliff Dwellings National Monument (a National Park Service area surrounded by lands managed by the Gila National Forest); Emory Pass and Aldo Leopold Vistas; and Senator Clinton P. Anderson Wilderness Overlook. 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 eastern edge of the forest. Interpretive Trails include the following: Apache Creek Rock Art Trail, Dragon Fly Trail, Vista Village Trail, Scorpion Campground Trail to the Past, Pueblo Park Trail, Lake Roberts Trail, and Tularosa Cabin Trail. The Fort Bayard National Historic landmark is located on the Gila National Forest and includes the Arrastra Interpretive Site as well as the Fort Bayard Big Tree, an enormous Alligator Juniper. Another unique record tree, a Texas Mulberry, is located in the Burro Mountains. The Gila River Bird Area was set aside as bird habitat in 1972 and continues to offer outstanding viewing opportunities year round.

Dispersed recreation activities occur outside of designated sites or developed facilities, and in Wilderness Areas. Dispersed recreation activities many times involve a combination of motorized and nonmotorized activities, and occur throughout the year. Hunting from dispersed campsites is very popular on the Gila National Forest. Motorized dispersed camping on the forest is primarily characterized as driving off-road some distance, parking, and setting up camp. This can be characterized as vehicles towing travel trailers, horse trailers or other types of camping trailers, vehicles with campers, or vehicles with a tent camp set up. Nonmotorized opportunities include hiking, backpacking, mountain climbing, mountain biking, horseback riding and packing, dispersed camping, fishing, hunting, boating, and viewing nature. Visitors seeking these forms of recreational experiences often use the forest's single-track trail system for hiking or horseback riding.

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 man-made 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, some of which are federally listed as threatened or endangered under the Endangered Species Act. None of the streams or rivers on the Gila National Forest are designated as wild and scenic rivers. The following rivers were found eligible pending determination as of their suitability for inclusion in the Wand Scenic River System: Whitewater Creek; Spruce Creek; Middle Fork Gila River; West Fork Gila River; Main Diamond Creek; South Diamond Creek; Holden Prong and Las Animas Creek.

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 horseback riders 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 multi-day backcountry trips using pack and saddle stock. Day trip horseback riders more often use trails in areas of the forest immediately adjacent to local communities.

Hunting is a very popular activity in southwestern New Mexico. It is estimated that in New Mexico 94 percent of hunters hunt on public lands. The 2011 National Visitor Use Monitoring Report (NVUM) (USDA Forest Service 2012) shows that approximately 20 percent of visitors to the Gila National Forest participate in hunting. Eleven New Mexico Department of Game and Fish (NMDGF) Game Management Units (GMUs) are encompassed on the Gila National Forest. Several of the GMUs fall entirely within the Gila National Forest boundary. (New Mexico Big-Game and Furbearer Rules and Information 2013-2014 license year (NMDGF 2013)).

There are six airstrips located on the Gila National Forest. Two airstrips, Jewett Mesa and Reserve are open to the public with maintenance/grading conducted as needed. The others, Beaverhead, Glenwood, Me-Own, and Negrito have restricted access with the public needing to acquire prior approval for landings. All airstrips have road access and none are located within wilderness.

In order to ensure quality recreation experiences for the guided public, the Forest Service requires that any commercial outfitter and guides operating on the national forest have a special use permit. Special use authorizations provide commercial use of NFS lands for a wide variety of

activities. There are 86 outfitter and guide operations that provide services on the Gila National Forest.

There are 1,608.6 miles of foot/horse trail opportunities on the forest, with 873 miles of trail (54 percent) located within the three wilderness areas (Aldo Leopold, Blue Range, and Gila Wildernesses) providing nonmotorized trail opportunities. There are 735 miles of trail located outside wilderness. An additional 524 miles of Maintenance Level 1 (ML-1) closed roads are available for nonmotorized travel opportunities. These "closed roads" are roads are in storage between intermittent administrative uses and closed to all vehicular traffic, but may be available and suitable for nonmotorized uses. Currently, except where prohibited, foot or horse travel on the forest is not restricted to the designated trail system, that is, foot or horse travel can travel cross-country within the forest boundary. There are 16 miles of existing motorized OHV trails, less than 50 inches in width, designated on the forest. Over 5,300 miles of roads within the forest boundary are under forest, county, State, and Federal jurisdiction are available for motorized travel by all types of motor vehicles.

National Visitor Use Monitoring

The NVUM survey process was designed to better understand recreational use of NFS lands (USDA Forest Service 2012). Visitor use monitoring data were collected on the Gila National Forest during Fiscal Years (October to September) 2001, 2006, and 2011.

Information provided regarding NVUM data is from the 2011 surveys (USDA Forest Service, 2012) unless stated otherwise. The information gleaned from NVUM is valid and applicable at forest, regional, and national levels, but was not designed to be accurate at the district or site-specific level. This is the only use data the forest has collected.

FY 2011 Total Estimated Site Visits to the Gila National Forest are 699,000 site visits broken out into the following categories: 214,000 Day Use Developed Sites Visits; 62,000 Overnight Use Developed Site Visits; General Forest Area Site Visits 402,000; and Designated Wilderness 21,000 Site Visits. A site visit is the entry of one person onto a national forest site or area to participate in recreational activities for an unspecified period of time. Demographic results show that over 72 percent of visits are made by males. Hispanics account for over 35 percent of all visits to the Gila. Native American visitors account for almost 4 percent. Children under the age of 16 comprise only a little more that 10 percent of visits. Over 30 percent of visits are people age 60 or older. The Gila serves two distance zones. Approximately 55 percent of visits are from people living within 50 miles of the forest; however, almost 30 percent are from 100 to 500 miles away (figure 4).

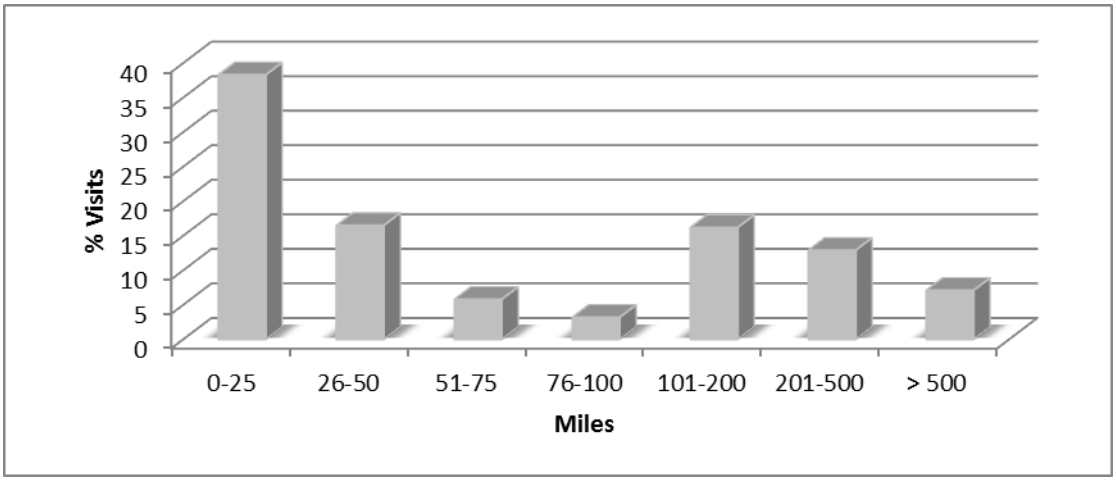

Figure 4. Percent distribution of forest visits by distance traveled from FY11 National Visitors Use Monitoring (USDA Forest Service 2012)

The top 15 most common zip codes reported in the NVUM are from the following vicinities:

61% Grant County	4% Sierra County
10% Catron County	4% Valencia County
6% Dona Ana County	3% Cibola County
5% Luna County	2% Foreign Countries
5% Socorro County	Less than 1% Hidalgo County

Wilderness visitors traveled the greatest distance. Most traveled from other states to visit wilderness areas within the Gila National Forest.

Most visits to the Gila National Forest are relatively short. The median national forest visit duration is under 5 hours. But, the mean national forest visit duration is over 38 hours, which indicates a number of national forest visits involve staying quite some time. Almost 50 percent of visits are made by people who visit at most five times per year. But nearly 20 percent are made by people who visit more than 50 times per year.

The distribution of activities by recreation type estimates that motorized activities account for 26 percent to 50 percent and nonmotorized activities account for 53 to 76 percent of the Gila National Forest recreation (refer to tables in Social and Economic report (USDA Forest Service 2013k)). The use figures could likely underestimate users. The figures are taken from what users indicated as the primary purpose of their visit. Users may not have indicated their mode of travel as their primary purpose of their visit. The four most frequently selected main activities reported by those surveyed on the Gila National Forest are hiking/walking (21 percent), hunting (20 percent), viewing natural features (12 percent), and pleasure driving (12 percent).

Gila National Forest Niche

In 2007, the Gila National Forest developed a Recreation Facility Analysis 5-Year Program of Work and Programmatic Results of Implementation Document. During the Recreation Facility Analysis (RFA) Process the forest developed a Forest Niche that defines what opportunities the

Gila National Forest can provide local and regional visitors (USDA Forest Service 2007). A full description of the Gila National Forest Niche is located in the project file. The Gila National Forest Niche is "Experience the Wild."

> *From wilderness to western heritage, visitors to the Gila NF have the opportunity to "find themselves" in the wildness of the forest. The essence of the Gila is the freedom to explore vast expanses of backcountry. Heritage and cultural connections allow local communities, Native Americans, and recreationists to establish long-term bonds with the forest. Traditional gathering of forest products and hunting bring visitors from near and far. Rivers and lakes, uncommon in the Southwest, provide relief from heat across the forest.*

Motorized Routes

Affected Environment

Motorized routes within the Gila National Forest boundary include 4,572.6 miles of maintenance level 2 to 5 NFS roads, and 15.8 miles of NFS trails (vehicles less than 50 inches) designed and managed for motorized use. There are also 784.1 miles of county, State, and U.S. roads and highways within the administrative boundary; this mileage remains constant throughout all alternatives.

There are 1,608.6 miles of foot or horse trail opportunities on the forest, with 873 miles of trail (54 percent) located within the three wilderness areas (Aldo Leopold, Blue Range, and Gila Wildernesses) providing nonmotorized trail opportunities. There are 735 miles of trail located outside wilderness. An additional 524 miles of Maintenance Level 1 (ML-1) closed roads are available for nonmotorized travel opportunities. These "closed roads" are roads in storage between intermittent administrative uses and closed to all vehicular traffic, but may be available and suitable for nonmotorized uses. Currently, except where prohibited, foot/horse travel on the forest is not restricted to the designated trail system, that is, foot or horse travel can travel cross-country within the forest boundary.

There are currently no single-track-motorcycle trails designated on the forest. 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 users of the forest.

Motorized opportunities involve the use of both highway legal and non-highway legal vehicles such as motorcycles, ATVs, UTVs, and 4-wheel drives of all varieties. People who practice motorized recreation such as firewood gathering, hunting, and motorized dispersed camping are specific user groups who benefit greatly from the Gila National Forest's network of nearly 4,600 miles of operational maintenance level 2 to 5 roads.

Many nonmotorized activities such as picnicking, hiking, viewing wildlife, biking, hunting 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 addition of unauthorized motorized routes. Public responses to scoping emphasize this dilemma. Many comments

expressed a desire to protect and enhance opportunities for quiet recreation; others expressed a desire for continued motorized access to special places, while others expressed a desire to keep motorized access points in which to begin trips in which to perform nonmotorized forms of recreation travel.

The forest is currently open to cross-country motorized travel. There is approximately 2.44 million acres of NFS land outside of wilderness and other areas restricted to off-road vehicle use that is open to motorized uses. The areas listed in the forest plan where motorized off-road use is restricted include: all wilderness areas, Tularosa Wetlands, Gila River Bird Management Area, Fort Bayard, Silver City Watershed, Funny Rocks Area, and San Francisco River from Mule Creek to the Arizona State line.

There are currently few prohibitions on motorized use of the single-track trail system within the forest area; however, evidence of motorized use of single-track trail on the ground 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.

It is also acknowledged that slope, topography, and vegetation may limit motor vehicle use and access on the 2.44 million acres. Using 40 percent as a maximum slope for vehicle travel, approximately 1.85 million of the 2.44 is more likely available for motorized cross-country travel. The design parameter for the maximum slope for short pitches recommended for construction of single-track motorcycle trails is 40 percent (FSH 2309.18 USDA Forest Service 2008a). This is just an approximation and motor vehicle use may still be limited by topography and vegetation across the landscape.

The earliest approach to recreational conflict was to view it as competition for resources among user groups (Devall and Harry 1981; Owens 1985). Two more theoretically grounded and somewhat overlapping conceptualizations today are categorized as follows: conflict as goal interference and conflict based on differences in social values. (MacLennan and Moore 2011) Jacob and Schreyer (1980) conceptualized the goal interference can arise between recreationists on the basis of four distinct factors: activity style—the various personal meanings attached to an activity, resource specificity—the significance attached to using a specific recreation resource for a given recreation experience, mode of experience—the varying expectation of how a natural environment is perceived, and tolerance for lifestyle diversity—the tendency to accept or reject lifestyles different from one's own.

All of these types of conflict can arise between motorized and nonmotorized recreationists. Use conflict often can be "asymmetrical" in that one user group is generally more impacted by conflict than the other. The most often reported social and safety impacts are conflicts between OHV and nonmotorized users, displacement of users, conflicts with private land owners, and irresponsible OHV operation (GAO report June 2009 report to subcommittee on National Parks, Forests, and Public lands, Committee on Natural Resources, House of Representatives; Enhanced Planning Could Assist Agencies in Managing Increase Use of Off-Highway Vehicles). Often motorized and nonmotorized users share the same or similar goals, but those seeking quiet and solitude through nonmotorized means are more likely to be disturbed by engine noise from an ATV than are those traveling by motor vehicle.

In the comments, examples of specific incidences were provided regarding conflicts which occurred on the forest with motorized users. Comments received from nonmotorized users expressed the importance of the ability to enjoy their recreational forest pursuits such as hiking, horseback riding, hunting, angling, bird watching, and other activities where quiet and solitude are an important element of their recreational experience. When nonmotorized users encounter motorized activity and associated traffic, speeding, exhaust, dust, vehicle noise, or environmental damage conflict can occur. This can all lead to the displacement of nonmotorized recreationist from places they would normally frequent (Moore 1994, Gambill 1998, La Pointe and Stokowski 2000). Comments were received favoring primitive and semi primitive nonmotorized modes of recreation within the general forest area outside of wilderness.

Comments were received from residents of communities adjacent to and within the forest including the Burros, Mimbres, Glenwood, Quemado Estates, Reserve, and Rancho Grande Estates. Most of these comments expressed concern of the allowance of cross-country travel on forest adjacent to their community and were in support of the designation of motorized routes and the elimination of cross-country travel on forest.

Comments from motorized users stated conflict was not perceived as an issue. More important to motorized users experience and satisfaction is the variety, distance, and number of motorized routes to choose from. Motorized users' comments expressed concern that the action alternatives do not provide enough semi-primitive motorized and roaded natural opportunities. Concern was also expressed that the range of the action alternatives was not wide enough. Commenters felt alternative C, which proposes the most motorized activities would not adequately meet their desires to enjoy their motorized recreational pursuits.

The conflict for motorized users may stem from off-site interactions when other user groups seek to restrict motorized access and issue complaints about off-road vehiclesuse to land management agencies. Forest recreation managers report many motorized users are feeling disenfranchised and frustrated that they keep "losing trails and areas" to ride. After decades of relatively unrestricted use, many motorized users are beginning to feel squeezed (Yankoviak 2005).

Motor vehicles are a legitimate and appropriate way for people to enjoy their national forests, in the right places, and with proper management. Current regulations were developed when OHVs were less widely available, less powerful, and less capable of cross-country travel than today's models. The growing popularity and capabilities of OHVs demand new regulations, so that the Forest Service can continue to provide these opportunities while sustaining the health of NFS lands and resources.

Americans cherish the national forests and grassland for the values they provide: opportunities for healthy recreation and exercise, natural scenic beauty, important natural resources, protection of rare species, wilderness, a connection with their history, and opportunities for unparalleled outdoor adventure.

National forests should provide access for both motorized and nonmotorized users in a manner that is environmentally sustainable over the long term. The national forest is not reserved for the exclusive use of any one group, nor must every use be accommodated on every acre. The forests are managed by law for multiple-use. The Travel Management Rule does not prohibit the management of NFS lands for multiple use as provided in the Multiple Use-Sustained Yield Act of 1960. The Multiple Use-Sustained Yield Act authorizes and directs the Secretary of Agriculture

to develop and administer the renewable resources of timber, range, water, recreation, and wildlife on the national forests for multiple use and sustained yield of the products and services.

Methodology and Assumptions

Motorized Route Indicators

Route indicator tables are located in appendix A of the recreation specialist report.

- Miles of Motorized Road and Trail Route Designation by Definition Forestwide and miles including State and County Roads. The subsets of Miles of Motorized Road and Trail Route Designations within IRAs and WSAs are included in the IRA and WSA sections.
- Miles of Motorized and Maintenance Level-1 (ML-1) (closed) Road and Motorized Trail Opportunities forestwide and miles including county, State, and Federal highways that cross the forest, including the 11 New Mexico Department of Game and Fish GMUs. The subsets of 28 inventoried roadless areas (IRAs), 2 wilderness study areas (WSAs), and 3 eligible wild and scenic rivers outside wilderness are included in the IRA, WSA, and eligible wild and scenic river sections.
- Number of motorized routes by lengths in miles proposed for closure
- Total Forest Percentage of Non-wilderness displaying nearest open road within 0.0 to 0.5 mile, 0.5 to 1.0 mile, 1.0 to 2.0 mile, 2.0 to 3.0 mile, 3.0 to 4.0 miles and greater than 4.0 miles by alternative

Data limitations

A complete inventory of on-the-ground unauthorized routes has not been completed. Unauthorized routes proposed in the action alternatives were recommended from the public and proposed to respond to the issues and intent of each alternative. The Travel Management Rule (USDA Forest Service 2005) states that “reviewing and inventorying all roads, trails, and areas without regard to prior travel management decisions and travel plans would be unproductive, inefficient, and counter to the purposes of this final rule.” Regional guidelines regarding the Travel Management Rule (USDA Forest Service 2008) state that “it is important to convey to all interested parties that identification of the existing direction does not preclude the designation of road, trail, or areas that are not part of the existing direction. Conversely, a road, trail, or area that is currently part of the existing direction does not assure its designation.”

There are no data available regarding user conflicts. Miles of proposed motorized activities has been used to estimate the risk of potential conflicts by alternative. There are no site-specific motorized or nonmotorized visitor use data for wilderness, IRAs, WSAs, or GMUs. NVUM data are presented in the background section. These data pertain to the forest level and are not site-specific.

Council on Environmental Quality regulations for implementing NEPA state that when an agency is evaluating reasonable foreseeable significant adverse effects on the human environment, in an EIS, and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking (40 CFR 1502.22)

Assumptions Common to All Action Alternatives Regarding Motorized Routes

- Roads, trails, and areas designated for motor vehicle use are open to visitors of all ages and abilities. The Forest Service is committed to integrating into the full range of recreation opportunities while protecting natural resources and settings so that people with and without disabilities have the opportunity to enjoy the outdoors. This commitment is established by laws and in Forest Service policy.
- Wheelchairs are not motor vehicles and may be used where foot traffic is allowed, which is almost everywhere in the National Forest System; this will not be changed by the travel management decision. However, where motor vehicle use including the use of other power-driven mobility devices is prohibited, such use is prohibited for all people, including people with disabilities. Federal laws, regulation and policy do not require exceptions be made solely because a person has a disability.
- A Travel Management Rule Implementation Plan will be developed that will include: monitoring; education; enforcement; and engineering (signing).
- With visitor use data limited and NVUM data lacking site specificity, it is difficult to estimate or predict if or how visitor use and travel would change under the various action alternatives.
- The site-specific routes proposed for closure and proposed to remain open to motorized travel would affect each individual's visitor satisfaction. Each visitor's perception of opportunities the forest should offer into the future is based on past experiences tied to a sense of place and preferred recreation activity.

Environmental Consequences

Effects Common to All Action Alternatives

- 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 as described in the following bullets.
    - The addition of unauthorized motorized routes resulting from unrestricted motorized cross-country travel will be drastically reduced and/or eliminated. The designation of motorized routes and prohibition on cross-country travel gives the most opportunity for managers to contain and rehabilitate areas damaged by cross-country motorized use.
    - Forest users who currently travel cross-country expressed concern at the loss of this opportunity on the forest. Cross-country travel is currently practiced for the following uses: retrieving game; testing technical skills and exciting off-route travel; traveling between two existing routes or to points of interest; accessing dispersed campsites by a motorized mode of travel; or gathering forest products (i.e., piñon nuts and firewood gathering for dead and down) outside of designated areas. These forest users will now be restricted to traveling on designated routes.
    - Upon implementation of the Travel Management Rule, the use of motorized vehicles off of the designated road system (i.e., cross-country travel) for the purpose of gathering firewood (dead, down, live, and green) within designated firewood areas may be allowed. Where allowed, based on need and project area, vehicle use off of designated routes will be described within the designated firewood area permit.
    - The use of motorized vehicles off of the designated road system (i.e. cross-country travel) for the purpose of gathering and transporting firewood (dead, down permits)

outside of designated firewood areas would not be allowed. Parking for firewood gathering would be limited to within one vehicle length (including vehicle and trailer) from road edge along all designated roads where it is safe to do so without resource damage or is already restricted and does not block any routes.

- Overall, user conflict on motorized routes is expected to be reduced by implementing the Travel Management Rule under all action alternatives. Researchers have found that such a system reduces direct conflicts (Filmore and Bury 1978, Frost and McCool 1998, Albritton and Stein 2007, Snyder et al. 2008). This is due to motorized roads and trails routes, areas, and corridors for motorized dispersed camping and motorized big game retrieval would be administratively defined and published on the motor vehicle use map. When drivers, dispersed campers, and hunters stay on the system of designated routes, everyone else knows where to go to avoid motorized users if they choose. When a user's expectation of what they will experience are aligned with the opportunities provided, that user's satisfaction is increased and conflict between users has the potential to be reduced.
- All action alternatives provide the current access to the 27 developed campgrounds, 7 picnic sites, 42 trailheads, and 3 public shooting ranges located on the Gila National Forest. An exception exists where road access is proposed to change to one or two trailheads. This is described in action alternatives D, E, F, and G.
- Forest users would continue to be able to park within one vehicle length (including vehicle and trailer) from road edge along all designated roads where it is safe to do so without resource damage.
- This project may affect special use Outfitter and Guide operations where a change in motorized or nonmotorized opportunity is proposed. Direct and indirect effects to outfitter and guide operation could occur with all action alternatives. The changes proposed in motorized access could affect the outfitters operation and hunting opportunities provided.
- Table 2 displays 28 miles of roads proposed to be open to highway-legal vehicles only. Mixed use would no longer be allowed at the proposed parking lots, parking areas and view points. The rationale listed in the table includes state law prohibiting off-highway (ATV) vehicles on paved roads. The public expressed concerns about campgrounds being limited to street-legal vehicles and desires for the continued use of ATVs in the campgrounds because it is essential to their recreation experience at these sites. A main concern for limiting use to highway-legal vehicles only in the campgrounds proposed is visitor safety. These are main access routes within the campground and receive a large amount of vehicle and foot traffic from campers and family groups.

Alternative B – No Action

The number of NFS motorized routes (roads and trails) and their mileage would remain unchanged. The current road system provides access to the majority of the 2.44 million acres of non-wilderness forest lands open to motorized travel. Use of motor vehicles is essentially unrestricted outside of designated wilderness and areas closed by the forest plan and forest orders. There are no prohibitions on motor vehicle use off designated routes under this alternative and cross-country travel outside of designated wilderness and other areas closed by the forest plan and forest orders would continue to be allowed. Users would continue to be able to travel cross-country for retrieving big game; for testing technical skills and exciting off-route travel; for traveling between two existing routes or to points of interest; for accessing dispersed campsites

by a motorized mode of travel; or for gathering forest products, i.e., piñon nuts and firewood gathering.

Under current conditions, the ability to get away from roads is rather limited outside of designated wilderness. Approximately 70 percent of the forest located within non-wilderness is 0 to 0.5 mile from an open road, with 0.4 percent of the non-wilderness located greater than 3 miles distant from a road when examining the distance to the nearest open, motorized route (table 26). This exercise utilized lands within the administrative boundary excluding wilderness. Maps of this analysis are included in the recreation specialist report (USDA Forest Service 2013b1).

Table 26. Area of non-wilderness to nearest open, motorized route and percent distribution for alternative B

Distance in miles between open roads	Percent
0.0 to 0.5 mile	70.8%
0.5 to 1.0 mile	18.6%
1.0 to 2.0 miles	9.0%
2.0 to 3.0 miles	1.1%
3.0 to 4.0 miles	0.4%
Greater than 4.0 miles	0.0%

Currently, users who participate in nonmotorized and motorized activities may meet each other at some point of their trip on trails or in the backcountry. To some nonmotorized users, such contact is not an issue. For those seeking solitude for a variety of reasons (i.e., hunting, wildlife viewing, fishing, viewing scenery, etc.), it can be an important issue. As a result of the continuation of the forest being open to cross-country travel, such user dissatisfaction is expected to increase over time under alternative B. Conversely, motorized users are satisfied with the ability to travel cross-country with no restrictions.

Currently, access to Eagle Peak, Signal Peak, Fox Mountain, Mangus Mountain, and Bearwallow Lookouts is restricted with flexible open and closure dates. These roads are generally opened by April 1 and closed by September 1; however, closure and opening dates are contingent upon road and weather conditions. Some years, there is an opportunity to visit these lookouts over the Labor Day holiday weekend. The action alternatives propose implementing seasonal restrictions for these routes.

Roads 4043 J, 4172 O, and 4307 K on the Reserve District located south of South Fork Negrito Campground are currently open year-round, providing opportunities for motorized travel and camping. The action alternatives propose implementing seasonal restrictions for these routes (table 6).

Alternative C

Alternative C proposes 4,233.7 miles of roads open to the public, 5.5 miles are a result of additions or re-opening of previously closed or decommissioned routes and 7.1 miles are unauthorized routes proposed to be added to the forest road system. The amount of NFS road

mileage open to all vehicle types would be reduced by 7.4 percent or 338.9 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) or conversion to motorized trails. This alternative proposes that 203.8 miles of motorized trail routes be open to the public.

This alternative would result in the highest number of miles of road designated for motor vehicle use providing the most motorized opportunities when compared to the other action alternatives. This mileage would be available for exploring, driving for pleasure, and access to developed campgrounds, trailheads and roadside parking.

NFS trails designated for motor vehicle use would increase from 15.8 miles to 203.8 miles, an increase of 1,189 percent. Alternative C ranks first in providing the most motorized trail opportunities on designated routes than the other action alternatives. This alternative provides 188 additional miles of designated motorized trail routes. However, since there are currently no restrictions or designation of motorized trail routes on the ground, comments were received stating that these designations are not perceived as an increase, but a decrease in motorized trail recreation opportunities.

Motorcycle riders would benefit most under alternative C since it is the only alternative that designates motorcycle use only on 13.1 miles of unauthorized routes. The remaining 50.6 miles of proposed motorcycle trails are located on existing nonmotorized trails designed and managed for hikers and pack and saddle stock. There would be a potential for conflicts to increase over time between motorized and nonmotorized users.

An analysis was conducted evaluating the length of roads closed to all motor vehicle use due to comments received concerning the closure of roads and resultant limitations on access to the forest. Alternative C proposes the least miles of motorized closures totaling 142.3 miles with the longest closure length between 4 and 5 miles in length. Fifty-four percent of the proposed road closure lengths fall between 0 to 0.25 mile and 0.26 to 0.5 mile in length (figure 5). Some of these roads are not currently being used based on natural re-vegetation growth within the road bed; have resource concerns; or are redundant to other, better sited roads that access the same destination. The recreational experiences for those users who are accustomed to traveling in a motorized vehicle on the road segments proposed for closure to access the forest will be affected. The longer closure lengths would mean a further distance for visitors to travel using nonmotorized modes of travel to access a favorite area. With this alternative proposing the least amount of closures, the effect of limiting recreationists' ability to travel on routes they are accustomed to travel on with a motorized vehicle would be the least of the action alternatives.

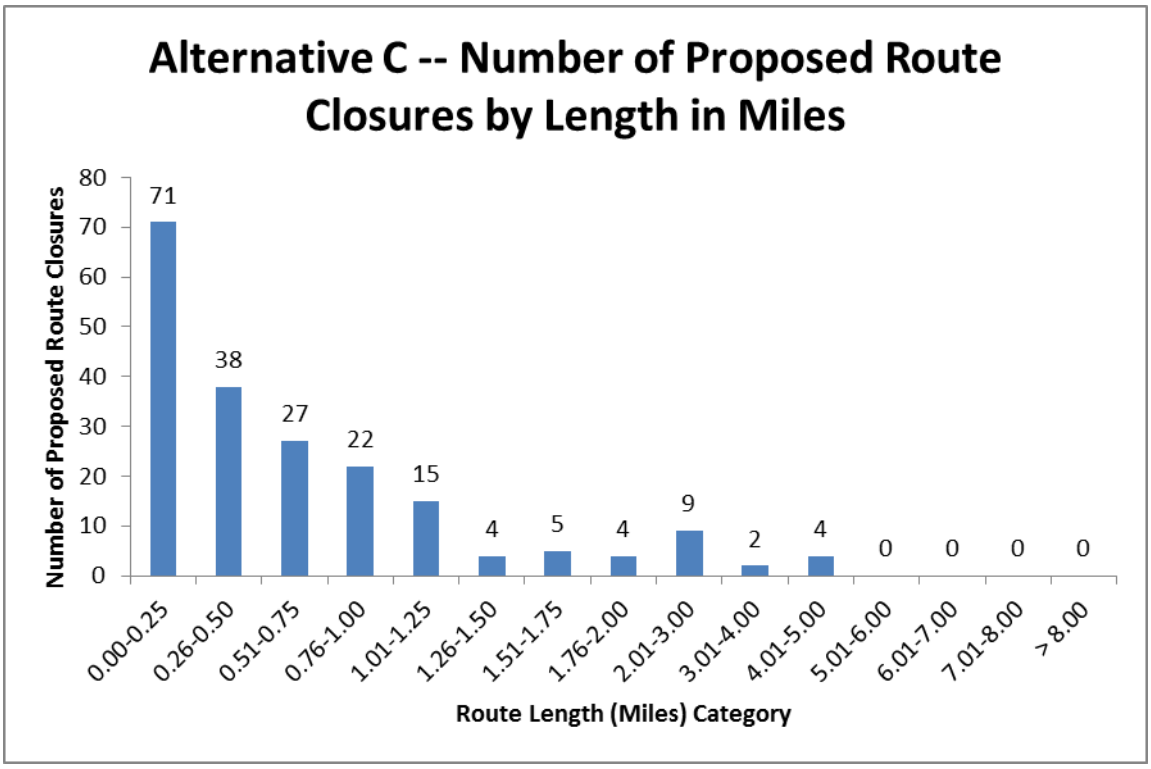

Figure 5. Distribution of the number of route closures proposed under alternative C by mileage categories

When examining the distance to the nearest open, motorized route (table 27), Alternative C provides a similar percentage breakout from alternative B where the ability to get away from roads is rather limited outside of wilderness. However, compared to alternative B, this alternative increases the area of the forest to 0.4 percent where the nearest open road is greater than 3 miles and reduces the area with roads within 0 to 0.5 mile to 68 percent providing a mix, which includes some remote settings.

Table 27. Area of non-wilderness to nearest open, motorized route and percent distribution for alternative C

Distance in miles between open roads	Percent
0.0 to 0.5 mile	68.1%
0.5 to 1.0 mile	19.0%
1.0 to 2.0 miles	10.6%
2.0 to 3.0 miles	1.9%
3.0 to 4.0 miles	0.3%
Greater than 4.0 miles	0.1%

Since this alternative proposes the least amount of closures and the most mileage of designated routes of the action alternatives, it would provide the most opportunities for motorized access and camping along roadways. The proposed 1-mile corridor for motorized big game retrieval for elk,

deer, bear, mountain lion, javelina, and pronghorn provides access for this activity to most of the forest. The recreation opportunities provided in this alternative would be the most similar to alternative B, the existing condition.

Road restrictions are proposed for Fox Mountain and Mangus Mountain Lookouts with the roads open from April 1 to September 1. This would limit forest visitors' access to these two lookouts to within these dates and limit access over the Labor Day holiday weekend. Eagle Peak, Signal Peak, and Bearwallow Lookouts would continue to have flexible dates for when road access is open and closed.

Roads on the Reserve District located south of the South Fork Negrito Campground are proposed as follows: 4043 J – open with dispersed camping corridor; 4172 O – open to motorized vehicle use; 4307 K – open to motorized vehicle use providing camping and motorized travel opportunities year-round.

Alternative D

Alternative D proposes 2,943.3 miles of roads open to the public, 2.4 miles are a result of additions or re-opening of previously closed or decommissioned routes and 5.8 miles of unauthorized routes proposed to be added to the forest road system. The number of road mileage would be reduced by 35.6 percent or 1,629.3 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) or conversion to motorized trail. This alternative proposes 123.6 miles of motorized trail routes open to the public for vehicles less than 50 inches in width.

NFS trails designated for motor vehicle use would increase from 15.8 miles of trail designed and managed for motorized use to 123.6 miles of NFS trail designated for motorized use for vehicles less than 50 inches, an increase of 682 percent. However, since there are currently no restrictions or designation of motorized trail routes on the ground, comments were received stating that these designations are not perceived as an increase, but a decrease in motorized recreation opportunity.

The effect 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) would experience a corresponding 35.6 percent reduction in road access.

Alternative D ranks fourth in opportunity for motorized trail access among the action alternatives. Motorcycles and ATVs would share the same designated motorized trail segments.

Alternative D proposes the second largest number of miles of roads closed to all motor vehicle use totaling 1,226.6 miles of road closure with the longest closure length between 7 and 8 miles in length. Sixty percent of the proposed route closure lengths fall between 0 to 0.25 mile and 0.26 to 0.5 mile in length (figure 6). Many of these roads are not currently being used, have resource concerns, or are redundant to other, better sited roads that access the same destination. These closures would affect the recreational experiences for those users who are accustomed to traveling these short road segments proposed for closure in a motorized vehicle to access the forest. Examples of activities that could be affected include exploring routes, camping with a vehicle or trailer away from roadways, staging areas for horse trailers for camping with stock or parking area for pack trips.

The motorized closure of Road 537 at the junction of 152 (McKnight Road) would change the access to East Canyon and Quaking Aspen Trailheads to nonmotorized. The Quaking Aspen and East Canyon Trailheads are located approximately 1.5 miles from the road junction. This alternative provides more travel and hiking on a closed road than alternatives F and G.

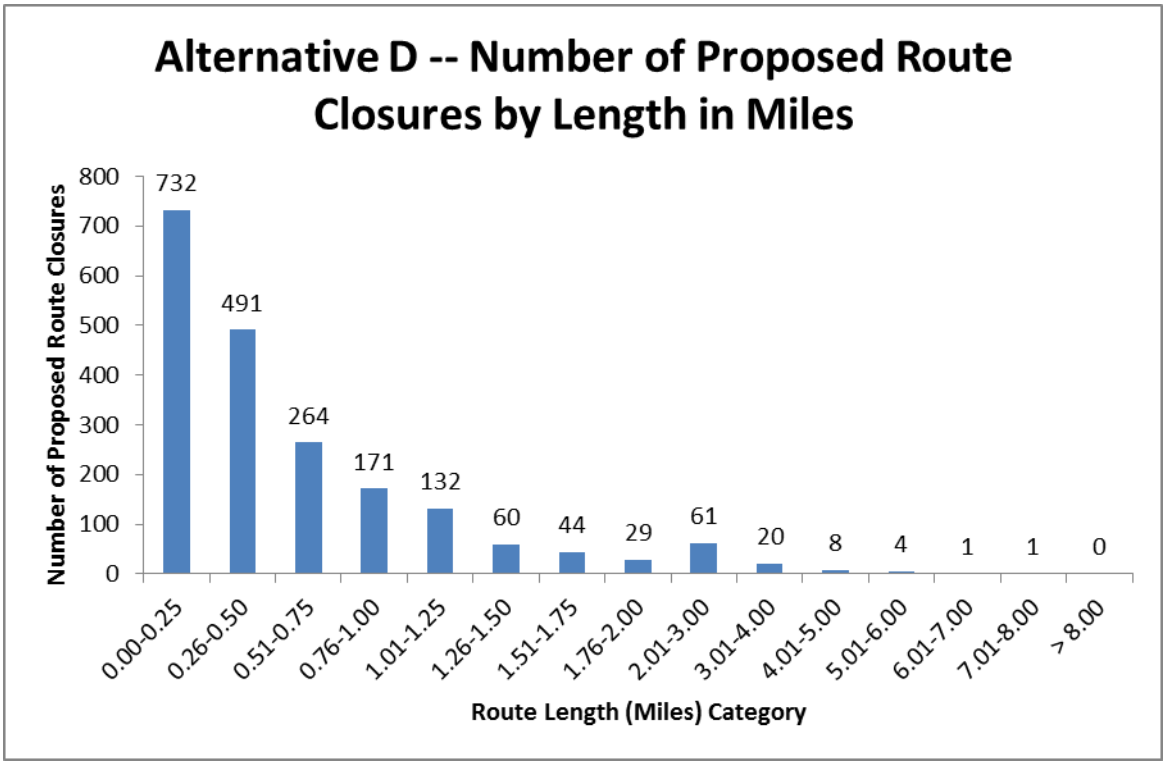

Figure 6. Distribution of the number of route closures proposed under alternative D by mileage categories

When examining the distance to the nearest open, motorized route (table 28), alternative D provides a similar percentage breakout from alternative B.

However, compared to alternative B, this alternative increases the area of the forest to 1.7 percent where an open road is greater than 3 miles and reduces the area of non-wilderness with roads within 0 to 0.5 mile to 60 percent, providing a mix that would include some remote settings and open space.

Table 28. Area of non-wilderness to nearest open, motorized toute and percent distribution for alternative D

Distance in miles between open roads	Percent
0.0 to 0.5 mile	59.7%
0.5 to 1.0 mile	21.5%
1.0 to 2.0 miles	13.6%
2.0 to 3.0 miles	3.6%
3.0 to 4.0 miles	1.1%
Greater than 4.0 miles	0.6%

Since this alternative proposes the second highest amount of closures and ranks fourth in mileage of designated routes of the action alternatives, it will provide less motorized access and opportunities for camping along roadways. There will be less motorized opportunities and less chance of motorized and nonmotorized users traveling the same routes.

Road restrictions are proposed for Eagle Peak, Signal Peak, Fox Mountain, Mangus Mountain, and Bearwallow Lookouts with the roads open from April 1 to September 1. This would limit forest visitors' access to these lookouts to within these dates with access not available over the Labor Day holiday weekend.

Restrictions are proposed for roads located on the Reserve Ranger District south of South Fork of Negrito Creek Campground with road access open from September 1 to February 28, for Roads 4043 J, 4172 O, and 4307 K. The proposal for restrictions on 4037K is located on 0.894 mile of road, with the remainder of the road proposed for closure. This road restriction would provide access opportunities to the area for hunters during the bow and rifle seasons in the fall.

Alternative E

Alternative E offers the largest reduction in miles and ranks the lowest in road miles available among the other action alternatives. Alternative E proposes to designate 2,290.3 miles of roads open to the public. Less than 2 miles of routes are proposed to be added under this alternative. Road mileage will be reduced by 49.9 percent or 2,282.3 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 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) would experience the most effects, a corresponding 49.9 percent reduction in road access.

NFS motorized trails mileage would experience a decrease of 100 percent. All existing motorized trails designed and managed for motorized use (15.8 miles) would be converted to nonmotorized trails. Less than 2 miles of road are proposed to be converted to ATV use under this alternative. Unlike any of the alternatives proposed, users of ATVs and motorcycles will be restricted to those

NFS roads designated open to all vehicles and the less than 2 miles of road converted to ATV use. This alternative is the most restrictive and offers the least opportunity for motorized users.

Alternative E proposes the largest number of miles of roads closed to all motor vehicle use totaling 1,854.8 miles of road closure with the most segment closures over 4 miles in length. Three segments are proposed with closure lengths over 8 miles. Fifty-six percent of the proposed route closure lengths fall between 0 to 0.25 mile and 0.26 to 0.5 mile in length (figure 7). Many of these roads are not currently being used, have resource concerns, or are redundant to other, better sited roads that access the same destination. Since this alternative proposes the most route closures, this alternative has the largest potential to affect the recreational experiences for those users who are accustomed to traveling the road segments proposed for closure to provide motorized access to the forest.

As in alternative D, the motorized closure of Road 537 at the junction of 152 (McKnight Road) would change the access to East Canyon and Quaking Aspen Trailheads to nonmotorized, see alternative D for effects.

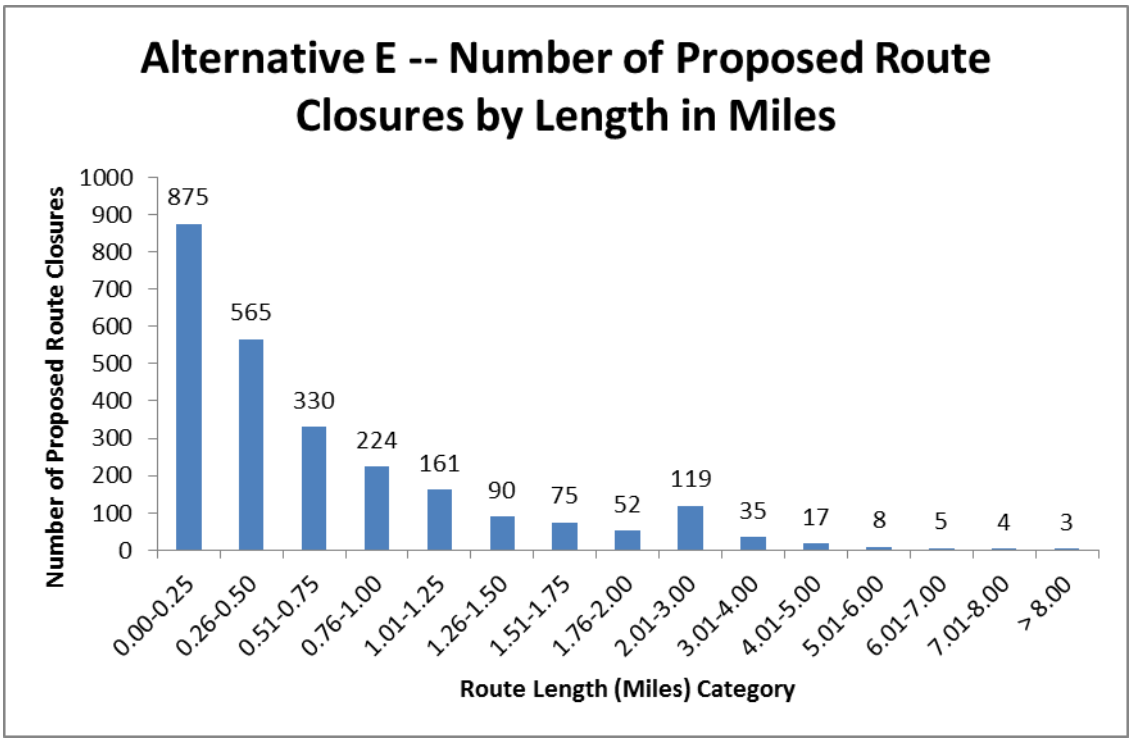

Figure 7. Distribution of the number of route closures proposed under alternative E by mileage categories

Alternative E proposes the fewest motorized routes and most route closures, resulting in the least percentage of area (49 percent) of non-wilderness within one-half mile of a route and the largest percentage of area of non-wilderness (2.1 percent) over 3 miles from a route (table 29).

Table 29. Area of non-wilderness to nearest open, motorized route and percent distribution for alternative E

Distance in miles between open roads	Percent
0.0 to 0.5 mile	52.1%
0.5 to 1.0 mile	23.4%
1.0 to 2.0 miles	17.7%
2.0 to 3.0 miles	4.7%
3.0 to 4.0 miles	1.4%
Greater than 4.0 miles	0.7%

With a 49 percent proposed reduction of motorized road and trail routes from alternative B, the existing condition, this alternative provides the least motorized access and opportunities for camping along roadways. With no corridors proposed for motorized dispersed camping and big game retrieval, this alternative represents the most loss of these activities. Motorized users accustomed to traveling routes proposed for closure, for general forest access, for access to dispersed campsites, and for retrieving big game would potentially be dissatisfied with the reductions in access. This alternative provides the most opportunity for visitors to get away from roads outside of designated wilderness. The visitor who seeks a more remote setting will have less chance to meet motorized users on roads or trails.

As in alternative D, road restrictions are proposed for Eagle Peak, Signal Peak, Fox Mountain, Mangus Mountain, and Bearwallow Lookouts with the roads open from April 1 to September 1. This would limit forest visitors' access to these two lookouts to within these dates, and limit access over the Labor Day holiday weekend.

Roads 4043 J, 4172 O, and 4307 K located on the Reserve District south of South Fork Negrito Campground are proposed to be closed year-round to vehicle traffic in this alternative. There would be no motorized access to the area for summer users and hunters in the fall. There could be user dissatisfaction by recreationists accustomed to traveling these routes with a motor vehicle in the summer and fall.

Alternative F

Alternative F offers the third largest reduction in motorized opportunities among the action alternatives. Of the five action alternatives proposed, alternative F ranks second in road miles available.

Alternative F proposes 3,329.2 miles of roads open to the public, 2.5 miles are a result of re-opening of previously closed ML-1 or decommissioned routes and 5.9 miles of unauthorized route additions.

Road mileage would be reduced by 27.2 percent or 1,243.4 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) or conversion to motorized

trail. This alternative proposes 178.1 miles of motorized trail routes open to the public for vehicles less than 50 inches in width.

The 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) would experience a corresponding 27.2 percent reduction in road access.

NFS motorized trails mileage would experience an increase of 1,027 percent, up from its current level of 15.8 miles to 178.1 miles. This alternative provides 162.3 additional miles of designated motorized trail routes. However, since there are currently no restrictions or designation of motorized trail routes on the ground, comments were received stating that these designations are not perceived as an increase, but a decrease in motorized recreation opportunity. Alternative F ranks second in opportunity for motorized trail access among action alternatives proposed.

Alternative F proposes the second fewest miles of roads closed to all motor vehicle use totaling 872.2 miles of road closure with one segment over between 6 and 7 miles in length (figure 8). Seventy percent of the proposed closure segments fall between 0 to 0.25 mile and 0.26 to 0.5 mile in length. Many of these roads are not currently being used, have resource concerns, or are redundant to other, better sited roads that access the same destination. These closures would affect the recreational experiences for those users accustomed to traveling these road segments proposed for closure in a motor vehicle to access the forest.

Motorized access will continue to the Quaking Aspen Trailhead, with access to the East Canyon Trailhead located above Quaking Aspen becoming nonmotorized. Parking will be at the Quaking Aspen Trailhead. This alternative provides less travel and hiking on a closed road than alternatives D and E.

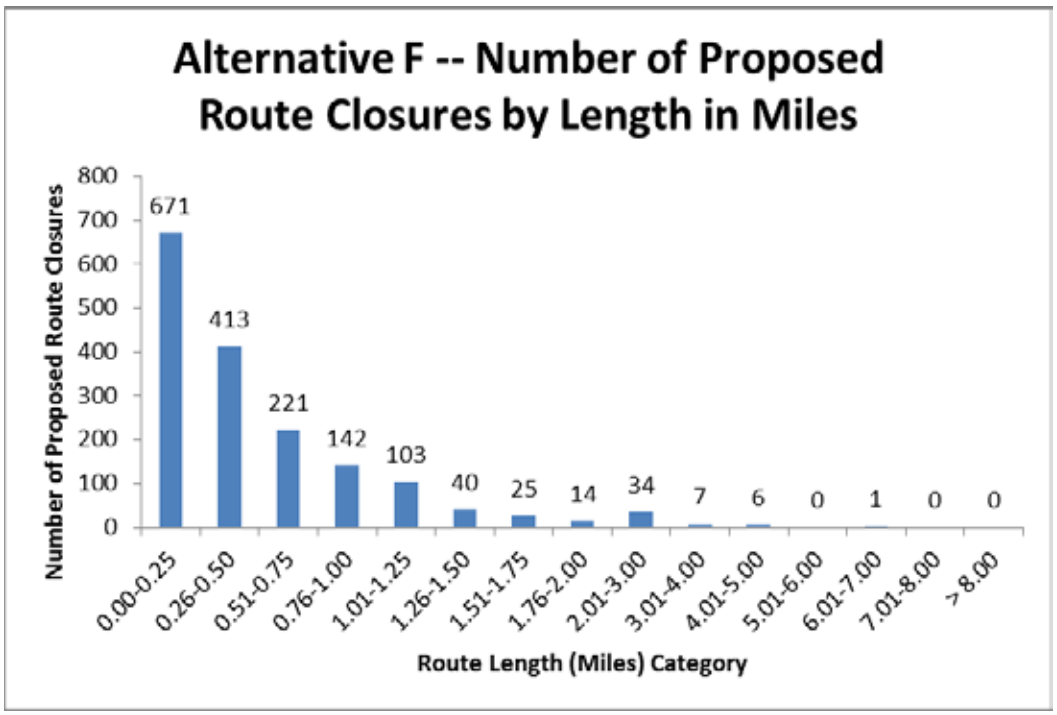

Figure 8. Distribution of the number of route closures proposed under alternative F by mileage categories

When examining the distance to the nearest open, motorized route (table 30), compared to alternative B, alternative F increases the area of the forest to 1.3 percent where an open road is greater than 3 miles and reduces the area of non-wilderness with roads within 0 to 0.5 mile to 63.4 percent, providing a mix that would include some remote settings.

Table 30. Area of non-wilderness to nearest open, motorized route and percent distribution for alternative F

Distance in miles between open roads	Percent
0.0 to 0.5 mile	63.4%
0.5 to 1.0 mile	20.7%
1.0 to 2.0 miles	11.9%
2.0 to 3.0 miles	2.8%
3.0 to 4.0 miles	0.9%
Greater than 4.0 miles	0.4%

This alternative accommodates both motorized users and those users who prefer a more remote setting, providing more areas with the potential to get away from roads outside of designated wilderness than in alternative B, the no action alternative, and alternative C, which proposed the most motorized recreation opportunities.

As in alternatives D and E, road restrictions are proposed for Eagle Peak, Signal Peak, Fox Mountain, Mangus Mountain, and Bearwallow Lookouts with the roads open from April 1 to September 1, limiting access to these two lookouts to within these dates. This would limit forest visitors' access over the Labor Day holiday weekend.

Roads 4043 J, 4172O, and 4307 K on the Reserve District located south of the South Fork Negrito Campground are proposed as open year-round to motorized vehicles, providing this motorized opportunity for visitors.

Alternative G

Alternative G offers the third largest reduction in miles of NFS road open to all motor vehicle types and proposes 3,300.1 miles of roads open to the public, wherein 2.5 miles are a result of re-opening of ML-1 (closed) roads and 6.6 miles from unauthorized route additions. Road mileage would be reduced by 27.8 percent or 1,272.5 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) or conversion to motorized trail. This alternative proposes 177.8 miles of motorized trail routes open to the public for vehicles less than 50 inches in width.

The effect 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) would experience a corresponding 27.8 percent reduction in road access. Of the five action alternatives proposed, alternative G ranks third in road miles available.

NFS motorized trails mileage would experience an increase of 1,151.8 percent, up from its current level of 15.8 miles of trail designed and managed for motorized use to 177.8 miles of trail designated for motorized use. This alternative provides an additional 162 miles of designated motorized trail routes. However, since there are currently no restrictions or designation of motorized trail routes on the ground, comments were received stating that these designations are not perceived as an increase, but a decrease in motorized recreation opportunity. Alternative G ranks third in opportunity for motorized trail access among action alternatives proposed, but only 0.3 mile behind alternative F.

Alternative G proposes slightly more miles of roads closed to motor vehicle use totaling 902.0 miles of road closure, with one segment between 7 and 8 miles in length, than alternative F. Sixty-three percent of the proposed closure segments fall between 0 to 0.25 mile and 0.26 to 0.5 mile in length (figure 9). Many of these roads are not currently being used, have resource concerns, or are redundant to other, better sited roads that access the same destination.

Motorized access will continue to the Quaking Aspen Trailhead, with the access to East Canyon Trailhead becoming nonmotorized. Parking will be at the Quaking Aspen Trailhead the same as alternative F.

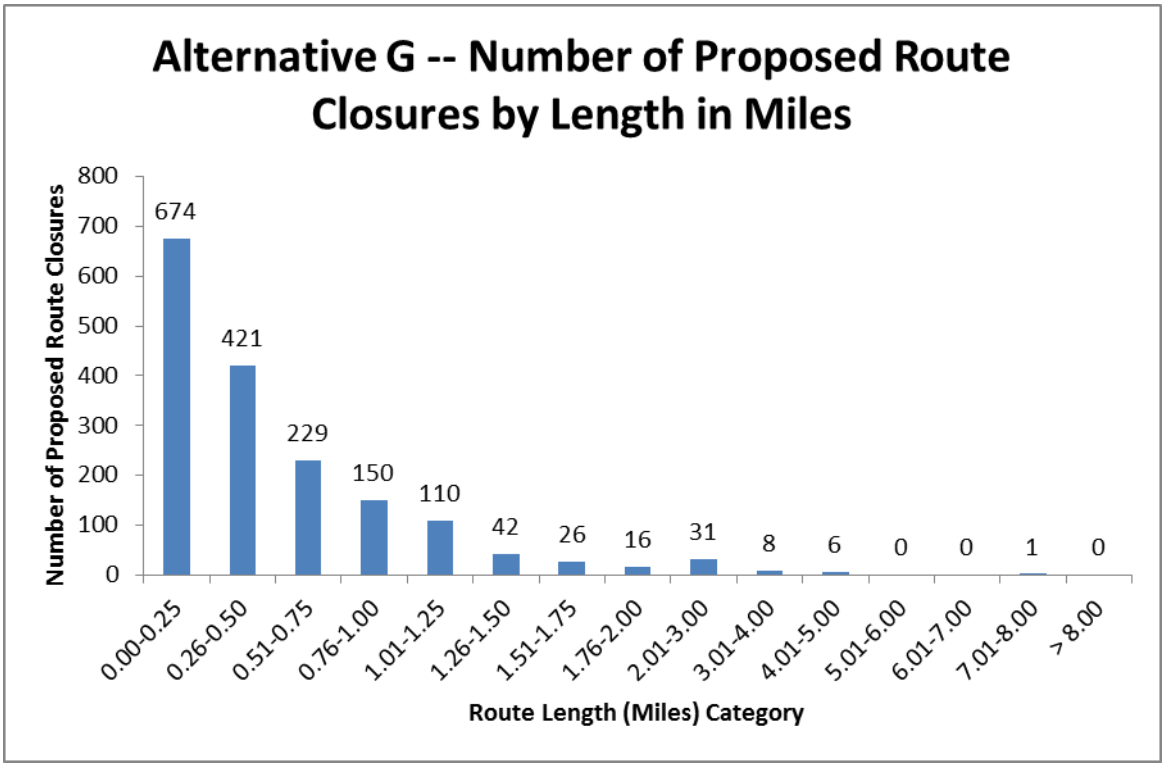

Figure 9. Distribution of the number of route closures proposed under alternative G by mileage categories

When examining the distance to the nearest open, motorized route (table 31), Alternative G is very similar to alternative F, increasing the area of the forest to 1.3 percent where an open road is greater than 3 miles and reducing the area of non-wilderness with roads within 0 to 0.5 mile to 63.3 percent, providing a mix that would include some remote settings. These closures would

affect the recreational experiences for those users who are accustomed to traveling these short road segments proposed for closure in a motorized vehicle to access the forest.

Table 31. Area of non-wilderness to nearest open, motorized route and percent distribution for alternative G

Distance in miles between open roads	Percent
0.0 to 0.5 mile	63.3%
0.5 to 1.0 mile	20.6%
1.0 to 2.0 miles	11.9%
2.0 to 3.0 miles	2.8%
3.0 to 4.0 miles	0.9%
Greater than 4.0 miles	0.4%

Alternatives F and G propose the same mileages of motorized trail opportunities. Proposed designated road mileages and opportunity to get from roads outside of designated wilderness are similar, accommodating both motorized users and those users who prefer a more remote setting.

The difference in this alternative with alternative F is the reduction in opportunities for motorized dispersed camping and big game retrieval.

As in alternatives D, E, and F, road restrictions are proposed for Eagle Peak, Signal Peak, Fox Mountain, Mangus Mountain, and Bearwallow Lookouts with the roads open from April 1 to September 1, limiting access to these two lookouts to within these dates. This would limit forest visitors' access over the Labor Day holiday weekend.

As in alternative F, Roads 4043 J, 4172O, and 4307 K on the Reserve District located south of the South Fork Negrito Campground are proposed as open year-round to motorized vehicles, providing this motorized opportunity for visitors.

Cumulative Effects

The cumulative effects analysis for motorized routes considers past, present, and reasonably foreseeable actions upon motorized recreational opportunities on the Gila National Forest, forests in the Southwestern Region 3, and adjacent BLM lands for the next 20 years. Twenty years was selected because it is the longest anticipated length of time for natural rehabilitation of unauthorized routes (where achievable).

Past Actions

The interpretive trails described in the background section have all been constructed to provide interpretive trail opportunities across the forest.

The 2012 Whitewater-Baldy Fire Area currently has a closure order in place for the Willow Creek Area and trails within the fire area including a portion of the Catwalk National Recreation Trail. Burned Area Emergency Restoration (BAER) work was implemented in 2012, and included the road and trail closures mentioned above including gates and signing, aerial mulching, aerial

seeding, installation of drainage features on roads, pumping of vault toilets, clearing and stabilizing of 3 miles of trail access to Mogollon Baldy, and stabilization of heritage sites located within high-severity burn areas of the fire. The 2011 Wallow Fire on the Apache-Sitgreaves National Forests also has a closure order in place restricting road and trail access within the burned area. Some roads and trails on both forests may be closed for several years.

The past construction of roads for timber sales may also have contributed to conflict by the addition of roads where they had not previously existed.

Ongoing and Future Foreseeable Actions

Alternative B, the existing condition, provides 5,290.9 miles of road access including state highways and county roads on the Gila National Forest. The range of alternatives for forest road access including state highways and county roads (excluding roads for periodic administrative use) is 3,011.9 miles for alternative E the least road access and 4,960.6 miles of road access the most miles of road access in alternative C. Alternative G, the preferred alternative, would provide 4,026.2 miles of road access to the forest. The forest believes a wide range of motorized opportunities have been analyzed with an action alternative emphasizing motorized, an alternative emphasizing nonmotorized, as well as alternatives emphasizing a mix of both motorized and nonmotorized recreation opportunities.

If the population in the Southwest and its preference for using off-highway vehicles continues to increase, a potential exists for an increase in conflicts between motorized and nonmotorized users in alternative B, no action. People wishing to avoid vehicles altogether could potentially be pushed to using wilderness areas exclusively. With a designated system in place, as proposed in all action alternatives, there would be no cumulative change since people would know where to go to avoid vehicles and where to go to participate in motorized activities.

All national forests in the Southwestern Region are either in the process of travel management planning or implementing existing Travel Management Plan decisions. The following forests or ranger districts within the Southwestern Region have completed travel planning and have designated routes for motorized travel, published motor visitor use maps and are currently implementing their Travel Management Rule decisions:

Arizona
Coconino National Forest
Coronado National Forest
Kaibab National Forest – Williams and Tusayan Districts*
Prescott National Forest

New Mexico
Santa Fe National Forest
Lincoln National Forest
Cibola National Forest –Mount Taylor, Sandia, and Mountainair Ranger Districts; Black Kettle, McClellan Creek, and Kiowa Rita Blanca National Grasslands*
Carson National Forest – Jicarilla, Questa, El Rito, Tres Piedras, and Canjilon Ranger Districts*

*The Carson, Kaibab and Cibola National Forests completed their analyses at the district level. Work is ongoing to complete Travel Management Rule planning and produce motor vehicle use maps for the additional districts on the Kaibab, Carson and Cibola National Forests.

The Apache-Sitgreaves and Tonto National Forests are currently in the process of travel management planning. Based on the status of the modified proposed actions for both forests, the proposals would restrict off-road vehicle travel and designate a portion of existing roads and trails.

The Bureau of Land Management (BLM) is also undergoing travel management planning. The Socorro Field Office of the BLM completed a Land Use Plan in 2010 that included transportation planning on all wilderness study areas (approximately 300,000 acres) including the Continental Divide Wilderness Study Area and is implementing this decision. The field office has not started the analysis for transportation planning on the remaining 1.2 million acres of the resource area. The BLM land that lies adjacent to the Black Range Ranger District will be evaluated for the designation of routes when the travel planning process begins.

The White Sands Field Office of the BLM is currently working on a revision of their Tri County Dona Anna, Otero and Sierra) White Sands Resource Area Plan. After completion of this revision, a separate transportation planning analysis would be completed with route designations within the next 5 years for this area. Motorized travel within the Apaches Box, Blue Creek, and Cooke's Range Wilderness Study Areas is limited to the existing routes in the areas when inventoried in 1979.

All action alternatives have the potential for the following cumulative effects upon motorized recreational opportunities.

- Change the array of recreational opportunities across the forest and would restrict motorized cross-country travel and reduce the amount of motorized access on the Gila National Forest.
- The possibility of user dissatisfaction over the loss of cross-country motorized access.
- The possibility of user dissatisfaction with the loss of motorized recreational opportunities throughout the forest lands in the Southwestern Region 3 and particularly in New Mexico.

Motorized Routes and Wilderness Areas

Affected Environment

The concept of wilderness in the National Forest System was first implemented in 1924 with the administrative designation of the Gila Wilderness.

The Gila Wilderness became a component of the National Wilderness Preservation System when Congress passed the Wilderness Act of 1964. In 1980, the Blue Range and Aldo Leopold Wilderness Areas were designated and became part of the National Wilderness Preservation System with passage of Public Law 96-550 (New Mexico Wilderness Act 1980).

The definition of wilderness from the 1964 Wilderness Act is:

> *"A Wilderness in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain."*

The Wilderness Act prohibits permanent roads and the use of vehicles and any other forms of motorized or mechanized transport within wilderness areas. There is no law or policy that prohibits motorized use up to the boundary of designated wilderness.

The Wilderness Act describes wilderness using these four qualities of wilderness character:

- Untrammeled – free from modern human control or manipulation
- Natural – where the natural condition of the land, its plants, wildlife, water, soil, air and the ecological processes are managed, protected, and preserved
- Undeveloped – retaining its primeval character and influence, as is essentially without permanent improvements or human occupation
- Solitude or Primitive Unconfined recreational opportunities

During the comment period for the DEIS, specific concerns were raised about the effects of road closures around designated wilderness areas on the forest. It was felt that buffers were being created around designated wilderness areas by closing roads near the boundaries. The creation of these buffers was expanding the wilderness boundaries and that creation of such buffers was in violation of the Wilderness Act and Public Law (P.L.) 96-550 the New Mexico Wilderness Act. PL 96-550 states “Congress does not intend that designation of wilderness areas in the State of New Mexico lead to the creation of protective perimeters or buffer zones around each Wilderness area. The fact that non-wilderness activities or uses can be seen or heard from areas within the Wilderness shall not, of itself, preclude such activities or uses up to the boundary of the Wilderness Area.”

Motorized route indicators for wilderness areas

- Roads leading to wilderness boundary to within one-quarter mile
- Four wilderness characteristics listed above

The one-quarter-mile distance was chosen as an indicator to accommodate the width of the NM-15 a road corridor within the Gila Wilderness and Road 150, a road corridor between the Gila Wilderness and the Aldo Leopold Wilderness areas. This aids in not duplicating road miles in examining changes to the road system around the wilderness areas. This one-quarter-mile distance indicator was not chosen to be a buffer, but to identify and illustrate the effects of proposals that are adjacent to a wilderness boundary.

Environmental Consequences

Effects Common to All Action Alternatives Regarding Motorized Routes and Wilderness Areas

- 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 as described in the following bullets.
    - The prohibition on cross-country travel and the reduction of where people can drive would improve all four wilderness characteristics in all three wilderness areas. In particular, the prohibition would reduce the encroachment of sight and sound across the wilderness boundary improving the solitude characteristic.
    - Reduction in illegal intrusions would reduce the influence of humans on the wilderness improving the untrammeled characteristics.

- Fewer intrusions would reduce resource damage, improving the natural characteristic.
- No areas are proposed within one-quarter mile of a wilderness boundary posing no effect to the solitude characteristic.

Alternative B – No Action

Alternative B proposes no change to the existing road system within one-quarter mile of the three wilderness boundaries. The same road system and trailheads would be available for access to the forest and as starting points for trips into the Gila, Aldo Leopold, and Blue Range Wilderness Areas. With the continuation of cross-country travel, this alternative provides the most motorized opportunities including motorized dispersed camping and motorized big game retrieval. This alternative poses the most potential for motorized intrusions into the wilderness. There have been individual incidences reported where motorized users have extended or pioneered routes from existing roads across the boundary into the wilderness. The Gila National Forest has not completed any baseline monitoring for the characteristics of wilderness character.

Access to and along the boundaries of the three wilderness areas is available off of 62.4 miles of roads located within one-quarter mile of these boundaries. The miles of road located within one-quarter mile of a wilderness boundary break out for each wilderness as follows: Aldo Leopold 18.8 miles, Blue Range Wilderness 7.7 miles, and Gila Wilderness 35.9 miles. These road systems have been in place since wlderness designation and are allowed up to the boundary of a wilderness area. If users stay on current motorized routes, there would be no effect to wilderness character.

All Action Alternatives

Action alternatives C through G add and reduce miles of motorized roads and trails that are open to the public within one-quarter mile of the wilderness boundaries. Miles of roads open to the public are also reduced within one-quarter mile of the wilderness boundaries for roads proposed to be changed to an administrative use-only designation. See table 32 and table 33. Table 34 and table 35 display the proposals for motorized dispersed camping and motorized big game retrieval within one-quarter mile of a wilderness boundary.

Table 32. Forest Service motorized route miles open to the public within one-quarter mile of wilderness boundaries and percent change

Wilderness Area	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Aldo Leopold Wilderness	18.8	15.2	11.4	4.4	12.3	12.3
Blue Range Wilderness	7.7	6.5	3.6	3.6	3.6	3.7
Gila Wilderness	35.9	31.7	19.7	17.9	22.7	22.7
Total	**62.4**	**53.4**	**34.7**	**25.9**	**38.6**	**38.6**
Percent change from alt B		**-14.5%**	**-44.4%**	**-58.6%**	**-38.3%**	**-38.2%**

Table 33. Forest Service route miles for periodic administrative use or by written authorization only within one-quarter mile of wilderness

Wilderness Area	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Aldo Leopold Wilderness	0.00	3.29	3.78	4.14	3.78	3.78
Blue Range Wilderness	0.00	3.18	5.98	4.15	5.52	5.82
Gila Wilderness	0.00	1.63	6.21	6.87	6.02	6.02
Total	**0.00**	**8.10**	**15.97**	**15.16**	**15.32**	**15.62**

Table 34. Miles and acres of motorized dispersed camping within one-quarter mile of wilderness areas

Wilderness Area	Alt. B Miles	Alt. B Acres	Alt. C Miles	Alt. C Acres	Alt. D Miles	Alt. D Acres	Alt. E Miles	Alt. E Acres	Alt. F Miles	Alt. F Acres	Alt. G Miles	Alt. G Acres
Aldo Leopold	N/A	17,395	4.65	328	4.25	297	0.00	0	4.65	328	4.65	328
Blue Range	N/A	4,727	0.88	83	0.88	79	0.00	0	0.88	83	0.88	79
Gila	N/A	29,582	9.75	722	8.45	654	0.00	0	9.30	683	9.30	682
TOTAL	N/A	51,704	15.28	1,133	13.58	1,030	0.00	0	14.83	1,094	14.83	1,089

Table 35. Miles and acres of motorized big game retrieval within one-quarter mile of wilderness areas

Wilderness Area	Alt. B Miles	Alt. B Acres	Alt. C[a] Miles	Alt. C[a] Acres	Alt. D[b] Miles	Alt. D[b] Acres	Alt. E Miles	Alt. E Acres	Alt. F[c] Miles	Alt. F[c] Acres	Alt. G[d] Miles	Alt. G[d] Acres
Aldo Leopold	N/A	17,395	14.95	9,305	4.25	297	0.00	0	11.74	5,499	4.65	328
Blue Range	N/A	4,727	19.80	4,355	0.88	79	0.00	0	16.95	3,050	0.88	79
Gila	N/A	29,582	49.28	24,266	8.45	654	0.00	0	40.24	18,207	9.30	682
TOTAL	N/A	51,704	84.03	37,927	13.58	1,030	0.00	0	68.93	26,756	14.83	1,089

[a] 1 mile each side from any designated road
[b] 300 feet using same motorized dispersed camping corridor
[c] ½ mile each side from any designated route
[d] 300 feet using same motorized dispersed camping corridor

Alternative C

Alternative C proposes the least reduction, 14.5 percent, in roads leading to within one-quarter mile of the wilderness boundary compared to the no action alternative. Of the action alternatives, when considering motorized routes, corridors for motorized dispersed camping and motorized big game retrieval, this alternative provides the most motorized access opportunities for recreationists. This alternative is the most similar to alternative B, the no action alternative posing the most potential for motorized intrusions into the wilderness affecting the characteristics of solitude and untrammeled.

Alternative D

Alternative D proposes the second most reduction, a 44.4 percent in roads leading to within 1/4 mile of the wilderness boundary. When considering motorized routes, corridors for motorized dispersed camping and motorized big game retrieval (300 feet off of both sides of 13.58 miles of road per 1,030 acres for motorized dispersed camping and motorized big game retrieval, this alternative proposes more motorized opportunities than alternative E and less motorized opportunities than alternatives F and G with the potential for motorized intrusions into wilderness more than alternative E and less than alternatives F and G.

Alternative E

Alternative E proposes the most reduction (58.6 percent) in roads leading to within one-quarter mile of the wilderness boundary. Of the action alternatives, this alternative provides the least motorized opportunities for recreationists with no opportunities for motorized dispersed camping and motorized big game retrieval. This alternative poses the least potential for motorized intrusions into the wilderness.

Alternatives F and G

Both alternatives propose a 32.8 percent reduction in roads leading within one-quarter mile of the wilderness boundary. Both alternatives propose the same mileage of corridors for motorized dispersed camping 300 feet off of 14.8 miles per 1,089 acres within one-half mile of a wilderness boundary. Alternative F proposes 68.9 miles per 26,756 acres of motorized big game retrieval one-half mile off both sides of the road that are located within one-half mile of a wilderness boundary. Alternative G proposes the same 300-foot corridor and miles per acres for motorized dispersed camping. This represents more motorized recreation opportunities than alternatives D and E with less motorized opportunities provided than alternative C. The potential for intrusions are more likely in alternative F with a wider corridor and more mileage proposed for motorized big game retrieval within one-half mile of a wilderness boundary.

Although all action alternatives reduce road mileage within one-quarter mile of all three wilderness boundaries, corridors for motorized dispersed camping and Big Game Retrieval are proposed in all action alternatives except E. The proposed reductions of road mileages would potentially improve wilderness character. The proposed road closures, corridors for motorized dispersed camping and motorized big game retrieval were not proposed with the intent to create a complete buffer around these wilderness areas. None of the action alternatives are in violation of the 1964 Wilderness Act and Public Law 96-550 (New Mexico Wilderness Act 1980). Proposed closures and corridors were identified during the travel analysis process (USDA Forest Service 2010) and through public comments during the Travel Management Rule planning process.

Cumulative Effects

The spatial boundary for the cumulative effects analysis for motorized routes and wilderness includes the boundaries of the Gila, Aldo Leopold, and Blue Range Wilderness Areas with the area adjacent to the boundaries defined as one-quarter mile. This distance was utilized to identify projects adjacent to the wilderness boundary that may cumulatively influence wilderness character.

The analysis considers past, present, and reasonably foreseeable actions upon the wilderness character of wilderness areas located on the Gila National Forest for the 20 years. A review of past activities was completed by reviewing past activities since 1988 in the forest's Activity Tracking System (FACTS) database. See Table Rec-A5 in Appendix A of the Recreation Specialist Report (USDA Forest Service 2013b1).

Wilderness character and the untrammeled attribute of wilderness may be compromised regardless of alternative from the general population increase and associated increase in recreational use within and adjacent to wilderness areas. All action alternatives result in a reduction of miles within one-quarter mile of a wilderness boundary.

As described in the assumptions section, the prohibition on cross-country travel has the potential to improve all four characteristics of wilderness character.

Motorized Routes and Motorized Creek Crossings - Eligible Wild and Scenic Rivers Outside of Wilderness

Affected Environment

Congress created the National Wild and Scenic Rivers System 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. There are three classifications of wild and scenic rivers: wild, scenic, and recreational. For a river to be eligible for wild and scenic river designation it must be free flowing and with its adjacent land area, must possess one or more outstandingly remarkable values. Outstandingly remarkable values are specific to each river segment and may include scenic, recreation, fish, historic and cultural values. None of the streams or rivers on the Gila National Forest is designated wild and scenic.

The Gila National Forest Plan as amended incorporated direction to protect eligible wild and scenic rivers (river areas) for their outstandingly remarkable values, and preserve their classification pending determination of their suitability for inclusion in the National Wild and Scenic River System. The following rivers were included in the eligibility findings: Whitewater Creek, Spruce Creek, Middle Fork Gila River, West Fork Gila River, Main Diamond Creek, South Diamond Creek, Holden Prong, and Las Animas Creek.

Table 36 displays the outstandingly remarkable values and classifications for the proposed eligible segments located outside wilderness.

Table 36. Proposed wild and scenic rivers outstandingly remarkable values and classification

Name	Outstandingly remarkable value	Classification
Whitewater Creek	Recreational and historic	Recreational
Las Animas	Fish and historic	Wild
West Fork	Scenic and historic	Wild and recreational
Main Diamond	Fish and historic	Wild and recreational

Segments of the San Francisco and the Mimbres Rivers on the Gila National Forest were proposed during the eligibility planning process for wild and scenic rivers and not included in the final eligibility findings.

The San Francisco River and Coal Creek are included in the eligibility findings for the Apache-Sitgreaves National Forests. These findings identify a segment of the San Francisco River eligible under the classification of "Wild" and a segment of the river eligible under the classification of "Recreational." A segment of Coal Creek is identified as eligible under the classification of "Wild" and a segment as eligible under the classification of "Recreational." The "Recreational" segment of Coal Creek flows along the Arizona New Mexico border and flows on and off the Gila National Forest. The Apache-Sitgreaves National Forests administer this eligible wild and scenic river.

Motorized Route and Motorized Creek Crossing Indicators for Eligible Wild and Scenic Rivers Outside of Wilderness Indicators

- Miles of motorized routes within 300 feet of eligible wild and scenic rivers outside of wilderness
- Number of motorized route vrossings

Assumptions Common to All Action Alternatives Regarding Eligible Wild and Scenic Rivers Outside Wilderness

- Total miles of motorized routes miles within 300 feet of eligible wild and scenic rivers outside wilderness that remain the same for all action alternatives are:
  - Main Diamond Creek 1 mile;
  - Las Animas Creek 4 miles; and
  - West Fork Gila River, 0.05 mile.
- The 0.05 mile in the West Fork Gila River, Road 973B (Gila Cliff Dwellings Parking Lot) and 1.0 mile in Whitewater Creek (Catwalk Parking Lot) are proposed in all action alternatives to change from open to all motor vehicles to NFS road open to highway-legal vehicles only. These two parking lots will no longer allow mixed use of highway-legal vehicles and off-highway vehicles improving visitor safety at these parking lots.

Environmental Consequences

Alternative B

The current miles of motorized routes within 300 feet of eligible wild and scenic rivers outside wilderness are as follows: Diamond Creek (1.0 mile), Las Animas Creek (4.0 miles), West Fork Gila River, (0.05 mile) and Whitewater Creek (1.0 mile). This totals 6.0 miles of motorized routes providing visitors motorized access within the non-wilderness eligible wild and scenic rivers corridors on the forest.

Currently, an ATV trail accesses an eligible segment of Whitewater Creek from the Powerhouse trailhead and Road 810. The trail accesses a popular picnicking spot at the confluence of Whitewater and South Fork Whitewater Creeks. Visitors may enjoy the outstandingly remarkable values of historic and recreation of Whitewater Creek with an ATV or motorcycle to access this segment of the creek.

Total motorized route creek crossings in perennial/intermittent degments of eligible wild and scenic rivers located outside of wilderness on the Gila National Forest are as follows: 1 on Diamond Creek; 21 on Las Animas Creek, and 2 on Whitewater Creek, totaling 24 motorized route creek crossings. Road access on Las Animas Creek is currently not open to the public; the public only has access to the motorized routes on Diamond Creek and Whitewater Creek.

Currently with no prohibition on cross-country travel, opportunities for motorized dispersed camping and motorized big game retrieval are available within eligible wild and scenic river corridors outside of wilderness.

Alternatives C, F, and G

Total motorized route creek crossings (24) in perennial/intermittent segments and miles of motorized routes (5.9 miles) within 300 feet of eligible wild and scenic rivers outside wilderness are proposed the same as alternative B, providing the same motorized recreational opportunities. Twenty-one crossings on Las Animas Creek are proposed for administrative use or use by written authorization, this does not represent a change on the ground since the public does not currently have access to these roads. The ATV trail providing access to a portion of Whitewater Creek from the Powerhouse trailhead and Road 810 will continue to provide motorized ATV trail access to the popular picnicking spot at the confluence of Whitewater and South Fork Whitewater Creeks, providing a motorized route to enjoy the outstandingly remarkable values of historic and recreation along Whitewater Creek.

Alternative C proposes the most miles per acres providing motorized dispersed camping and motorized big game retrieval within wild and scenic river corridors outside of wilderness. Alternatives F and G propose more opportunities for motorized dispersed camping and motorized big game retrieval than alternative E. There is a potential for dissatisfaction by visitors who currently use motor vehicles to disperse camp and retrieve big game within wild and scenic river corridors outside of wilderness.

Alternatives D and E

The proposed 0.52 mile reduction of motorized ATV routes resulting in 5.4 miles of motorized routes within 300 feet of eligible wild and scenic rivers outside of wilderness is located in Whitewater Creek. The short segment of ATV trail proposed for closure accesses a popular

picnicking spot at the confluence of Whitewater and South Fork Whitewater Creeks and eliminates one stream crossing. This portion of Whitewater Creek is accessed from the Powerhouse Trailhead and Road 810. Visitors currently accessing this picnic spot with an ATV will be affected by this proposal. Non-motorized access will continue to provide the opportunity to experience the historic and recreational outstandingly remarkable values of this eligible wild and scenic riversegment.

The same mileages and acreages of corridors for motorized dispersed camping and motorized big game retrieval are proposed, 0.9 mile per 89 acres providing motorized dispersed camping and motorized big game retrieval opportunities within wild and scenic river corridors outside of wilderness in alternative D. Alternative E proposes no opportunities for motorized dispersed camping and motorized big game retrieval in wild and scenic river corridors outside of wilderness. There is a potential for dissatisfaction by visitors who currently use motor vehicles to dispersed camp and retrieve big game within wild and scenic rivercorridors outside of wilderness.

Cumulative Effects

The cumulative effects analysis for motorized toutes and motorized creek crossings for eligible wild and scenic rivers outside of wilderness considers the past, present and reasonably foreseeable actions within the 300-foot corridors of the Gila National Forest eligible wild and scenic riversegments of Whitewater Creek, Las Animas, West Fork, and Main Diamond Creeks for the next 20 years.

The history of the Catwalk located on Whitewater Creek began with the discovery of gold and silver in the rugged Mogollon Mountains above Whitewater Canyon. A pipeline was constructed to channel water from a water collection point 3 miles upstream from Whitewater Creek to the Graham mill at the mouth of Whitewater Canyon. This operation lasted only 10 years when the mill and pipeline were sold. In the mid-1930s, the Civilian Conservation Corps rebuilt the Catwalk as a recreation attraction for the Gila National Forest. The Catwalk National Recreation Trail located on Whitewater Creek has been rebuilt several times after devastating floods have taken their toll. A portion of the trail is currently closed due to hazards from the Whitewater Baldy Fire of 2012. The headwaters of Whitewater Creek was aerially reseeded as part of the Whitewater Baldy Fire Burned Area Emergency Restoration (BAER) efforts discussed in Motorized Routes. A future project may include establishing Gila trout in Whitewater Creek which is likely fishless due to the fire effects from the Whitewater Baldy fire. Initial surveys indicate that Whitewater Creek could be fishless.

There is a planned restoration project in Las Animas Creek. The project includes the use of Rotenone to remove nonnative fish species and restore the native fish assemblage to Las Animas Creek, thus improving the outstandingly remarkable value of fish. There is not an expectation that visitor use with a motorized vehicle will increased on the motorized route and associated creek crossings since access is not currently open to the public and will be limited to periodic administrative use or by written authorization only.

With no prohibitions on cross-country travel within eligible wild and scenic river corridors, there would be a reduction in opportunities for motorized dispersed camping and motorized big game retrieval in all action alternatives. The designation of motorized routes and proposal for corridors for motorized dispersed camping and motorized big game retrieval has the potential to reduce the creation unauthorized routes within wild and scenic river corridors outside of wilderness.

Motorized Routes – National Scenic and National Recreation Trails

Affected Environment

The Continental Divide National Scenic Trail or CDNST is a 3,100-mile trail that runs along the Rocky Mountain Range starting at the Mexican border crossing 5 states, 25 national forests, 3 national parks, 1 national monument, 8 BLM resource areas, and 3 Indian teservations, and ending at the Canadian border. The trail travels through New Mexico, Colorado, Wyoming, Idaho, and Montana. Seven hundred and seventy-five (estimated) miles of the CDNST are located in New Mexico with 251 miles located on the Gila National Forest.

Traveling from south to north, (the direction a majority of hikers and horseback riders travel the trail) CDNST hikers and horseback riders cross onto the Gila National Forest in the Burro mountains between Lordsburg and Silver City through the Gila Box IRA. A segment of the trail has not been completed or officially designated from Mangus Creek to the Bear Mountain trailhead in the Burros. The CDNST route continues along the Continental Divide, crosses Signal Peak, then Black Peak within the Meadow Creek IRA, and drops down into Sapillo Group Campground. It then enters the Contiguous to the Gila Wilderness IRA, then the Gila Wilderness up Rocky Canyon crossing the Road 150 (North Star Mesa) entering the Aldo Leopold to Rocky Point climbing just below Reeds Peak heading north on the Continental Divide through the Contiguous to the Black and Aldo Leopold Wilderness, Dry Creek, Poverty Creek, Wahoo and Stone Canyon IRAs. It then leaves the forest crossing private land where the BLM has facilitated a trail easement within the Continental Divide WSA (administered by the BLM Socorro Field Office), then enters the forest again on the Reserve Ranger District traveling along the Continental Divide and through the Wagon Tongue IRA leaving the forest on the north east side of the Quemado Ranger District**.** A discussion of the effects to the specific portions of the CDNST located within IRAs is included within the IRA section of this document.

The Forest Service amended the CDNST Comprehensive Plan (USDA Forest Service 2009) and internal agency directives (FSM 2350 USDA Forest Service 2009a). The CDNST Comprehensive Plan provides overall direction for the development, management, and use of the CDNST. FSM 2350 guides policy, development, and management of the CDNST on NFS lands. The amended directives provide future management direction for the CDNST by addressing and clarifying the nature and purpose of the CDNST. All action alternatives reduce the mileage of CDNST that intersects and that follows an open motorized road. Implementation of District Plans for CDNST reroutes (separate from the travel planning process) will further reduce the mileage of CDNST route following an open road. See Cumulative Effects.

The nature and purpose of the CDNST are to provide for high-quality scenic, primitive hiking and horseback riding opportunities and to conserve natural, historic, and cultural resources along the CDNST corridor. The intent of the National Scenic Trail pursuant to the National Trails System Act of 1968 is for nonmotorized use. Exceptions are listed in FSM 2350 and include; motorized crossings, the designated class and width of vehicles that were allowed on the segment of the CDNST prior to November 10, 1978 or the designated segment was constructed as a road prior to November 10, 1978, as long as that use will not substantially interfere with the nature and purpose of the trail. Directives also state “Locate a CDNST segment on a road only where it is primitive and offers recreational opportunities comparable to those provided by a trail with a designed use of Pack and Saddle Stock, provided that the CDNST may have to be located on or across motorized routes because of inability to locate the trail elsewhere. Table 37 provides a summary of the existing condition and effects of each alternative upon the motorized route

indicators for the CDNST displaying where the trail follows or intersects a motorized road or trail and where it follows an ML-1 closed road.

Concerns received in comments state that the continuation of motorized use will substantially and significantly interfere with the nature and purposes of the trail and the experience sought by hikers and horseback riders on the CDNST. Specific concerns include the Burro Mountains, Sapillo Campground, and Quemado Ranger District.

The Catwalk National Recreation Trail is a historically intriguing feature of the Glenwood District. The area offers a beautiful picnic spot next to Whitewater Creek, a challenging one mile nonmotorized trail along the historic water line route from the 1890s, a trailhead access into the Gila Wilderness, a bird watcher's paradise and a sense of place that creates images of an earlier time. A portion of the Catwalk trail is currently closed to provide for public safety as part of the Whitewater-Baldy Fire Area closure.

Environmental Consequences

Continental Divide National Scenic Trail Motorized Route Indicators

- Continental Divide National Scenic Trail (CDNST)

  Total Miles of CDNST

  Miles intersecting a motorized trail
  Miles intersecting a motorized road
  Miles following an open motorized trail
  Miles following an open motorized road
  Miles following an open motorized road after CDNST District Proposed Reroutes
  Miles following a closed motorized trail proposed in alternatives
  Miles following a closed motorized road proposed in alternatives
  Miles per acres CDNST located within proposed corridors for motorized dispersed camping
  Miles per acres CDNST located within proposed corridors for motorized big game retrieval

Assumptions Common to All Action Alternatives Regarding Motorized Routes – Continental Divide Scenic Trail

- None of the action alternatives propose to change the location of the 251 miles of CDNST route designated on the Gila National Forest. No new trail construction or reconstruction is proposed in any of the action alternatives associated with the Travel Management Rule.
- In all action alternatives motorized cross-country travel will be prohibited which includes no cross-country travel being allowed off of any motorized segments of the CDNST.
- None of the action alternatives propose motorized designations on the 1.35 miles of the Catwalk National Recreation Trail.

Effects Common to All Action Alternatives Regarding Motorized Routes – Continental Divide Scenic Trail

- Visual quality along the CDNST could be improved in all action alternatives due to the prohibition of cross-country travel. The elimination of cross-country travel and limiting

motorized use to designated routes reduces the possibility of the creation of new unauthorized routes along the CDNST.

- In all action alternatives the mileages CDNST following an open road are reduced, improving the nonmotorized opportunities on the trail.

Table 37 displays a summary of the existing condition and effects of each alternative upon the motorized route indicators for the CDNST. Supporting data tables are located in Appendix C of the Recreation Report (USDA Forest Service 2013b1). In table 38, it appears that motorized trail routes are being added to the CDNST. However, alternatives D, F, and G propose motorized open roads to change to the designation of trails open to vehicles less than 50 inches in width. Within the Burros, there are also proposals to designate decommissioned and unauthorized routes that would be converted to motorized use for vehicles less than 50 inches in width and single track motorcycles, and routes proposed for motorized use for vehicles less than 50 inches in width and single-track motorcycles that would cross a segment of the CDNST.

Table 37. Continental Divide National Scenic Trail motorized route indicators

Motorized route indicators	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Total CDNST Miles on NFS Land	251	251	251	251	251	251
Number of CDNST intersects with a motorized trail	0	4	3	0	3	3
Number of CDNST intersects with a motorized road	73	66	50	41	56	56
Number of miles where CDNST follows an open motorized trail	0	1.0	2.0	0.0	2.4	2.4
Number of miles where the CDNST follows an open motorized road	41.4	36.2	30.2	29.9	30.2	30.9
Number of miles where the CDNST follows an ML-1 (closed) road	5.31	10.55	15.07	16.85	15.02	14.35

Alternative B – No Action

As described in the Affected Environment, there are 251 miles of the CDNST located on the Gila National Forest. The route currently does not intersect or follow a motorized trail open to vehicles less than 50 inches in width. It currently intersects an open road 73 times and the trail currently follows an open road for 41.4 miles. Of these miles, 2.2 miles are located on Maintenance Level 3 roads with the remaining 39.2 miles located on Maintenance Level 2 roads. The majority of this road mileage is located on primitive routes that offer recreational opportunities comparable to those provided by a trail with a designed use of Pack and Saddle Stock meeting the intent and purpose of the trail and are estimated to be on existing routes that were constructed as a road prior to November 10, 1978. No date construction data is retained in any Roads data bases. Currently, 209.2 miles of the CDNST is located in non-wilderness where cross-country vehicle travel is allowed. As opportunities arise, the districts have moved the CDNST off of roads and will continue to evaluate and implement proposals to move the CDNST off of motorized roads. The CDNST currently follows 5.31 miles of ML-1 (closed) road. Currently, motorized cross-country travel is allowed from any motorized segment of the CDNST.

Alternative C

Alternative C would add 4 intersections with a motorized trail, would reduce intersections with a motorized road to 66, would incorporate 1 mile of unauthorized coincident routes into a motorized trail open to vehicles less than 50 inches in width, and would reduce the miles following an open road to 36.2. The trail would follow 10.55 miles of ML-1 (closed) Roads. Of the action alternatives this alternative proposes the most motorized opportunities associated with the CDNST. Corridors for motorized dispersed camping are proposed on most of these proposed motorized designations on the CDNST which are located within the Burros. The majority of this road mileage is located on primitive routes that offer recreational opportunities comparable to those provided by a trail with a designed use of Pack and Saddle Stock meeting the intent and purpose of the trail. However, with the most miles of trail located on road, miles per acres of corridors for motorized dispersed camping and motorized big game retrieval, it is the least compatible with the purpose of providing a high quality scenic, primitive hiking and horseback riding opportunity for nonmotorized users.

Alternative D

Alternative D would add 3 intersections with a motorized trail, would reduce intersections with a motorized road to 50, would add 2 miles of CDNST route where it would follow a motorized trail open to vehicles less than 50 inches in width, and would reduce the miles following an open road to 30.2. Alternatives D, F, and G propose the same mileage of CDNST following an open road. One mile of the motorized trail proposed will shift from a road open to all vehicles. The majority of this road mileage is located on primitive routes that offer recreational opportunities comparable to those provided by a trail with a designed use of Pack and Saddle Stock meeting the intent and purpose of the trail. There would be 13.1 miles of CDNST that travel through corridors for motorized dispersed camping and big game retrieval, less than alternative B, the no action alternative where cross-country travel is currently allowed, improving nonmotorized opportunities on the trail.

Alternative E

Alternative E proposes the most reduction in motorized routes coincident with the CDSNT and would provide the most primitive experience on the trail. Alternative E would add 0 intersections with a motorized trail, would reduce intersections with a motorized road to 41, would add 0 miles of CDNST route where it would follow a motorized trail open to vehicles less than 50 inches in width, and would reduce the miles following an open road to 29.9. This alternative is most compatible with the purpose of the CDNST providing a high quality scenic, primitive hiking and horseback riding opportunity for non-use.

Alternative F

Alternative F would add 3 intersections with a motorized trail, would reduce intersections with a motorized road to 56, would add 1.4 miles of CDNST route where it would change from following a motorized road to a motorized trail open to vehicles less than 50 “in width, would add 1 mile of trail route open to vehicles less than 50 inches in width, and would reduce the miles following an open road to 30.2. The majority of this road mileage is located on primitive routes that offer recreational opportunities comparable to those provided by a trail with a designed use of Pack and Saddle Stock meeting the intent and purpose of the trail. Alternatives C and F provide

the least nonmotorized opportunity along the trail. They also carry the most risk of motorized ingress/access on the CDNST and potential for group camping next to the trail.

Alternative G

The affects in alternatives F and G are very similar. Alternative G would add 3 intersections with a motorized trail, would reduce intersections with a motorized road to 56, would add 1.4 miles of CDNST route where it would follow a motorized trail open to vehicles less than 50 inches in width, would add 1 mile of trail route open to vehicles less than 50 inches in width, and would reduce the miles following an open road to 30.9. The majority of this road mileage is located on primitive routes that offer recreational opportunities comparable to those provided by a trail with a designed use of Pack and Saddle Stock meeting the intent and purpose of the trail. This alternative proposes 14.1 miles of CDNST passing through corridors for motorized dispersed camping and motorized big game retrieval, less than alternative F, with less risk of motorized ingress/access on the CDNST and potential for group camping next to the trail.

Cumulative Effects

The cumulative effects analysis considers past, present, and reasonably foreseeable actions upon CDNST trail segment located on the Gila National Forest as well as the CDNST trail easement segment located between the Black Range and Reserve Ranger Districts for the next twenty years.

Past Actions

As mentioned, trail routes have been constructed to move the CDNST off of road routes. Most of this work has occurred on the Quemado and Silver City Districts. The Valle Tio Vinces CDNST Trailhead has been upgraded with a trail constructed to access the CDNST.

As previously mentioned, the 2012 Whitewater Baldy Fire Area currently has a closure order in place that closes the upper portion of the Catwalk National Recreation Trail and Area for public safety. An additional closure has been implemented at the Catwalk in June 2013 due to a rock slide and flooding potential. This closure is temporary and will be lifted as soon as safety conditions warrant.

The BLM has facilitated a trail easement within the Continental Divide WSA between the Black Range and Reserve Districts that is administered by the BLM Socorro Field Office.

Ongoing and Future Foreseeable Actions

Implementation of District Plans for CDNST reroutes (separate from the travel planning process) will further reduce the mileage of CDNST route following an open road (table 38).

Additional analysis will be conducted in the future to consider reducing additional mileage of CDNST traveling on roads. The CDNST District Plans propose to construct reroutes that would reduce the amount of trail on motorized road system. Work with forest and volunteer crews will occur in the John Kerr area of the Reserve District routing the trail off system roads summer 2013.

Table 38. Continental Divide National Scenic Trail motorized route indicators, district CDNST proposed plans

Motorized Route Indicators	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Number of miles where the CDNST follows an open motorized road	41.4	36.2	30.2	29.9	30.2	30.9
Number of miles where the CDNST follows an open motorized road						
Estimate After CDNST District Approved Plan Reroutes are completed	27.4	22.2	16.2	15.9	16.2	16.9
Number of miles where the CDNST follows a ML-1 (closed) road	5.31	10.55	15.07	16.85	15.02	14.35

The analysis for a long-term plan for the Catwalk National Recreation Trail began mid-summer 2013.

Cumulatively, there is likely to be a beneficial effect on the CDNST due to the Travel Management Rule proposed actions and proposed district reroutes moving the trail away from motorized routes to better meet the nature and intent of the trial.

Motorized Routes – Economics

Affected Environment

Trail Maintenance

Many trails including motorized trails are not maintained on an annual basis. An accurate number of unusable miles is unavailable, so the entire forest trail system will be used for this analysis. However, the total usable system is known to be much smaller, which would have a direct effect on the comparison of "equity" when using numbers of trail miles as an indicator. See table 22 in the roads section of the FEIS for miles of roads maintained based on annual forest road budget allocations.

Total estimated 5-year average of forest trail needs from (2005 to 2010 Average National Trail Cost figures) for the Gila National Forest follows: Total Operations $277,873, Deferred Maintenance $4,085,922, Annual Trail Maintenance $870,769, and Trail Capital Improvement (Trail Reconstruction) $2,948,985. The total (2005-2010 average Allocation figure) for funding the Gila National Forests Trails Program including Operations, Maintenance, and Trails Capital Investment is $485,554. See glossary for description of trail funding types. This Operations, Annual Maintenance, and Capital Investment funding currently goes to maintain the nonmotorized trail system on the forest. The Gila National Forest has the highest number of trail miles of any forest in the Southwestern Region.

Environmental Consequences

As described above, currently annual budgets to support trail maintenance work are insufficient to maintain all the miles of the forest's trail system to standard. Out-year budget funding projections are currently unknown. No alternative would change the amount of funds available for trail maintenance. Table 39 shows estimated cost for maintenance and operations for each alternative for the motorized trail system.

With the exception of alternative E, all action alternatives increase the mileage of motorized trails and associated motorized trail maintenance needs. Alternative E with the least motorized mileage is the least costly, while alternative C with the most motorized trail mileage is the most costly of the alternatives. Although the estimated motorized annual maintenance cost is below the average allocation figure of $485,554, this funding would be used for both the motorized and nonmotorized trail system. As discussed previously, there are 1,608 miles of foot/horse trail opportunities on the forest. The effect could be a designated motorized trail system that is not maintained to standard on a yearly basis (table 39).

Table 39. Projected trail maintenance and operations costs for motorized trail system by alternative

Alternative	# Miles Motorized Trails Designated for Motorized Use*	Annual Maintenance Needs/Mile	Annual Cost
B	15.8	$900**	$14,220***
C	203.4	$900	$183,060
D	123.5	$900	$111,150
E	1.5	$900	$1,350
F	178	$900	$160,020
G	178	$900	$160,020

*Does not include mileages of motorized trails open for periodic administrative use of by written authorization only for ATV access

**Average Trail Class 3 costs for operations and maintenance per year

***Currently this amount is not being spent on motorized trail maintenance.

Cumulative Effects

For all alternatives, volunteers who maintain trails help stretch the trail maintenance budget. Volunteers enable the forest to accomplish more maintenance with fewer dollars. Grants and other sources of funding could be a viable option for increasing the forest's ability to maintain the motorized and nonmotorized trail system. Having a designate motorized trail system has the potential to improve the forests chances to be competitive to obtain grants. While grants and volunteers cumulatively increase the amount of trails the Gila could maintain, it isn't expected to be enough to maintain every trail on the system on an annual basis with the potential for some trails to eventually pose a safety hazard.

Motorized Dispersed Camping

Affected Environment

Motorized dispersed camping occurs in undeveloped areas, usually adjacent to roads, trails, and water areas, particularly streams and riparian areas. Forests in the Southwestern Region receive some of the highest dispersed use in the nation (USDA Forest Service 2012), likely due to open vegetation and year-round sun. Though not identified among the Gila National Forest's geospatial inventory of features, or identified within the Infra data base with data on condition or location of dispersed campsites, there are numerous locations throughout the transportation system where motorized dispersed camping traditionally occurs (i.e., camping with the use 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 drive off the road system and park where they can have privacy. Many public comments regarding motorized access to dispersed campsites emphasize the importance of this type of dispersed recreation opportunity. Many comments expressed support for the continuation of motorized dispersed camping, but there were those opposed to the designation motorized dispersed camping corridors because of the possibility of increasing resource damage within the corridors and potential for overcrowding. Other comments expressed concern that the amount of corridors proposed were too few and or narrow and would limit motorized dispersed camping opportunities on the forest.

Currently on the Gila National Forest, 2,443,391 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 roads. Many motorized dispersed camping sites within 300 feet from road are consistently used. Many areas are used on an annual basis by large family gatherings during the summer seasons and hunting parties during the fall. Rarely are new dispersed camping areas created, and when they are, they are likely to only be used once because the “good” or “favorite” spot was already taken. Conversely, in some cases, campsites can be transitional during hunting season due to weather conditions, game presence, and the success of drawing a big game permit.

Environmental Consequences

The following are the direct and indirect effects of proposed actions that relate to the issues presented for corridors for motorized dispersed camping. The effects of the action alternatives discussion is based on the data tables located in appendix D of the Recreation Specialists Report (USDA Forest Service 2013b1). To display opportunities for dispersed camping for hunting access, miles per acres motorized access for dispersed camping are displayed by New Mexico Department of Game and Fish game management unit (GMU) and estimated travelable ground considering slope factor, eligible wild and scenic rivers outside wilderness and CDNST located within a proposed corridor. Proposed motorized dispersed camping within IRAs and WSAs is discussed in those sections. The discussion below focuses on the recreation opportunities available for motorized dispersed camping under the action alternatives. Areas (as opposed to corridors) proposed for dispersed camping are analyzed under the motorized areas issue.

Corridors for Motorized Dispersed Camping Indicators

- Miles per acres of corridors for motorized access for dispersed camping available by NMDGF GMUs, and estimated travelable ground and eligible wild and scenic rivers outside wilderness. Motorized dispersed camping for IRAs and WSAs is included in the IRA and WSA sections of this document.

Assumptions Common to All Action Alternatives Regarding Motorized Dispersed Camping

- Implementing the Travel Management Rule only affects motorized dispersed camping (i.e., travelling off the designated NFS road system with a vehicle to set up a camp); it does not affect dispersed camping by any other nonmotorized means. Dispersed camping by any other nonmotorized means, such as parking within one vehicle length (including

vehicle and trailer) alongside a designated open road and walking into a dispersed campsite to set up camp would continue to be allowed anywhere on the forest in all action alternatives.

- Corridors for motorized dispersed camping are meant solely for the purpose of motor vehicle access to dispersed campsites. These corridors would be limited to what is needed to provide direct ingress and egress to the campsite, with the campsite the base of activity. These corridors would not be open to unrestrained motor vehicle use, i.e., driving a motor vehicle outside that which is needed to drive to and from the campsite.
- Concern was expressed that designation of routes and corridors for motorized dispersed camping would confine people to a smaller area with the potential for resource damage and concentration of use at the reduced number of dispersed campsites that are available for motorized access under the various alternatives.
- In general forest areas, the FY11 NVUM shows the average crowding rating was 3, where 1 denotes hardly anyone there, and 10, perceived as over-crowded. Of the visitors surveyed, 11.5 of the responses fall in a crowding rated over 5, while 87.6 percent of the responses fall in a lower crowding rating of under 5.
- Game Management Unit 21 B contains no proposed designation for motorized dispersed camping in any of the action alternatives; however, there are only 140 acres of land within this GMU located on the Gila National Forest.
- There are no proposals for motorized dispersed camping within the following eligible wild and scenic river corridors outside of wilderness: Las Animas Creek, West Fork Gila River, and Whitewater Creek.
- Outfitters would be limited to the same corridors proposed for motorized dispersed camping. This has a potential to change the type of hunting opportunity provided to the public.

Effects Common to All Action Alternatives Regarding Motorized Dispersed Camping

- Some campers may leave the Gila 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 because these campgrounds may not be in desired locations, campsite availability may be limited, and this may not be the type of camping they prefer. Equally, using developed campgrounds does not provide for the privacy and solitude important to many motorized dispersed campers. It is difficult to predict if or how dispersed camping visitor use would change under the various action alternatives.

Alternative B

Under alternative B, all 4,526.8 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 into a dispersed campsite. In addition, because the forest is open to motorized cross-country travel (except for in wilderness and other areas closed by the forest plan and forest order) people may also drive off-road for any distance and set up a camp. This includes driving off of any segment of the CDNST that is currently located on a road (41.4.miles) and within IRAs, WSAs, and GMUs.

Currently on the Gila National Forest, 2,443,391 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 roads.

Alternative B, the no action alternative with no prohibitions on cross-country travel, does not meet the intent of the Travel Management Rule. The no action alternative is required by 40 CFR 15602.14(d) and is presented to provide a baseline for comparison of effects of the alternatives.

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 access dispersed campsites with a vehicle, 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 addition of unauthorized routes through the establishment of new dispersed campsites. 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 camp sites 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 4,526.8 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 term and long term.

In this analysis, the entire acreage (approximately 2.44 million acres) of NFS land on the Gila outside of wilderness and other areas restricted to off-road vehicle use was used to describe alternative B, the existing condition regarding motorized dispersed camping.

Like motorized routes, it is acknowledged that slope, topography, and vegetation may limit motor vehicle use and motorized access to dispersed campsites. Using 25 percent as a maximum slope for vehicle travel, approximately 1.16 million of the 2.44 million acres is more likely available for motorized dispersed camping. The design parameter for maximum slope for short pitches recommended for construction of 4x4 vehicles is 25 percent (FSH 2309.18 (USDA Forest Service 2008a). This is just an approximation and motor vehicle use may still be limited by topography and vegetation across the landscape.

The addition of unauthorized routes is also a possible effect of this alternative. Cross-country travel for motorized dispersed camping has the possibility of creating travel ways and new dispersed campsites. In the long term, the addition 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

This alternative proposes corridors for motorized dispersed camping along 1,538.1 miles of NFS roads designated for motorized travel encompassing 110,780 acres. Within the GMUs, there are

approximately 1,510.8 miles and 108,174 acres of proposed corridors for motorized dispersed camping. Approximately 70 miles of corridors are located along county roads.

Most campers may 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 providing the most miles of road and associated acres of corridors for motorized dispersed camping within GMUs, IRAs, WSAs, eligible wild and scenic rivers outside wilderness, and miles of CDNST within proposed corridors.

Alternative D

This alternative proposes corridors for motorized dispersed camping along 1,183 miles of NFS roads designated for motorized travel encompassing 85,921 acres. These same corridors will also be open to motorized big game retrieval. Within the GMUs, there are approximately 1,171 miles and 84,384 acres of proposed corridors for motorized dispersed camping. Thirty-four of these miles of corridors are located along county roads.

This alternative does not propose the designation of any areas for motorized dispersed camping. All motorized dispersed camping will be limited to roadside parking and within the proposed corridors.

The effect of this reduction in opportunity is not likely to be great. Most campers may 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 within IRAs, WSAs, wild and scenic rivers outside wilderness and GMUs, 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. The same mileage and acreage of corridors within wild and scenic rivers is proposed within alternatives C and D 0.99 mile per 89 acres.

Alternative E

No corridors for motorized dispersed camping are proposed for designation in this alternative – a 100 percent reduction in opportunity from what currently exists. Alternative E ranks last among the five action alternatives in providing motorized access opportunities for dispersed camping.

The public would be restricted to parking within one vehicle length including a trailer, on both sides of an open road where it is safe and feasible to do so. They would be able to use this as their campsite or walk further in to find a place to camp. Non-motorized dispersed campers are not likely to be affected since this reflects 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 of routes to dispersed camp, would be most affected by this alternative.

Alternative F

This alternative proposes corridors for motorized dispersed camping along 1,447 miles and of NFS roads designated for motorized travel encompassing 104,390 acres. Within the GMUs, there are approximately 1,421.6 miles and 101,911 acres of proposed corridors for motorized access for dispersed camping. Sixty-two miles of these corridors are located along county roads.

Most campers may 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 within IRAs, WSAs, eligible wild and scenic rivers outside wilderness and GMUs. It is anticipated that most motorized campers will be accommodated by this alternative.

Alternative G

This alternative proposes corridors for motorized dispersed camping along 1,327 miles and of NFS roads designated for motorized travel encompassing 95,994 acres. Within the GMUs, there are approximately 1,421.6 miles and 101,911 acres of proposed corridors for motorized dispersed camping. Forty eight of these miles of corridors are located along county roads.

Most campers would 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 within IRAs, WSAs, eligible wild and scenic rivers and GMUs.

It is anticipated that most motorized campers would 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 dispersed camping experiences and opportunities for some campers by limiting choice and the potential to concentrate use.

Cumulative effects

The cumulative effects analysis evaluates past, present, and reasonably foreseeable actions upon motorized dispersed camping opportunities on the Gila National Forest, and forests in the Southwestern Region located in New Mexico for the next 20 years.

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 in all action alternatives. With the proposed restrictions on cross-country travel, there would be a potential to affect motorized dispersed camping experiences and opportunities due to a more limited choice of motorized dispersed campsites with the potential to concentrate use.

As mentioned in the motorized routes section, all national forests in the Southwestern Region are either in the process of travel management planning or implementing existing Travel Management Plans. Selection of any of the action alternative would contribute to a statewide reduction in places to drive and camp next to your car on public land. Private land owners offer camping throughout the state. This would cumulatively add to this concept.

The following depicts Travel Management Decisions being implemented on New Mexico forests within the Southwestern Region regarding motorized dispersed camping:

New Mexico

Santa Fe National Forest – Motor vehicle use 150 feet off both sides of centerline roads on specific routes are designated for both motorized dispersed camping and motorized big game retrieval for deer or elk.

Lincoln National Forest – Motor vehicle use off of designated roads or trails for the purpose of dispersed camping is permitted for up to 300 feet from the centerline of road or trail for the same period as permitted for that road or trail as specified on the motor vehicle use map.

Cibola National Forest – Mount Taylor and Sandia Ranger Districts, Black Kettle and McClellan Creek National Grasslands. Designates specific road routes for limited cross-country motor vehicle use within 300 feet of that route, solely for the purpose of dispersed camping

Carson National Forest – Jicarilla, Questa, El Rito, Tres Piedras, and Canjilon Ranger Districts. Motor vehicle use off of designated roads or trails for the purpose of dispersed camping or big game retrieval is permitted for up to 300 feet from the centerline of road or trail or 150 feet from the centerline of road or trail as specified on motor vehicle use map.

Motorized Big Game Retrieval

Affected Environment

Motorized big game retrieval involves the use of full-size vehicles, ATVs, and UTVs and occurs throughout the non-wilderness portions of the forest where vehicle use or cross-country travel is allowed. Motorized vehicles are used primarily to retrieve elk and deer, although some responses 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 commenters reported 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. Other hunters mentioned they do not use a vehicle to retrieve their game. A separate issue for some commenters was for the potential for 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.

Portions of 11 game management units (GMUs) administered by the New Mexico Department of Game and Fish, are located within the administrative boundary of the Gila National Forest. Motorized Route Densities per Game Management Unit: GMUs 16 B, 21A, and 22 have the lowest motorized route densities and have the largest numbers of acres located within wilderness areas. GMU 16 E has the highest road densities. The total number of miles of motorized roads for GMUs is 5,217 miles, which includes Forest Service, State and Federal highways, and county roads. Executive Order 13443 (2007) Facilitation of Hunting Heritage and Wildlife Conservation directs Federal agencies “to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.”

Environmental Consequences

Corridors for Motorized Big Game Retrieval Indicators

- Motorized Route Densities by New Mexico Department Game and Fish (NMDGF) Game Management Units (GMUs)

- Miles per acres of corridors for motorized access for dispersed camping available by NMDGF GMUs and estimated travelable ground considering slope factor and wild and scenic rivers outside of wilderness. IRAs and WSAs are presented within those sections.
- Miles per Acres Continental Divide National Scenic Trail (CDNST) located within proposed corridors for motorized access for dispersed camping
- Number of maximum trips per proposal estimated per hunting success of game proposed for retrieval

Assumptions Common to All Action Alternatives

- Fixed distance corridors for motorized big game retrieval are meant solely for the purpose of motor vehicle access to retrieve downed game. These corridors would not be open for use with a motorized vehicle to hunt and scout game. These corridors would not be open to unrestrained motor vehicle use, i.e., driving a motor vehicle outside that which is needed to drive to and retrieve a game animal.
- Motorized big game retrieval only applies to those portions of GMU 15,16A,16B, 16C, 16D, 16E, 21A, 22, 23, and 24. Hunters must possess a valid big game license for one of these listed GMUs.
- All applicable New Mexico hunting regulations must be followed. To protect forest resources on forest roads or within fixed distance corridors applicable laws or regulation 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 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 2008)
- Proposed corridors for motorized big game retrieval would be from NFS roads. No corridors for motorized big game retrieval are proposed from designated motorized trail routes.
- Hunting outfitters would be limited to the same corridors proposed for motorized big game retrieval. This has a potential to change how the outfitter would retrieve game for their clients.

The following are the direct and indirect effects of proposed actions that relate to the issues presented for motorized access for big game retrieval. The effects of the action alternatives discussion is based on the data tables and listed indicators that are presented within Motorized Big Game Retrieval Indicator Tables located within appendix E of the Recreation Specialist Report (USDA Forest Service 2013b1).

Alternative B

Under this alternative, 2.44 million 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 plan and 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. Game species hunted within all GMUs on the forest include deer, elk, javelina, bear, mountain lion, and antelope.

Adding average harvest data together for all species hunted on the forest, a maximum of 3,205 trips could currently occur. This assumes all successful hunters would use motorized vehicles to retrieve their game. In addition to the number of trips, one must consider the lengths of each hunting season for each of the species allowed. With the variety of species allowed under this alternative, this alternative allows the most days when game retrieval could occur.

Motorized route densities per NMDGF GMU are 1.6 miles per square mile. GMUs 16 B, 21A, and 22 with the lowest motorized route densities have the largest numbers of acres located within wilderness areas. GMU 16 E has the highest road densities. The total number of miles of motorized roads for GMUs is 5,217 miles.

A 3-year study conducted by Rocky Mountain Research Station tracked hunters with global positioning systems (GPS) during hunting season to examine elk-hunter behavior and movement patterns within an area in western Montana that has no motorized access (Lyon and Burcham 1998). The study found that hunters who go the greatest distance from trailheads spend a great deal of time on closed roads. Where such roads are present, horses, bicycles and walking are highly effective transportation modes. An important observation from the study is that closed roads have a significant impact on hunter behavior. The study hypothesizes that closed roads facilitate access to areas most distant from open roads and trailheads. This study also found that less than half of the hunters traveled no farther than 1.6 miles from their starting point and only 12.5 percent of the hunters traveled as far as 2.8 miles from where they started. Although motorized access for big game retrieval is currently unlimited due to the forests being open to cross-country travel, this study indicates there could be limits on how far hunters are willing to travel off roads to hunt and retrieve game using modes of nonmotorized travel.

The addition 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 addition 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. This is also an affect for all action alternatives; however the potential affect to visuals is the most likely and most far reaching in the no action alternative.

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 open roads (4,526.8 miles), and county roads (255.8 miles) for retrieval of elk, deer, bear, mountain lion, javelina and pronghorn. Adding average harvest data together for these species, a maximum of 3,205 trips could occur in this alternative, the same as alternative B. Season lengths would be the same as alternative B, see effects above. 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 the most mileage per acreage available for motorized big game retrieval. Alternative C allows for retrieval of multiple game species identified through public scoping, represents the most number of species among the action

alternatives proposed, with the widest corridor width and the most miles of corridor proposed. Depending upon hunting preferences, this alternative benefits hunters and outfitters who choose to retrieve game using motorized modes of transportation. Of the action alternatives, Motorized Route Densities per NMDGF GMU are the highest in alternative C, 1.5 miles per square mile. This is a 0.1 mile per square mile reduction in road densities from the no action alternative B. In GMU 23, there is a slight increase in densities due to proposed motorcycle and ATV routes in the Burros. This alternative provides the most motorized access for hunting and game retrieval with a total of 4,879.8 miles of roads within the GMUs. Depending upon hunting preferences, this alternative benefits hunters who choose to retrieve game using motorized modes of transportation.

This alternative reduces motorized big game retrieval opportunities from what currently exists (forest open to cross-country travel) to a mile from each side of open designated road system. This alternative proposes the most mileage and acreage (4,879.8 miles per 2,078,551 acres by GMUs) among the five action alternatives in terms of motorized big game retrieval opportunities. When considering the slope factor, 1,639,672 acres would be available for motorized access for big game retrieval.

Of this mileage proposed, 0.99 mile per 89 acres in eligible wild and scenic rivers outside wilderness and 189.3 miles of CDNST would travel through a corridor for motorized big game retrieval. As stated in the motorized dispersed camping section, this alternative provides the least nonmotorized opportunities on the CDNST. For hunters who retrieve game with motorized vehicles, the change from open, cross-country travel to the use of 1-mile-wide corridors represents a fundamental change in policy. This would only affect those hunters who currently retrieve big game with vehicles from more than 1 mile from either side of a roadway.

Alternative D

Under this alternative, a 300-foot wide corridor for the purpose of big game retrieval would be designated along both sides of 1,171.0 miles of road. The corridors proposed under this alternative correspond to the motorized dispersed camping corridors in the alternative. Alternative D allows for the retrieval of elk and deer species only. Average harvest data for deer and elk show a maximum of 2,633 trips could occur during the 108 days of elk and deer season in this 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. Alternative D ranks fourth among the five action alternatives in terms of providing acreage available for motorized big game retrieval. This alternative benefits hunters who choose to hunt using nonmotorized modes of transportation. There is a possibility of dissatisfaction by hunters who currently retrieve big game using a motor vehicle for distances greater than 300 feet and hunters who use a motorized vehicle to retrieve javelina, pronghorn, and bear.

Motorized route densities per NMDGF GMU are the second lowest in alternative D. There are 3,592.8 miles of road proposed for designation within the GMU.

Of the 1,171 miles per 84,384 acres, 78,930 acres are available when considering slope factor; 13.15 miles of CDNST would travel through a corridor which would allow motorized big game retrieval and motorized dispersed camping.

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 1,171.0 miles of roads designated for motorized dispersed camping under this alternative. Public comments expressed concerns motorized dispersed camping and big game retrieval within the same designated corridors would result in a concentration of users. With the proposal to restrict motorized dispersed camping and motorized big game retrieval within the same corridors, hunting-related ATV activities associated with motorized dispersed camping and motorized big game retrieval would be the same as those opportunities provided for other ATV recreationists.

Alternative E

No motorized big game retrieval would be allowed in this alternative—a 100 percent reduction from what currently exists. Alternative E ranks last among the five action alternatives in terms of providing mileage per acreage or opportunity for motorized big game retrieval. There are no corridors proposed within IRAs, WSAs, wild and scenic river corridors outside wilderness, or CDNST traveling through a proposed corridor. This alternative provides the most nonmotorized experience for users of the CDNST.

Motorized route densities per NMDGF GMU are the lowest in alternative E. Depending upon hunting preferences, this alternative benefits hunters who choose to scout, hunt, and retrieve game with nonmotorized modes of transportation. There are 2,904.3 miles of road proposed for designation listed within the GMU. There is a 1.6-mile ATV trail located in Sycamore Canyon that provides access to private land. There are also 6.6 miles of motorized trail designation for ATV only proposed for periodic administrative use or by written authorization only for access by ATV only.

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 by or with aid of pack and saddle stock, this alternative has the most potential to impact elderly and mobility-impaired hunters. This alternative would have the most potential to affect hunting-outfitted operations. This alternative also has the potential to increase the number of hunters who would hunt closer to roads. Comments received expressed concern that game would be wasted if hunters did not have the ability to retrieve game by motorized means. Regardless of hunter preference (motorized or nonmotorized), responsible hunters will consider retrieval of the animal prior to the taking.

Alternative F

Under this alternative, a one-half-mile-wide corridor solely for the purpose of motorized big game retrieval would be designated along both sides of 3,246.8 miles of road including county (462.6 miles), and State (255.8 miles). This would amount to 1,506,508.2 acres. These open acres would represent opportunity for motorized big game retrieval purposes only, restricted to a one-half-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 and state and county roads. 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. Average harvest data for elk show a maximum of 1,311 trips during an 89-day hunting season could occur in this alternative.

Motorized route densities per NMDGF GMU are very similar in alternatives F and G. There are 3,978.1.3 miles of road proposed for designation listed within the GMU.

Of the 3,978.1 miles per 1,506,508 acres, 1,253,957 acres are available when considering slope factor. Of this mileage proposed, 0.99 mile per 446 acres within eligible wild and scenic rivers outside wilderness and 141.62 miles of CDNST would travel through a corridor that would allow motorized big game retrieval. This represents the second most amount of motorized game retrieval associated with the CDNST.

Alternative G

The difference in this alternative with alternative F is the reduction in opportunities for motorized dispersed camping and big game retrieval. Under this alternative, a 300-foot wide corridor for the purpose of big game retrieval would be designated along both sides of 1,308.3 miles of road. This would amount to 94,004 acres or 87,693 acres are available when considering slope factor. The corridors proposed under this alternative correspond to the motorized dispersed camping corridors proposed 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. This alternative 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. Average harvest data for deer and elk show a maximum of 2,633 trips during a 108-day hunting season could occur in this alternative.

Motorized route densities per NMDGF GMU are very similar in alternatives F and G. There are 3,949.0 miles of road proposed for designation listed within the GMU.

Of the 1,308.3 miles per 94,004 acres, 87,693 acres are available when considering slope factor. Of this mileage proposed, 0.83 mile per 70 acres within eligible wild and scenic rivers outside wilderness and 14.1 miles of CDNST would travel through a corridor that would allow motorized access for big game retrieval. This alternative proposes the least amount of miles and acreage of motorized big game retrieval within a wild and scenic river. This mileage is 1 mile more than proposed in alternative F for motorized game retrieval associated with the CDNST.

Those hunters with a desire or need for using motorized vehicles to retrieve big game are restricted to the 1,308.3 miles of roads designated for motorized dispersed camping under this alternative. With the proposal to restrict motorized dispersed camping and motorized big game retrieval within the same corridors, hunting-related ATV activities associated with motorized dispersed camping and motorized big game retrieval would be the same as those opportunities provided for other ATV recreationists.

Concern was raised in comments that a hunter’s inability to use motor vehicles to retrieve big game could lead to wanton waste of the animal. Regardless of hunter preference (motorized or nonmotorized), responsible hunters will consider retrieval of the animal prior to the taking.

Cumulative Effects

The cumulative effects analysis evaluates past, present, and reasonably foreseeable actions upon motorized big game retrieval opportunities on the Gila National Forest and forests in the Southwestern Region located in New Mexico for the next 20 years.

The change from open, cross-country travel to the use of designated corridors for big game retrieval in all action alternatives has the potential to exclude places and areas where hunters have previously used a motorized vehicle to retrieve game. With the proposed restrictions on cross-

country travel, there would be a potential to affect hunters' experiences and opportunities due to a more limited choice of retrieving game with a motorized vehicle.

As mentioned in the motorized routes and motorized dispersed camping sections, all national forests in the Southwestern Region are either in the process of travel management planning or implementing existing Travel Management Plans. Selection of any of the action alternatives would contribute to a statewide reduction in places to drive a vehicle to retrieve game.

The following depicts Travel Management Decisions being implemented on New Mexico forests within the Southwestern Region regarding motorized big game retrieval:

New Mexico

Santa Fe National Forest – Motor vehicle use 150 feet off both sides of centerline roads on specific routes is designated for both motorized dispersed camping and motorized big game retrieval for deer or elk.

Lincoln National Forest – Motorized vehicle use off designated roads and trails for the purpose of game retrieval is not permitted on the forest.

Cibola National Forest –Mount Taylor and Sandia Ranger Districts Black Kettle and McClellan Creek National Grasslands. Motorized big game retrieval is not permitted off of designated routes on the above ranger districts and grasslands on the forest.

Carson National Forest – Jicarilla, Questa, El Rito, Tres Piedras, and Canjilon Ranger Districts.

Motor vehicle use off of designated roads or trails for the purpose of dispersed camping or big game retrieval is permitted for up to 300 feet from the centerline of road or trail or 150 feet centerline of road or trail as specified on the forest motor vehicle use map.

All New Mexico forests have coordinated with New Mexico Department of Game and Fish regarding motorized big game retrieval.

Motorized Areas

Affected Environment

The forest is currently open to motorized cross-country travel, except in wilderness areas and where specified closed. Since there are currently no restrictions on motorized use within this area, the 2,443,391 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 activities.

Big game hunting, for example, often includes elements of nonmotorized and motorized activities, and sometimes includes cross-country travel to scout, hunt, and 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 addition 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.

Environmental Consequences

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 resource damage and conflict between motorized and nonmotorized user groups.

In the long term, the addition 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

Alternatives C, F, and G propose to designate 36 areas totaling 24 acres for use by all motor vehicles classes, and one 3-acre area restricted to only ATV and motorcycle use on the Reserve Ranger District. The 36 areas proposed for use by all vehicle classes are composed of traditional motorized dispersed recreation camping areas throughout the forest. These are typically areas that have already been disturbed and receive predictable use by forest visitors. Some of these areas were also identified through public input. As discussed in alternative B, since the forest is currently open to motorized cross-country travel, these areas are currently providing motorized access to dispersed campsites. The designation of these areas does not change the management and what is currently occurring on the ground at these sites. Table 40 displays the acreage of these proposed sites in the alternative B the existing condition.

The prohibition on cross-country motorized travel included in all action alternatives has the potential to impact many motor vehicle users. The 36 motorized areas proposed in this alternative will continue to provide motorized dispersed camping at these sites/areas and fulfill needs and desires of the forest visitors who have traditionally utilized these sites/areas. Three GMUs, 15, 16B, and 24 have areas proposed that have dispersed camping areas that have been traditionally used during hunting seasons. See table 40 for acres of proposed areas by alternative and GMU.

Table 40. Acres of proposed motorized areas by game management unit

GMU	GMU Acres FS Ownership	Alt. B *Acres	Alt. C Acres	Alt. D Acres	Alt. E Acres	Alt. F Acres	Alt. G Acres
15	598,970	598,970	12.14	0.00	0.00	12.14	12.14
16B	5,99,314	599,314	10.27	0.00	0.00	10.27	10.27
24	297,208	297,208	1.28	0.00	0.00	1.28	1.28
TOTAL	1,495,492	1,495,492	23.69	0.00	0.00	23.69	23.69

*No prohibition on cross-country motorized vehicle travel: proposed areas are currently open.

Area RA-1, the 3-acre area proposed for ATV and motorcycle use under these alternatives is located in the reserve area within GMU 15 (acreage not included in table 40) and is a previously disturbed area that currently receives substantial motorized use. Current motorized use and opportunities will continue under these alternatives.

Alternative D

No areas are proposed under this alternative. This alternative proposed roads into these areas, limiting camping to just roadside parking. This limits the motorized camping opportunities that are currently available with possible visitor dissatisfaction.

RA-1, the 3-acre area located on the Reserve Ranger District would no longer be available for off-road travel for ATVs and motorcycles. There is the possibility of user dissatisfaction by current motorized users of the area over the loss of this motorized access and opportunity.

Alternative E

No areas are proposed within this alternative. Motorized access to dispersed camping would be limited to parking along roadways one vehicle length including a trailer. This limits the motorized camping opportunities that are currently available with possible visitor dissatisfaction.

RA-1, the 3-acre area located on the Reserve Ranger District would no longer be available for off-road travel for ATVs and motorcycles. There is the possibility of user dissatisfaction by current motorized users of the area over the loss of this motorized access and opportunity.

Cumulative Effects

The cumulative effects analysis evaluates past, present, and reasonably foreseeable actions upon motorized area opportunities on the Gila National Forest, and forests in the Southwestern Region located in New Mexico for the next 20 years.

The change from open, cross-country travel to the designation of areas in all action alternatives has the potential to exclude places and areas where motorized users have previously used a motorized. With the proposed restrictions on cross-country travel, there would be a potential to affect experiences and opportunities for motorized users due to a more limited choice of where a motorized vehicle can travel.

As mentioned in the motorized routes, motorized dispersed camping and motorized big game retrieval sections, all national forests in the Southwestern Region are either in the process of travel management planning or implementing existing travel management plans. Selection of any of the action alternatives would contribute to a statewide reduction in places to drive a motor vehicle.

The following depicts Travel Management Decisions being implemented on New Mexico forests within the Southwestern Region regarding motorized dispersed camping:

New Mexico

Santa Fe National Forest – Designates areas for cross-country travel on the forest

Lincoln National Forest – There are no areas designated open to cross-country motorized travel on the forest

Cibola National Forest –Mount Taylor and Sandia Ranger Districts Black Kettle and McClellan Creek National Grasslands – There are no areas open to cross-country motorized uses on the Mount Taylor Ranger District

Carson National Forest – Jicarilla, Questa, El Rito, Tres Piedras, and Canjilon Ranger Districts – There are no areas open to cross-country motorized uses on the Tres Piedras, Canjilon, and El Rito Ranger Districts.

Recreation Opportunity Spectrum

Affected Environment

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. Visitors' perceptions and experiences are very difficult to analyze with any reliability. The recreation opportunity spectrum was developed by forest managers to better understand the public need for recreational opportunities, but with the understanding that not all opportunities can be provided on all areas of land (ROS Redbook) (USDA Forest Service 1986a).

Forestwide Existing and Desired Condition for each Opportunity Class:

- **Primitive**

  Existing Condition – 526,611 acres, or 16 percent of the forest.
  Desired Condition – 326,363 acres, or 10 percent of the forest.

- **Semi-Primitive**

  Existing Condition – 787,063 acres, or 24 percent of the forest.
  Desired Condition – 1,023,684 acres, or 31 percent of the forest.

- **Semi-Primitive Motorized**

  Existing Condition – 240,940 acres, or 7 percent of the forest.
  Desired Condition – 194,169 acres, or 6 percent of the forest.

- **Roaded Natural**

  Existing Condition **–** 1,768,071 acres, or 53 percent of the forest.
  Desired Condition – 1,771,995 acres, or 53 percent of the forest.

- **Rural**

  Existing Condition – 5,083 acres, or less than 1 percent of the forest.
  Desired Condition – 7,647 acres, or less than 1 percent of the forest.

The designations identified for recreation opportunity spectrum within the forest plan are objectives to meet management goal to optimize users' recreation experiences on the Gila National Forest. These categories are not prescriptive, for example the recreation opportunity spectrum categories of semi-primitive motorized and roaded natural do not require a minimum miles of roads or motorized trails within these opportunity classes.

Environmental Consequences

Data limitations:

There is no GIS layer for recreation opportunity spectrum. Mapping is incomplete; a portion of one Ranger District is missing. Due to technological changes and budget constraints, recreation opportunity spectrum information has not been transferred from old Forest Service maps. When the Gila National Forest begins forest plan revision efforts, a digital mapping update for the forest will be completed.

Without a GIS layer of the existing recreation opportunity spectrum classes a quantitative comparison of recreation opportunity spectrum by alternatives cannot be completed. Each alternative provides a different array of recreational opportunities across the forest. Additional discussion of semi-primitive recreation opportunity spectrum within IRAs is included within the IRA section.

In general, alternative E proposes the least motorized routes, and no corridors for dispersed camping and big game retrieval, or motorized areas emphasize opportunities for Primitive and Semi-Primitive Non-Motorized recreational pursuits. In contrast, alternative C proposes the most mileage of motorized routes, corridors for dispersed camping and big game retrieval, and motorized areas emphasize opportunities for Roaded Natural and Semi-Primitive motorized recreational pursuits. Alternatives D, F, and G fall within the spectrum with a mix of motorized and nonmotorized proposals providing a mix of recreation opportunity settings.

Cumulative Effects

The cumulative effects analysis evaluates past, present, and reasonably foreseeable actions upon the spectrum of recreation opportunities on the Gila National Forest for the next 20 years. All action alternatives would continue to provide a mix of motorized and nonmotorized opportunities.

Visual Quality Objectives

Affected Environment

The forest plan provides goals for visual quality and implements the visual management system as described on page 26 of the forest plan (USDA Forest Service 1986). 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 are further described including acceptable level of change in the recreation specialist's report (USDA Forest Service 2013b1).

Environmental Consequences

Data Limitations

There is no GIS layer for visuals. Due to technological changes and budget constraints, visual quality objective information has not been transferred from old Forest Service maps. When the Gila National Forest begins forest plan revision efforts, an inventory will be initiated using the Scenery Management System (SMS) process which replaces the visual quality objective process. The visual quality objective visual management system will continue to be used until completion of the Forest Plan Revision Process and is used for this scenery analysis.

Assumptions Common to All Action Alternatives Regarding Visual Quality Objectives

- Implementation of any of the action alternatives would be consistent with the visual quality objectives for the Gila National Forest. Visual quality objectives for the forest include preservation, retention, partial retention, modification, and maximum modification.
- Visual quality could be improved in all action alternatives due to the prohibition of cross-country travel. Eliminating cross-country travel and limiting motorized use to designated routes would reduce the possibility of the creation of new unauthorized routes.
- Seasonal closures proposed for varying mileage in all of the action alternatives could contribute to improved visual quality because the closures would help to protect routes from erosion and rutting during the wet seasons.
- The compatibility of proposed changes to the forest transportation system with forest plan standards and guidelines for visual quality objectives are reviewed. 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 they exist in, 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 that have 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 objectives, both acceptable in areas where route additions are planned for.

Effects Common to All Action Alternatives Regarding Visual Quality Objectives

- The creation 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 objective (i.e., retention) may take on characteristics of a more modified landscape and exceed their prescribed visual quality objective.
- As described in the Gila Forest Plan (USDA Forest Service 1986), 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 proposed routes, corridors for motorized access for dispersed camping or big game retrieval, or areas under any of the proposed action alternatives are expected to exceed partial retention to modification visual quality objective where planned.

Cumulative Effects

The cumulative effects analysis evaluates past, present and reasonably foreseeable actions upon the spectrum of visual quality objectives on the Gila National Forest for the next 20 years. This timeframe was chosen because it is the longest anticipated period of time for natural rehabilitation of unauthorized routes (where achievable). Wildfires pose the most potential to cumulatively impact scenic resources. Wildfire is a part of the Gila National Forest ecosystem, however high severity large scale wildfires have the potential to remove the majority of vegetative cover from entire viewsheds. By removing the characteristic vegetation of an area which can expose unnatural linear features such as roads trails, and power lines there is a potential for a cumulatively downward trend.

Vegetation and fuels management are planned to have a net, long-term improvement to natural scenic quality although there may be short-term negative impacts during implementation. Mitigation measures and best management practices are designed to mitigate any short-term impacts that may occur from project implementation. Vegetation management under power lines would cumulatively impact viewsheds by altering the natural appearance of the landscape. Livestock grazing activities (past and ongoing) have impacted visual quality, but re-authorizations of grazing permits are designed to minimize impacts to the visual resource.

Cumulatively, forest scenery is expected to meet forest plan scenery objectives in all action alternatives. With the prohibition of cross-country travel there is a potential for visual quality to improve with the reduction of unauthorized routes.

Effects of Forest Plan Amendments

Amendments 1 through 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the Travel Management Rule.

Recreation – Special Management Areas

This section summarizes the inventoried roadless areas and wilderness study areas report (USDA Forest Service 2013b2).

Inventoried Roadless Areas (IRAs)

Affected Environment

In 1964, when Congress passed the Wilderness Act creating the National Wilderness Preservation System, the act directed the Secretary of Agriculture to complete a study of 34 administratively designated "primitive areas" and determine their suitability as wilderness by September 2, 1974.

In 1971, the Forest Service expanded the scope of the review to include all roadless areas in the inventory and evaluation. This process was known as the Roadless Area Review and Evaluation (RARE). The final environmental impact statement (FEIS) for RARE was completed and released in 1973. The FEIS identified 247 roadless areas to be studied further for possible wilderness status as part of the multiple-use planning process used at the time. The National Forest Management Act of 1976 (NFMA) replaced that process with the requirement for an integrated land and resource management plan for each forest and grassland.

Inventoried roadless areas (IRAs) were authorized by the 2001 Roadless Area Conservation Rule, 36 CFR Part 294. The "inventoried" part of the name comes from the Roadless Area Review and Evaluation (RARE) forests conducted in the 1970s and 1980s described above. The characteristics that follow describe attributes considered when areas were inventoried for roadless area designation under RARE:

- 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.

The Roadless Area Conservation Final Rule prohibits road construction, reconstruction, and timber harvest, except under certain circumstances, in inventoried roadless areas because they have the greatest likelihood of altering and fragmenting landscapes, resulting in immediate long-term loss of roadless area values. Roads and motorized trails can be present within IRAs. The Roadless Rule does not prohibit travel on existing roads or motorized trails.

Approximately 22 percent of the forest's land mass is located within 29 individual IRAs. The Gila National Forest's GIS inventory shows that there are 734,384 acres of IRAs on the forest.

A mix of Semi-Primitive Non-Motorized and Semi-Primitive Motorized opportunities within specific IRAs are provided on the Continental Divide Scenic Trail (CDNST). As described in the Motorized Routes and National Scenic and Recreation Trail section in the Recreation Specialists Report (USDA Forest Service 2013b2), 42.3 miles of the CDNST are located within the following IRAs: Gila Box; Meadow Creek; Contiguous to the Gila Wilderness; Contiguous to the Black and Aldo Leopold Wilderness; Dry Creek; Poverty Creek; Wahoo; and Stone Creek IRAs.

Currently 2.9 miles of the CDNST is located on roads open to motorized travel. These roads, open to all vehicle types, are located in the Gila Box, Wahoo Mountain, and Wagon Tongue IRAs. The forest plan designates 678,788 acres located within IRAs as Semi-Primitive Recreation Opportunity Setting (ROS). Semi-Primitive is defined as an area characterized by moderate opportunity for solitude in a predominantly unmodified natural environment with a moderate degree of trail maintenance.

The Headwaters of the San Vincente Draw (formally known as the Silver City Watershed) is located within the Meadow Creek IRA. Off-road travel is currently restricted within this watershed, the Hub IRA, and a portion of the Lower San Francisco IRA/WSA.

The following analysis includes all 29 IRAs located on the Gila National Forest. The Hell Hole and Lower San Francisco IRAs encompass the Hell Hole and Lower San Francisco Wilderness Study Areas (WSAs). Effects to the roadless characteristics with a narrower focus on these WSAs are also analyzed within the WSA section of this document.

Proposed Changes to Motorized Access within IRAs by Alternatives

Each action alternative proposes a combination of changes to the motorized route system that results in a net reduction of road mileages within IRAs (table 41). Data tables in their entirety associated with this analysis are located in Appendix A of the Recreation IRA/WSA report (USDA Forest Service 2013b2).

Table 41. Miles of motorized road and trail open to the public by alternatives within IRAs

Motorized Route	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
NFS roads open to the public for motorized use (miles)	362.1	296.7	198.1	156.4	226.4	223.3
NFS motorized trails (less than 50 inches in width and single-track (motorcycle)) (miles)	4.5	52.4	9.0	0	20.9	22.3

Alternative B

Of the 4,572.6 miles of NFS roads open to the public on the Gila National Forest, 362.1 miles of NFS roads and 4.5 miles of motorized trails provide motorized access within IRAs (table 41). There are more than 10 miles of county and state highways that also provide motorized access within IRAs. All 29 IRAs within the forest have some road mileages associated with them.

Ninety-seven percent of the forest roads located within IRAs are low volume, Maintenance Level 2 (ML-2) Roads. Cross-country travel is currently allowed within all IRAs providing opportunities for motorized dispersed camping and motorized big game retrieval.

Alternative C

Alternative C proposes designation of 296.7 miles of NFS roads and 52.4 miles of motorized trail opportunities within IRAs (table 41). This is a decrease of 65.4 miles of motorized road and an increase of 47.9 miles of motorized trail. Alternative C proposes to designate 35 miles of nonmotorized trail system for motorized single track use within IRAs.

Alternative C proposes the most miles and acres of motorized dispersed camping, 85 miles per 6,615 acres and motorized big game retrieval, 307.2 miles per 461,827 acres. The 1-mile corridor

on each side of designated routes for motorized big game retrieval is proposed for elk, deer, bear, mountain lion, javalina, and pronghorn. Since all successful hunters will not have hunted within an IRA and not all use motorized modes of transportation to retrieve their game, the maximum number of trips is estimated to be less than the forest total of 3,205 trips. Alternative C also proposes 0.97 acre of motorized area located within the Contiguous to Black and Aldo Leopold Wilderness Study Area. These areas, WA2, WA25, WA26, and WA27, are located on the Wilderness Ranger District in the McKnight, Kelly Mesa, and Dutchman areas. These proposed areas currently receive motorized use to access dispersed campsites and would be designated to provide motorized access to dispersed campsites (table 13).

Alternative D

This alternative proposes designation of 198.1 miles of NFS road and 9 miles of motorized trail opportunities within IRAs (table 41). This is a decrease of 164 miles of motorized road and an increase of 4.5 miles of motorized trail open to the public within IRAs.

This alternative proposes designation of 56 miles per 4,420 acres of the same 300-foot corridor on both sides of the road for motorized dispersed camping and motorized big game retrieval. Motorized big game retrieval is for deer and elk only. Since all successful hunters will not have hunted within an IRA and not all use motorized modes of transportation to retrieve their game, the maximum number of trips is estimated to be less than the forest total of 2,663 trips. No motorized areas are proposed in alternative D; however the corridors for motorized dispersed camping were identified to the extent possible, to include campsite areas that are currently being accessed by motorized vehicles within IRAs.

Alternative E

Alternative E is the most restrictive of the alternatives and does not propose any motorized trail routes, corridors for motorized dispersed camping or motorized big game retrieval or motorized areas. This alternative proposes designation of 156.4 miles of NFS roads, the least within IRAs of all action alternatives. This is a decrease of 205.7 miles of motorized road and a decrease of 4.5 miles of motorized trail opportunities within IRAs (table 41).

Alternative F

Alternative F proposes designation of 226.4 miles of NFS road and 20.9 miles of motorized trail opportunities within IRAs (table 41). This is a decrease of 135.7 miles of motorized road and an increase of 16.4 miles of motorized trail opportunities within IRAs.

This alternative proposes 1,421.6 miles per 101,911 acres of motorized access for dispersed camping and 237.0 miles per 222,354 acres one-half mile off both sides of roads for motorized access for big game retrieval for elk only. Since all successful hunters will not have hunted within an IRA and not all used motorized modes of transportation to retrieve that game the maximum number of trips is estimated to be less than the forest total of 1,311. The same motorized areas proposed in alternative C located on the Wilderness District are proposed for designation in this alternative. See alternative C above.

Alternative G

Alternative G proposes designation of 223.3 miles of NFS roads and 22.3 miles of motorized trail opportunities within IRAs (table 41). This is a decrease of 138.8 miles of motorized road and an increase of 17.8 miles of motorized trail opportunities within IRAs.

This alternative proposes 63 miles per 4,954 acres of motorized dispersed camping and motorized big game retrieval for elk and deer within the same corridors 300 feet off both sides of the road. Since all successful hunters will not have hunted within an IRA and not all use motorized modes of transportation to retrieve that game, the maximum number of trips is estimated to be less than the forest total of 2,663. The same motorized areas on the Wilderness District proposed in alternatives C and F are proposed for designation in this alternative. See alternative C above.

Environmental Consequences

Analysis Methods

In this analysis, potential impacts to roadless areas and their values are discussed for the purpose of compliance with NEPA, which requires disclosure of expected impacts to forest resources. This analysis is not meant to have any bearing on the implementation of the Roadless Rule other than to understand the potential effects to roadless characteristics values from the proposed action alternatives.

Some road and trail mileages are located along the IRAs boundaries. In some cases, the IRA boundary is displayed crossing the road where it was most likely intended to run along it, or where there are indents or corridors along the boundary where the road was probably located when the polygons were drawn. In either case, the associated existing roads were probably meant to be excluded from being within the boundaries. No corrections were made to road miles to exclude these segments and, are therefore, included in the analysis.

Indicators

Inventoried roadless areas provide clean drinking water and function as biological strongholds for populations of threatened and endangered species. They provide large, relatively undisturbed landscapes that are important to biological diversity and the long-term survival of many at-risk species. Inventoried roadless areas provide opportunities for dispersed outdoor recreation, opportunities that diminish as open space and natural settings are developed elsewhere. They also serve as bulwarks against the spread of nonnative invasive plant species and provide reference areas for study and research.

Inventoried roadless areas are managed for nine roadless characteristics, resources, or features that are often present in and characterize inventoried roadless areas. These characteristics that follow are the indicators used in the Inventoried Roadless Area Analysis.

- Soil, water, and air resources
- Sources of public drinking water
- Diversity of plant and animal communities
- Habitat for TES and species dependent on large undisturbed areas of land
- Primitive and semi-primitive motorized and nonmotorized classes of recreation,
- Reference landscape for research study or interpretation

- Natural appearing landscapes with high scenic quality
- Traditional cultural properties and sacred sites
- Other locally unique characteristics – eligible wild and scenic rivers outside of wilderness

Effects Common to All Action Alternatives Regarding IRAs

- All action alternatives would prohibit cross-country travel in IRAs. Roads would be closed unless designated open. This could improve resource conditions of all nine roadless characteristics and primitive classes of recreation opportunities within the IRAs on the forest.
- Parking off roads would be allowed up to one vehicle length including a trailer in all action alternatives. This should reduce impacts to the soil and water roadless characteristics within IRAs that can be caused by parking farther off roadways.
- All action alternatives decrease the miles of roads within IRAs ranging from an 18 percent decrease in alternative C to a 45 percent decrease in alternative E. Proposing fewer roads than people are driving now within IRAs means there could be visitor dissatisfaction due to being restricted from places they have traditionally accessed on the forest within a particular IRA with a vehicle. The reduction in road mileage provides additional Primitive and Semi-Primitive Non-Motorized opportunities within IRAs on the forest.
- All roads including unauthorized and decommissioned routes that are proposed to be maintained on the road and motorized trail system within IRAs already have a footprint on the ground and are currently being used by the public. There is not an expected change in use or change in resource condition of these existing routes as a result of implementation of the action alternatives. If these routes are not designated and are unavailable for use, traces of the route will likely remain for a long time, especially those routes on steep slopes where erosion often prevent plants from growing back (USDA Forest Service 2013d). This would affect the roadless characteristic of Natural Appearing Landscape with High Scenic Quality.
- All action alternatives keep Road 4260 U open. This road provides access to the Rain Creek Trailhead located one-half mile within the Contiguous to the Gila IRA. Access to this trailhead will continue to provide a parking area for hikers and horseman traveling on Rain Creek Trail 189 accessing the West Fork of Mogollon Creek and Bud's Hole. This poses no change in access or the facilities located within the Contiguous to the Gila IRA.
- The following IRAs would continue to provide Primitive and Semi-Primitive Non-Motorized opportunities for visitors. Currently there are no designated Motorized Trails located within the following IRAs: Apache Mountain; Brushy Mountain; Brushy Springs; Canyon Creek; Contiguous to Blue Range Wilderness; Dry Creek; Elk Mountain; Hell Hole; Lower San Francisco; Poverty Creek; Stone Canyon; T Bar; Taylor Creek; The Hub; Wagon Tongue; and Wahoo Mountain. None of the action alternatives propose to designate any motorized trail mileage within these IRAs.
- All action alternatives propose to close 0.8 mile of open road that is coincident with the CDNST Trail within the Wahoo Mountain IRA. This would provide a nonmotorized trail opportunity on this segment of the CDNST meeting the purpose and need of the CDNST.

Effects of Roadless Characteristics for Each Alternative

The following paragraphs describe the effects on each roadless characteristic for each alternative. The effects analysis includes all 29 inventoried roadless areas on the Gila National Forest. Also, the "Other Pertinent Information" section includes a discussion of motorized routes within the IRAs that are overlapped by WSAs. Please note that table and appendix references within this section are found in the Recreation Inventoried Roadless Area and Wilderness Study Area report (USDA Forest Service 2013b2).

Soil, water, aquatics and air resources

All action alternatives provide for a net decrease in adverse cumulative impacts and improve these resources within IRAs by limiting areas available for cross-country travel and designation of motorized use on roads and trails.

All alternatives (including no action) comply with the applicable fisheries, water, and soil-related standards and guidelines from the forest plan as well as other pertinent laws, regulations, and directives (i.e., Clean Water Act, Endangered Species Act).

All alternatives would continue to meet state air quality standards within IRAs with improvement potentially occurring in alternatives D, E, F, and G.

Under all action alternatives, set distances for MDC and MBGR reduce potential impacts to the watershed resource within IRAs.

Effects of Alternative B (no action)

- Stable in most IRAs with localized effects degrading soil resources due to existing condition of motorized cross-country travel being permitted to continue with the associated expansion of unauthorized routes.
- Greatest risk of direct and indirect impacts to water quality, riparian plants, habitat disturbance, mobilization and downstream transport of stream bottom sediments from motorized traffic.

Effects of Alternative C

- Alternative C proposes the most miles of motorized trail routes, miles, and acres of MDC and MBGR and acres of motorized areas.
- Alternative C poses the least reduction in risk and potential to negatively impact watershed, aquatic, and soil resources within IRAs.
- Only a slight decrease in risk of direct and indirect impacts to water quality, riparian plants, habitat disturbance, mobilization and downstream transport of stream bottom sediments from motorized traffic, due to same number of stream crossings and 0.10 less miles of route along streams.

Effects of Alternative D

- Alternative D proposes the second most reduction of adverse cumulative impacts by eliminating cross-country travel outside of the 300-foot designated corridors and reducing the second most motorized routes within IRAs.
- Eliminates direct and greatly reduces indirect impacts to water quality, riparian plants, habitat disturbance, mobilization and downstream transport of stream bottom sediments

from motorized traffic, due to elimination of stream crossings reduction of route along streams.

Effects of Alternative E

- Alternative E proposes no miles of motorized trail routes or miles per acres of corridors for MDC or MBGR and acres of motorized areas.
- This alternative provides the most reduction in relative risk and potential impacts to riparian and wetlands/wet meadows, water quality, and aquatic resources within IRAs.
- Eliminates direct and greatly reduces indirect impacts to water quality, riparian plants, habitat disturbance, mobilization and downstream transport of stream bottom sediments from motorized traffic, due to elimination of stream crossings and route along streams.

Effects of Alternative F

- Alternatives F and G reduce similar miles of routes within IRAs but less than D and E. More miles of MBGR are proposed with wider corridors than alternative G.
- This alternative reduces cumulative impacts for soil, air, water, and aquatic resources within IRAs but less than alternatives D, E, and G.
- Only a slight decrease in risk of direct and indirect impacts to water quality, riparian plants, habitat disturbance, mobilization and downstream transport of stream bottom sediments from motorized traffic, due to greatest number of stream crossings and route miles along streams.

Effects of Alternative G

- Alternatives F and G reduce similar miles of routes within IRAs but less than D and E.
- This alternative is similar to D in restricting cross-country travel outside of the 300-foot MDC/MBGR corridors.
- This alternative reduces cumulative impacts for soil, air, water, and aquatic resources within IRAs but less than D and E.
- Eliminates direct and greatly reduces indirect impacts to water quality, riparian plants, habitat disturbance, mobilization and downstream transport of stream bottom sediments from motorized traffic, due to elimination of stream crossings reduction of route along streams.

Sources of Public Drinking Water

Effects of Alternative B (no action)

No change to the headwaters of the San Vincente Draw located within the Meadow Creek IRA (Stable Conditions). Off-road travel is currently restricted within this watershed.

Effects of All Action Alternatives

No change in any of the action alternatives. There is no effect to this roadless characteristic because off-road travel is currently restricted within this watershed.

Diversity of Plant and Animal Communities

See Rare Plant Section of this document for effects to specific plant species. See the Wildlife section of this document for effect to specific wildlife species.

Habitats for sensitive plant species would benefit from less ground disturbance by specifically designating motorized road, trail routes, and areas. Designation of routes within all action alternatives serves to minimize cross-country disturbance to sensitive plants and potential for the spread of invasive species.

Unauthorized routes proposed to maintain as motorized routes currently receive motorized use and should not pose additional risk of the spread of invasive species within IRAs.

Effects of Alternative B (no action)

- Overall Habitat Conditions for sensitive plant species dependent on large undisturbed areas of land are stable. Due to existing condition of cross-country motorized travel being permitted with the associated expansion of unauthorized routes, localized areas may be degrading.
- Where roads and trails exist within IRAs, they provide the greatest risk for introducing new nonnative species. Unauthorized routes created due to unlimited cross-country travel also pose that same risk.
- This alternative continues to allow cross-county travel which can also lead to additional route creation; therefore, this alternative has the greatest potential to cause harvest and disturbance effects to the highest percentage of wildlife focal groups. It also has the highest potential to cause direct effects to sensitive plant habitat.

Effects of Alternative C

- Alternative C proposes the most miles of motorized trail routes, miles, and acres of MDC and MBGR posing the most risk for the spread of invasive species and disturbance to sensitive plants within IRAs.
- Motorized areas proposed in alternative C pose a risk for the spread of invasive species; however, these areas currently receive motorized travel within IRAs.
- This alternative allows cross-country travel for big game retrieval up to 1 mile from motorized routes and also increases the miles of motorized routes above the existing condition in some focal species analysis areas.
- Of the five action alternatives, this is the most potential to impact wildlife. For some focal groups it could be argued that it may be worse than the existing condition. Other than the existing condition, this alternative has the greatest potential to affect wildlife species diversity.

Effects of Alternative D

- Alternative D proposes the second most reduction of motorized routes and reduces cross-country travel to corridors for MDC and MBGR.
- It poses the second least risk of spread of invasive species and disturbance to sensitive plant species.
- This alternative substantially reduces the amount of cross-country travel allowed and typically reduces the number of motorized routes in focal group analysis areas by a greater percentage than in any other action alternative except alternative E. Except for alternative E; this alternative causes the least harvest and disturbance effects to most focal groups within IRAs. There still remains a fairly high potential to cause harvest effects to

the remaining Chiricahua leopard frog populations within IRAs on the forest, particularly considering potential cumulative effects.

- Alternative D provides for the next to the greatest potential to support a more diverse animal community, more so than alternatives B, C, D, F, and G.

Effects of Alternative E

- Alternative E proposes no miles of motorized trail routes, or miles per acres of MDC and MBGR or acres of motorized areas within IRAs while posing the least risk for the spread of invasive species and disturbance to sensitive plant species.
- This alternative allows no off-road use, and reduces the number of motorized routes by the largest percentage; therefore, this alternative has the least potential to cause harvest and disturbance effects within IRAs.
- This alternative is substantially better for most wildlife focal groups than any of the other alternatives, particularly for federally listed terrestrial wildlife species.
- Provides for the greatest potential to support more of a diverse animal community than alternatives B, C, D, F, and G.

Effects of Alternative F

- Motorized areas proposed in alternative F pose a risk for the spread of invasive species; however, these areas currently receive motorized travel.
- A wider corridor for MBGR with more miles is proposed in this alternative compared to G, posing a greater risk for the spread of invasive species within IRAs and disturbance to TES plant species.
- This alternative allows cross-country travel for elk game retrieval up to one-half mile from motorized routes. On average, this alternative reduces the number of open motorized routes greater than alternative C, but less than alternatives E, D, and G, respectively.
- Provides a greater potential to support more of a diverse animal community than alternatives B and C.

Effects of Alternative G

- There are no known invasive species sites located within the motorized areas proposed in alternative G. These areas pose a risk for the spread of invasive species; however, these areas currently receive motorized travel and there is no source of invasive plant species to spread. There is the potential for invasive plant species to be brought in on vehicle tires or undercarriages.
- This alternative substantially reduces the amount of cross-country travel allowed and typically reduces the number of motorized routes in focal group analysis areas within IRAs. On average, this alternative reduces the number of open motorized routes greater than alternatives C, and F, but less than E and D, in this respective order.
- Provides a greater potential to support more of a diverse animal community than alternatives B, C, and F.

Habitat for TES and Species Dependent on Large Undisturbed Areas of Land

TES and other species that depend upon large undisturbed areas of land (habitat) would benefit from specifically designating motorized road and trail routes. Designation serves to minimize motorized cross-country disturbance to species such as Mexican spotted owl, Mexican wolf, southwestern willow flycatcher, Chiricahua leopard frog, raptors, forest and grassland birds, large ungulates, and wide ranging carnivores.

Effects of Alternative B (no action)

- Overall habitat conditions for TES and species dependent on large undisturbed areas of land are stable, but in some cases declining for species like the Chiricahua leopard frog.
- Localized areas are degrading because of the existing condition of cross-country motorized travel being permitted to continue with the associated expansion of unauthorized routes.

Effects of Alternative C

- Alternative C provides the most motorized trail miles, and corridors for MDC and MBGR within IRAs, resulting in the least amount of undisturbed wildlife habitat.
- In some areas this alternative increases disturbance effects to wildlife by maintaining the use of unauthorized routes.

Effects of Alternative D

- Alternative D proposes an increase in motorized trail miles compared to alternative B, but less than alternatives C, F, and G within IRAs.
- Proposes the second least miles per acres of MDC and MBGR and no motorized areas.
- With these reductions in motorized use, second to alternative E, alternative D would reduce disturbance to wildlife and improve wildlife security within IRAs.

Effects of Alternative E

- Alternative E provides the least motorized trail miles, no corridors for MBGR and MDC, and no motorized areas within IRAs, providing the most improved habitat conditions for wildlife.
- Alternative E would greatly reduce the amount of motorized use within the IRAs, and would reduce disturbance to wildlife in these areas.

Effects of Alternative F

- Alternatives F and G reduce similar miles of routes within IRAs, but less than D and E.
- More miles of MBGR are proposed with wider corridors than alternative G, making this alternative have more of an effect on wildlife disturbance than alternatives D, E, and G.

Effects of Alternative G

- Alternatives F and G reduce similar miles of routes within IRAs, but less than D and E.
- This alternative is similar to D in restricting cross-country travel outside of the 300-foot MDC/MBGR corridors.
- This alternative provides more undisturbed wildlife habitat within IRAs than F and C.

Primitive, Semi-Primitive Non-Motorized and Semi-Primitive Motorized classes of Dispersed Recreation

All action alternatives would prohibit cross-country travel and would decrease the miles of roads within IRAs.

Effects of Alternative B (no action)

- Motorized cross-country travel is currently allowed within all IRAs with the potential for the addition of unauthorized routes.
- Currently Semi-Primitive Motorized opportunities are provided on 2.9 miles of the CDNST within IRAs. The CNDST is located on roads open to motorized use within the Gila Box, Wahoo Mountain, and Wagon Tongue.

Effects of Alternative C

- Alternative C offers the most miles of designated road, trails open for ATV use, designation of motorcycle trails, miles of unauthorized and reopened routes to maintain as road and motorized trail, miles per acres of MDC and MBGR, and proposes four motorized areas. Visitors who currently access dispersed campsites not located within corridors or areas for MDC within IRAs could be dissatisfied.
- Visitors would be able to continue to travel on unauthorized roads and reopened routes proposed to maintain as NFS system roads located within the Wahoo Mountain, Stone Canyon, and Poverty Creek IRAs.
- Unauthorized routes proposed to maintain as single-track motorcycle trail would provide opportunities in the Contiguous to Gila Wilderness and Primitive Areas, Contiguous to Black and Aldo Leopold Wilderness, Meadow Creek, and Sawyers Peak IRAs.
- Unauthorized routes to maintain as ATV trails would provide opportunities within the Contiguous to Gila Wilderness and Primitive Areas, Contiguous to Black and Aldo Leopold Wilderness, Devils Creek, Gila Box, and Mother Hubbard IRAs.
- In contrast, alternative C offers the least Primitive and Semi-Primitive Non-Motorized opportunities in IRAs. Motorized users would benefit from this alternative with the most access provided, while nonmotorized users may shift their use to other areas of the forest or to wilderness areas.
- This alternative would provide the most Semi-Primitive Motorized opportunities in IRAs and on the CDNST in IRAs. CDNST traveling on roads within an IRA would be reduced to 1.1 miles. However, this alternative proposes the most miles per acres of MDC and MBGR where the CDNST would travel through.
- This alternative poses the most motorized interactions for CDNST travelers within IRAs, making it the least compatible with the purpose and intent of the CDNST.

Effects of Alternative D

- Alternative D provides less Primitive and Semi Primitive Non-Motorized trail opportunities than E. It provides more Semi-Primitive Motorized opportunities with opportunities for MBGR and MDC than E. No motorized areas are proposed.
- There is potential for dissatisfaction among users who currently travel on roads proposed for closure and practice MDC and MBGR outside of corridors proposed for these activities. After alternative E, alternative D provides more Primitive and Semi-Primitive

Non-Motorized opportunities for visitors seeking solitude that the other action alternatives.

- Visitors will be able to continue to travel on unauthorized roads and reopened routes proposed to maintain as NFS system roads located within the Contiguous to the Black and Aldo Leopold Wilderness, and Lower San Francisco IRAs. Stone Canyon and Wahoo Mountain IRAs are proposed for periodic administrative use or by written authorization only.
- Unauthorized and reopened routes proposed to maintain as NFS system trail would provide opportunities in the Contiguous to Gila Wilderness and Primitive Areas and Contiguous to Black and Aldo Leopold Wilderness Area IRAs.
- In alternatives D, E, F, and G, the 2.9 miles of road coincident with the CDNST located within IRAs are proposed for closure meeting the intent of Semi-Primitive Non-Motorized Use on the trail.

Effects of Alternative E

- Alternative E would provide the most Primitive and Semi-Primitive Non-Motorized trail and nonmotorized dispersed camping opportunities for those visitors seeking solitude. There would be no opportunities for MDC, MBGR, or motorized areas.
- This alternative impacts current motorized users who travel off of existing motorized routes to travel, sight see, picnic, dispersed camp and retrieve game. Parking off roads would be allowed up to one vehicle length including a trailer. Visitors could then hike their gear to a campsite along the roadside.
- There is the potential for the most dissatisfaction by motorized users who currently travel on roads proposed for closure and practice MDC and MBGR within IRAs. The only unauthorized routes and ML-1 closed roads are proposed to maintain for periodic administrative use or by written authorization only within the Stone Canyon IRA.
- Visitors that currently use unauthorized routes and ML-1 closed roads could experience dissatisfaction at the loss of access on these routes within IRAs.
- This alternative favors nonmotorized users and provides the most opportunities for nonmotorized uses in IRAs and along the CDNST.
- See effects in alternative D regarding the 2.9 miles of road coincident with the CDNST proposed for closure.

Effects of Alternative F

- Alternatives F and G would provide similar Primitive and Semi Primitive Non-Motorized trail, and MDC opportunities; however, both provide more motorized opportunities than D and E. Alternative F proposes the same four motorized areas proposed in alternative C. Visitors who currently access dispersed campsites not located within corridors or areas for MDC within IRAs could be dissatisfied.
- The difference from alternative G is more opportunities within IRAs for MBGR. This alternative provides more opportunity for hunters who choose to retrieve game using motorized modes of transportation.
- There is the potential for dissatisfaction by motorized users who currently travel on roads proposed for closure and practice MDC and MBGR outside of proposed corridors within IRAs.

- Unauthorized and reopened routes proposed to maintain as NFS system motorized trail would provide opportunities in the Contiguous to Gila Wilderness and Primitive Areas, Contiguous to Black and Aldo Leopold Wilderness Area, Devil's Creek, Gila Box, and Mother Hubbard IRAs.
- See effects in alternative D regarding the 2.9 miles of road coincident with the CDNST proposed for closure.

Effects of Alternative G

- Alternative G offers less motorized trail opportunities than alternatives C and F, and proposes the same four motorized areas as alternatives C and F. Visitors who currently access dispersed campsites not located within corridors or areas for MDC within IRAs could be dissatisfied.
- Opportunities for MDC and MBGR are restricted to the same 300-foot corridors (less than alternative F). Hunting-related ATV activities within IRAs associated with MDC and MBGR would be the same as those opportunities provided for other ATV recreationists.
- With less acres of MBGR proposed than alternative F, this could provide more opportunities for those seeking solitude in the fall.
- Motorized users would be able to continue to travel on unauthorized roads proposed to maintain as NFS system roads located within the Lower San Francisco IRA.
- Unauthorized and reopened routes proposed to maintain as NFS system motorized trail would provide opportunities in the same IRAs listed for alternative F.
- See effects in alternative D regarding the 2.9 miles of road coincident with the CDNST proposed for closure.

Natural-appearing Landscapes with High Scenic Quality

Visual quality could be improved in all action alternatives with cross-country travel prohibited. Eliminating cross-country travel and limiting motorized use to designated routes would reduce the possibility of the creation of new unauthorized routes.

Effects of Alternative B (no action)

- Conditions are stable to decreasing where evidence of cross-country travel may impact the visual appeal with high scenic quality over time.
- With the continuation of cross-country travel there is a potential for the addition of unauthorized routes to continue within IRAs, which has the potential to adversely affect visual resources. The effects include erosion, bare soil, and trampling of vegetation.

Effects of Alternative C

- Alternative C proposes the most corridors for MDC and MBGR and proposes motorized areas. Of all the action alternatives, this alternative poses the most potential risk to visual resources within IRAs.
- The overall effects of this alternative are less than alternative B (no action) due to the prohibition on cross-country travel.

Effects of Alternative D

- Alternatives D, E, F, and G propose seasonal restrictions on the Eagle Peak Road located within the Eagle Peak IRA. The implementation of seasonal restrictions on this route could improve visual quality because the closures would help protect routes from erosion and rutting during the wet season.

Effects of Alternative E

- Alternative E proposes no miles of motorized trail routes, or miles per acres of MDC and MBGR or acres of motorized areas. This alternative poses the least potential risk to visual resources within IRAs, and the effects of erosion, bare soil, and trampling would be kept to a minimum.
- The seasonal restrictions proposed in alternative D are a part of this alternative. See alternative D.

Effects of Alternative F

- Alternative F proposes more miles of MBGR with wider corridors than alternative G. This alternative reduces potential risk to visual resources, but less than D, E, and G.
- The seasonal restrictions proposed in alternative D are a part of this alternative. See alternative D.

Effects of Alternative G

- This alternative is similar to D in restricting cross-country travel outside of the 300-foot MDC/MBGR corridors. This alternative reduces cumulative impacts for visual resources within IRAs, but less than D and E.
- The seasonal restrictions proposed in alternative D are a part of this alternative. See alternative D.

Reference Landscapes for Research Study or Interpretation

The implementation of the prohibition on cross-country travel would apply to both RNAs within IRAs and would reduce the possibility of the creation of new unauthorized routes.

Effects of Alternative B (no action)

All of the designated Gila River RNA located within the Gila Box IRA is currently closed to cross-country travel and has no roads located within the IRA. A portion (34 percent) of the proposed Turkey Creek RNA is located within the Contiguous to Gila Wilderness and Primitive Area IRA, and that portion of the RNA contains no roads. The effects of the no action alternative are the same as the action alternatives.

Effects of Action Alternatives

- No change – No roads are located within RNAs within IRAs and per forest plan direction motorized cross-country travel is prohibited.
- No additional roads are proposed within any of the action alternatives.

Traditional Cultural Properties and Sacred Sites

While no potential traditional cultural properties (TCPs) or sacred sites were identified as being affected by the Travel Management Plan through consultation, there is a chance that not all sacred sites or TCPs are known to the Gila NF.

Effects to potential TCPs and sacred sites in the no action and all action alternatives may include, but are not limited to, routes bisecting the property and introducing noise to traditional gathering areas or during other traditional activities.

Beneficial effects to potential sacred sites and TCPs from closing routes and prohibiting motorized cross-country travel in the action alternatives may include, but are not limited to, a reduction in noise, route-property intersections, and interruption of traditional activities. These beneficial effects will increase as the number of acres proposed for MDC corridors, MBGR, motorized areas, and miles of routes decrease.

Effects of Alternative B (no action)

- Alternative B provides the maximum potential of motorized access to NFS lands through motorized cross-country travel. Therefore, alternative B has the highest relative risk of effects to any potential TCPs or sacred sites of all alternatives.
- In alternative B, any motorized use of unauthorized, ML-1 or any other route occurs because of motorized cross-country travel.

Effects of Alternative C

- Alternative C provides the most unauthorized routes, nonmotorized trails, and ML-1 roads that will be maintained as either part of the NFS motorized trail or road system, motorized areas, and corridors for MDC and MBGR within IRAs. This alternative proposes the same number of motorized areas as alternatives F and G.
- Outside of alternative B, alternative C poses the highest relative risk of effects to potential TCPs and sacred sites. See effects described for all action alternatives.

Effects of Alternative D

- Alternative D proposes less miles per acres for unauthorized routes, and ML-1 roads that will be maintained as either part of the NFS motorized trail or road system than alternatives C, F, and G. It also proposes closing more routes than alternatives C, F, and G.
- With the prohibition of motorized cross-country travel and the proposed closure of routes, alternative D provides an overall decrease of motorized access or use when compared to alternative B.
- Alternative D proposes the second least miles per acres of MDC and MBGR and no motorized areas.
- This alternative provides the second most beneficial effects to TCPs and sacred sites.
- Changes presented in alternative D result in the second least potential risk for direct and indirect effects to potential sacred sites and TCPs within IRAs.

Effects of Alternative E

- Alternative E provides the least miles per acres for unauthorized routes, and ML-1 roads that will be maintained as either part of the NFS motorized trail or road system and no corridors for MDC and MBGR or motorized areas within IRAs.
- This alternative would provide the most beneficial effects to TCPs and sacred sites.
- Changes presented in alternative E result in the least potential for direct and indirect effects to potential sacred sites or TCPs of all alternatives.

Effects of Alternative F

- Alternative F proposes less miles per acres for unauthorized routes, and ML-1 roads that will be maintained as either part of the NFS motorized trail or road system than alternative C; comparable to alternative G; and more than alternatives D and E. It also proposes more route closures than alternative C, but less than alternatives E, D, and G.
- With the prohibition of motorized cross-country and the proposed closure of routes, alternative F provides an overall decrease of motorized access or use when compared to alternative B.
- This alternative proposes less acreage for MDC and MBGR than alternatives B and C and more than alternatives D, E, and G. Alternative F proposes the same acreage of motorized areas as do alternatives C and G.
- Alternative F would provide less beneficial effects to TCPs and sacred sites than alternatives D, E, and G, but more than alternatives B and C.
- Changes proposed in alternative F result in less relative risk of direct and indirect effects to potential sacred sites or TCPs when compared to alternatives B and C, but a higher relative for risk when compared to alternatives D, E, and G.

Effects of Alternative G

- Alternative G proposes less miles per acres for unauthorized routes, and ML-1 roads that will be maintained as either part of the NFS motorized trail or road system than alternative C; comparable to alternative F; and more than alternatives D and E.
- With the prohibition of motorized cross-country and the proposed closure of routes, alternative G provides an overall decrease of motorized access or use when compared to alternative B.
- This alternative proposes less MDC and MBGR acreage than alternatives B, C, and F; comparable to alternative D; and more than alternative E. Alternative G proposes the same acreage of motorized areas as do alternatives C and F.
- Alternative G would provide less beneficial effects to TCPs and sacred sites than alternatives D, and E, but more than alternative B, C, and F.
- Changes proposed in alternative G result in less relative risk for direct and indirect effects to potential sacred sites and TCPs when compared to alternatives B, C, and F, but poses a higher relative risk when compared to alternatives D and E.

Other Locally Unique Characteristics

1. Eligible Wild and Scenic Rivers Outside Wilderness

The prohibition of cross-country travel will be in place for all eligible wild and scenic rivers outside of wilderness. There is a potential for dissatisfaction by visitors who currently travel cross-country within these eligible wild and scenic river corridors within IRAs.

Effects of Alternative B (no action)

- A segment of Whitewater Creek runs through the Devils Creek IRA, a segment of Diamond Creek runs through the Taylor Creek IRA, and a segment of Las Animas Creek runs through the Contiguous to Black and Aldo Leopold Wilderness IRA. Currently, with no prohibition on cross-country travel, opportunities for MDC and MBGR are available within these eligible wild and scenic river corridors located within IRAs.

Effects of Alternative C

- Alternative C proposes the same miles of motorized routes and motorized creek crossings as alternatives B, F, and G. Cross-country travel would be limited to the 0.99 mile per 89 acres of corridors for MDC and 0.99 mile per 582 acres MBGR. This provides the most opportunities for these activities; however, hunters and dispersed campers may experience dissatisfaction at the entire eligible wild and scenic river corridor segments within IRAs not being available for MDC and MBGR.
- Nonmotorized users would appreciate the increased opportunity for solitude and unconfined primitive forms of recreation activities.

Effects of Alternative D

- Alternative D would limit cross-country travel to the same corridors, 0.99 mile per 89 acres for MDC and MBGR.
- Hunters and dispersed campers may experience dissatisfaction at the entire wild and scenic river corridor segments within IRAs not being available for MDC and MBGR.
- Nonmotorized users would appreciate the increased opportunity for solitude and unconfined primitive forms of recreation activities.
- Hunting-related ATV activities within IRAs associated with MDC and MBGR would be the same as those opportunities provided for other ATV recreationists within wild and scenic river corridors within IRAs.
- 0.5 mile of ATV trail on Whitewater Creek is proposed for closure, eliminating one motorized creek crossing. Nonmotorized access will continue to provide the opportunity to experience the historic and recreational outstandingly remarkable values of this eligible wild and scenic river segment located within an IRA. ATV riders who travel to Whitewater Creek on the ATV trail proposed for closure may experience dissatisfaction.

Effects of Alternative E

- Alternative E proposes no cross-country travel, and no MDC, or MBGR, or motorized areas are proposed in this alternative.
- Hunters and dispersed campers may experience dissatisfaction at no opportunities for MDC or MBGR within wild and scenic river corridor segments within IRAs.

- This alternative favors nonmotorized recreation opportunities within the eligible wild and scenic rivers within IRAs.
- As in alternative D, 0.5 mile of ATV trail on Whitewater Creek is proposed for closure, eliminating one motorized creek crossing. See effects listed for alternative D.

Effects of Alternative F

- Alternative F would limit cross-country travel to the 0.83 mile per 70 acres of corridors for MDC and 0.99 mile per 446 acres MBGR.
- Hunters and dispersed campers may experience dissatisfaction at the reduced opportunities for MDC and MBGR within eligible wild and scenic river corridor segments within IRAs.
- Nonmotorized users would appreciate the increased opportunity for solitude and unconfined primitive forms of recreation activities.

Effects of Alternative G

- Alternative G would limit cross-country travel to the 0.83 mile per 70 acres of corridors for MDC and MBGR.
- Hunters and dispersed campers may experience dissatisfaction at the reduced opportunities for MDC or MBGR within wild and scenic river corridor segments within IRAs.
- Nonmotorized users would appreciate the increased opportunity for solitude and unconfined primitive forms of recreation activities.
- Hunting-related ATV activities within IRAs associated with MDC and MBGR would be the same as those opportunities provided for other ATV recreationists within wild and scenic river corridors within IRAs.

Other Pertinent Information

1. Hell Hole IRA

Route Specifics

- All action alternatives propose a reduction in miles of road access within the Hell Hole IRA.
- Access from the Hell Hole IRA to the Hell Hole WSA is described below in the Proposed Changes to Motorized Access within WSAs section of this document.

Effects of Alternative B (no action)

- Currently, there are 10.9 miles of road open to the public within the Hell Hole IRA.
- Cross-country travel is allowed with the associated potential for the use of and addition of unauthorized routes.

Effects of Alternative C

- Alternative C reduces the roads open to the public within the Hell Hole IRA to roughly half (5.8 miles) of what is currently available in alternative B, the no action alternative.

- This alternative provides the most motorized opportunities of the action alternatives. The majority of the proposed road closures are short segments located at the end of roads. This is pertinent to all action alternatives.

Effects of Alternative D

- Alternative D proposes to reduce road access to 2.4 miles within the Hell Hole IRA. This is slightly more road miles than proposed in alternative F, however, it provides less road miles than alternatives C, E, and G.

Effects of Alternative E

Alternative E proposes 4.1 miles of road opportunities.

Effects of Alternative F

Alternative F proposes the least road opportunities of the action alternatives, 2.1 miles. This would provide the most opportunities for Primitive and Semi-Primitive Non-motorized activities.

Effects of Alternative G

Alternative G proposes 4.4 miles of road opportunities similar to alternative E.

2. Lower San Francisco IRA Route Specifics

All action alternatives propose a reduction in miles of road within the Lower San Francisco IRA.

Access from the Lower San Francisco IRA to the Lower San Francisco WSA is described below in the Proposed Changes to Motorized Access within WSAs section of this document.

Effects of Alternative B (no action)

Currently, 17.6 miles of road are open to the public within the Lower San Francisco IRA.

Effects of Alternative C

- Alternative C provides slightly less road opportunities than the no action alternative: 16.8 miles of roads open to the public.
- This alternative provides the most opportunities for Semi-Primitive Motorized Activities.

Effects of Alternative D

- Alternative D proposes 9.2 miles of road access within the Lower San Francisco IRA.
- This alternative provides fewer motorized opportunities than alternatives C, F, and G.

Effects of Alternative E

Alternative E provides 5.1 miles of road opportunities, the least of the action alternatives.

Effects of Alternative F

Alternative F provides slightly less road opportunities than alternative C at 16.5 miles.

Effects of Alternative G

Alternative G provides the same miles of road opportunities as alternative D, 9.2 miles.

Cumulative Effects within IRAs

The cumulative effects analysis evaluates past, present, and reasonably foreseeable actions on roadless characteristics in IRAs. This analysis specifically considers those activities that have influenced motorized or nonmotorized travel in the IRAs and their associated effects on roadless characteristics.

The cumulative effects analysis area for IRAs includes the 29 roadless areas within the boundary of the Gila National Forest. Consideration was given to cumulative effects beyond the IRA boundary to include wilderness on the Gila National Forest, Blue Range Primitive Area and the Hell Hole and Lower San Francisco IRAs located on the Apache-Sitgreaves National Forests and WSAs located on BLM land administered by the Las Cruces Field Office. Time frame evaluated is the next 20 years. The Forest Activity Tracking System (FACTS) data base information for past actions is located in Appendix A (Table IRA A14) of the Recreation IRA/WSA report (USDA Forest Service 2013b2).

Past Actions

Access to and within IRAs has been developed over time from past Native American use, mining, military travel, timber harvest, road construction, and trail construction and reconstruction activities. There are 372.7 miles of roads located within the IRAs on the forest. Road mileage occurs within all 29 IRAs with the most mileage occurring in Contiguous to the Gila Wilderness and Primitive Area and Devil Creek IRAs.

Since the implementation of the forest plan in 1986, existing roads and trails on the boundaries of and within IRAs have been routinely maintained. Trails within IRAs are maintained periodically to protect the trail, soil, and water resources. Specific trail improvement projects within IRAs include Camp Creek Trail on the Glenwood District within Aspen Mountain IRA, and reroutes on the CDNST in the Gila Box IRA and the Meadow Creek IRA.

There are two inventoried roadless areas located on the Apache-Sitgreaves National Forests in Arizona adjacent to the Hell Hole and Lower San Francisco IRAs located on the Gila. The Hell Hole IRA located in Arizona is 15,547 acres in size and the Lower San Francisco is 59,124 acres in size.

Ongoing and Future Foreseeable Actions

Road and trail maintenance, as well as weed treatment, occurs along the transportation system located within the Gila National Forest IRAs. Grazing, Outfitter and Guide, and Communication Site and Power line permittees all utilize the road transportation system to access the IRAs on system roads for their operations. This road system is also used for firefighting operations. Projects to clear power lines located on the forest have occurred in the past and will continue to occur.

Treating noxious weeds would allow native vegetation to reestablish and greatly improve many roadless characteristics, such as the soil resource, diversity of plant and animal communities, and their associated habitat, and the naturalness associated with the area’s landscape character and integrity. It also limits the expansion of weed infestations throughout non-infested areas within the IRAs.

Short-term effects to recreational opportunities in Primitive and Semi-Primitive environments may occur if recreationists expecting solitude encounter weed control crews working in the IRAs. Apparent naturalness may also be affected in the short term where grubbing, pulling, and/or mechanical treatments are obvious.

Portions of active grazing allotments are located within all 29 IRAs located on the Gila National Forest. The presence of manure and stock trails would appear unnatural to many. Range improvements, like fences and watering facilities, are an obvious sign of man's work on an otherwise natural-appearing landscape.

A number of proposed projects could affect and improve IRA characteristics over the next 5 years. Weed treatment, vegetation projects, ongoing trail maintenance and reconstruction, and fire management activities all have the potential for cumulative effects on the areas' roadless characteristics

Future vegetation projects may include burning operations. Short-term impacts to opportunities for quiet, backcountry recreation could be expected where recreationists encounter crews working with chainsaws, helicopters, etc. Burning of woody debris could result in short-term exposure to weed infestations in the burned areas, impacting natural integrity. In the long term, burning projects benefit natural integrity by restoring a more natural fire regime in areas where fires have long been suppressed.

All action alternatives have the potential for the following cumulative effects within IRAs:

- In most cases, the projects proposed within IRAs trend toward improving roadless area character.
- User dissatisfaction over the loss of the following motorized opportunities within IRAs.
  - Motorized cross-country travel.
  - Unlimited opportunities for motorized dispersed camping
  - Unlimited opportunities for motorized big game retrieval.
  - Motorized access on specific roads within the IRAs proposed for closure.
  - Trails designated for nonmotorized use within an IRA, where visitor expectations for that IRA has been for a Semi-Primitive Motorized Setting.
- User dissatisfaction from those nonmotorized users who expressed the desire to see the IRAs managed to specifically favor Primitive and Semi-Primitive Nonmotorized Recreation Settings.
- User satisfaction dependent upon Alternative regarding the opportunities provided focusing on Primitive and Semi-Primitive Nonmotorized Recreation Settings within IRAs.

Wilderness Study Areas (WSAs)

Affected Environment

In 1980, when Public Law 96-550 was passed, it designated the Aldo Leopold and Blue Range Wilderness Areas in New Mexico. In addition, this law designated two areas, the Hell Hole and Lower San Francisco Wilderness Study Areas for review as having wilderness characteristics that make these areas worthy of consideration by Congress for wilderness designation. While Congress considers whether to designate a wilderness study area (WSA) as permanent

wilderness, the Gila National Forest manages the WSAs in a manner as to prevent impairment of the area's suitability for wilderness designation.

The forest plan (1986) evaluated the Hell Hole and Lower San Francisco Wilderness Study Areas for wilderness suitability as directed by Congress and Public Law 96-550. The Gila National forest plan recommends that these areas not be designated as wilderness. Until such time that Congress acts on this recommendation, the forest plan calls for managing these lands to maintain existing wilderness character. No baseline monitoring data has been collected for the wilderness character within these WSAs.

Hell Hole Wilderness Study Area

The Hell Hole WSA, 18,860 acres in size is located south of Mule Creek New Mexico with the boundary running along the Arizona State line (acres listed in P.L. 96-550). The GIS layer displays Access from the north is by Highway 78 west of Mule Creek. A county road heading south from Mule Creek forms the eastern boundary of the WSA. The Apache Box WSA administered by the BLM is contiguous to the south of the Hell Hole WSA. The Hoverrocker WSA is a 22 acre area that remained after the adjacent Arizona portion of the WSA was released from wilderness review in 1990. This WSA is located west of the Hell Hole and Apache Box WSAs and is administered by the BLM.

The Hell Hole IRA located on the Gila National Forest encompasses the WSA; however the IRA is larger in size at 19,533 acres. The Hell Hole IRA located in Arizona on the Apache-Sitgreaves National Forests lies to the west of the Hell Hole WSA and IRA located in New Mexico.

The landscape of the southern portion of the WSA is dominated by topographic features including deep, rugged canyons, rock peaks, and steep cliffs. The northern portion of the WSA is primarily rolling hills. Vegetation varies greatly with elevation and aspect providing for variety and change. The presence of ponderosa pine in the WSA is somewhat unusual, as it is rather scarce in surrounding areas. The area lends itself to a variety of primitive recreation activities. The degree of difficulty and variety of conditions found in the WSA provide an adequate level of challenge regardless of user’s skills.

Proposed Changes to Motorized Access within Hell Hole WSA by Alternatives

Each action alternative proposes a combination of changes to the motorized route system within WSAs (see appendix B of Recreation IRA/WSA report (USDA Forest Service 2013b2)). The discussion below uses these data to contrast the difference in the combination of proposed routes and corridors for the Hell Hole WSA by alternative.

Alternative B

There are currently 10.4 miles of NFS road within the Hell Hole WSA. Due to firewood theft, there is an extensive network of two-track user-created firewood access roads on the east side of the WSA. This system of routes has not been inventoried. Since there is no prohibition on cross-country travel, motorized dispersed camping and motorized big game retrieval are currently allowed. Motorized big game retrieval is currently utilized for the following species: elk; deer; bear; mountain lion; javalina; and pronghorn.

Alternative C

Alternative C proposes 5.4 miles of road, a reduction of 4.9 miles within the Hell Hole WSA. There are 3.0 miles proposed for periodic administrative use or by written authorization only (i.e., not open to the public for general use). Motorized dispersed camping is proposed for 1.4 miles per 114 acres. A 1-mile corridor on each side of the 5.7 miles (9,777 acres) of designated routes is proposed motorized big game retrieval for elk, deer, bear, mountain lion, javelina, and pronghorn.

Alternative D

Alternative D proposes 2.1 miles of road, a reduction of 8.3 miles within the Hell Hole WSA. There are 4.1 miles proposed for periodic administrative use or by written authorization only (i.e., not open to the public for general use). Motorized dispersed camping is proposed for 0.23 mile per 21.7 acres. This alternative proposes the same 300-foot corridor on both sides of the road for motorized big game retrieval for deer and elk only.

Alternative E

Alternative E proposes 3.7 miles of road, a reduction of 6.7 miles within the Hell Hole WSA. There are 2.5 miles proposed for periodic administrative use or by written authorization only (i.e., not open to the public for general use). No miles or acres of motorized dispersed camping or motorized big game retrieval or motorized areas are proposed within this WSA.

Alternative F

Alternative F proposes 1.8 miles of road, a reduction of 8.6 miles within the Hell Hole WSA. There are 4.7 miles proposed for periodic administrative use or by written authorization only (i.e., not open to the public for general use). This alternative proposes 0.26 mile per 29.0 acres of motorized dispersed camping and 2.1 miles (3,818 acres) one-half mile off both sides of roads for motorized big game retrieval for elk only.

Alternative G

Alternative G proposes 4.1 miles of road, a reduction of 6.3 miles within the Hell Hole WSA. There are 3.0 miles proposed for periodic administrative use or by written authorization only (i.e., not open to the public for general use). This alternative proposes 0.23 mile per 21.7 acres of motorized dispersed camping and motorized big game retrieval. Big game retrieval for elk and deer is proposed within the same corridors as the 300 feet off both sides of the road corridors for dispersed camping.

Lower San Francisco Wilderness Study Area

The Lower San Francisco WSA located on the Gila National Forest is located north of the Hell Hole WSA and is 8,800 acres in size (acres listed in P.L. 96-550). The Lower San Francisco IRA encompasses the WSA; however the IRA is larger in size at 26,461 acres. The forest's GIS layer shows 2,988 acres within the 7,132 acres (41 percent) of the Lower San Francisco IRA are currently closed to motorized cross-country travel. The Lower San Francisco IRA located in Arizona on the Apache-Sitgreaves National Forests lies to the west of the Lower San Francisco WSA and IRA located in New Mexico.

The Lower San Francisco River Wilderness Study Area is located west of Highway 180 and Glenwood, New Mexico. Off of Highway 180, south of the community of Pleasanton, a dirt road heads southeast to provide access to the San Francisco Hot Springs Trailhead. The main recreation activity after the monsoons is accessing the San Francisco at Big Dry and driving to the River to picnic, fish, and hunt. The recreation setting of this area is currently Roaded Natural. In May and June, when water is high, rafting and kayaking occurs. Rafters put in above the San Francisco Hot Springs south of Glenwood and take out at Martinez Ranch on the Apache Sitgreaves National Forest in Arizona. The box cliffs downriver from the San Francisco Hot Springs limit foot travel along the river.

Motorized use in the San Francisco River corridor has been and is very controversial. Opinions expressed by the public range from a total closure of the entire River corridor, to keeping the entire corridor open to motorized vehicle use. This wide range of opinion and the concerns raised were considered in developing the Travel Management Rule proposed action and in the development of alternatives. During the comment period for the Draft EIS, specific concerns were raised about the effects of maintaining existing user created roads within the Lower San Francisco IRA and Wilderness Study Area. The unauthorized and decommissioned roads proposed to be maintained within the Lower San Francisco River WSA already have a footprint on the ground and are currently being used. The proposal to maintain these routes is not expected to result in a change in use. If these routes are not designated and are unavailable for use, traces of the route will likely remain for a long time, especially those routes on steep slopes where erosion often prevent plants from growing back.

Proposed Changes to Motorized Access within Lower San Francisco WSA by Alternative

Alternative B

There are two NFS roads (Road 68 and 4223 L) located within the Lower San Francisco WSA. NFS road 68 provides motorized access to where the San Francisco River and Big Dry Creek connect while NFS road 4223 L provides motorized access and use on the San Francisco River above Mule Creek. There is a restriction in effect from Mule Creek downstream to the Arizona-New Mexico border that prohibits motorized cross- country travel. The Lower San Francisco is surrounded by the Lower San Francisco IRA. Currently, only three points of motorized access exist to the border of the WSA starting from the IRA. In the areas where there is no prohibition on cross-country travel, motorized dispersed camping and motorized big game retrieval are currently allowed.

Alternative C

Alternative C proposes to allow motorized use and motorized dispersed camping from Highway 180 to Mule Creek. Alternative C proposes 8.0 miles of road a reduction of 0.2 mile of road within the river corridor. A motorized dispersed camping corridor 300 feet on both sides of the road is proposed for all 8.0 miles (580 acres). A 1-mile corridor on each side of these 8.0 miles of designated road (4,062 acres) is proposed for motorized big game retrieval for elk, deer, bear, mountain lion, javelina, and pronghorn.

Alternative D

Alternative D proposes to allow motorized use in Little and Big Dry Creeks. This alternative proposes to close routes along the San Francisco River. Motorized dispersed camping would be allowed at the confluence of Big Dry and San Francisco River. No motorized access along the river would be allowed. Alternative D proposes 0.7 mile of road, a reduction of 7.5 miles of road. Approximately 0.2 acre of the motorized dispersed camping 300-foot corridor off of Road 4075 D, located on the southern rim of the San Francisco River Canyon near the Arizona state boundary extends into the WSA boundary. This alternative proposes the same 300-foot corridor on both sides of the road for motorized big game retrieval for deer and elk only. Existing unauthorized routes Glenwood Proposed Routes (GPR) 14, 15 and 16 totaling 0.3 mile are proposed to be maintained as open to all vehicle types.

Alternative E

Alternative E proposes to close motorized access along the San Francisco River and end motorized use at Big Dry at Estes Well. No miles or acres of motorized routes, motorized dispersed camping, motorized big game retrieval or motorized areas are proposed for designation within this WSA.

Alternative F

Alternative F proposes to allow motorized use from Highway 180 to Mule Creek down the San Francisco River. This alternative proposes to allow motorized dispersed camping from Highway 180 to the confluence of the San Francisco River and Big Dry Creek. Alternative F proposes 8.0 miles of road, a reduction of 0.2 mile within the WSA. This alternative proposes 0.5 mile (37.6 acres) of Motorized dispersed camping and 8.0 miles (3,328 acres) one-half mile off both sides of roads for motorized big game retrieval for elk only.

Alternative G

Alternative G allows motorized use in Little and Big Dry Creeks. This alternative proposes to close routes along the San Francisco River. Motorized dispersed camping is proposed at the confluence of Big Dry and the San Francisco River. No motorized access will be allowed along the river. Alternative G proposes 0.7 mile of road, a reduction of 7.5 miles within the WSA, a 91 percent reduction. Approximately 0.2 acre of the motorized dispersed camping 300-foot corridor off of Road 4075 D, located on the southern rim of the San Francisco River Canyon near the Arizona state boundary extends into the WSA boundary. Big game retrieval for elk and deer is proposed within the same motorized dispersed camping 300-foot corridors. The same unauthorized routes, Glenwood Proposed Routes (GPR) 14, 15, and 16, totaling 0.3 mile proposed in alternative D are proposed to be designated as open to all vehicle types in alternative G.

Environmental Consequences

Analysis Methods

In this analysis, potential impacts to wilderness study areas and their values are discussed for the purpose of compliance with the National Environmental Policy Act, which requires disclosure of expected impacts to forest resources. This analysis is not meant to have any bearing on proposing these areas for wilderness designation other than to understand the potential effects to wilderness

character and roadless characteristic values from the proposed action alternatives. The analysis also includes the consideration of irreversible and irretrievable commitments of resources on Wilderness Character and Roadless Area Characteristics effects for potential designation as wilderness under the 1964 Act. The document "Applying the concept of wilderness character to national forest planning, monitoring, and management" (Landres et al. 2008) was used to direct the analysis on wilderness character.

The four qualities of wilderness character listed below were considered in this analysis.

- Untrammeled – Wilderness is essentially unhindered and free from modern human control or manipulation.
- Natural – Wilderness ecological systems are substantially free from the effects of modern civilization.
- Undeveloped – Wilderness is essentially without permanent improvements or modern human occupation.
- Solitude or Primitive unconfined recreational opportunities – Wilderness provides outstanding opportunities for people to experience solitude or primitive and unconfined recreation

Each roadless characteristic is discussed below for the IRA area contained within the two WSAs.

- Soil, water, and air resources
- Sources of public drinking water
- Diversity of plant and animal communities
- Habitat for TES and species dependent on large undisturbed areas of land
- Primitive and semi-primitive motorized and nonmotorized classes of recreation,
- Reference landscape for research study or interpretation
- Natural appearing landscapes with high scenic quality
- Traditional cultural properties and sacred sites
- Other locally unique characteristics

The wilderness character and roadless characteristics are the indicators used in this Wilderness Study Area Analysis for both the Hell Hole and Lower San Francisco WSAs. This analysis used the Forest Geographic Information System coverage of Wilderness Study Areas and Inventoried Roadless Areas.

Effects Common to All Action Alternatives Regarding Wilderness Character

- All action alternatives would prohibit motorized cross-country travel in WSAs. Roads would be nonmotorized, unless designated open. However, physical barriers or rehabilitation of roadbeds would require a separate NEPA decision. With the prohibition on motorized cross-country travel and the reduction of where people can drive, there is a potential to improve all four wilderness characteristics in both wilderness study areas as described in the following bullets.
    - Reduced motorized access adjacent to wilderness study areas has the likelihood to reduce intrusions and the influence of modern human activities within the WSAs improving the Untrammeled, and Undeveloped characteristics.

  - Fewer intrusions would reduce resource damage and improve Visual Quality Objectives improving the Natural characteristic.
  - In particular, the prohibition on motorized cross- country would reduce the encroachment of sight and sound across the boundary of the wilderness study areas improving the Wilderness Character of Solitude.
- In keeping with preserving all four wilderness characteristics within both WSAs
  - No motorized areas are proposed within the Hell Hole and Lower San Francisco WSAs in any of the action alternatives.
  - No new motorized trail routes are proposed within the Hell Hole and Lower San Francisco WSAs in any of the action alternatives.
  - All action alternatives propose a reduction in road miles as described above.
- Parking off-road would be limited to a maximum of one vehicle length including a trailer. This limitation would reduce impacts to vegetation and soils within WSAs that is caused by parking farther off roadways, improving the Natural, Undeveloped and Untrammeled characteristics.
- All action alternatives decrease the miles of roads within WSAs. Proposing fewer roads than people are driving now within WSAs means visitors will be restricted from places they have traditionally accessed with a vehicle. Recreationists accustomed to traveling the roads proposed for closure may be dissatisfied and may not continue to recreate within the WSAs. A reduction in roads has the potential to improve all four wilderness characteristics.
- All roads including unauthorized routes that are proposed to be maintained on the road and motorized trail system within WSAs already have a footprint on the ground and are currently being used by the public. There is not an expected change in use or change in resource condition of these existing routes as a result of implementation of the action alternatives. If these routes are not designated and are unavailable for use, traces of the route will likely remain for a long time (USDA Forest Service 2013d). In Hell Hole this would occur especially on those routes on steep slopes where erosion often prevents plants from growing back. In the Lower San Francisco with the routes located in the river bottom, flooding would be expected to remove the routes within 10 years. This would affect the wilderness characteristics of Natural, Untrammeled, and Undeveloped.
- No unauthorized routes are proposed to be maintained on the road system within the Hell Hole WSA. There is the potential for dissatisfaction from recreationists who currently travel on any unauthorized routes with a motorized vehicle. This has the potential to improve the wilderness character of Undeveloped. There is a potential for improvement to the characteristics of Natural and Untrammeled, due to the revegetation of these routes over time. However, as described above, the traces of these routes would likely remain for a long time, especially those routes on steep slopes where erosion often prevents plants from growing back.
- The proposal reduces the chance of visitors meeting others due to a reduction in motorized access in and adjacent to WSAs and the prohibition on motorized cross-country travel improving the wilderness character of Solitude. The majority of visitors to both WSAs do not travel more than one-half mile from their vehicles. Therefore, those individuals willing to hike would have an increased opportunity for Solitude in all action alternatives.

- No motorized trail routes are proposed within the Hell Hole or Lower San Francisco WSAs in any of the action alternatives. There is no effect since this is no change from the no action alternative B.
- No motorized areas are proposed within the Hell Hole or Lower San Francisco WSAs in any of the action alternatives. There could be visitor dissatisfaction by those forest visitors who currently travel cross-country, or access dispersed sites with a vehicle within either IRA. This would improve all four qualities of wilderness character.
- By designating routes and prohibiting off-road travel, law enforcement for illegal firewood theft would be simplified. Motorized vehicle use off of designated routes would be prohibited.

Table 42 describes the effects on the four qualities of wilderness character for each alternative.

Table 42. Effects summary of wilderness character for both wilderness study areas

Please note that table and appendix references within this table are found in the Recreation Inventoried Roadless Area and Wilderness Study Area report (USDA Forest Service 2013b2).

Wilderness character	Effects of alternative B (no action)	Effects of alternative C	Effects of alternative D	Effects of alternative E	Effects of alternative F	Effects of alternative G
Natural ***Wilderness ecological systems are substantially free from the effects of modern civilization.*** With the prohibition on cross-country travel proposed in all action alternatives, the only acres of the WSAs that would be vulnerable to motorized use and associated human impacts to vegetation and soils would be the corridors proposed for MDC and MBGR. The Natural Characteristic of both WSAs has a potential to improve under all action alternatives due to the reduction in cross-country travel. See Appendix B Table WSA B4 and B5 for total miles per acres MDC and MBGR in WSAs.	Hell Hole WSA has impacts from illegal firewood theft over the past 10 years including unauthorized roads and loss of large green and dead Alligator juniper trees. Both WSAs are currently open to motorized cross-country travel resulting in some unauthorized routes and associated damage to vegetation and soils. All acres within the WSA would continue to be vulnerable to motorized use and associated human impacts to vegetation and soil from unlimited motorized cross-country travel.	Alternative C proposes 300 ft. corridors for MDC along both sides of roads and 1 mile corridors for MBGR along both sides of roads: **Hell Hole WSA** *MDC* 1.4 miles per 114 acres *MBGR* 5.7 miles per 9,777 acres **Lower SF WSA** *MDC* 8.1 miles per 580 acres *MBGR* 8.1 miles per 4,062 acres Alternative C proposes the most miles per acres of MDC and MBGR. These acres would be vulnerable to human impact by motorized vehicle use and associated activities.	Alternatives D and G proposes 300-ft. corridors for MDC and MBGR along both sides of roads. **Hell Hole WSA** *MDC and MBGR* 0.23 miles per 21.71 acres **Lower SF WSA** *MDC and MBGR* 0.0 miles per 0.27 acre The proposed 0.27 acre of MDC and MBGR is accessed from Road 4075D located on the southern rim of the San Francisco River Canyon near the Arizona state boundary outside of the WSA. Of the action alternatives, alternatives D and G would cause less impacts from motorized use and associated human impacts to vegetation than alternatives C and F.	Alternative E proposes no corridors for MDC or MBGR within either WSA. Of the action alternatives, alternative E would cause the least impacts from motorized use and associated human impacts to vegetation and soils. The Natural Characteristic of both WSAs has the most potential to improve under this alternative.	Alternative F proposes 300-ft. corridors for MDC along both sides of roads and 1/2 mile corridors for MBGR along both sides of roads. **Hell Hole WSA** *MDC* 0.26 mile per 29.02 acres *MBGR* 2.13 miles per 3,818 acres **Lower SF WSA** *MDC* 0.48 mile per 37.68 acres *MBGR* 8.07 miles per 3,328 acres Alternative F proposes fewer miles per acres of MBGR than alternative C, but more than alternatives D, E, and G. Therefore, acres vulnerable to human impact by motorized vehicle use and associated activities would be less than alternative C and more than alternatives D, E and G.	Alternative G proposes 300-ft. corridors for both MDC and MBGR along both sides of roads, the same as alternative D. See effects of alternative D. **Hell Hole WSA** *MDC and MBGR* 0.23 mile per 21.71 acres **Lower SF WSA** *MDC and MBGR* 0.0 miles per 0.27 acre

Wilderness character	Effects of alternative B (no action)	Effects of alternative C	Effects of alternative D	Effects of alternative E	Effects of alternative F	Effects of alternative G
Untrammeled ***Wilderness is essentially unhindered and free from modern human control or manipulation.*** There would be no change to existing grazing permits in either WSA in any alternative. With the prohibition on cross-country travel and designation or routes proposed in all action alternatives, the only acres of the WSAs that would be available for motorized use would be the designated routes and corridors proposed for MDC and MBGR. See Natural above regarding MDC and MBGR. All action alternatives propose a reduction of miles of road open to the public within both WSAs providing areas free from modern human control and manipulation.	All acres within the WSA would continue to be vulnerable to motorized use and the signs of human control and manipulation due to both WSAs currently being open to motorized-cross-country travel.	**Hell Hole WSA** Nearly half of the existing roads (5.0 miles) are proposed for closure in alternative C. This alternative offers the most motorized opportunities within the Hell Hole WSA. **Lower SF WSA** Similar miles of road are proposed as in alternative B, no action and alternative F. See effects of alternative B.	**Hell Hole WSA** Alternative D proposes 2.1 miles of road remain open within the WSA. **Lower SF WSA** Alternative D proposes 0.7 mile of road to remain open within the WSA. Existing Unauthorized Routes Glenwood Proposed Routes (GPR) 14 – 16 totaling 0.3 mile are proposed to maintain as road open to all vehicle types. These routes already have a footprint on the ground and are currently being used by the public. There is no expected change in use or resource condition of these existing routes. These routes are located in the river bottom, so flooding would be expected to remove the routes within 10 years.	**Hell Hole WSA** Alternative E proposes 3.7 miles of road to remain open within the WSA. **Lower SF WSA** Alternative E proposes 0.0 miles of road to remain open within the WSA. This Alternative poses the least miles or River Access within the Lower San Francisco WSA.	**Hell Hole WSA** Alternative F proposes 1.8 miles, the least miles of road to remain open providing motorized opportunities within the WSA. **Lower SF WSA** Alternative F proposes 8.0 miles of road to remain open within the WSA.	**Hell Hole WSA** Alternative G proposes 4.1 miles of road to remain open within the WSA. **Lower SF WSA** Alternative G proposes the same 0.7 mile of road to remain open within the WSA as in alternative D. Existing Unauthorized Routes Glenwood Proposed Routes (GPR) 14 – 16 totaling 0.3 mile are proposed to maintain as road open to all vehicle types as in alternative D. See effects for alternative D.

Wilderness character	Effects of alternative B (no action)	Effects of alternative C	Effects of alternative D	Effects of alternative E	Effects of alternative F	Effects of alternative G
Undeveloped ***Wilderness is essentially without permanent improvements or modern human occupation.***	**<u>Hell Hole WSA</u>** There are some signs of human activity including approximately 24 developed springs and tanks, 0.4 mile of distribution pipeline, and 8 stock handling corrals. There are approximately 15 miles of exterior boundary fence/ROW fence and 8 miles of interior fence. **<u>Lower San Francisco WSA</u>** There is one corral and 3 seasonal spring developments. There are 0.2 mile of allotment boundary fence and 1.5 miles of interior fence. There is scattered evidence of illegal occupancy, exclusively within the Lower San Francisco River. Currently these developments are maintained or reconstructed as needed.	There would be no change from the no action alternative. There are currently no proposals to change or add any new range developments; however, existing developments will be retained or reconstructed as needed. By reducing motorized access to the WSAs, there would be an associated increase in cost due to time needed to monitor and address illegal livestock use, range development maintenance, and trespass occupancy.	There would be no change from the no action alternative. There are currently no proposals to change or add any new range developments; however, existing developments will be retained or reconstructed as needed. By reducing motorized access to the WSAs, there would be an associated increase in cost due to time needed to monitor and address illegal livestock use, range development maintenance, and trespass occupancy.	There would be no change from the no action alternative. There are currently no proposals to change or add any new range developments; however, existing developments will be retained or reconstructed as needed. By reducing motorized access to the WSAs, there would be an associated increase in cost due to time needed to monitor and address illegal livestock use, range development maintenance, and trespass occupancy.	There would be no change from the no action alternative. There are currently no proposals to change or add any new range developments; however, existing developments will be retained or reconstructed as needed. By reducing motorized access to the WSAs, there would be an associated increase in cost due to time needed to monitor and address illegal livestock use, range development maintenance, and trespass occupancy.	There would be no change from the no action alternative. There are currently no proposals to change or add any new range developments; however, existing developments will be retained or reconstructed as needed. By reducing motorized access to the WSAs, there would be an associated increase in cost due to time needed to monitor and address illegal livestock use, range development maintenance, and trespass occupancy.

Wilderness character	Effects of alternative B (no action)	Effects of alternative C	Effects of alternative D	Effects of alternative E	Effects of alternative F	Effects of alternative G
Outstanding opportunities for solitude or a primitive and unconfined type of recreation ***Wilderness provides outstanding opportunities for people to experience solitude or primitive and unconfined recreation, including the values of inspiration and physical and mental challenge.***	Both WSAs have opportunities for solitude and primitive and unconfined recreation because of rugged terrain and limited access. Recreation opportunities include hiking, hunting, viewing wildlife and photography. The rugged terrain and steep canyons contribute to a sense of solitude. The Lower San Francisco WSA provides opportunities to picnic, fish and hunt. In May and June, when water is high, rafting and kayaking occurs. Due to no prohibition on cross-country travel, this alternative provides the least opportunities for Solitude n both WSAs.	See Natural and Untrammeled above. Of the action alternatives, Alternative C proposes the most motorized opportunities providing the least opportunity for Solitude or primitive and unconfined type of recreation within both WSAs.	See Natural and Untrammeled above. Alternatives D and G would provide more opportunities for Solitude than Alternatives C, and F.	See Natural and Untrammeled above. With no opportunities for MDC and MBGR provided in Alternative E, it provides the most opportunities for Solitude. **Hell Hole WSA** Alternative E proposes 3.7 miles of road to remain open within the WSA providing motorized access within the WSA, however reduced from Alternative A No Action. **Lower SF WSA** Alternative E proposes no miles of road access providing the most opportunity for Solitude within the Lower San Francisco River corridor and WSA.	See Natural and Untrammeled above. Alternative F proposes ½ mile corridors for MBGR which would provide less opportunities for Solitude than Alternatives D, E and G.	See Natural and Untrammeled above and Alternative D. **Hell Hole WSA** Alternative G proposes 4.1 miles of road to remain open within the WSA providing motorized access within the WSA; however, reduced from alternative B no action. **Lower SF WSA** Alternative G proposes 0.7 mile of road access reduced from alternative B no action. This alternative improves the opportunity for Solitude within the Lower San Francisco River corridor and WSA.

Hell Hole WSA/IRA - Roadless Characteristics

The following analysis identifies effects to the Roadless Characteristics of the Hell Hole IRA/WSA.

Soil, Water, Aquatic, and Air Resources

Soils Analysis

Each of the alternatives was evaluated to determine the effects of a motorized route system on the Gila National Forest to the Hell Hole Wilderness Study Area in regards to impacts to soils.

All alternatives impact the same amount of acres of soils with moderate erosion potential and unsuited and unsatisfactory soil condition.

Effects of routes to soils include 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. There has been a commitment of the soil resource when the route was established, which resulted in loss of soil productivity and vegetative cover. This commitment, in places, may be irreversible and/or irretrievable due to long-term compaction and off-site soil loss from the road. 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. Routes located on soils with moderate and high erosion potential and unsuited and unsatisfactory soil condition typically are more susceptible to erosion and subsequent sedimentation and loss of soil productivity than soils with slight erosion potential ratings and satisfactory soil conditions (USDA Forest Service 2013d).

Water Quality

There are currently 71 motorized route crossings within the WSA. Alternatives D and E provide the most reduction (-23 percent) of these motorized crossings, with alternative F close behind with a reduction of 21 percent of motorized crossings. Alternative G reduces motorized crossings by 14 percent, with alternative C reducing motorized crossings by 1 percent. Alternatives D, E, and F provide the most opportunity to reduce direct impacts to water quality as mobilization of stream bottom sediments from motorized traffic would be greatly limited with the reduction and/or elimination of stream crossings. In addition, once recovery of riparian vegetation occurs at the ingress and egress point of the crossings, this vegetation can serve as a filter for sediment movement that may occur during precipitation events along current route/crossing paths.

There are no waterbodies within the WSA/IRA currently documented on New Mexico's 2012-2014 303(d) list of impaired waterbodies.

There are currently 7.47 miles of perennial, intermittent, and ephemeral waterbodies within the Hell Hole WSA. In review of motorized routes within 300 feet of these waterbodies, alternative D provides the most reduction (-32 percent) of motorized routes within the 300 feet. Alternative E is close behind with a reduction of 31 percent of motorized routes within the 300 feet. Alternative F reduces these routes by 27 percent and alternative G reduces routes within the 300 feet by 19 percent. Alternative C reduces motorized routes within 300 feet by the least amount

(-7 percent). Alternatives D, E, and F provide the most opportunity to reduce the risk for potential road-related sediment to enter into the drainage network. Hydrologic impacts would not be immediately eliminated, but would rather be dependent on natural recovery and successful revegetation of the current route paths.

Riparian Areas: There are currently 1.65 acres associated with motorized routes within riparian areas located in the Hell Hole WSA. None of the alternatives propose to make any changes to motorized routes within these riparian areas. There will be no change to riparian habitat under any action alternative.

Summary: Overall, alternatives D, E, and F reduce the potential risk of impacts to water quality within the Hell Hole WSA by the most amount, with alternative G following. Alternative C shows the least amount of potential reduction of impacts. None of the alternatives proposed to change motorized route impacts to riparian areas.

The Hell Hole Wilderness Study Area (WSA) lies south of State Road 78 and east of the New Mexico/Arizona State Line. The area has limited aquatic resources due to the lack of perennial and intermittent water bodies. There are a few springs within the area and short reaches of perennial flow originating from these springs. Major drainages include the headwaters of Mule and Coal creeks in the northern area of the WSA and headwaters of Blue and Apache creeks to the south. These major drainages are mostly ephemeral within the WSA. There are no known, aquatic, sensitive or threatened and endangered species within the WSA. The table below displays the miles of routes within 300 feet of streams and the number of stream crossings by alternative.

Aquatics

The area has limited aquatic resources due to the lack of perennial and intermittent water bodies. There are a few springs within the area and short reaches of perennial flow originating from these springs. Major drainages include the headwaters of Mule and Coal Creeks in the northern area of the WSA and headwaters of Blue and Apache Creeks to the south. These major drainages are mostly ephemeral within the WSA. There are no known aquatic sensitive or threatened and endangered species within the WSA

Comparison of alternatives: Alternative B has the greatest risk of negative impacts to aquatic resources; it includes the greatest number of stream crossings and miles of motorized routes. Of the action alternatives, alternative C has the greatest risk of negative impacts to aquatic resources; it includes a slight decrease in the number of stream crossings and miles of motorized routes when compared to alternative B. Alternative C also includes designating some currently motorized routes as administrative routes that would be open only by permit or for administrative purposes. Administrative routes would likely see reduced use. Alternative D would have the least risk of negative impacts to aquatic resources; this alternative has the least miles of routes, and along with alternative E, the fewest stream crossings. Alternative E is similar to alternative D, the number of stream crossings in each of these alternatives is the same, and alternative E has 0.06 mile of additional routes. Alternatives F and G are similar, with alternative G having 5 more stream crossings and 0.01 mile less routes. All of the action alternatives present some level of risk to aquatic resources due to the impacts that roads close to and crossing streams have. These impacts include increased sedimentation, stream bank alteration, riparian habitat alteration, large woody debris recruitment and availability, and water quality parameters. Any decrease in the miles of routes within 300 feet or that cross streams will have positive impacts to aquatic resources.

Air Quality

The Gila National Forest is currently 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.

Air quality is currently good in the area of the Gila National Forest, as evidenced by available data and information provided by the NMED Air Quality Bureau. The Gila National Forest has continued to follow state regulations and forest plan guidance to ensure that its actions are in compliance. It is, however, difficult to distinguish between the alternatives other than via a relative risk analysis as there is no available monitoring data linked to fugitive dust, motorized routes, and/or motorized uses.

See the air quality section of the FEIS and Report (USDA Forest Service 2013c) for more information on air quality.

Sources of Public Drinking Water

No municipal watersheds are located within the Hell Hole WSA or IRA.

Diversity of Plant and Animal Communities

Habitat for TES and Species Dependent upon Large Undisturbed Areas of Land

The Hell Hole Wilderness Study Area (WSA) lies south of State Road 78 and east of the New Mexico/Arizona State Line. Major drainages include the headwaters of Mule and Coal creeks in the northern area of the WSA and headwaters of Blue and Apache creeks to the south. These major drainages are mostly ephemeral within the WSA. There are a few springs within the area and short reaches of perennial flow originating from these springs. These drainages and spring areas have low and middle elevation riparian type habitat. The majority of the uplands are piñon - juniper/shrub oak woodland type habitat with pockets of ponderosa pine, desert shrub/grassland, and plains/mountain grassland type habitat.

Wide ranging, federally listed, and Regional Forester sensitive species and species groups/focal groups that have the potential to be affected include:

- Large Ungulates – deer and elk. These two wide ranging species have the potential to occur in all the habitat types in this WSA.
- Wide Ranging Carnivores – including bears, mountain lions, and wolves (federally listed as threatened). These three wide ranging species have the potential to occur in all the habitat types in this WSA.
- Small Mammals – Hooded skunk, Botta's pocket gopher, White-nosed coati, Western red bat, and Arizona gray squirrel. These five Regional Forester Sensitive species are associated with riparian habitat in this WSA. Gunnison's prairie dog and White Mountain ground squirrel are sensitive species found in plains and mountain grassland habitat. A very small amount of this type of habitat occurs in this area; therefore, is unlikely that these species would be affected.
- Amphibians and Reptiles – Arizona toad is a designated sensitive species that is associated with riparian type habitat. Reticulate Gila monster is a sensitive species found in desert shrub and grassland habitat. A very small amount of this type of habitat occurs in this area; therefore, is unlikely that this species would be affected.

- Raptorial Birds – Northern goshawk is a regional sensitive species that has nest and post-family fledging area (PFA) in this WSA. Other raptors that may occasionally forage in the area, but are not known to roost or nest in this WSA are peregrine falcon, bald eagle, and golden eagle. The peregrine and bald eagle are both designated sensitive species and wide ranging. The golden eagle is a wide ranging species.
- Primary Cavity Nesters – Hairy woodpecker is a wide ranging species that has habitat in the ponderosa pine vegetation type in this area.
- Riparian Birds – Northern gray hawk, western yellow-billed cuckoo, Arizona Bell's vireo, Abert's towhee, Gila woodpecker, common ground dove, and black hawk all are designated sensitive species that have the potential to occur in the small amount of low and middle elevation riparian habitat that is located in this area.
- Woodland Birds – Plains titmouse, and gray vireo are designated sensitive species that occur in the piñon-juniper/shrub oak woodland type habitat.
- Forested and Grassland Birds – Costa's hummingbird is a sensitive species that occurs in the desert shrub and grassland type habitat. The white-eared hummingbird is a sensitive species that is associated with ponderosa pine type habitat. The burrowing owl is a sensitive species that is associated with plains and mountain grassland type habitat. All have the potential to occur in the small amount of desert shrub/grassland, ponderosa pine, and plains and mountain grassland habitat that is located in this area.
- Game Birds – Mearn's quail and wild turkey are wide ranging species that occur in the project area, and have the potential to occur in all the habitat types associated with this WSA.

See FEIS wildlife section and Wildlife Report (USDA Forest Service 2013g) for more description of motorized route effects to species groups/focal groups summarized above.

Comparison of Alternatives:

Alternatives B and C have the greatest risk of causing negative impacts to the wide ranging and threatened/endangered/sensitive species that occur in all the habitat types listed above; the exception is in the piñon-juniper woodland habitat type. There are more route miles in alternative B which would cause more direct and indirect effects than alternative C. Alternatives D, E, F, and G cause the same level of indirect and direct effect as alternatives B and C for species that are associated with riparian, and plains/mountain grassland habitat since all these alternatives have the same amount of routes in these habitat types. For species associated with desert shrub/grassland and ponderosa pine type habitats alternatives D, E, F, and G reduce the potential to cause direct and indirect effects below the level of alternatives B and C. In the piñon-juniper/shrub oak woodland habitat type, alternatives D, E, F, G, and C reduce the potential to cause direct and indirect effects to the species associated with this habitat type below alternative B. Each alternative is listed by a greater level of effect in the order they are listed, respectively.

A goshawk nest and post-fledging family area (PFA) area have been identified in this WSA. On the Gila National Forest, nests have also typically been located in ponderosa pine vegetation.

A PFA is the area of concentrated use by the goshawk family after the young leave the nest (Reynolds et al. 1992). The PFA surrounds the nest and is approximately 600 acres. The forest plan amendment standards and guidelines state: Limit human activity in PFAs during the

breeding season; limit human activities in or near nest sites and post-fledging family areas during the breeding season; manage road densities at the lowest level possible.

Certain kinds of human disturbances to goshawk nests have been speculated to cause nest abandonment (Reynolds et al. 1992). A study investigating effects of logging truck noise caused no discernible behavioral response by goshawks at distances greater than 400 m from nest sites (Grubb et al. 1998). Gaines et al. (2003) suggest that the nesting period and post-fledgling periods for goshawks be critically evaluated for disturbance affects. The PFA is an area of use from the time the young fledge to the time when they are no longer dependent on the adults for food. Managers recommend a 400- to 500-meter radius to buffer goshawk nest sites in order to protect them from disturbance during the breeding season (Call 1979; Jones 1979). Loss of goshawk habitat due to fragmentation from roads bisecting forested areas was identified as a detrimental effect to the species due to reduction in prey base (Wisdom et al. 2000). This species is sensitive to changes in canopy closure and habitat fragmentation (BISON-M 2010b). To analyze effects to this species from the existing condition and the change proposed in each alternative of the Travel Management Project on the Gila National Forest analysis will focus on two factors:

1. To analyze the potential for direct effects of motorized activities to northern goshawks, we will measure road miles within PFAs as these densities pertain to the existing condition and the change proposed in each alternative.
2. To analyze disturbance effects, we will use a disturbance zone of 400 meters within PFAs as it pertains to the existing condition and the change proposed in each alternative.

Alternatives B and C have the same number of miles of motorized routes and affect the same amount of acres of habitat within this PFA; the direct and indirect effects from these alternatives is greater than any of the other action alternatives. Alternatives E and D provide the greatest reduction in the level of potential effects to this PFA, and the goshawks associated with this nesting area. Alternative F provides next to the highest level of improvement above the existing condition, followed by alternative G.

Invasive Species

There are currently no invasive species infestations identified in the Hell Hole WSA. There are very few internal roads—most roads associated with this area are on the perimeter. The fewer travel routes, the less risk for invasive species to be introduced, established, and spread due to this pathway. Due to the absence of roads, effects to the area from implementing any of the action alternatives are probably not significant and also not a significant difference by alternative. However, alternative B allows cross-country travel, which increases this risk. All other alternatives restrict this activity, which lowers the risk.

There are currently three grazing allotments within the Hell Hole WSA. Two of these allotments; Winchester and Mule Cr., are grazed year-round on a deferred rotational system meaning pastures are deferred from grazing during the growing season to allow plants to complete the growth cycle. These pastures are then alternated annually. Key areas are monitored by Forest Service personnel to ensure pastures are not grazed beyond identified standards. Standards are currently being met. This reduces the risk of over use of the area that creates a higher disturbance and risk of the introduction, establishment and spread of invasive species. Existing improvements include numerous developed springs and tanks (approximately 37), boundary fencing (approximately

42 miles and interior fencing (approximately 24 miles. The third allotment Apache Springs is vacant.

Primitive, Semi-Primitive Nonmotorized and Semi-Primitive Motorized Classes of Dispersed Recreation

In alternative B, the no action alternative, due to firewood theft, there is an extensive network of two-track user-created firewood access roads on the east side of the Hell Hole WSA. With no prohibition on cross-country travel, there is the potential for this network of routes to continue to be used and the creation of additional unauthorized routes to continue.

Alternative C proposes the most motorized opportunities within this WSA, however recreationists that currently travel on routes proposed for closure, travel cross-country, or travel cross-country for motorized dispersed camping and motorized big game retrieval outside of proposed corridors could be dissatisfied with a loss of these motorized opportunities. This alternative also provides the least opportunities for Solitude and Primitive and Semi-Primitive Non-Motorized Settings.

In alternative D, recreationists that currently travel on routes proposed for closure or travel cross-country for motorized dispersed camping and motorized big game retrieval outside of proposed corridors could be dissatisfied. Hunters accustomed to motorized big game retrieval for bear, mountain lion, javalina and pronghorn could be dissatisfied at the loss of opportunity within the WSA. This alternative favors Primitive and Semi-Primitive Non-Motorized activities. Hunting-related ATV activities within the WSA associated with motorized dispersed camping and motorized big game retrieval would be the same as those opportunities provided for other ATV recreationists within the Hell Hole WSA.

Alternative E provides the most solitude or primitive unconfined recreational opportunities within the WSA. There is the potential for user dissatisfaction by those who currently travel on routes proposed for closure, travel cross-country or motorized dispersed camping, or practice motorized big game retrieval within the WSA.

Alternative F accommodates both motorized users and those users who prefer a more remote setting. Hunters accustomed to motorized big game retrieval for deer, bear, mountain lion, javalina, and pronghorn could be dissatisfied at the loss of opportunity within the WSA.

In comparison with alternative F, alternative G provides less opportunity for motorized big game retrieval and accommodates both motorized users and those users who prefer a more remote setting. There is a potential for hunters who prefer to retrieve game using motorized means to be dissatisfied at loss of opportunity within the Hell Hole WSA. Hunting-related ATV activities within the WSA associated with motorized dispersed camping and motorized big game retrieval would be the same as those opportunities provided for other ATV recreationists within the Hell Hole WSA.

Reference Landscapes

There are no research natural areas located within the Hell Hole WSA or IRA.

Natural Appearing Landscapes with High Scenic Quality

Visual quality could be improved in all action alternatives due to the proposed prohibition on cross-country travel and limiting motorized use to designated routes within the WSA.

Designation of routes would reduce the possibility of the creation/expansion of new unauthorized routes, and allow unauthorized routes to recover over time.

Traditional Cultural Properties

While no traditional cultural properties or sacred sites were identified as being affected by the Travel Management Project through consultation within the Hell Hole WSA, there is a chance that not all traditional cultural properties or sacred sites are known to the Gila National Forest.

Alternative B provides the maximum potential of motorized access to forest service lands through motorized cross-country travel. Therefore, alternative B has the highest relative risk of effects to any potential traditional cultural properties or sacred site of all alternatives.

None of the action alternatives propose unauthorized or ML-1 roads that will be maintained as part of the NFS Trail or Road System or motorized areas within the Hell Hole WSA. Therefore, effects to potential traditional cultural properties and sacred sites may include, but are not limited to, the introduction of noise to traditional gathering areas or during other traditional activities.

Beneficial effects from the closure of routes and the prohibition of motorized cross-country travel to potential sacred sites and traditional cultural properties may include, but are not limited to, a reduction in noise, route-property intersections, and interruption of traditional activities. These beneficial effects will increase as the number of acres proposed for motorized dispersed camping corridors, motorized big game retrieval, motorized areas, and miles of routes decrease.

Alternative C provides for the most motorized dispersed camping and motorized big game retrieval corridors with the Hell Hole WSA. Alternative C proposes the lowest number of route closures among the action alternatives. Outside of alternative B, alternative C provides the highest relative risk of direct and indirect effects to potential sacred sites and traditional cultural properties.

Alternative D and alternative G propose the same amount of motorized dispersed camping and motorized big game retrieval corridors, which provides less area for such activities than alternatives B, C, and F. Alternative D proposes the highest number of route closures among the action alternatives. Alternative D provides the second most beneficial effects to potential traditional cultural properties and sacred sites of all action alternatives. Alternative D, along with alternative G, provides the second least relative risk of direct and indirect effects to potential traditional cultural properties and sacred sites of all action alternatives.

Alternative E proposes no motorized dispersed camping or motorized big game retrieval corridors within the Hell Hole WSA. This alternative provides the most beneficial effects to potential traditional cultural properties and sacred sites of all action alternatives. Changes presented in alternative E result in the least relative risk of direct and indirect effects to potential sacred sites and traditional cultural properties.

Alternative F proposes more motorized dispersed camping and motorized big game retrieval corridors acreage than alternatives D, G, and E, but less than alternatives B and C. Alternative F proposes more closure of routes than alternatives C and G, but less than alternatives E and D. Alternative F has more beneficial effects than alternatives B and C , but less than E, D, and G. Changes presented in alternative F result in less relative risk of direct and indirect effects to

potential sacred sites and traditional cultural properties when compared to alternatives B and C, but more risk when compared to D, G, and E.

Alternative G and alternative D propose the same amount of motorized dispersed camping and motorized big game retrieval corridors, which provides less area for such activities than alternatives B, C, and F. Alternative G proposes more miles of route closures than C, but less than E, D, and F. Alternative G has more beneficial effects than alternatives B, C, and F, but less than D and E. This alternative provides the second most beneficial effects to potential traditional cultural properties and sacred sites of all action alternatives. Alternative G, along with alternative D, provides the second least relative risk of direct and indirect effects to potential traditional cultural properties and sacred sites of all action alternatives.

Other Locally Unique Characteristics

There are no other known unique characteristics in the area.

Lower San Francisco WSA/IRA - Roadless Characteristics

The following analysis identifies effects to the roadless vharacteristics of the Lower San Francisco IRA with a narrower focus on the river corridor within the Lower San Francisco WSA.

Soil, Water, Aquatic, and Air Resources

This section also summarizes sections of the Soils and Watershed report (USDA Forest Service 2013d); Aquatic Species and Habitat report (USDA Forest Service 2013e); and Air Quality report (2013c).

Soils Analysis

Each of the alternatives was evaluated to determine the effects of a motorized route system on the Gila National Forest to the Lower San Francisco Wilderness Study Area in regards to impacts to soils. The following two tables show the route prism acres by alternative that are located on soils with moderate and severe erosion hazard ratings and soils with unsatisfactory and unsuited soil condition rating.

These ratings were derived from the General Terrestrial Ecosystem Survey, which is an ecological unit inventory which maps soils, geology, climate and potential natural vegetation and was used for the Travel Management Rule soils analysis.

Alternatives B, C, and F have the largest impact to soils with moderate and high erosion potential and unsuited and unsatisfactory soil condition. Alternatives D and G have the least impact to soils with the above-mentioned ratings. Alternative E reduces all potential impacts to soils.

Water Quality

There are currently 40 motorized route crossings within the WSA. Alternative E provides the most reduction (-100 percent) of these motorized crossings by eliminating all motorized access down to the San Francisco River WSA. Alternatives D and G are close behind with a reduction of 98 percent of motorized crossings. The only remaining crossing in these two alternatives would be on Big Dry Creek at its confluence with the San Francisco River. Alternatives C and F do not eliminate any of the existing motorized crossings. Alternatives E, D, and G provide the most opportunity to reduce direct impacts to water quality as mobilization of stream bottom sediments

from motorized traffic would be greatly limited with the reduction and/or elimination of stream crossings. In addition, once recovery of riparian vegetation occurs at the ingress and egress point of the crossings, this vegetation can serve as a filter for sediment movement that may occur during precipitation events along current route/crossing paths.

A small reach (0.23 mile) of the San Francisco River within the WSA is documented on New Mexico's 2012-2014 303(d) list of impaired waterbodies. Alternative E would eliminate all motorized routes within 300 feet of this listed reach. The remaining alternatives (C, D, F, and G) would eliminate 88 percent (0.20 mile) of the motorized routes within 300 feet of this listed reach. All five alternatives provide a major reduction in the length of motorized routes adjacent to the impaired reach of the San Francisco River within the WSA. This reduction in routes reduces the risk for potential road-related sediment to enter this reach of the river.

There are currently 9.95 miles of perennial, intermittent, and ephemeral waterbodies within the Lower San Francisco River WSA. In review of motorized routes within 300 feet of these water bodies, Alternative E eliminates all motorized routes within the 300 feet. Alternatives D and G are close behind with a reduction of 93 percent of motorized routes within the 300 feet. Alternatives C and F reduce a minor amount (-2 percent) of motorized routes within the 300-foot width. Alternatives E, D, and G provide the most opportunity to reduce the risk for potential road-related sediment to enter into the drainage network. Hydrologic impacts would not be immediately eliminated, but would rather be dependent on natural recovery and successful revegetation of the current route paths.

Riparian Areas - There are currently 11 acres associated with motorized routes within riparian areas located in the Lower San Francisco River WSA. Alternative E eliminates motorized routes within the WSA, thus providing a 100 percent reduction of acres associated with these routes. Alternatives D and G are close behind with a reduction of 91 percent of acres associated with motorized routes. Alternatives C and F reduce a minor amount (-3 percent) of acres associated with motorized routes within riparian areas. Alternatives E, D, and G provide the greatest opportunity to reduce the risk of negative impacts to riparian areas from motorized routes, thus increasing the opportunity for riparian habitat restoration. The wet nature of riparian areas provides an increased level of resiliency to irreversible impacts, and often increases the opportunity for recovery. Disturbed riparian habitat in the San Francisco River WSA may recover to a more natural state in a shorter period of time than a disturbed site in a drier, upland location.

Summary: Overall, alternatives E, D, and G greatly reduce the potential risk of impacts to water quality and riparian areas within the Lower San Francisco River WSA, as motorized access would either be eliminated in its entirety (alternative E) within the WSA, or limited to Dry Creek and small spur roads at the confluence of Big Dry Creek and the San Francisco River (alternatives D and G). Alternatives C and F provide little to no reduction in risk of potential impacts to water quality and riparian areas, as motorized access would continue down Big Dry Creek and along the San Francisco River for over eight miles within the WSA.

Aquatic Resources

The San Francisco River within the Lower San Francisco River Wilderness Study Area (WSA) is designated critical habitat for the loach minnow and spikedace. Currently, the native fishery within this reach of stream has been severely degraded due to the dominance of nonnative fish in the stream (J. Monzingo pers. obs). Spikedace historically occurred in this reach of stream but were extirpated by around 1950. Loach minnow have not been detected in this reach recently.

However, rigorous, systematic surveys have not been completed along this reach of river since Anderson and Turner (1977) documented loach minnow during surveys beginning near the confluence of Big Dry Creek to downstream of the New Mexico and Arizona state line. Other native fishes that occurred or occur in the WSA include longfin dace, Sonora sucker, desert sucker, and speckled dace, and Gila chub. Historically, roundtail or headwater chub and Gila topminnow also occurred.

There are currently 37 motorized route crossings within loach minnow and spikedace critical habitat in the WSA. All currently motorized stream crossing located within loach minnow and spikedace designated critical habitat would be nonmotorized in alternatives D, E, and G. All currently motorized stream crossings in loach minnow and spikedace designated critical habitat would remain motorized in alternatives C and F. Alternatives D, E, and G provide the most opportunity to reduce direct impacts to water quality, riparian plants, and habitat as mobilization and downstream transport of stream bottom sediments and physical disturbance of habitat, from motorized traffic, would be reduced as the number of stream crossings decrease. In addition, once recovery of riparian vegetation occurs at the ingress and egress point of the crossings, this vegetation can serve as a filter and reduce sediment movement into the stream.

There are currently 8.19 miles of motorized route located within loach minnow and spikedace critical habitat within the San Francisco River WSA. Alternative E eliminates all motorized routes within the 300 feet of designated critical habitat and presents the least relative risk to aquatic resources. Alternatives D and G include 0.66 mile of motorized routes within loach minnow and spikedace critical habitat. When compared to alternative B, alternatives C and F only slightly reduce the miles of motorized routes located within loach minnow and spikedace critical habitat. Alternatives E, D, and G provide the most opportunity to reduce the risk for potential road-related sediment to enter into the drainage network. Hydrologic impacts would not be immediately eliminated, but would rather be dependent on natural recovery and successful re-vegetation of the current route paths.

Summary - Overall, alternatives D, E, and G greatly reduce the potential risk of direct and indirect impacts to aquatic resources within the San Francisco River WSA, as motorized access would either be eliminated in its entirety (alternative E) within the WSA, or limited to Dry Creek and small spur roads at the confluence of Big Dry Creek and the San Francisco River (alternatives D and G). Alternatives C and F provide little to no reduction in risk of direct and indirect impacts to aquatics resources, as motorized access would continue down Big Dry Creek and along the San Francisco River for over 8 miles and there would continue to be 40 stream crossings of which 37 are located in designated critical habitat for loach minnow and spikedace.

Sources of Public Drinking Water

No municipal watersheds are located within the Lower San Francisco WSA or IRA.

Diversity of Plant and Animal Communities:

Habitat for TES and Species Dependent upon Large Undisturbed Areas of Land

The flow regimes of the San Francisco are primarily unrestricted by major impoundments or diversions; therefore, channel configurations are widely variable and the vegetation communities are typically represented by healthy riparian communities. Within this analysis area the primary

vegetation type has been classified as lower riparian vegetation. A very small amount of piñon-juniper/shrub oak woodland habitat also occurs on the terraces within the canyon bottom.

Wide ranging, federally listed and Regional Forester sensitive species and species groups/focal groups that are currently being affected include:

- Large Ungulates – primarily, deer but this area may occasionally be used by elk and big horn sheep. Deer and elk are wide ranging species and big horn sheep are on the Regional Forester's sensitive species list.
- Wide Ranging Carnivores – including bears, mountain lions, and potentially wolves (federally listed as threatened) on occasion.
- Small Mammals – Hooded skunk, Botta's pocket gopher, White-nosed coati, Western red bat, and Arizona gray squirrel are all on the Regional Forester's sensitive species list.
- Amphibians and Reptiles – Arizona toad, and narrow-headed gartersnake are designated sensitive species. The narrow-headed gartersnake has also recently been proposed for federal listing.
- Raptorial Birds – Northern goshawk, peregrine falcon, bald eagle, and golden eagle (these species may occasionally forage in the area, but no known roost or nesting areas occur). The peregrine and bald eagle are both designated sensitive species and wide ranging. The golden eagle is a wide ranging species.
- Riparian Birds – Northern gray hawk, western yellow-billed cuckoo, Arizona Bell's vireo, Abert's towhee, Gila woodpecker, common ground dove, and black hawk are all designated sensitive species.
- Woodland Birds – Plains titmouse, and gray vireo are designated sensitive species.
- Game Birds – Wild turkey is a wide ranging species.

See FEIS wildlife section and Wildlife Report (USDA Forest Service 2013g) for more description of motorized route effects to species groups/focal groups summarized above.

Summary: Overall, alternatives D, E, and G greatly reduce the potential risk of direct and indirect impacts to species and species groups identified above within the San Francisco River WSA, as motorized access would either be eliminated in its entirety (alternative E) within the WSA, or limited to Dry Creek and small spur roads at the confluence of Big Dry Creek and the San Francisco River (alternatives D and G). Alternatives C and F provide little to no reduction in risk of direct and indirect impacts to the species identified above, as motorized access would continue down Big Dry Creek and along the San Francisco River for over 8 miles and there would continue to be 37 stream crossings along this section of the San Francisco River.

Invasive Plant Species within the Lower San Francisco WSA

The invasive plant species of concern in the Lower San Francisco watershed is Tamarix (spp.) or Salt cedar. Salt cedar is listed on the New Mexico State Noxious Weed List as Class C, meaning limited to portions of the state and managed at the local level. This plant is a perennial, deciduous small shrub or tree that can grow up to 25 feet tall. It is commonly found in disturbed or undisturbed sites along streams, springs, flood plains, drainages, and irrigation ditches. Rapid colonization and expansions most commonly occurs with flood events or water inundation.

Known infestations of Tamarix (Salt cedar) are scattered through-out the San Francisco River corridor from the confluence of Whitewater Creek downstream to the border of Arizona and New Mexico. These infestations are mostly individual small "seedling-like" trees. There are two known areas of tamarix that consist of approximately $1/10^{th}$ acre and estimated at 100 stems, located along the corridor below the confluence of Mule Creek. (Personal communication with Kendall Brown, Range Staff, Glenwood Ranger District, 2013).

Direct/Indirect Effects - Invasive Plant Species within the San Francisco WSA

Alternative B leaves the San Francisco River above Mule Creek and also Big Dry Creek open to motorized vehicles. Stream crossings are not restricted. Although motorized travel does not directly affect the introduction, establishment and spread of tamarix, motorized travel in riparian corridors could alter native habitat through disturbance of vegetation, compaction, and streambank alteration along the corridor and at river crossings. This could increase the opportunity for invasive species establishment as compared to other alternatives by reducing vegetative cover that may hold streambanks and floodplains in place in flood events. Alternative C also allows motorized travel for camping along the San Francisco River from Hwy 180 to Mule Creek creating basically the same effects as alternative B.

Alternatives D and G do not allow motorized travel along the San Francisco River nor allow any river crossings, therefore decreasing the opportunity for habitat alteration and invasive species introduction due to disturbance factors as described above when compared to alternatives B and C. However, these alternatives (D and G) would provide increased opportunities for invasive species when compared to alternative E which closes the entire river to any motorized travel. Effects of alternative F to invasive species would be similar to those of alternative C as this alternative also allows for motorized travel from Hwy 180 to Mule Creek.

In summary, alternative E provides the least opportunities for invasive species and alternatives B, C, and F would provide for the most opportunity for invasive species due to motorized travel. In alternatives D and G, opportunities for invasive species introduction, establishment, and spread due to motorized travel falls in between alternatives E and B or C.

Three allotments border the Lower San Francisco River: Pleasanton/Lightning Mesa, Potholes, and Harden Cienega allotments. Livestock grazing is not permitted within the Lower San Francisco River corridor as described in the Grazing Allotment Instructions. Access is controlled either by fencing or topography. Compliance monitoring is conducted to assure cattle are not accessing the San Francisco River.

Primitive, Semi-Primitive Nonmotorized and Semi-Primitive Motorized Classes of Dispersed Recreation

The following discussion of effects of the action alternatives is based on the data contained in Appendix B Tables WSA A1-WSA A6 of Recreation IRA/WSA report (USDA Forest Service 2013b2).

Of the action alternatives, alternative C provides the most opportunities for Semi-Primitive Motorized recreation with the least opportunities for Primitive and Semi Primitive Non-motorized recreation activities.

Alternative D benefits visitors that currently utilize these routes to access the river with a motorized vehicle.

Alternative E provides the most solitude or primitive unconfined recreational opportunities in the Lower San Francisco WSA. This alternative would have the most effect on visitors who currently access the River on routes that are currently open to motorized travel.

In alternative F, hunters accustomed to motorized big game retrieval for deer, bear, mountain lion, javalina, and pronghorn could be dissatisfied at the loss of opportunity within the Lower San Francisco WSA.

This alternative benefits visitors that currently utilize these routes. There is the potential for user dissatisfaction at the loss of motorized opportunity on the roads proposed for closure. There is a potential for hunters who prefer to retrieve game using motorized vehicles to be dissatisfied at loss of opportunity within the Lower San Francisco WSA. Hunting-related ATV activities within the WSA associated with motorized dispersed camping and motorized big game retrieval would be the same as those opportunities provided for other ATV recreationists within WSA.

Reference Landscapes

No research natural areas are located within the Lower San Francisco River WSA or IRA.

Natural appearing landscapes with high scenic quality

The Lower San Francisco River is well known for its scenic beauty. Visual quality could be improved in all action alternatives due to the proposed prohibition on cross-country travel and limiting motorized use to designated routes within the WSA. Designation of routes would reduce the possibility of the creation of new unauthorized routes.

Traditional Cultural Properties

While no traditional cultural properties or sacred sites were identified as being affected by the Travel Management Project through consultation within the Lower San Francisco WSA and associated IRA, there is a chance that not all traditional cultural properties or sacred sites are known to the Gila National Forest.

Alternative B provides the maximum potential of motorized access to NFS lands through motorized cross-country travel. Therefore, alternative B has the highest relative risk of effects to any potential traditional cultural properties or sacred site of all alternatives.

Effects to potential traditional cultural properties and sacred sites may include, but are not limited to, unauthorized routes that will be maintained as part of the NFS road system bisecting the property and the introduction of noise to traditional gathering areas or during other traditional activities. Beneficial effects would be the same as seen in the Hell Hole WSA.

While no unauthorized routes that will be maintained as part of the NFS road system are proposed for alternative C, this action alternative proposes the most acreage for motorized dispersed camping and motorized big game retrieval corridors of all action alternatives. It has the least beneficial effects for potential traditional cultural properties and sacred sites. Outside of alternative B, alternative C provides the highest relative risk of direct and indirect effects to potential sacred sites and traditional cultural properties.

Alternatives D and G propose the same number of acres for motorized dispersed camping and motorized big game retrieval corridors. Alternatives D and G provide less area for these activities than alternatives B, C, and F, but more than alternative E. Alternatives D and G are the only

alternatives that propose unauthorized routes that will be maintained as either part of the NFS road system. However, they still propose less area for motorized use than alternatives B, C, and F. Alternatives D and G also propose the same number of route closures. These alternatives provide the second most beneficial effects to potential traditional cultural properties and sacred sites. Alternative D, along with alternative G, provides the second least relative risk of direct and indirect effects to potential traditional cultural properties and sacred sites of all action alternatives.

Alternative E proposes no new routes, motorized dispersed camping or motorized big game retrieval corridors within the Lower San Francisco WSA/IRA. This alternative provides the most beneficial effects to potential traditional cultural properties and sacred sites. Changes presented in alternative E result in the least relative risk of direct and indirect effects to potential sacred sites and traditional cultural properties.

Alternative F proposes more motorized dispersed camping and motorized big game retrieval corridors acreage than alternatives D, G, and E, but less than alternatives B and C. No new routes are proposed in alternative F. Alternative F provides less beneficial effects to potential traditional cultural properties and sacred sites than alternatives D, E, and G, but more than alternative B and C. Changes presented in alternative F result in less relative risk of direct and indirect effects to potential sacred sites and traditional cultural properties when compared to alternative B and C, but more risk when compared to alternatives D, G, and E.

Cultural Resources

The potential direct, indirect, and beneficial effects to cultural resources are the same as described in the Cultural Resource specialist report (USDA Forest Service 2013j) and summarized within this FEIS chapter for motorized routes, motorized dispersed camping corridor, motorized big game retrieval, and motorized areas. The following analysis only covers the extent of the Lower San Francisco Wilderness Study Area (WSA).

The Lower San Francisco WSA has not been widely surveyed by the Forest Service. As a result, not many known sites are found within the area. This area is rocky and steep, much of it exceeds 40 percent slope. However, this type of terrain may contain certain types of sites.

Due to the steep terrain, not many areas within the WSA would be easily accessible for motorized big game retrieval or motorized dispersed camping . If an alternative is chosen that proposes motorized dispersed camping corridors, these areas will be surveyed. Any sites located or visited would be assessed for travel management effects and potentially adverse effects avoided or mitigated, as appropriate.

Motorized Routes: Analysis of the current route system (alternative B), shows about 8.28 miles of existing routes with no known sites. However, motorized cross-country travel is allowed on 4,144 acres within the WSA. Analysis of this portion of the WSA shows that one known site is within that area. Under alternatives C, E, and F, no new routes are proposed. There would be no potential risk to cultural resources within these alternatives. Therefore, this would be a 100 percent reduction from alternative B. Under alternatives D and G, there is 0.29 mile of unauthorized routes proposed. This area has been assessed and there are no known sites within the surveyed area. There would be no potential risk of direct or indirect effects to cultural resources and a 100 percent reduction from alternative B.

Motorized Dispersed Camping Corridors: In alternative B, motorized dispersed camping is allowed on over 4,144 acres within the Lower San Francisco WSA. There is one known site within this area.

Changes in alternative C result in about 580 acres being available for motorized dispersed camping corridors, a reduction of 86 percent from alternative B. This alternative also has one known site within it. Alternative C reduces the number of acres available for motorized dispersed camping , but has equal relative risk of direct and indirect effect to known sites when compared to alternative B.

Alternatives D and G propose 0.3 acre of motorized dispersed camping corridors within the Lower San Francisco WSA, a reduction of 99.992 percent from alternative B. There are no known sites within this area. This is nearly a 100 percent reduction in potential risk to cultural resources compared to alternatives B and C.

Alternative E does not propose motorized dispersed camping corridors along the routes in the Lower San Francisco WSA. Therefore, this alternative would not affect known cultural resources in this area. This would be a 100 percent reduction in potential risk to cultural resources when compared to alternatives B and C.

Changes in alternative F result in about 38 acres available for motorized dispersed camping corridors, a reduction of 99.08 percent from alternative B. This alternative also has one known site within it. Alternative B reduces the number of acres available for motorized dispersed camping, but has equal relative risk of direct and indirect effect to known sites when compared to alternatives B and C, and less relative risk than alternatives D, E, and G.

Motorized Big Game Retrieval: Alternative B allows motorized big game retrieval on 4,144 acres within the Lower San Francisco WSA. There is one known site within this area. Changes in alternative C result in about 4,063 acres being available for motorized big game retrieval, a reduction of 1.95 percent from alternative B. This alternative also has one known site within it. Alternative C reduces the number of acres available for motorized big game retrieval, but has equal relative risk of direct and indirect effect to known sites when compared to alternative B.

Alternatives D and G propose 0.3 acre of motorized big game retrieval within the Lower San Francisco WSA, a reduction of 99.992 percent from alternative B. There are no known sites within this area. This is nearly a 100 percent reduction in potential risk to cultural resources with compared to alternatives B and C.

Alternative E does not propose motorized big game retrieval along the routes in the Lower San Francisco WSA. Therefore, this alternative would not affect cultural resources in this area. This would be a 100 percent reduction in potential risk to cultural resources when compared to alternatives B and C.

Changes in alternative F result in about 3,329 acres available for motorized big game retrieval, a reduction of 19.67 percent from alternative B. This alternative also has one known site within it. Alternative F reduces the number of acres available for motorized big game retrieval, but has equal relative risk of direct and indirect effect to known sites when compared to alternatives B and C, and less relative risk than alternatives D, E, and G.

Motorized Areas: There are no designated motorized areas in alternative B. However, motorized cross-country travel and motorized dispersed camping are allowed in alternative B. These activities are similar in scope to those that would occur in motorized areas. They also pose similar potential effects to cultural resources. Alternative B allows motorized cross-country travel and motorized dispersed camping upon 4,144 acres. There is one known site within this area.

Alternatives C, D, E, F, and G do not propose motorized areas within the Lower San Francisco River WSA. Therefore, there is no potential risk to cultural resources due to this action in this area. This would be a 100 percent reduction in potential risk of direct and indirect effect when compared to alternative B.

Summary: As this analysis shows, there is little survey in this area and very few known sites. Due to the steep terrain, not many areas within the WSA would be easily accessible by vehicle for motorized dispersed camping or motorized big game retrieval. Motorized areas are not proposed. The newly proposed routes have already gone through the Section 106 process and no cultural resources were located within them. If one of the action alternatives that proposes motorized dispersed camping corridors on these routes is chosen, they will go through the Section 106 compliance and consultation before appearing on the motor vehicle use map. Any potential effects to cultural resources will be addressed through this process.

Cumulative Effects within WSAs

The cumulative effects analysis evaluates past, present, and reasonably foreseeable actions on roadless characteristics and wilderness character in WSAs considering those activities that have influenced motorized or nonmotorized travel within WSAs for the next decade.

The cumulative effects analysis area for the two wilderness study areas, Hell Hole and Lower San Francisco, includes the lands within the WSA boundaries. It also includes adjacent lands beyond the WSA boundary; lands within the Lower San Francisco and Hell Hole IRAs; lands to the west located on the Apache-Sitgreaves National Forests including the eligible wild and scenic river corridor of the San Francisco River and lands within the Hell Hole and Lower San Francisco IRAs; and lands to the south of the Hell Hole WSA located within the Apache Box WSA managed by the Las Cruces Field Office of the Bureau of Land Management.

Past Actions

Access to WSAs has been developed over time from past Native American use, mining, military travel, timber harvest, road construction, and trail construction and reconstruction activities. There are 10.75 miles of road located within the Hell Hole and 8.28 miles of road located within the Lower San Francisco River WSA.

Since the implementation of the forest plan in 1986, existing roads on the boundaries of and within WSAs have been routinely maintained. No NFS system trails are located within either WSA.

Segments of the San Francisco River on the Gila National Forest were proposed during the eligibility planning process for wild and scenic rivers and not included in the final eligibility findings.

The San Francisco River and Coal Creek are included in the eligibility findings for River segments located on the Apache-Sitgreaves National Forests. These findings identify a segment of the San Francisco River eligible under the classification of "Wild" and a segment of the river eligible under the classification of "Recreational." A segment of Coal Creek is identified as eligible under the classification of "Wild" and a segment as eligible under the classification of "Recreational." The "Recreational" segment of Coal Creek flows along the Arizona New Mexico border and flows on and off the Gila National Forest. The Apache-Sitgreaves National Forests administer the Coal Creek eligible wild and scenic river

None of the action alternative proposes any new road or trail construction within either WSAs or associated IRAs. The combination of changes to the motorized route system results in a net reduction of road mileages and areas available for motorized dispersed camping and motorized big game retrieval within WSAs and associated IRAs. The proposed changes to motorized access should not affect the eligible wild and scenic river segments of the San Francisco River and Coal creek located on the Apache-Sitgreaves National Forests.

Ongoing and Future Foreseeable Actions

In June 2009, the Apache-Sitgreaves National Forests conducted wilderness evaluation reports for the Hell Hole and Gila and Apache-Sitgreaves National Forests portions of the Blue/San Francisco potential wilderness areas. These are being considered for wilderness area planning.

Road maintenance, as well as weed treatment, occurs along the transportation system located within the Gila National Forest WSAs. Grazing and outfitter and guide permittees use the road transportation system to access the WSAs on system roads for their operations. This road system is also used for firefighting operations.

Treating noxious weeds would allow native vegetation to reestablish and greatly improve many roadless characteristics, such as the soil resource, diversity of plant and animal communities, and their associated habitat, and the naturalness associated with the area's landscape character and integrity. It also limits the expansion of weed infestations throughout non-infested areas within the WSAs.

Short-term effects to recreational opportunities in primitive and semi-primitive environments may occur if recreationists expecting solitude encounter weed control crews working in the WSAs. Apparent naturalness may also be affected in the short term where grubbing, pulling, and/or mechanical treatments are obvious.

Weed treatment, vegetation projects, ongoing trail maintenance and reconstruction, and fire management activities all have the potential for cumulative effects on the areas' roadless characteristics. In most cases, however, these projects trend toward improving roadless area character.

Future vegetation projects may include continued weed treatment of Tamarisk/Salt Cedar. Short term impacts to opportunities for quiet, backcountry recreation could be expected where recreationists encounter crews working in the field treating Salt Cedar.

The Tucson Electric Power powerline right-of-way (ROW) located in the Lower San Francisco WSA would continue in all alternatives. The ROW is periodically maintained per the terms and conditions of the permit. This would include helicopter access, use of roads, and vegetation fuel

reduction treatments within the corridor all of which could be audible or visible to the recreating public.

All action alternatives have the potential for the same cumulative effects related to primitive, semi-primitive-motorized and semi-primitive-nonmotorized recreation opportunities and visitor satisfaction within WSAs as listed above for IRAs.

Effects of Forest Plan Amendments

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the Travel Management Rule.

Air Quality

This section summarizes the air quality specialist report (USDA Forest Service 2013c).

Introduction

Air quality on 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 affects for authorized motorized vehicle travel on the Gila National Forest to impact National and State Ambient Air Quality Standards (AAQS), to degrade air quality by more than any applicable Prevention of Significant Deterioration (PSD) 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 fugitive 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 a discussion of 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 (carbon monoxide, lead, nitrogen dioxide, particulate matter less than10 microns in diameter, particulate matter less than 2.5 microns in diameter, ozone, sulfur dioxide), which are called “criteria” pollutants. 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 (NMAC) 20.2.3 and define the upper limit of a pollutant that can be present in outdoor air without harm to 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.

The Freeport-McMoRan Chino Copper Smelter in Grant County, near the Gila National Forest, is currently considered a Sulfur Dioxide (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 redesignation plan (http://www.nmenv.state.nm.us/aqb/Control_Strat/sip/Grant_Text.pdf) was approved by the EPA in 2003. In 2008, the Hurley smelter stack was demolished, thus there are no further point source emissions from the stack. To date however, the NM 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 on the Gila National Forest and adjacent lands 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 (NMED) has not designated any airsheds in or around the Gila National Forest as being in non-attainment of Ambient Air Quality Standards.

Gila Wilderness (Hoadley 2008)

The Gila Wilderness Area was in existence at the time of the passage of the Clean Air Act Amendments of 1977, and thus was designated as a Class I area and provided the highest level of protection from additional air pollution. Under the 1977 CAA, national wilderness areas existing as of August 7, 1977, and that exceeded 5,000 acres in size were designated as "Class I" areas under PSD. Within Class I areas, stringent allowable "increments" or increases in air pollutant concentrations were established and new/modified sources of air pollution are required to demonstrate compliance with these increments in a PSD permit application. 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 Revised Phase I Report (FLAG 2010) that the three areas of greatest concern for air quality in Class I and II areas under their jurisdiction remain (1) visibility impairment, (2) ozone effects on vegetation, and 3) effects of pollutant deposition on soils, lichen, and surface waters. Air Quality Related Values (AQRV) at risk from these threats includes flora, fauna, odor, water, soils, geologic features and cultural resources. For established Air Quality Related Values (Blankenship 1990a), visibility in the Class I airshed of the Gila Wilderness is regulated by the Regional Haze Rule. All remaining private and public lands (including the remaining wildernesses) outside of those listed

are designated as Class II. The main distinction between Class I and Class II areas for Forest Service air quality management purposes is that areas designated as Class I are protected from human-caused degradation of air quality through the Prevention of Significant Deterioration (PSD) permitting program. Although the responsibility of the Forest Service to protect air quality values in all wilderness areas is the same, regardless of whether areas are Class I or Class II, it is the agency's ability to affect change using the protective framework in place for Class I areas that differs.

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 southeastern Arizona, southwestern New Mexico and extreme western Texas. Pollutants are also likely being transported across the border from Mexico. Some of the large smelters in this area have gone out of operation since 1999; however, the Asarco plant in El Paso has recently been granted approval for a renewal of their air quality permit from the state of Texas and may soon return to operation.

Regional Haze - Visibility

Note: The Regional Haze Rule under the Clean Air Act puts forth the regulations discussed in this section. The Gila National Forest contains the Gila Wilderness, which is a Class I Area. Class I Areas receive the highest level of protection for air quality, where prevention of significant deterioration of visibility is mandated by the Clean Air Act. Visibility is monitored at these sites through IMPROVE monitoring sites, one of which is located near the Gila Wilderness. The Gila Wilderness was added to the Interagency Monitoring for Protection of Visual Environments (IMPROVE) network on April 6, 1994. This site is located near the Gila Cliff Dwellings National Monument and the Monument is considered representative of all three wilderness areas (see Figures 1 and 2). Data are currently available on the Visibility Information Exchange Web Site (VIEWS 2012). IMPROVE monitoring data tracks the quality of visibility conditions and trends in visibility data and are specific to the wilderness areas of interest.

Visibility impacts are generally assessed in terms of "natural background" or the expected visibility in the absence of human emission sources. In the southwest visibility is mainly impacted by both fine and coarse particulate matter (FLAG 2010). The Federal Land Managers responsible for Class I areas have developed natural background visibility estimates for Class I areas (FLAG 2000). Visibility at the Gila Wilderness site can temporarily be impacted by wildfires and prescribed fires, and from point sources such as the power and mining industry, and emissions from outside the region. Population increases which result in higher emissions from vehicular traffic can also impact air quality related values. While natural background visibility is currently degraded compared to historic conditions, the trends in visibility have been improving.

Figure 10 shows visibility trends on the best 20 percent of days in Gila Wilderness from 2001 to 2064. The figure includes both monitored and modeled data. The monitored data are from 2001 through 2010. Also shown are modeled baselines established for 2000 to 2004, a baseline for 2005 to 2009, and the visibility improvements required to meet national visibility goals by 2064. In this case, when measured in deciviews (dv), an index in which one unit is equivalent to the change in visibility noticeable by the human eye, visibility on the best days already exceeds the 2064 goal. When measured in light extinction, the current readings are ahead of the glide path

(the rate at which improvements must occur in order to meet the 2064 goal) but some further improvement is needed. However, the trend based on both the monitored data and the two baselines are showing progress toward the 2064 visibility goal and are on the trajectory to meet this goal.

Figure 11 shows the visibility trends at Gila Wilderness on the worst 20 percent of days. The baselines and projections are based on the same assumptions as in figure 10, except they are based on the 20 percent worst days at the Gila Wilderness. Additionally, the glide path necessary to meet the 2064 visibility goals is included. Again, the monitored data and the current trend based on these data are below the current glide path. Some improvements will be required to meet the 2064 visibility goal at the Gila Wilderness, whether measured in deciviews or light extinction. However, the trend based on both the monitored data and the two baselines are showing progress toward the 2064 visibility goal and are on the trajectory to meet this goal.

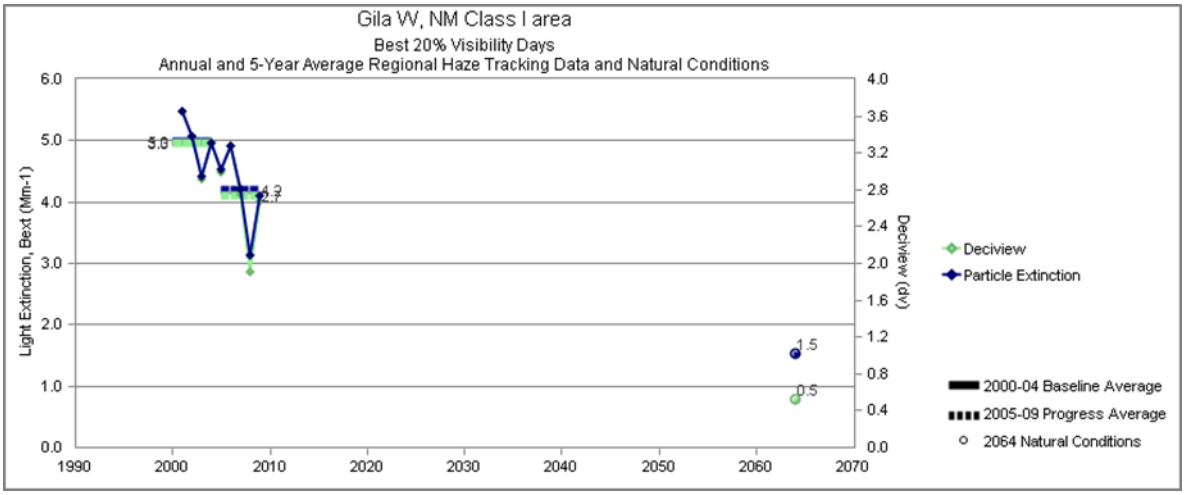

Figure 10. Visibility trends on the 20 percent best days at Gila Wilderness, 2000 through 2064 (VIEWS 2012)

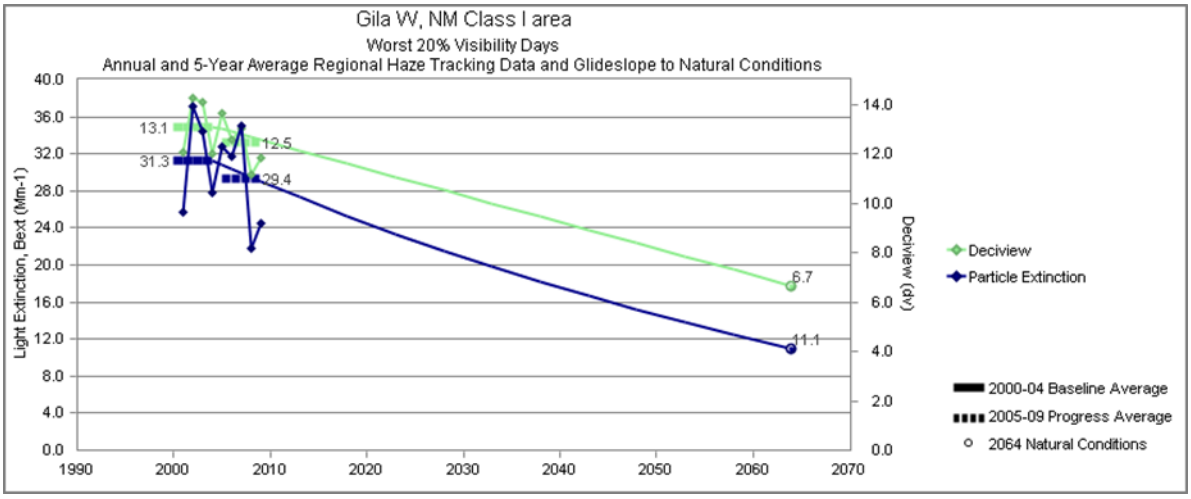

Figure 11. Visibility trends on the 20 percent worst days at Gila Wilderness, 2000 through 2064 (VIEWS 2012)

Other Monitoring Data

Ozone pollution is of added concern because it can stress sensitive ecological systems. Particulate Matter (PM) emissions are generally broken into two categories based on the size of the PM emissions. Fine PM represents the particulate matter emissions sized at or below 2.5 microns in diameter ($PM_{2.5}$). Coarse PM (CPM) represents the particulate matter emissions sized at or below 10 microns, but above 2.5 microns, in diameter. Smaller-sized particles have greater health-related impacts because the smaller particles are more easily inhaled into the lungs.

Since 2007, several of NMED's $PM_{2.5}$ monitors have been collecting ambient concentrations below the NAAQS. NMED operates two PM_{10} gravimetric monitors in Grant County (AQS #35-017-1002 and #35-017-1003). Since 2007, these two monitors have reported values which are very low in comparison with the 24-hour NAAQS.

Ozone

Ozone is considered a secondary pollutant because it forms on warm sunny days when the primary pollutants nitrogen oxide (NOx) 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 due to cells may be present in the form of spots or dead areas. Decreased growth or altered carbon allocation may also occur. Ponderosa Pine is one species which is known to be sensitive to ozone in the atmosphere (FLAG 2000).

Ozone monitors in the southwestern United States in 2006 indicated that while high concentrations are not generally present in this area, the 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) related to these resources. However, the acid neutralizing capacity of the Gila Wilderness is likely insufficient for sensitive ecosystem components such as lichen.

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 Program website: http://nadp.sws.uiuc.edu/sites/siteinfo.asp?id=NM01&net=NTN

Trend plots for atmospheric aerosols, including both sulfates (SO_4) and nitrates (NO_3), from the National Acid Deposition site indicate a decrease over the past few years, which may be a result of decreased smelting activities at the Chino Copper Smelter near Silver City.

Smoke Management

The Gila National Forest complies with the New Mexico Smoke Management Program, NMAC 20.2.65 (State of New Mexico 2005). The Smoke Management Program was developed to protect

the health and welfare of New Mexicans from the impacts of smoke from planned and unplanned ignitions, and to meet the requirements of the Federal Regional Haze Rule. The forest is committed to follow the rule and to use tools and information necessary to minimize impacts from smoke. Particulate monitors are often used to measure smoke concentrations, from prescribed fires and wildfires. Smoke from wildland fire can temporarily impact air quality in the region, and at times beyond the region, although air quality is typically very good.

Fugitive Dust

Fugitive dust is primarily lightweight soil particles, including silt and clay, that arises 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. The force of wheels moving across the native surfaces causes pulverization of surface material. Dust is lofted by the rolling wheels as well as by the turbulence caused by the vehicle itself. This air turbulence can persist for a period of time after the vehicle passes. The quantity of dust emissions from a native surface road varies linearly with the volume of traffic. The silt content of the road surface layer, the distance traveled, the weight and speed of the vehicle, average number of wheels per vehicle, the road surface texture, the fraction of road surface material which is classified as silt (particles less than 75 microns in diameter), and the moisture content of the road surface, as well as weather conditions, influence the amount of dust produced. Surfaced roads produce a relatively smaller amount of dust than do native surface roads, especially during dry weather (EPA 2003, Lovich and Bainbridge 1999).

Although a small amount of fugitive dust occurs naturally, the Environmental Protection Agency (EPA) lists road dust as the largest single source of particulate matter in the air (EPA 2013).

Motorized use on dirt roads, in particular during windy weather conditions, can increase fugitive dust levels. Adjacent to roads, dust generated from motorized traffic can cover plants which can interfere with plant growth by clogging pores and reducing light interception. In addition, fugitive dust can cause low visibility on unpaved roads.

A recent study (Painter et al. 2010) indicates that an increased amount of dust in the air over the last century has impacted the longevity of snowpacks, thus leading to changes in the timing and magnitude of stream runoff, in particular in the Upper Colorado River Basin. This relationship is influenced by many factors, including snow accumulations, vegetation cover, and the amount of soil surface disturbance in an area. Currently, there is no data or studies in the geographical area of the Gila National Forest to conclude how much influence fugitive dust has on the smaller snowpacks of these southwestern mountain ranges.

Vehicle Emissions

Vehicle emissions in the project area are most concentrated along federal and state highways. The Forest does not have jurisdiction on vehicle use levels or emissions in any of these concentrated motorized areas. Recreational motorized uses 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 non-road engines and vehicles (snowmobiles, ATVs, boats, etc.). The standards for emissions of oxides of nitrogen (NOx), 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 formulation 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 (EPA 2003).

Emissions controls on automobiles have become much more effective in recent years; however emissions from small engines still pose problems to air quality. In particular, OHV emissions from two-stroke engines (many are which are being phased out) do not burn fuel completely and produce significant amounts of airborne contaminants (nitrogen oxides, carbon monoxide, ozone, among other aldehydes, and extremely persistent polycyclic aromatic hydrocarbons (PAH), including the suspected human carcinogen, methyl tert-butyl ether (MTBE) (http://www.arb.ca.gov/msprog/offroad/sm_en_fs.pdf).

Some airborne contaminants settle onto plants or into soils and function as fertilizers, thus causing changes in plant community composition and altering growth rates (Bazzaz and Garbutt 1988, Ferris and Taylor 1995, Falkengren-Grerup 1986; Holzapfel and Schmidt 1990; Angold 1997). The accumulation of emissions contaminants has been found in the tissues of plants and animals exposed to them. Prior to the ban on leaded gasoline, lead also was prevalent in plants and animals near paved roads and other travel routes, and because it persists in the environment, it can still have impacts when contaminated soils are mobilized (Ouren et al. 2007). Sulfur dioxide, which can be taken up by vegetation, may result in altered photosynthetic processes (Winner and Atkinson 1986).

OHV emissions also contain a variety of heavy metals, including zinc, copper, nickel, chromium, and lead. In terms of overall quantity, lead was one of the most significant heavy metals emitted prior to the ban on leaded gasoline in 1996 (Daines et al. 1970; Motto et al. 1970; Quarles et al. 1974; Wheeler and Rolfe 1979). The declining gradient in lead concentrations away from roadsides may be due, in part, to the direction of surface water flow, as soil and other debris to which lead adheres were flushed away by the volume of water that runs off road surfaces. Although lead emissions from gasoline have declined dramatically since control policies were implemented in the 1970s (Forman et al. 2003), it persists in soils and can continue to move through the environment when contaminated soils are dislodged.

Airsheds

The Gila National Forest occupies portions of four designated airsheds in New Mexico. Table 43 outlines the number of Gila National Forest acres within each airshed.

Table 43. Gila National Forest acres within New Mexico airsheds

Airshed	Total Acres in Airshed	Forest Acres within Airshed	Percent of Forest in Airshed	Percent of Airshed Occupied by Forest
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 which have been 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.

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, the 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" in 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, 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 time frame 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.
>
> Average air temperatures are rising, and it is likely that continued warming will accentuate the temperature difference between the Southwest and the tropical Pacific Ocean, enhancing the strength of the westerly winds that carry moist air from the tropics into the Southwest during the monsoon. This scenario may increase the monsoon's intensity, or its duration, or both, in which case floods will occur with greater frequency (Guido 2008). While the region is expected to dry out, it is likely to see larger, more destructive flooding. Along with storms in general, hurricanes and other tropical cyclones are projected to become more intense overall. Arizona and New Mexico typically receive 10 percent or more of

> their annual precipitation from storms that begin as tropical cyclones in the Pacific Ocean. In fact, some of the largest floods in the Southwest have occurred when a remnant tropical storm hit a frontal storm from the north or northwest, providing energy to empower a remnant tropical storm (Guido 2008).
>
> Most global climate models are not yet precise enough to apply to land management at the ecoregional or National Forest scale. This limits regional and forest-specific analysis of the potential effects from climate change."

Due to the limitations of climate models, as stated above, site-specific analysis of climate change at the forest level in regard 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.

A new U.S. Forest Service report predicts that most of the Southwest, parts of California and the southern and central Great Plains will be the most vulnerable areas in the nation to water shortages during the next 60 years. The report, "Vulnerability of U.S. Water Supply to Shortage: A Technical Document Supporting the Forest Service 2010 RPA Assessment" (Foti et al. 2012), affirmed that of 98 river basin assessments across the U.S., the arid and semi-arid regions of the nation are the most vulnerable areas to future water shortages. Although the detailed results differ depending on which scenario is simulated and which climate model is used, the general finding of increasing and substantial vulnerability in the Southwest holds true in all cases.

The National Climate Assessment Development Advisory Committee (NCADAC) has overseen the development of a Draft Climate Report that was recently released for public comment (January 2013). Summarized below are some of the findings from the report.

> "The Southwest is the hottest and driest region in the U.S., where the availability of water has defined its landscapes, history of human settlement, and modern economy. Climate changes pose challenges for an already parched region that is expected to get hotter and, in its southern half, significantly drier. Widespread tree death and fires, which already have caused billions of dollars in economic losses, are projected to increase, forcing wholesale changes to forest types, landscapes, and the communities that depend on them. Climate change is increasing the vulnerability of forests to ecosystem change and tree mortality through fire, insect infestations, drought, and disease outbreaks. Western U.S. forests are particularly vulnerable to increased wildfire and insect outbreaks.
>
> Factors affecting tree death, such as drought, higher temperatures, and/or pests and pathogens, are often interrelated, which means that isolating a single cause of mortality is rare (Allen et al. 2010; Dukes et al. 2009; McDowell et al. 2008). However, rates of tree mortality due to one or more of these factors have increased with higher temperatures in western forests (Van Mantgem et al. 2009; Williams et al. 2010) and are well correlated with both rising temperatures and associated increases in evaporative water demand (Williams et al. 2012). Trees die faster when higher temperatures accompany drought; thus a shorter drought

> can trigger mortality. Short droughts occur more frequently than long droughts, therefore the direct effect of rising temperatures, without a change in drought frequency, could result in substantially greater mortality (Adams et al. 2009). Western forests are currently considered limited by moisture and thereby highly susceptible to future changes in environmental conditions.
>
> Fire naturally shapes southwestern landscapes. Indeed, many Southwest ecosystems depend on periodic wildfire to maintain healthy tree densities, enable seeds to germinate, and reduce pests (Bowman et al. 2009; Keeley and Zedler 2009). Excessive wildfire destroys homes, exposes slopes to erosion and landslides, threatens public health, and causes economic damage (Frisvold et al. 2011; Morton and Global Institute of Sustainable Forestry 2003; Richardson et al. 2011; WFLC 2010). Given strong relationships between climate and fire, even when modified by land use and management, projected climate changes suggest that western forests in the United States will be increasingly affected by large and intense fires that occur more frequently (Bowman et al. 2009; Keane et al. 2009; Littell et al. 2009; Westerling et al. 2011; Williams et al. 2010)."

Projected future climate change may affect New Mexico in a variety of ways. Public health can suffer due to 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. Managers should avoid situations where 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.

Methodology and Assumptions

The analysis area under consideration for direct and indirect air quality impacts is at the landscape level, considering the area within a radius of 62 miles (100 kilometers) from the edge of the project area. NMED'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 were considered by airshed, taking into accountthe 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

Data sources for this analysis included existing surveys, inventories and data bases incorporated into the Gila National Forest GIS layers:

- Roads, associated maintenance levels, road widths and road miles from the Gila National Forest Infra Database (see engineering section)
- User-created routes inventory (Forest and Public)
- NM air basins (State of New Mexico)

General Assumptions:

- Public education, compliance, and enforcement of regulations will generally limit public travel to designated routes.
- The action alternatives involve the closure of routes to vehicle use by the public and not the physical removal (decommissioning) of roads. The 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 minor source of fugitive dust during windy periods. These emissions may vary across the Forest dependent on location of wind events and exposure of the closed routes to the event.
- Miles by traffic use are unknown. Traffic use on maintenance level 2 routes and user-created routes is generally low, and traffic use on maintenance levels 3, 4, and 5 routes is generally moderate.
- An undetermined amount of unauthorized routes exist that are not included in any current inventory.
- Fugitive dust is the major air pollutant from native-surface roads. Other pollutants from roads, such as trace metals and man-made chemicals may be attached to dust. Thus, the relative effects of the alternatives with regard to fugitive dust apply to trace metals and man-made chemicals.
- Pollutants such as smoke, ozone, vehicle emissions, and atmospheric deposition are not analyzed in the effects section as they either do not apply (smoke) to the project or there is insufficient data to analyze.
- The designation of motorized routes does not translate to changes in numbers of motorized vehicles, either full-size or off-road vehicles that use the Forest, just location of use.
- 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.
- Fugitive dust emissions will be produced from motorized dispersed recreation within designated corridors and motorized areas. Acres associated with these activities will be included in this analysis

- Fugitive dust emissions will be produced from motorized big game retrieval over vegetated surfaces. Acres associated with this activity will 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. Table 44 displays the average road widths that were used.

Table 44. Assumed average road widths by maintenance level

Type of Route	Average Assumed Width of Route (feet)
Single-Track Trails	3
Maintenance Level 1 – Decommissioned*	0
Maintenance Level 1 – Closed	12
Maintenance Level 2	12
Maintenance Level 3	14
Maintenance Level 4	20
Maintenance Level 5	20
ATV Trails	8
Non-Forest Service Roads	16

*Decommissioned is defined as returning the route to its natural (pre-road) condition.

Data Limitations: The amount of fugitive dust generated from acres of disturbed roadways on Forest has not been quantified, nor is there data that documents the frequency or timing of travel that occurs on these roadways. In addition, the forest does not have data associated with traffic numbers, vehicle weights, speeds used by motorized traffic, tire types, and other factors that are required to calculate fugitive dust emissions. For this analysis, the forest did not have the time, funding, or necessity to obtain this data within practical reason. Estimates of increases or decreases in potential air impacts created by fugitive dust generation are relative to corresponding increases and decreases in acres of open roadways by alternative.

Issue Statements

1. 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.
2. Motorized dispersed recreation within proposed designated corridors may lead to resource, recreation, social and economic impacts.
3. The proposed motorized big game retrieval may lead to resource, recreation, social and economic impacts.
4. The proposed motorized areas, specifically for OHV activities may lead to resource, recreation, social and economic impacts.

Relative Risk Analysis

This report uses a relative risk analysis to compare alternatives. Relative risk is considered the potential impact that can result from one action (alternative) measured against the potential impact that might result from a different action (alternative).

The following method was used for all direct and indirect effects analyses in this report, based on the premise that: A – The effects of a motorized route system, motorized dispersed recreation, motorized big game retrieval, and motorized areas on a key resource are considered the same under all alternatives; and B – More or less of these effects occur, or have the potential to occur, under each alternative, based on each alternative's design.

1. The direct/indirect effects* to the resource are described
2. Measures of the indicator for the resource area are used to compare each action alternative to the no action alternative.
3. These results of these measures are compared to determine relative risk
4. Results are summarized the resource area

*direct/indirect effects – Direct effects are those occurring at the same time and place as the triggering action. Indirect effects are those caused by the action, but that occur at a later time, or at a distance from the triggering action.

Indicators

Indicators for air quality were selected that represent how a motorized route system has the potential to impact this resource. These indicators include the following: (1) Motorized disturbance with potential to contribute to fugitive dust and visibility impairment across the Forest and in airsheds, and (2) Motorized disturbance with potential to contribute to fugitive dust and add to visibility impairment in Gila Wilderness Class I airshed and Aldo Leopold Wilderness and Blue Range Wilderness Class II airsheds

Air Quality

Indicator:

- Motorized disturbance with potential to contribute to fugitive dust and visibility impairment across the Forest and in airsheds.

Measure:

- Acres of motorized route disturbance forestwide and per airshed
- Acres of potential disturbance from motorized big game retrieval, motorized dispersed recreation, and motorized areas forestwide and per airshed

Indicator:

- Motorized disturbance with potential to contribute to fugitive dust and add to visibility impairment in Gila Wilderness Class I airshed and Aldo Leopold Wilderness and Blue Range Wilderness Class II airsheds

Measure:

- Acres of motorized route disturbance within 1 mile of Gila Wilderness Class I airshed and 1 mile of Aldo Leopold Wilderness and Blue Range Wilderness Class II airsheds
- Acres of potential disturbance from motorized big game retrieval, motorized dispersed recreation, and motorized areas within 1 mile of Gila Wilderness Class I airshed and 1 mile of Aldo Leopold Wilderness and Blue Range Wilderness Class II airsheds

Environmental Consequences

Effects Common to All Alternatives

The following effects discussion describes general direct and indirect effects that currently, or would, occur under all alternatives, including alternative B – no action. No ground-disturbing activities such as decommissioning are proposed in this project.

Effects that will carry out throughout all alternatives are related to fugitive dust, vehicle emissions, air quality within the Gila Wilderness Class I airshed and other wilderness areas, and potential impacts to climate change. The implementation of any of the action alternatives will impact air quality to some degree, with the potential for negative impacts varying by the number of roads that will remain open for motorized use in each proposal.

Fugitive dust levels produced from forest roads result from routine forest management, user activities, and wind disturbance on native road surfaces. While wind disturbance can release fugitive dust from the road even without motorized interaction, the primary release of fugitive dust into the atmosphere is a result of wheels interacting with the native road surface and releasing dust particles into the air.

The main effects from fugitive dust as a result of vehicular use of motorized routes are reduced visibility on and adjacent to roads and increased levels of small diameter particulates (specifically $PM_{2.5}$ and PM_{10}) which can impact human health. Fugitive dust impacts depend on the quantity and drift potential of the dust particles that enter the air column. Large particles will typically settle out near the source. However, fine particles of dust may disperse over a much wider area, in particular on a windy day. These fine particles may float for a long time due to lack of gravitational settling. Drift distances for fugitive dust have been estimated based on particle size and wind speeds. These estimates indicate that for a typical mean wind speed of 10 mph, particles larger than about 100 microns in aerodynamic diameter are likely to settle out within 20 to 30 feet from the edge of the route. Particles that are 30 to 100 microns in diameter are likely to settle further out, but usually within a few hundred feet of the source, depending on wind turbulence. Smaller particles such as $PM_{2.5}$ and PM_{10} have much slower settling rates and are much more likely to be impacted by atmospheric turbulence. The release of these smaller particles becomes an indirect effect to air quality over a more widespread area. However, $PM_{2.5}$ and PM_{10} levels would rapidly disperse over this larger area as they are carried by winds.

Exposure to particulate matter can aggravate a number of respiratory illnesses and may even cause early death in people with existing heart and lung disease. Both long-term and short-term exposure can have adverse health impacts. These finer particles can deposit deep in the lungs and may contain substances that are particularly harmful to human health. Fugitive dust impacts, however, are highly localized and short-lived, thus minimizing health risks to the majority of Forest users.

Fugitive dust can have negative effects on vegetation, though mainly at high dust loadings. Its primary impact is on the plant's physiological processes, in particular photosynthesis. Heavy dust loadings can reduce light penetration into the plant, which in turn impacts its growth rate and vigor potential.

Emissions within the forest boundary from automobile use would be most concentrated adjacent to motorized roads and trails. The direct effects of these emissions are formation of $PM_{2.5}$, carbon monoxide, volatile organic compounds, nitrogen oxide, and production of diesel engine

particulate matter. Indirect effects of vehicle emissions are related to air quality degradation as a result of $PM_{2.5}$ and PM_{10}, reduced ability of the blood to carry oxygen based on exposure to carbon monoxide, and formation of ozone in the atmosphere when hydrocarbons and nitrogen oxide precursor emissions react in the presence of sunlight. Ozone is a strong irritant that can constrict the airways, forcing the respiratory system to work harder to provide oxygen to the rest of the body.

Low numbers of vehicle traffic and good wind dispersion across the Forest are generally sufficient to avoid long-lasting air quality impacts. In addition, automobile emissions are controlled by standards that are designed to regulate outputs that contribute to the formulation of ozone and carbon monoxide. Emissions from OHVs, especially those with two-stroke engines, would have the most negative impact on air quality, as these can produce significant amounts of air borne contaminants. These contaminants can settle onto plants or into soils and act as fertilizers. If these volumes of emissions are significant, the contaminants can cause changes in plant community composition and alter growth rates. Some contaminants can persist in soils for several years.

Air quality within the Gila Wilderness Class I airshed and the Aldo Leopold and Blue Range Class II airsheds can be negatively impacted by motorized uses on adjacent native surface roads as this activity can reduce visibility by the production of dust. Fine particulate matter produced from Forest roads that becomes suspended in the air can act as light scatterers and contribute to regional haze. Currently, visibility in the the Gila Wilderness Class I airshed is regulated against impairment due to regional haze.

Impacts to climate change may occur from the burning of fossil fuels by motorized vehicles. This burning results in the emission of greenhouse gases including CO_2, methane (CH_4), nitrous oxide (N_2O), and hydrofluorocarbons (HFCs). These gases are emitted as CO_2, CH_4, N_2O emissions resulting directly from operation of the vehicle, and CO_2 emissions resulting from operating the air conditioning system.

Alternative B – No Action

Impacts to air quality as a result of the current motorized route system on the Forest are detailed above in the Effects Common to All Alternatives. Under Forest Service jurisdiction, there are currently 4,614 miles of open routes that create 6,918 acres of roaded disturbance, with the majority being in the Lower Colorado River airshed. These routes are of varying widths based on maintenance levels. There are currently 407 roaded acres found within one mile of all Wilderness areas on the Forest. Cross-country travel by motor vehicles is permitted in all areas, except designated Wilderness, roads, trails, or areas specified in Forest Orders, and restricted off-road vehicle areas identified in the Forest Land Management Plan. This cross-country travel includes access for motorized big game retrieval, dispersed recreation and camping areas. Currently, cross-country travel associated with motorized big game retrieval, motorized dispersed recreation, and camping areas is not repetitious enough in the same location to generate notable amounts of fugitive dust. This would only occur in an area where an unauthorized route has been created, the route was frequently traveled, and little to no vegetation remained on the route.

Effects Unique to each Action Alternative based on Measure of the Indicator

Each action alternative will be evaluated based on the potential risk to air quality relative to the change from the no action alternative. The effects common to all alternatives will have the potential to either increase, decrease or remain the same, based on the change from the no action alternative. The relative risk of change from baseline is derived based on the potential acres of disturbance that are possible under each of the action alternatives. Appendix A provides a complete set of tables displaying percent increase/decrease in acres of disturbance that have the potential to impact air quality from a motorized route system, motorized dispersed recreation and motorized areas, and motorized big game retrieval. (Note: Acres of motorized dispersed recreation and motorized areas were combined in this analysis.)

Alternative C

Motorized Routes – Effects to air quality under this alternative would be similar to the no action alternative. Proposed open routes under Forest Service jurisdiction total 4,675 miles of open routes that create 6,899 acres of roaded disturbance. This represents a less than 1 percent reduction forestwide from no action, which is negligible in terms of change. Alternative C, by airshed shows a 1 percent increase in acres of potential disturbance in the Lower Colorado River airshed, approximately a 16 percent reduction in acres in the Lower Rio Grande airshed, approximately a 2 percent increase in acres in the Southwestern Closed airshed, and approximately a 1 percent reduction in acres in the Western Closed airshed. By wilderness areas, alternative C shows a 2 percent decrease in acres of potential disturbance within 1 mile of the Gila and Aldo Leopold Wilderness areas and a 16 percent increase in acres adjacent to the Blue Range Wilderness.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes)—minimal effects to air quality are expected under this activity. Motorized dispersed recreation typically occurs over vegetated surfaces where little fugitive dust is generated. However, there would be more potential for fugitive dust to occur in areas where motorized dispersed recreation is allowed, than where it is prohibited. This activity is not expected to be repetitious enough in the same location to mobilize significant amounts of fine particles. Under all alternatives, there is greater than a 90 percent reduction in acres open to this activity, both forestwide, by airshed, and adjacent to Wilderness areas.

Motorized Big Game Retrieval (1-mile corridor for elk, deer, bear, mountain lion, javelina, pronghorn)—minimal effects, similar to the no action alternative, would result under this activity. Motorized big game retrieval typically occurs over vegetated surfaces where little fugitive dust is generated. This activity would not be repetitious enough in the same location to mobilize significant amounts of fine particles. However, there would be more potential for fugitive dust to occur in areas where motorized big game retrieval is allowed, than where it is prohibited. Alternative C provides the most acres open to this activity.

Motorized Areas (37 areas: 1 motorcycle/ATV; 36 camping)—The Travel Management Rule defines ‘areas’ as open to all motorized vehicle use. The 36 camping areas proposed in this alternative are existing sites with traditional use related to camping. The majority of these sites are less than 1 acre in size, totaling 24 acres in all. Limited ATV activity has occurred on these sites in the past, and it is anticipated that activity will continue to be limited. Minimal effects to air quality would result as a continuation of this traditional use. However, there would be more potential for fugitive dust to occur in motorized areas, than where this activity is prohibited. The

single motorcycle/ATV area proposed is located near the Village of Reserve, within the Lower Colorado River airshed. This area covers approximately 3 acres and is located within an old borrow pit near the previous landfill site. Currently, there is little to no herbaceous vegetation at this area and the site would continue to remain denuded of most vegetation under this proposal. There would be recurrent mobilization of fugitive dust within these three acres during periods of use. This area would be a localized and short-lived source of negative impacts to air quality. This motorized area has the highest potential of generating fugitive dust of all areas proposed.

Alternative D

Motorized Routes—Effects to air quality under this alternative would be similar to alternative B, with the possibility of a reduction in negative impacts from fugitive dust due to fewer miles of routes and acres of roaded disturbance available for motorized vehicle use.

Proposed open routes under Forest Service jurisdiction total 3,473 miles of open routes that create 5,240 acres of roaded disturbance. This represents a 24 percent reduction from alternative B. Alternative D, by airshed shows a 23 percent reduction in acres of potential disturbance in the Lower Colorado River airshed acres, approximately 34 percent reduction in acres in the Lower Rio Grande airshed, approximately 25 percent reduction in acres in the Southwestern Closed airshed, and approximately a 29 percent reduction in acres in the Western Closed airshed. By Wilderness areas, Alternative D shows a 19 percent decrease in acres of potential disturbance within one mile of the Gila Wilderness, a 24 percent decrease in acres adjacent to the Aldo Leopold Wilderness, and 16 percent increase in acres adjacent to the Blue Range Wilderness.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes) – minimal effects similar to alternative C, with less acres available for potential disturbance than alternative C.

Motorized Big Game Retrieval (within 300-foot motorized dispersed recreation corridor) – minimal effects similar to alternative C, with less acres available for potential disturbance than alternative C.

Motorized Areas (no areas designated) – There would be no negative impacts to air quality due to camping areas. This alternative is an improvement over alternatives C, F, and G because there is no proposed 3-acre motorcycle/ATV area that would contribute to recurring, localized fugitive dust emissions near the Village of Reserve.

Alternative E

Motorized Routes – Effects to air quality under this alternative would be similar to alternative B, with the possibility of a reduction in negative impacts from fugitive dust due to fewer miles of routes and acres of roaded disturbance available for motorized vehicle use. Proposed open routes under Forest Service jurisdiction total 2,755 miles of open routes that create 2,699 acres of roaded disturbance. This represents a 39 percent reduction from the no action , which represents the largest reduction in open routes of all alternatives. Alternative E, by airshed shows 39 percent reduction in acres of potential disturbance in the Lower Colorado River airshed acres, approximately 38 percent reduction in acres in the Lower Rio Grande airshed, approximately 39 percent reduction in acres in the Southwestern Closed airshed, and approximately a 42 percent reduction in acres in the Western Closed airshed. By wilderness areas, alternative E shows a 30 percent decrease in acres of potential disturbance within one mile of the Gila Wilderness, a

33 percent decrease in acres adjacent to the Aldo Leopold Wilderness, and 3 percent decrease in acres adjacent to the Blue Range Wilderness.

Motorized Dispersed Recreation (No motorized dispersed recreation corridors designated) – No negative impacts to air quality due to motorized dispersed recreation.

Motorized Big Game Retrieval (No motorized big game retrieval permitted) – No negative impacts to air quality due to motorized big game retrieval.

Motorized Areas (no areas designated) – Same as alternative D – no negative impacts to air quality due to areas.

Alternative F

Motorized Routes – Effects to air quality under this alternative would be similar to Alternative B, with the possibility of a reduction in negative impacts from fugitive dust due to fewer miles of routes and acres of roaded disturbance available for motorized vehicle use. Proposed open routes under Forest Service jurisdiction total 3,860 miles of open routes that create 5,789 acres of roaded disturbance. This represents a 16 percent reduction from the no action alternative. Alternative F, by airshed shows a 15 percent reduction in acres of potential disturbance in the Lower Colorado River airshed acres, approximately 23 percent reduction in acres in the Lower Rio Grande airshed, approximately 16 percent reduction in acres in the Southwestern Closed airshed, and approximately a 22 percent reduction in the Western Closed airshed. By wilderness areas, alternative E shows a 12 percent decrease in acres of potential disturbance within 1 mile of the Gila Wilderness, a 10 percent decrease in acres adjacent to the Aldo Leopold Wilderness, and a 13 percent increase in acres adjacent to the Blue Range Wilderness.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes) – minimal effects similar to alternative C, with less acres available for potential disturbance than alternative C, but more acres than alternative D.

Motorized Big Game Retrieval (within one-half mile of motorized routes, elk only) – minimal effects similar to alternative C, with less acres available for potential disturbance than alternative C, but more than alternatives D and G.

Motorized Areas (37 areas: 1 motorcycle/ATV; 36 camping) – same as alternative C.

Alternative G

Motorized Routes – Effects to air quality under this alternative would be similar to Alternative B, with the possibility of a reduction in negative impacts from fugitive dust due to fewer miles of routes and acres of roaded disturbance available for motorized vehicle use. Proposed open routes under Forest Service jurisdiction total 3,829 miles of open routes that create 5,746 acres of roaded disturbance. This represents a 17 percent reduction from the no action alternative, which is virtually the same as alternative F. Alternative G, by airshed shows a 16 percent reduction in acres of potential disturbance in the Lower Colorado River airshed acres, approximately 23 percent reduction in acres in the Lower Rio Grande airshed, approximately 16 percent reduction in acres in the Southwestern Closed airshed, and approximately a 23 percent reduction in the Western Closed airshed. By wilderness areas, alternative E shows a 12 percent decrease in acres of potential disturbance within one mile of the Gila Wilderness, a 10 percent decrease in acres

adjacent to the Aldo Leopold Wilderness, and 16 percent increase in acres adjacent to the Blue Range Wilderness.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes) – minimal effects similar to alternatives C, D and F.

Motorized Big Game Retrieval (within 300-foot motorized dispersed recreation corridor) – same as alternative D.

Motorized Areas (37 areas: 1 motorcycle/ATV; 36 camping) – same as alternative C.

Summary of Effects

Each of the alternatives were analyzed to determine if there is potential for motorized route systems, including motorized dispersed recreation corridors, motorized areas, and motorized big game retrieval, on the Gila National Forest to degrade air quality, contribute to violations of National Ambient Air Quality Standards, contribute to visibility impairment, or to affect the Gila Wilderness Class I airshed and the Aldo Leopold and Blue Range Wilderness Class II airsheds beyond their current condition. The direct effects to air quality by motorized route systems (including motorized dispersed recreation corridors, motorized areas, and motorized big game retrieval) result from the relationship of motorized uses that that occur on native surface routes. While this project does not propose a change in the levels of use, it will result in a change in the locations of use and acres available for use that may impact air quality.

Under alternatives D, E, F, and G, fewer miles of roads and trails are open for motorized use, and fewer acres are available for motorized dispersed recreation, motorized areas, and motorized big game retrieval, as compared to alternative B (no action). Alternative C is similar to alternative B, with an increase in single-track miles (motorcycle), but a slight decrease in overall acres (due to a decrease in Level 2 route miles and associated acres). Alternative B – no action – 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/or 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, corridors and areas, if other routes and areas of the forest 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 has returned to pre-road conditions naturally.

Analysis indicates that, forestwide, alternative E provides the greatest reduction in potential roaded acres that may impact air quality and reduce visibility within or adjacent to wilderness airsheds, followed by alternative D. Alternatives F and G reduce motorized route acres by virtually the same amount. Alternative C provides the least reduction in motorized route acres, and would leave the most motorized routes and areas available for potential disturbance that could impact air quality.

Potential acres of disturbance related to motorized dispersed recreation and motorized areas that could contribute to fugitive dust and add to visibility impairment in, or adjacent to, Wilderness areas are similar under alternatives C, D, F, and G. Each of these alternatives eliminates uncontrolled motorized cross-country travel and limits this type of activity to designated corridors

and areas. Alternative E eliminates uncontrolled motorized cross-country travel as well as does not designate any corridors or areas. This, in effect, restricts motorized cross-country travel from the majority of the Forest, thus reducing potential acres of disturbance by greater than 90 percent in all of the action alternatives.

Potential acres of disturbance related to motorized big game retrieval that could contribute to fugitive dust and add to visibility impairment in, or adjacent to, Wilderness areas are similar under alternatives D and G. Alternative E eliminates motorized big game retrieval entirely. In these three alternatives, there is a reduction in potential acres of disturbance of greater than 90 percent from alternative B. Reductions in potential acres of disturbance that may impact air quality also occur in alternatives F and C, however to a lesser degree than D, E and G. Each of the action alternatives eliminates uncontrolled motorized big game retrieval. In alternatives C, D, F, and G, this type of activity is limited to designated corridors of varying widths.

Visibility Impairment of Wilderness Areas:

Under all action alternatives, alternative E provides the least amount of acres available for potential disturbance by motorized routes, motorized dispersed recreation, motorized areas, and motorized big game retrieval that have the potential to contribute to visibility impairment within the Gila Wilderness Class I airshed, and the Aldo Leopold and Blue Range Wilderness areas. It is not expected that selection of any of the action alternatives would degrade air quality from its current state, or have a long-term, noticeable or measurable impact on visibility.

In general, air quality on the Gila National Forest is good, given current motorized activities. With reductions across the Forest in acres (related to motorized routes and motorized cross county travel) that have the potential to contribute to fugitive dust and add to visibility impairment, it is expected that air quality would continue to remain good under all of the action alternatives.

Cumulative Effects

Cumulative effects were considered at the airshed level. In all action alternatives, alternative E indicates the largest decrease in acres related to motorized routes, motorized dispersed recreation and areas, and motorized big game retrieval in all four airsheds. Alternatives D, F, and G also show reductions in acres available for motorized activities across each airshed at varying levels. Alternative C shows reductions in acres related to motorized dispersed recreation, motorized areas, and motorized big game retrieval, and a decrease in acres of motorized route acres in the Lower Rio Grande airshed and the Western Closed airshed (slight, -1 percent). There are slight increases (1 percent to 2 percent) in motorized route acres in the Lower Colorado River airshed and the Southwestern Closed airshed for alternative C. This project does not propose to change use levels, just the location of where the use may occur.

At the airshed level, under all alternatives, the cumulative impacts of fugitive dust on air quality caused by the proposed change in motorized travel on designated routes and cross-country travel, combined with all other activities, would likely be immeasurable. Some past actions may no longer be having any effect on air quality. The actions contributing to cumulative effects include those industrial activities listed in the Air Quality report (Table 3 - USDA Forest Service 2013c) as well as other activities occurring on forest lands such as prescribed fire, wildland fire, motorized traffic, and harvest operations, because they have caused or have the potential to cause

changes in air quality. Fine particulate matter from road dust would combine with other particulates produced during implementation of forest projects such as prescribed burning and harvest operations. 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.

There are no data to 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 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

In summary, alternative E, unilaterally, indicates the largest decrease in potential direct, indirect, and cumulative effects to air quality from alternative B. Alternative D has the second largest decrease in potential effects to air quality across the board. Alternatives F and G follow alternative D and are mostly similar (within 1 percent), while alternative C indicates the least amount of decrease in potential effects to air quality from alternative B. This alternative poses little change from alternative B.

The Gila National Forest is currently 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.

Air quality is currently good in the area of the Gila National Forest, as evidenced by available data and information provided by the NMED Air Quality Bureau. The Gila National Forest has continued to follow state regulations and forest plan guidance to ensure that its actions are in compliance. It is, however, difficult to distinguish between the alternatives other than via a relative risk analysis as there is no available monitoring data linked to fugitive dust, motorized routes, and/or motorized uses. However, as there are no alternatives that propose to increase the acres of motorized routes on the Forest (minor increase of miles in alternative C), it is the conclusion of this analysis that any alternative selected will continue to keep the forest's efforts for air quality improvement on the right path.

Effects of Forest Plan Amendments

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the Travel Management.

Watershed and Soils

This section summarizes the watershed and soils specialist report (USDA Forest Service 2013d).

Affected Environment

General Description

The Gila National Forest lies in southern Catron, northern Grant, western Sierra, and extreme northeastern Hidalgo counties in southwestern New Mexico. It was established in 1905 and covers approximately 3.3 million acres of public land, making it the sixth largest National Forest in the continental United States. Part of the area, the Gila Wilderness, was established in 1924 as the first designated wilderness by the Federal Government. The Aldo Leopold Wilderness and the Blue Range Wilderness are also found within its borders. The Forest Supervisor's office is located in Silver City, New Mexico. There are local ranger district offices in Glenwood, Mimbres, Quemado, Reserve, Silver City, and Truth or Consequences.

The forest has 12 mountain ranges, and elevations range from approximately 4,160 feet to 10,770 feet. Annual precipitation ranges from approximately 11 inches on the northern end of the forest by Quemado and the very southern end of the Black Range to over 35 inches in the higher elevations of the Mogollon Mountains. The forest has five of the eight life zones identified in the Region 3 General Ecosystem Survey of the Gila National Forest. Life zones include semi desert grassland, woodland, ponderosa pine, mixed conifer, and spruce fir.

Climate

Precipitation and temperature are tied tightly to elevation gradients on the Gila National Forest. As elevation increases precipitation tends to increase and temperature decreases. Through analyses of precipitation data from NOAA Weather Stations (New Mexico Climate Summaries http://www.wrcc.dri.edu/summary/climsmnm.html) and NRCS SNOWTEL (http://www.wcc.nrcs.usda.gov/snotel/New_Mexico/new_mexico.html) sites located within the Forest it has been shown that there are orographic effects on precipitation patterns throughout the Forest.

Precipitation patterns on the forest can be characterized as bimodal in nature. The principal periods of precipitation occur during the monsoon season of July through September. During this period, rainfall is characterized by convective, high intensity, short duration storms that are generally of limited areal extent, averaging an estimated five square miles. During the latter part of this period and continuing on into October; there is also a threat of high intensity, longer duration storms of cyclonic origin associated with Gulf of Mexico and Pacific Ocean hurricanes. These usually do not occur with the same regularity as the monsoon season rains.

The second principal period of the bimodal precipitation distribution occurs during the period of December through February, when easterly storm tracks originating over the Pacific Ocean shift over the forest, allowing widespread precipitation. This precipitation falls typically at higher elevations as snow. The snow pack at these higher elevations generally develops continuously over this period but melts over a much shorter time span (The University of Arizona n.d.).

In years where there is an associated El Niño in the Southwest, winter precipitation tends to be higher than normal starting in late fall and continuing through the winter months and conversely, in years where there is an associated La Niña, drier than normal conditions exist from late

summer and into the winter months. The warmest months of the year are June and July with daytime temperatures averaging in the 80s. The coldest months of the year are December and January with daytime temperatures averaging in the 50s.

Watershed Condition

Watershed condition encompasses both aquatic and terrestrial processes and functions as the quality of water and aquatic habitat is inseparably linked to the integrity of uplands and riparian areas within a watershed. Aspects of a watershed related to geomorphic integrity can be defined in terms of attributes such as slope stability, soil productivity, channel morphology and other upslope, riparian and aquatic habitat characteristics. Hydrologic integrity of a watershed is related primarily to flow, sediment and water quality attributes. Biological integrity can be defined by the aquatic characteristics that influence the diversity and abundance of species. In each case, integrity must be evaluated in the context of the natural disturbance regime, geoclimatic setting and other important factors. The geomorphic, hydrologic, and biologic components are then combined and evaluated as a whole to assess watershed integrity and health.

Hydrologically, the Gila National Forest lands drain into seven major river basins within New Mexico. The northernmost portions of the Forest drain into the Lower Colorado River basin (Little Colorado River) to the north and northwest, and into the San Augustin Plains basin to the northeast. The eastern side of the Forest drains into the Rio Grande basin to the east. The southeastern portion of the Forest drains into the Mimbres basin to the south and southeast, with the southernmost section of the Burro Mountains draining south in the Southwestern Closed basin (Animas Valley). The majority of the Forest, however, drains to the southwest into the Gila River and San Francisco River basins.

Within these river basins, there are 49 5th-code watersheds that intersect portions of the Gila National Forest. These 5th-code watersheds can be further divided into 6th-code subwatersheds of which there are 202 that intersect forest lands. 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.

Three classes are used to describe watershed condition (USDA Forest Service 2004 - FSM 2521.1):

1. Class 1 watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
2. Class 2 watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
3. Class 3 watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

In March 2011, watershed condition classification was completed across the Gila National Forest at the subwatershed level (6th-code). The watersheds were classified as being in one of the three condition classes noted above, as translated to functionality.

- Class 1 = Functioning Properly,
- Class 2 = Functioning at Risk, and
- Class 3 = Impaired Function.

The percentage of forest lands that are within these subwatersheds ranges from less than 1 percent up to 100 percent. This analysis will address effects at the 6th-code watershed level, which can range in size from 7,000 acres to 40,000 acres on the Gila National Forest.

The 5th-code watershed scale analysis in the DEIS is replaced with a 6th-code watershed analysis based on classifications completed in 2011. The 6th-code watersheds are used in this analysis as this information reflects the most up-to-date watershed condition classification for the Gila National Forest, with the overall analysis still being conducted at the landscape scale.

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, hydrophobic soils conditions 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 are likely to occur in any area with 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, trails), motorized cross-country travel, and motorized dispersed recreation 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 forest does not have a completed Terrestrial Ecosystem Survey coverage and associated interpretations completed on the forest. It does have the General Ecosystem Survey (GES) which is an ecological unit inventory, mapped at 1:250,000 scale. The GES identified 28 distinct ecological map units and associated map unit components over the forest, which indicates high soil variability. GES 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 GES is a broad scale inventory it is the best available survey currently for the Forest. Soil orders identified in the GES include Alfisols, Inceptisols, Entisols and Mollisols. The Forest has five of the eight life zones identified in the Region 3 General Ecosystem Survey (USDA Forest Service Southwestern Region 1991). These include semi desert grassland, woodland, ponderosa pine, mixed conifer and spruce fir. The majority of the soils classified fall into the woodland and forest soil types.

The geology of the forest can be characterized as extremely variable. The forest lies within the Mogollon Plateau of the Mogollon-Datil volcanic field. This field became active approximately 40 million years ago. Volcanic units in the Mogollon-Datil volcanic unit field include domes, lava flows, intrusions and many ash flow tuffs. There are eleven calderas within the Mogollon-Datil volcanic field and their associated sheets of ash flow tuff. Since the volcanism occurred, the Mogollon-Datil volcanic field has been undergoing Basin and Range extension and faulting, so today an ash sheet that was originally continuous is most likely discontinuously exposed in fault-block mountains separated by down-dropped basins (Ratte et al. 1989). 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 geologic erosional processes.

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. Table 45 and table 46 display the acres and percentage of the forest by soil condition and erosion hazard rating.

Table 45. Summary of soils conditions on Gila National Forest

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

Table 46. Summary of erosion hazard on Gila National Forest

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

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 was collected in the field, forestwide. The training data was 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 lifeform (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).

In 2012, the Whitewater-Baldy Complex wildfire burned approximately 300,000 acres on the Glenwood, Reserve, and Wilderness Ranger Districts. This included a large portion of the western

side of the Gila Wilderness. A majority of the high-severity burn was within high-elevation mixed conifer. Following the fire, a mapping update was completed in January 2013, reflecting the changes to the existing vegetation types within the burned area. Table 47 displays the pre- and post-fire acres of mid-scale existing vegetation types found on the forest.

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 National Hydrography Dataset (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 stockponds and other storage tanks, when filled to capacity.

Riparian, Wetlands, and Upland Wet Meadows

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.

A Region 3 riparian vegetation mapping project (RMAP) was initiated in 2009, completed in 2011, and made available to the Gila National Forest in November 2011.

RMAP used a combination of GIS, remote sensing, photo interpretation in conjunction with high resolution infrared photography and other ancillary data sources to map riparian vegetation communities region wide at a scale of 1:12,000. An independent accuracy assessment was completed to determine overall map performance in regards to map themes. Based on a random sample of 258 map polygons, the overall area-weighted user accuracy was estimated at 81 percent. On the Gila National Forest there are 14 map units. Table 48 lists the map units and the associated acres and percentages of each map unit forestwide.

Wetlands and upland wet 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. These are included in the RMAP assessment under herbaceous riparian.

Table 47. Mid-scale existing vegetation map units on Gila National Forest (Pre and Post 2012 Whitewater-Baldy Complex Fire)

Map Unit	Pre-fire Acres	Pre-fire Percent	Post-fire Acres	Post-fire Percent
Alligator juniper	99,573	2.9%	99,139	2.92%
Aspen	8,723	0.25%	7,775	0.23%
Corkbark fir and Engelmann spruce	2,540	0.075%	898	0.03%

Map Unit	Pre-fire Acres	Pre-fire Percent	Post-fire Acres	Post-fire Percent
Mixed conifer and aspen (mixed combinations of Douglas fir, white fir, white pine, Engelmann spruce, corkbark fir with aspen)	8,108	0.24%	4,257	0.13%
Deciduous shrub mix	19,625	0.58%	19,625	0.58%
Douglas-fir mix (Douglas-fir and combination of Douglas-fir and ponderosa pine, white pine, and Gambel oak)	101,190	2.98%	86,500	2.55%
Evergreen oak mix (pure and mixed stands of gray oak, silverleaf oak, and netleaf oak)	245,016	7.23%	222,752	6.57%
Evergreen shrub mix	43,949	1.3%	43,830	1.29%
Gambel oak	31,568	0.93%	30,961	0.91%
Mixed conifer and Gambel oak (mixed combinations of Douglas-fir, white fir, ponderosa pine, white pine, with Gambel oak)	51,320	1.5%	49,273	1.45%
Grasslands	283,040	8.35%	283,040	8.35%
Grasslands-stand replacement and seeded (Whitewater-Baldy Fire)			18,460	0.54%
One-seed juniper and piñon pine	327,367	9.7%	327,116	9.65%
Woodlands mixed (combinations of mixes of piñon pine, juniper, and gray oak)	1,001,190	29.5%	994,512	29.33%
Ponderosa pine-gray oak	14,614	0.43%	13,851	0.41%
Ponderosa pine (either pure ponderosa pine stands or stands with alligator juniper or Gambel oak)	1,100,728	32.5%	1,093,410	32.25%
Sparsely vegetated	6,932	0.20%	6,932	0.20%
Sparsely vegetated-recent stand replacement (Whitewater-Baldy Fire)			59,017	1.74%
Mixed conifer (mixed combinations of Engelmann Spruce, corkbark fir, white fir, blue spruce and Douglas-fir)	11,688	0.34%	6,048	0.18%
Lakes	309	0.01%	309	0.01%
White fir or white fir and Douglas-fir mixed	33,164	0.98%	22,939	0.68%
Total			3,390,642	100%

Table 48. Riparian vegetation communities on Gila National Forest

Map Unit	Riparian Vegetation	Acres	Percent
110	Arizona Alder	2,703	4.43%
130	Desert Willow	11,447	18.75%
170	Fremont Cottonwood-Oak	85	0.14%
180	Fremont Cottonwood-Shrub	3,123	5.12%
190	Herbaceous Riparian	2,603	4.26%
230	Narrowleaf Cottonwood-Shrub	26,679	43.71%
270	Sycamore-Fremont Cottonwood	10,204	16.72%
280	Upper Montane Conifer/Willow	670	1.10%
290	Willow/Thinleaf Alder	1,083	1.77%
300	Arizona Walnut	1,427	2.34%
310	Elm/Eastern Cottonwood	33	0.05%
340	Sparsely Vegetated	10	0.02%
350	Ponderosa Pine/Willow	886	1.45%
410	Historic Riparian/Residential Urban	83	0.14%
Total Acres		61,037	100%

Assessment of riparian and wetland ecosystems across the Forest has not been completed, however a considerable amount of data and information has been collected on these areas Forestwide. As of 2010, Riparian Area Survey and Evaluation System (RASES) assessments have been completed on 326 stream reaches, and Proper Functioning Condition (PFC) assessments have been completed on 132 stream reaches. Table 49 provides a summary of PFC ratings across the Forest to date. Ratings of Proper Functioning Condition and Functional at Risk – Upward Trend are considered to be meeting forest plan standards. Currently, 64 percent of the reaches inventoried using the PFC method are meeting forest plan standards. Some of the ancillary data from this RASES and PFC information was incorporated into the RMAP assessment.

Table 49. Summary of Gila Nationall Forest proper functioning condition (PFC) riparian data

% of Riparian Reaches Assessed* as PFC	% of Riparian Reaches Assessed* as Functional at Risk w/ Trend	% of Riparian Reaches Assessed* as Non-Functional
2% designated as low end	10% upward trend	8% trend not designated
1% designated as low to mid	14% downward trend	2% downward trend
52% not otherwise designated	8% trend not apparent 1% lower end of class 3% trend not designated	
Total: 54%	**Total: 36%**	**Total: 10%**

* There were 132 riparian PFC reaches assessed.

Water Quality

The potential adverse effects from forest management activities are non-point 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. These water quality standards are examined for changes on a 3-year rotating basis. The current standards (State of New Mexico 2013) are documented in "Standards for Interstate and Intrastate Surface Waters." 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 and to establish a total maximum daily load (TMDL) for each pollutant. Reaches of streams that are in some state of non-attainment are documented in "State of New Mexico CWA 303 (d)/ 305(b) Integrated List and Report; 2012-2014 US EPA-Approved" (State of New Mexico 2012).

Currently there are 28 waterbodies (streams and lakes) within or adjacent to Forest system land that are not meeting State water quality standards (refer to table 9 of Watershed and Soils report (USDA Forest Service 2013d)). Of these 28 waterbodies, eleven reaches have listed a probable source of impairment as either off-road vehicles or highway/road/bridge runoff.

The 28 waterbodies are only those waters that have been 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. Maintenance level 3 to 5 roads may be maintained more frequently, thus reducing erosion potential, but might still have poorly placed drainage features. Maintenance level 2 roads may see less frequent, if any maintenance, thus increasing the risk for erosion potential. These routes, however, may receive less traffic and imprint a smaller swath of disturbance on the immediate landscape.

Best management practices (BMPs) can considerably reduce negative impacts to water quality from motorized routes. Routes on the Gila National Forest vary as to the implementation, and effectiveness of BMPs. Current Forest Service policy directs compliance with required Clean Water Act permits and State regulations and requires the use of BMPs to control nonpoint source pollution to meet applicable water quality standards and other Clean Water Act requirements (FS-

990a-USDA Forest Service 2012). This project proposes no ground disturbance; it only specifies where people are allowed to drive. BMPs will likely be incorporated into restoration decisions that will follow the decision on travel management.

Outstanding National Resource Waters

In 2011, the New Mexico Environmental Department, Surface Water Quality Bureau, had all perennial rivers and streams located in wilderness areas statewide designated as outstanding national resource waters. Tables 10 and 11 of the Watershed and Soils report list the outstanding national resource waterss found on the Gila National Forest (USDA Forest Service 2013d).

The criteria for outstanding national resource waters designations in New Mexico are set forth in the Water Quality Standards at Section 20.6.4.9.B NMAC (State of New Mexico 2013), which provides that a surface water of the state, or a portion of a surface water of the state, may be designated as an outstanding national resource waters where the Water Quality Control Commission determines that the designation is beneficial to the State of New Mexico, and:

1. The water is a significant attribute of special trout waters, national or state park, national or state monument, national or state wildlife refuge or designated wilderness area, or is part of a designated wild river under the federal Wild and Scenic Rivers Act; and
2. The water has exceptional recreational or ecological significance; or
3. The existing water quality is equal to or better than the numeric criteria for protection of aquatic life uses, recreational uses, and human health uses, and the water has not been significantly modified by human activities in a manner that substantially detracts from its value as a natural resource.

Climate Change

Refer to “Climate Change” portion of the Air Quality section on page 170.

Summary of Existing Condition

Table 50 provides a synopsis of watershed characteristics forestwide, as well as a summary of attributes at the 6th-code watershed level.

Table 50. 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 – September (monsoon) Winter precipitation occurs from December – 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 drainages 13 miles of water pipeline 16 miles of ditches 289 surface acres of lakes 2,603 acres of upland wet meadows (RMAP)
Major drainage basins/rivers	San Francisco River and its headwaters which flows into Arizona and eventually the Gila River; Upper Gila River and its headwaters which flows into Arizona and eventually into the Colorado River near Yuma; Mimbres River and its headwaters which flows south of the forest into a closed basin within the Rio Grande region above the International U.S./Mexico border Northern most portion of forest flows northwest into Little Colorado River via tributaries Eastern portion of forest flows east, southeast into Rio Grande via tributaries
Watersheds	202 6th-code watersheds that intersect the forest with average size of 26,500 acres 180 watersheds assessed for Watershed Condition Classification: • 98 classified as “functioning properly” • 81 classified as “Functioning at Risk” • 1 classified as “Impaired Function”
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	28 waterbodies within or adjacent to forest not meeting State water quality standards 11 of 28 list probable source of impairment as off-road vehicles or highway/road/bridge runoff. 80 Outstanding National Resource Waters (Streams) totaling 367 miles 725 Outstanding National Resource Waters (Wetlands) totaling 2,315 acres

Feature	Characteristics
Riparian condition	61,037 acres of riparian vegetation (RMAP) 132 reaches assessed using PFC assessment 54% of these in Proper Functioning Condition 36% of these Functioning at Risk 10% of these Non-Functional 64% currently meeting forest plan standards of PFC or FAR - Upward Trend 326 reaches inventoried using RASES
Soil conditions	Satisfactory soil condition = 53% Unsatisfactory soil condition = 25% Unsuited soil condition = 21% Slight erosion hazard = 45% Moderate erosion hazard = 12% Severe erosion hazard = 43%
Roads	More than 5,100 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 motorized route density in 6th-code watersheds (Forest Service and non-Forest Service routes)	43% of the 6th-code watersheds have a road density of less than 1.0 mile of road per square mile of land (mi/mi^2). 51% of the 6th-code watersheds have a road density of 1 to 2.4 mi/mi^2 6% of the 6th-code watersheds have a road density of greater than 2.4 mi/mi^2

Methodology and Analysis Process

The analysis area under consideration for direct and indirect impacts is all forest lands interior to the Forest boundary. Cumulative impacts will be considered at the 6th-code watershed level for those watersheds that intersect the Gila National Forest having a substantial land base managed by the Forest.

The 2013 Watershed and Soils Specialist report (USDA Forest Service 2013d) updates the 2010 Draft Watershed and Soils Specialist in the following areas:

1. The 2011 Gila National Forest Riparian Map (RMAP) replaces the Riparian Risk Zone. Reason: This new data provides an up-to-date, comprehensive, Forestwide coverage of riparian information that was not completed prior to the Draft report.
2. The 2011 Watershed Condition Classification of Forest watersheds at the 6th Code level is used in lieu of 5th-code watershed information. Reason: This new evaluation and classification of watershed condition Forestwide updates previous 5th-code watershed condition information from 1986. Sixth code watershed condition ratings were not completed prior to 2011.
3. The State of New Mexico 2012-2014 Integrated 303(d)/305(b) List of Impaired Waters replaces the State of New Mexico 2010-2012 303(d)/305(b) List of Impaired Waters.

Reason: The State of New Mexico is required to issue updated biannual assessments of water quality statewide. This report provides the most up-to-date assessments of water quality on the Gila National Forest.

4. Outstanding national resource waters were designated in 2011 and will be included in the water quality analysis. Note: There were no outstanding national resource waterss on the Gila National Forest prior to 2011.

Important Assumptions Pertinent to the Summary

The following assumptions were made for this analysis and are important to understanding effects analysis. This is not a complete list of assumptions that were made for the analysis; see the Watershed and Soils report (USDA Forest Service 2013d) 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) or roads. The 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.
- Unauthorized routes may not be in an acceptable condition, as they were created without engineering design.
- Sediment is the major pollutant from native-surface roads. Most other pollutants from roads, such as trace metals and man-made chemicals are attached to sediment (Dissmeyer 2000. Gucinski et al. 2001). Thus, the relative effects of the alternatives with regard to sediment apply to trace metals and man-made chemicals.
- The effects of roads on the peak flows on streams and the subsequent conditions of aquatic habitat are minor. Research on small watersheds typically has shown that peak flows do not increase until more than 12 percent of the watershed is covered with roads and other impermeable areas (Ziemer 1981), such as roads, landings, parking lots, and buildings.
- Disturbance within 300 feet of streams has the greatest potential to impact water quality, via overland flow (Burroughs and King 1989, Belt et al. 1992).
- The most important factors that influence 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.
- The reduction or elimination of vehicle traffic on a road or trail near a stream will result in less sediment delivered from the road to the stream over time. This relates to the reduction of the amount of loose material on the road surface and also the increase in the amount of vegetative litter and other cover on the road surface. Erosion rates from a closed road may decrease to near background levels as the density of vegetation on the surface of the road increase (Dissmeyer 2000).
- Existing road system has already committed soil resources to loss of productivity.

- Routes that are 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.
- The Watershed and Soils Report (USDA Forest Service 2013d) is analyzed at the landscape level, so the assessment considers effects "in general" across the entire Forest. This report is not intended to address isolated effects at smaller, site-specific locations. This report does acknowledge that impacts may, and do, occur at some of these locations.
- The 2011 Watershed Condition Classification incorporated management activities and watershed events that occurred in the past or that are on-going. The final assessment of watershed condition in 2011 constituted a culmination of these activities and/or events, leading to current watershed condition. The condition classification of each 6th-code watershed is considered a result of cumulative watershed effects up to 2011.
- Relative risk is considered the potential impact that can result from one action (alternative) measured against the potential impact that might result from a different action (alternative).

Data Limitations

- The General Ecosystem Survey:
  - The GES map and associated soil interpretations were used to evaluate soils on the Forest. The GES is mapped at a scale of 1:250,000 and was designed for general assessments and evaluation of projects at the landscape or forestwide level similar to the scope of the proposed action. It is key to acknowledge that the GES is a very broad scale survey (1 inch = approximately 4 miles) and many differences in soils, geology and topography can occur within very short distances.
  - There are 7,948 acres on the Gila National Forest that do not have GES data or interpretations associated with them. These acres are associated with the Fort Bayard area on the Silver City District and areas associated with the Forest Boundary.
- Motorized crossings on ephemeral drainages were not field inventoried. These crossings were determined via a GIS analysis. Motorized routes and ephemeral streams (National Hydrography Dataset) were overlayed, with a motorized crossing point being created where the two lines intersected. This report acknowledges that there may be some errors in motorized crossing numbers as a result of this method.
- The forest has no data for motorized use levels
- The RMAP riparian mapping project is completed at a scale of 1:12,000. This project was done utilizing GIS, satellite imagery, aerial photography and ancillary data. This project was limited to 24 regional-type map units.
- No data to support sedimentation modeling, thus no effort made to predict sediment increases or decreases.
- The State of New Mexico's GIS 303(d) stream layer was used to evaluate potential impacts to impaired waterbodies from a motorized route system. The State's GIS layer and its narrative describing the listed reach do not always match. This may lead to some errors in miles of stream being impacted and/or stream crossings per listed reach. This

report acknowledges that some errors in the 303(d) tables may exist related to this discrepancy.

Relative Risk Analysis

This analysis uses a relative risk method of assessing differences between alternatives. Relative risk is considered the potential impact that can result from one action (alternative) measured against the potential impact that might result from a different action (alternative).

The following method was used for all direct and indirect effects analyses in this report, based on the premise that: A – The effects of a motorized route system, motorized dispersed recreation, motorized big game retrieval, and motorized areas on a key resource are considered the same under all alternatives; and B – More or less of these effects occur, or have the potential to occur, under each alternative, based on each alternative's design.

1. The direct/indirect effects* to the resource are described
2. Measures of the indicator for the resource area are used to compare each action alternative to the no action alternative.
3. These results of these measures are compared to determine relative risk
4. Results are summarized under each resource area

*direct/indirect effects – Direct effects are those occurring at the same time and place as the triggering action. Indirect effects are those caused by the action, but that occur at a later time, or at a distance from the triggering action.

Indicators

This analysis prioritizes areas at highest risk for critical resource loss, and examined the relative risk associated with motorized use in these areas. This places the focus on sensitive resources that are guided by law, regulation, and policy. The following indicators for soils and watershed were selected to analyze how a motorized route system has the potential to impact these critical resources.

Soil Resources – Erosion Potential

- Acres of disturbance from motorized routes in areas with moderate and severe erosion classes
- Acres of potential disturbance from motorized big game retrieval, motorized dispersed recreation, and motorized areas in areas with moderate and severe erosion classes

Soil Resources – Soil Condition

- Acres of disturbance from motorized routes in areas having unsatisfactory and unsuited soil condition classes
- Acres of potential disturbance from motorized big game retrieval, motorized dispersed recreation and motorized areas in areas having unsatisfactory and unsuited soil condition classes

Water Resources - Riparian Areas and Wetlands/Wet Meadows

- Acres of disturbance from motorized routes within riparian areas and wetlands/wet meadows.
- Acres of potential disturbance from motorized big game retrieval, motorized dispersed camping, and motorized areas within riparian areas and wetlands/wet meadows.

Water Resources – Water Quality

- Number of stream crossings on perennial, intermittent, 303(d) streams, outstanding national resource waters streams, ephemeral drainages
- Miles of perennial streams, intermittent streams, 303(d) streams, and ephemeral drainages potentially impacted by motorized routes, motorized big game retrieval, motorized dispersed recreation, and motorized areas
- Miles of outstanding national resource waters streams impacted by motorized routes.
- Miles of motorized routes within 300 feet of outstanding national resource waters wetlands.
- Acres of motorized dispersed recreation, motorized big game retrieval and motorized areas within 300 feet of outstanding national resource waters streams and wetlands.

Environmental Consequences

Effects to Soils

General Direct and Indirect Effects of Motorized Routes Common to All Alternatives including the No Action

Effects that will carry out throughout 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. There has been a commitment of the soil resource when the route was established, which resulted in loss of soil productivity and vegetative cover. This commitment, in places, may be irreversible and/or irretrievable due to long-term compaction and off-site soil loss from the road. 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 recreation, acres of big game retrieval and motorized areas affected by parking one vehicle length off of 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 off-site 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 coming into contact with the surface of the ground. The heavier the vehicle the more contact pressure (pounds per square inch) is exerted by the tire 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 they

are 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 from a motorized routes system 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 that contribute to loss of soil productivity of the motorized route, 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 that influence 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

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 increases that a vehicle is traveling on, 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 is displaced. This leaves bare soil exposed that can potentially be moved off site, 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.

Alternative B

Effects to soil resources as a result of current routes and unlimited cross-country travel on the Forest are detailed above in the Effects of Motorized Routes Common to All Alternatives and Effects of Motorized Off-Road Travel Common to all Alternatives. With this alternative there are 4,577 miles of motorized routes under Forest Service jurisdiction and 6,863 acres of disturbed ground associated with these routes. Of these 6,836 acres of disturbance 2,468 acres are located on soils with moderate or severe erosion hazard ratings and 2,870 acres are located on soils with unsatisfactory or unsuited soil conditions. Cross-country travel by motor vehicles is permitted in all areas, except designated Wilderness, roads, trails, or areas specified in Forest Orders, and restricted off-road vehicle areas identified in the Forest Land Management Plan. Cross-country travel includes access for motorized big game retrieval and motorized dispersed recreation and camping. Under this alternative, 2,441,804 acres could potentially be impacted by cross-country travel. Of the 2,441,804 acres that could potentially be impacted by cross-country travel, 1,210,241 acres are located on soils with moderate or severe erosion hazard and 1,161,775 acres are located on soils with unsatisfactory or unsuited soil conditions. Under the no action alternative, continued, unrestricted motorized dispersed recreation would continue off of approximately 4,577 miles of routes.

Alternative C

Motorized Routes

Under this alternative there are a total of 6,846 acres of disturbed ground associated with proposed motorized routes. Of these total acres, 2,504 acres are located on soils with moderate or severe erosion hazard ratings and 2,874 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized routes are described in the Effects of Existing Routes Common to all Alternatives section, and apply to this issue. This alternative has the greatest number of motorized routes under any action alternative. For soils having moderate or severe erosion hazard ratings this alternative has a 1 percent increase from the no action alternative. For soils that have unsatisfactory or unsuited ratings, there is essentially no change from the no action alternative.

Motorized Dispersed Recreation Corridors (300-foot camping corridor along designated routes)

Under this alternative there are a total of 108,060 acres that could potentially be impacted within motorized dispersed recreation corridors. Of these total acres, 34,241 acres are located on soils with moderate or severe erosion hazard ratings and 46,981 acres are located on soils with unsatisfactory or unsuited soil condition ratings. In addition to the potential affected camping corridor areas there is motorized parking allowed for recreational purposes of up to one vehicle length off of motorized routes. There are a total of 54,592 acres that could potentially be impacted by this activity. Of these total acres, 18,712 acres are located on soils with moderate or severe erosion hazard and 23,290 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized off-road travel are described above in Effects of Motorized Off Road Travel Common to all Alternatives, and apply to this issue. For this and all other action alternatives, there is a large reduction in potential acres impacted by motorized dispersed recreation to soils with moderate and severe erosion hazard ratings and unsatisfactory and unsuited soil condition ratings. At the landscape scale, all action alternatives are very similar, with percent decreases ranging from 94 percent to 99 percent.

Motorized Big Game Retrieval (1 mile from motorized routes, all big game species)

Under this alternative there are a total of 2,073,825acres that could potentially be impacted by motorized big game retrieval. Of these total acres, 950,931 acres are located on soils with moderate or severe erosion hazard ratings and 949,094 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized cross county travel are described above in the effects common to all alternatives, and apply to this issue. This alternative reduces potential motorized big game retrieval impacts to soils having moderate or severe erosion hazard ratings by 21 percent, and to soils having unsatisfactory or unsuited soil condition rating by 18 percent, which are the least amount of reductions of any action alternative.

Motorized Areas (36 traditional camping areas and 1 ATV/motorcycle area)

Under this alternative there are 36 traditional camping areas totaling approximately 24 acres that will be available and intended for motorized dispersed recreation throughout the forest. The majority of these sites are less than 1 acre in size. Some of these sites are somewhat hardened due to past use, while others are not. Camping in these areas would continue to remove the vegetative ground cover, litter layer and compact soils and potentially leave ruts during wet periods which would result in a loss of soil productivity. These camping areas are located on relatively flat gentle ground were soils typically have slight to moderate erosion hazard. The effects of motorized camping are described above in the Effects of Motorized Off-road Travel Common to all alternatives, and apply to this alternative. Of the 24 total acres, 9 acres are located on soils with moderate or severe erosion hazard rating and 12 acres are located on soils with unsatisfactory soil conditions, similar to alternatives F and G.

There is one area open to ATV and motorcycle use (approximately 3 acres) located near Reserve. This area is an old borrow pit site located by the old landfill. Currently there is little to no vegetative cover at this site. The effects of an ATV/motorcycle play area would include and is not limited to: continued loss of soil productivity, continued lack of vegetative ground cover, accelerated sheet and wind erosion, soil compaction, soil displacement and potential sedimentation to adjacent drainage system. The ATV/motorcycle area does not impact soils with moderate or severe erosion hazard rating under any alternative, as they are not present in this

location. The area is located within soils having unsatisfactory and unsuited soil condition rating, similar to alternatives F and G.

Alternative D

Motorized Routes

Under this alternative there are a total of 5,192 acres of disturbed ground associated with proposed motorized routes. Of these total acres, 1,829 acres are located on soils with moderate or severe erosion hazard ratings and 2,282 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized routes are described in the Effects of Existing Routes Common to all Alternatives section, and apply to this issue. In soils having moderate or severe erosion hazard ratings, acres are reduced by 26 percent from the no action alternative, which is the second largest reduction behind alternative E. In soils with unsatisfactory and unsuited soil condition ratings, motorized routes are reduced by 20 percent, which is the second largest reduction behind alternative E.

Motorized Dispersed Recreation Corridors (300-foot camping corridor along designated routes)

Under this alternative there are a total of 84,267 acres that could potentially be impacted by motorized dispersed recreation. Of these total acres, 28,200 acres are located on soils with moderate or severe erosion hazard ratings and 35,327 acres are located on soils with unsatisfactory or unsuited soil condition ratings. In addition to the potential affects to the camping corridor areas there is motorized off-road parking allowed for recreational purposes of up to one vehicle length off of motorized routes. There are a total of 39,274acres that could potentially be impacted by this activity. Of these total acres, 12,748 acres are located on soils with moderate or severe erosion hazard and 17,474 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized cross county travel are described above in Effects of Motorized Off Road Travel Common to all Alternatives, and apply to this issue. For all action alternatives, there is a large reduction in potential acres impacted by motorized dispersed recreation to soils with moderate and severe erosion hazard ratings and unsatisfactory and unsuited soil condition ratings. At the landscape scale, all action alternatives are very similar, with percent decreases ranging from 94 percent to 99 percent.

Motorized Big Game Retrieval (in the 300-foot designated camping corridors, for deer and elk)

Under this alternative there are a total of 84,267 acres that could potentially be impacted by motorized big game retrieval. Of these total acres, 28,200 acres are located on soils with moderate or severe erosion hazard ratings and 35,327 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized cross county travel are described above in Effects of Motorized Off Road Travel Common to all Alternatives, and apply to this issue. This alternative reduces potential motorized big game retrieval impacts to soils having moderate or severe erosion hazard ratings by 98 percent, and to soils having unsatisfactory or unsuited soil condition rating by 97 percent, which is similar to alternatives E and G. This is a greater reduction than alternatives C and F.

Motorized Areas (camping areas or ATV/motorcycle area)

Under this alternative there would be no areas, thus no impacts to soils. This alternative is similar to alternative E.

Alternative E

Motorized Routes

Under this alternative there are a total of 4,173 acres of disturbed ground associated with proposed motorized routes. Of these total acres, 1,443 acres are located on soils with moderate or severe erosion hazard ratings and 1,908 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized routes are described in the Effects of Existing Routes Common to all Alternatives section, and apply to this issue. From the no action alternative, this alternative has the largest reduction of motorized routes impacting soils with moderate or severe erosion hazard ratings at 42 percent. There is also a 34 percent reduction in motorized routes impacting soils with unsatisfactory or unsuited soil condition ratings, which is the largest reduction of all the alternatives.

Motorized Dispersed Recreation Corridors

Under this alternative there would be no motorized dispersed recreation though there would be motorized off-road parking for recreational purposes of up to one vehicle length off of motorized routes. There are a total of 31,427 acres that could potentially be impacted by this activity. Of these total acres, 10,106 acres are located on soils with moderate or severe erosion hazard and 15,277 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized cross county travel are described above in Effects of Motorized Off Road Travel Common to all Alternatives, and apply to this issue. For all action alternatives, there is a large reduction in acres impacted by motorized dispersed recreation to soils with moderate and severe erosion hazard ratings and unsatisfactory and unsuited soil condition ratings. At the landscape scale, all action alternatives are very similar, with percent decreases in potential impacts ranging from 94 percent to 99 percent.

Motorized Big Game Retrieval

Under this alternative there would be no motorized big game retrieval, thus no potential adverse impacts to soils from this activity. This alternative reduces potential motorized big game retrieval impacts to soils having moderate or severe erosion hazard ratings by 100 percent, and to soils having unsatisfactory or unsuited soil condition rating by 100 percent, which is similar to alternatives E and G and greater than alternatives C and F.

Motorized Areas (camping areas or ATV/motorcycle area)

Under this alternative there would be no areas, thus no impacts to soils. This alternative is similar to alternative D.

Alternative F

Motorized Routes

Under this alternative there are a total of 5,741 acres of disturbed ground associated with proposed motorized routes. Of these total acres, 2,099 acres are located on soils with moderate or

severe erosion hazard ratings and 2,428 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized routes are described in the Effects of Existing Routes Common to all Alternatives section, and apply to this issue. In soils with moderate and severe erosion hazard ratings, and unsatisfactory and unsuited soil condition ratings, this alternative has less reduction in acres impacted by motorized routes than alternatives D and E, but more reduction than alternative C. This alternative has a similar reduction in acres impacted by motorized routes to alternative G.

Motorized Dispersed Recreation Corridors (300-foot camping corridor along designated routes)

Under this alternative there are a total of 101,776 acres that could potentially be impacted in motorized dispersed recreation corridors. Of these total acres, 32,442 acres are located on soils with moderate or severe erosion hazard ratings and 43,130 acres are located on soils with unsatisfactory or unsuited soil condition ratings. In addition to the potential affects to the camping corridor areas there is motorized parking allowed for recreational purposes of up to one vehicle length off of motorized routes. There are a total of 43,902 acres that could potentially be impacted by this activity. Of these total acres, 14,724 acres are located on soils with moderate or severe erosion hazard and 18,856 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized cross-county travel are described above in Effects of Motorized Off Road Travel Common to all Alternatives, and apply to this issue. For all action alternatives, there is a large reduction in acres impacted by motorized dispersed recreation to soils with moderate and severe erosion hazard ratings and unsatisfactory and unsuited soil condition ratings. At the landscape scale, all action alternatives are very similar, with percent decreases ranging from 94 percent to 99 percent.

Motorized Big Game Retrieval (one-half mile from motorized routes, elk only)

Under this alternative there are a total of 1,503,239 acres that could potentially be impacted by motorized big game retrieval. Of these total acres, 605,485 acres are located on soils with moderate or severe erosion hazard ratings and 679,407 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized cross-county travel are described above in Effects of Motorized Off Road Travel Common to all Alternatives, and apply to this issue. This alternative reduces potential motorized big game retrieval impacts to soils having moderate or severe erosion hazard ratings by 50 percent, and to soils having unsatisfactory or unsuited soil condition rating by 42 percent. This is a greater reduction than alternative C, but less reduction than alternatives D, E and G.

Motorized Areas (36 historic camping areas and 1 ATV/motorcycle area)

Under this alternative there are 36 historic camping areas totaling approximately 24 acres that will be available and intended for motorized dispersed recreation throughout the Forest. Some of these sites are somewhat hardened, due to past use while others are not. Camping in these areas would continue to remove the vegetative ground cover, litter layer and compact soils and potentially leave ruts during wet periods which would result in a loss of soil productivity. These camping areas are located on relatively flat gentle ground were soils have a slight to moderate erosion hazard. Of the 24 total, acres 9 acres are located on soils with moderate or severe erosion hazard rating and 12 acres are located on soils with unsatisfactory soil conditions. The effects of

motorized camping are described above in Effects of Motorized Off Road Travel Common to all Alternatives, and apply to this alternative, similar to alternatives C and G.

There is 1 ATV/motorcycle area is approximately 3 acres and located just out of Reserve. The effects of the ATV/motorcycle area is described in alternative C and applies to this alternative. The area does not impact soils with moderate or severe erosion hazard rating under any alternative, as they are not present in this location. The ATV/motorcycle area is located within soils having unsatisfactory and unsuited soil condition rating, similar to alternatives C and G.

Alternative G

Motorized Routes

Under this alternative there are a total of 5,634 acres of disturbed ground associated with proposed motorized routes. Of these total acres, 2,076 acres are located on soils with moderate or severe erosion hazard ratings and 2,403acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized routes are described in the Effects of Existing Routes Common to all Alternatives section, and apply to this issue. In soils with moderate and severe erosion hazard ratings, and unsatisfactory and unsuited soil condition ratings, this alternative has less reduction in acres impacted by motorized routes than alternatives D and E, but more reduction than alternative C. This alternative has a similar reduction in acres impacted by motorized routes to alternative F.

Motorized Dispersed Recreation Corridors (300-foot camping corridor along designated routes)

Under this alternative there are a total of 93,871 acres that could potentially be impacted within motorized dispersed recreation corridors. Of these total acres, 29,914 acres are located on soils with moderate or severe erosion hazard ratings and 39,625 acres are located on soils with unsatisfactory or unsuited soil condition ratings. In addition to the potential affects to the camping corridor areas there is motorized off-road parking allowed for recreational purposes of up to one vehicle length off of motorized routes. There are a total of 43,553 acres that could potentially be impacted by this activity. Of these total acres, 14,511 acres are located on soils with moderate or severe erosion hazard and 18,658 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized off-road travel are described above in Effects of Motorized Off Road Travel Common to all Alternatives, and apply to this issue. For all action alternatives, there is a large reduction in potential acres impacted by motorized dispersed recreation to soils with moderate and severe erosion hazard ratings and unsatisfactory and unsuited soil condition ratings. At the landscape scale, all action alternatives are very similar, with percent decreases ranging from 94 percent to 99 percent.

Motorized Big Game Retrieval (in the 300-foot designated camping corridors)

Under this alternative there are a total of 93,871 acres that could potentially be impacted by motorized big game retrieval. Of these total acres, 29,914acres are located on soils with moderate or severe erosion hazard ratings and 39,625 acres are located on soils with unsatisfactory or unsuited soil condition ratings. The effects of motorized cross county travel are described above in Effects of Motorized Off-road Travel Common to all Alternatives, and apply to this issue. This alternative reduces potential motorized big game retrieval impacts to soils having moderate or severe erosion hazard ratings by 98 percent, and to soils having unsatisfactory or unsuited soil

condition rating by 97 percent, which is similar to alternatives D and E and greater than alternatives C and F.

Motorized Areas (36 traditional camping areas and 1 ATV/motorcycle area)

Under this alternative there are 36 historic camping areas totaling approximately 24 acres that will be available and intended for motorized dispersed recreation throughout the Forest. Some of these sites are somewhat hardened due to past use while others are not. Camping in these areas would continue to remove the vegetative ground cover, litter layer and compact soils and potentially leave ruts during wet periods which would result in a loss of soil productivity. These camping areas are located on relatively flat gentle ground were soils have a slight to moderate erosion hazard. Of the 24 total acres, 9 acres are located on soils with moderate or severe erosion hazard rating and 12 acres are located on soils with unsatisfactory soil conditions. The effects of camping areas are described above in Effects of Motorized Off-road Travel Common to all Alternatives, and apply to this alternative, similar to alternatives C and F.

There is one ATV/motorcycle area that totals approximately 3 acres located outside of Reserve. The effects of the ATV/motorcycle area are described in alternative C and apply to this alternative. The area does not impact soils with moderate or severe erosion hazard rating under any alternative, as they are not present in this location. The area is located within soils having unsatisfactory and unsuited soil condition rating, similar to alternatives C and F.

Summary

The effects to soils by a motorized route system 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 motorized route system across the forest; however, no alternative proposes decommissioning or obliteration of any roads to return them to a more natural state.

Effects are briefly described below:

- 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/thaw such as in the Southwest, 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 (-98 percent) show significant reduction in potential acres of disturbance on soils with moderate or severe erosion hazard ratings from motorized big game retrieval, followed by alternatives F (-50 percent) and C (-21 percent).

- Alternatives D (-97 percent), E (-100 percent), and G (-97 percent) show significant reduction in potential acres of disturbance on soils with unsuited or unsatisfactory soil condition ratings from motorized big game retrieval, followed by alternatives F (-42 percent) and C (-18 percent).
- All alternatives show significant reduction (greater than 94 percent) in potential acres of disturbance to soils having moderate or severe erosion hazard ratings and soils with unsatisfactory or unsuited soil condition ratings by motorized dispersed camping.
- Alternatives D and E completely removed the 36 areas (approximately 24 acres) from soils having moderate or severe erosion hazard ratings and soils with unsatisfactory or unsuited soil condition ratings. Alternatives C, F, and G have effects to 9 acres of soils with soil erosion hazard rating of moderate or severe and 12 acres of soils with unsatisfactory or unsuited soil conditions.
- The approximately 3-acre ATV/motorcycle area does not impact soils having moderate or severe erosion hazard. However, in alternatives C, F, and G, the proposed site is located on soils having unsatisfactory or unsuited soil condition ratings.

Effects to Riparian Areas and Wetlands/Wet Meadows

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

Although riparian and wetland/wet meadow 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.

A motorized route system can affect riparian areas and wetlands/wet meadows directly or indirectly by inducing changes to natural hydrologic functions. Motorized activities on these routes can result in modification of surface and subsurface drainage patterns which can result in changes in moisture regimes of these areas. Motorized routes can directly damage riparian vegetation within or near the stream channel. A reduction of riparian function may result by the action of tires churning up and removing vegetation and causing streambank alteration. Continued driving in and through stream channels can directly breakdown streambanks that provide for riparian function and aquatic habitat. Soil rutting, compaction and detachment of soils, and accelerated erosion may occur, as well as sediment transport and sediment deposition occurring into connected waters, reducing water quality on-site and downstream. Motorized routes that are adjacent to, or that intersect portions of wetlands/wet meadows alter surface hydrology and water flow causing loss of water storage, vegetation productivity and wetland function.

Many wetlands and wet meadows across the forest have road access and provide easy opportunity for motorized dispersed recreation and motorized big game retrieval. Motorized route systems in these areas pose a threat to soil productivity and vegetation, particularly if several motorized passes remove or destroy vegetation. Repeated motor vehicle activities can cause soil compaction in wetlands and wet meadows, which may result in long-term adverse effects.

Adverse impacts to riparian areas and wetlands/wet meadows related to motorized travel off of designated routes vary in magnitude. Riparian areas tend to be a natural draw for concentration of both 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 and their susceptibility to rutting and compaction. In general, observations on the Gila National Forest indicate that the amount of adverse effects to riparian areas and wetlands, Forestwide, from travel off of designated routes is 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 however, motorized users have created visible routes that get repeatedly used by motorized vehicles for such things as recreation, big game hunting, antler hunting, and unrestricted cross-country travel. These locations, which include popular recreation and camping spots such as sections of the Gila River, Turkey Creek, Little Dry Creek and the San Francisco River, can continue to experience adverse impacts to the riparian areas and associated wetlands, as long as the use is permitted.

Alternative B

Impacts to riparian and wetland vegetation as a result of the current motorize route system on the Forest are detailed above in the Effects Common to All Alternatives. Under Forest Service jurisdiction, there are currently 299 miles of open routes that create 443 acres of motorized route disturbance within riparian areas. In wetlands/wet meadows, there are 12 miles of motorized routes, which translates to 18 acres. Cross-country travel by motorized vehicles is permitted in all areas, except designated Wilderness, roads, trails, or areas specified in Forest Orders, and restricted off-road vehicle areas identified in the Forest Land Management Plan. This cross-country travel includes access for motorized big game retrieval, motorized dispersed recreation and motorized camping and ATV/motorcycle areas. Currently, cross-country travel associated with motorized big game retrieval, motorized dispersed recreation, and motorized areas has the potential to impact 31,581 acres within riparian areas, and 1,568 acres within wetlands/wet meadows.

For all alternatives it is unlikely that all acres of riparian and wetlands/wet meadows are having use by motor vehicles.

Alternative C

Motorized Routes

In riparian areas, the acreage potentially impacted by motorized routes (441 acres) is similar to the no action alternative (443 acres). In wetlands, the acreage is reduced to 17 acres, which is a 6 percent reduction from the no action alternative (18 acres). This alternative provides the least reduction of potential impacts to riparian areas and wetlands of any action alternative

Motorized Dispersed Recreation (300-footcorridor designated along specific routes)

In riparian areas, the acreage potentially impacted by motorized dispersed recreation (4,357 acres) is less than the no action alternative (31,581 acres), which is similar to alternatives D, F, and G, but less than alternative E. In wetlands, the acreage is reduced to 296 acres, which is an 81 percent reduction from the no action alternative (1,568 acres), which is similar to alternatives D, F, and G, but less than alternative E.

Motorized Big Game Retrieval (1 mile corridor for elk, deer, bear, mountain lion, javelina, pronghorn)

In riparian areas, the acreage potentially impacted by motorized big game retrieval (27,356 acres) is less than the no action alternative (31,581 acres), which is the least reduction of all action alternatives. In wetlands, the acreage is reduced to 1,561 acres, which is a 0 percent reduction from the no action alternative (1,568), which is similar to the no action alternative and the least reduction of all action alternatives.

Motorized Areas (37 areas: 1 motorcycle/ATV; 36 camping)

The Travel Management Rule defines 'areas' as open to all motorized vehicle use. The 36 camping areas proposed in this alternative are existing sites with traditional use related to camping. The majority of these sites are less than 1 acre in size. The motorcycle/ATV area covers approximately 3 acres and is not located within a riparian area or wetland/wet meadow. Considering the Forest has not previously been closed to this type of activity, the alternatives are measured against the total acres of riparian areas (31,581 acres) and wetlands/wet meadows (1,568 acres) that this type of activity would have been allowed to occur. In riparian areas and wetlands/wet meadows, this alternative virtually eliminates the acres of motorized areas available for potential impacts, similar to all action alternatives.

Alternative D

Motorized Routes

In riparian areas, the acreage potentially impacted by motorized routes (330 acres) is less than the no action alternative (443 acres), which is the second largest reduction behind alternative E. In wetlands, the acreage is reduced to 13 acres, which is a 28 percent reduction from the no action alternative (18 acres), similar to alternatives F and G.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes)

In riparian areas, the acreage potentially impacted by motorized dispersed recreation (3,334 acres) is less than the no action alternative (31,581 acres), which is similar to alternatives C, F, and G, but less than alternative E. In wetlands, the acreage is reduced to 239 acres, which is an 85 percent reduction from the no action alternative (1,568 acres), which is similar to alternatives C, F, and G, but less than alternative E.

Motorized Big Game Retrieval (within 300-foot motorized dispersed recreation corridor for elk, deer, bear, mountain lion, javelina, pronghorn)

In riparian areas, the acreage potentially impacted by motorized big game retrieval (3,334 acres) is less than the no action alternative (31,581 acres), which is similar to alternative G. In wetlands, the acreage is reduced to 239 acres, which is an 85 percent reduction from the no action alternative (1,568), which is similar to alternative G.

Motorized Areas (no areas designated)

Motorized areas are not designated under this alternative, thus there would be no potential adverse impacts within riparian areas or wetlands/wet meadows due to motorized areas. In riparian areas and wetlands/wet meadows, this alternative eliminates the acres of motorized areas available for potential impacts, similar to all action alternatives.

Alternative E

Motorized Routes

In riparian areas, the acreage potentially impacted by motorized routes (273 acres) is less than the no action alternative (443 acres), which is the largest reduction of any action alternative. In wetlands, the acreage is reduced to 10 acres, which is a 44 percent reduction from the no action alternative (18 acres), and the largest reduction of any action alternative.

Motorized Dispersed Recreation (not motorized dispersed recreation permitted)

Motorized dispersed recreation is not permitted under this alternative, thus there would be no potential adverse effects within riparian areas or wetlands/wet meadows. This alternative reduces the acreage available for potential impacts to riparian areas and wetlands/wet meadows from motorized dispersed recreation by 100 percent, which is the largest reduction of all action alternatives.

Motorized Big Game Retrieval (no motorized big game retrieval permitted)

Motorized big game retrieval is not permitted under this alternative, thus there would be no potential adverse effects within riparian areas or wetlands/wet meadows. This alternative reduces the acreage available for potential impacts to riparian areas and wetlands/wet meadows from motorized big game retrieval by 100 percent, which is the largest reduction of all action alternatives.

Motorized Areas (no areas designated)

Motorized areas are not designated under this alternative, thus there would be no potential adverse impacts within riparian areas or wetlands/wet meadows due to motorized areas. In riparian areas and wetlands/wet meadows, this alternative eliminates the acres of motorized areas available for potential impacts, similar to all action alternatives.

Alternative F

Motorized Routes

In riparian areas, the acreage potentially impacted by motorized routes (382 acres) is less than the no action alternative (443 acres), which is less than alternatives D and E, but similar to alternative G. In wetlands, the acreage is reduced to 14 acres, which is a 22 percent reduction from the no action alternative (18 acres), similar to alternatives D and G.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes)

In riparian areas, the acreage potentially impacted by motorized dispersed recreation (3,828 acres) is less than the no action alternative (31,581 acres), which is similar alternatives C, D, and G, but less than alternative E. In wetlands, the acreage is reduced to 293 acres, which is an 81 percent reduction from the no action alternative (1,568 acres), which is similar alternatives C, D, and G, but less than alternative E.

Motorized Big Game Retrieval (within one-half mile of motorized routes, elk only)

In riparian areas, the acreage potentially impacted by motorized big game retrieval (20,565 acres) is less than the no action alternative (31,581 acres). In wetlands, the acreage is reduced to 1,485 acres, which is a 5 percent reduction from the no action alternative (1,568), which is similar to alternative C.

Motorized Areas (37 areas: 1 motorcycle/ATV; 36 camping)

The motorcycle/ATV area is not located within a riparian area or wetland/wet meadow. In riparian areas and wetlands/wet meadows, this alternative virtually eliminates the acres of motorized areas available for potential impacts, similar to all action alternatives.

Alternative G

Motorized Routes

In riparian areas, the acreage potentially impacted by motorized routes (374 acres) is less than the no action alternative (443 acres), which is less than alternatives D and E, but similar to alternative F. In wetlands, the acreage is reduced to 14 acres, which is a 22 percent reduction from the no action alternative (18 acres), similar to alternatives D and F.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes)

In riparian areas, the acreage potentially impacted by motorized dispersed recreation (3,568 acres) is less than the no action alternative (31,581 acres), which is similar to alternatives C, D, and F, but less than alternative E. In wetlands, the acreage is reduced to 265 acres, which is an 83 percent reduction from the no action alternative (1,568 acres), which is similar to alternatives C, D, and F, but less than alternative E.

Motorized Big Game Retrieval (within 300-foot dispersed camping corridor for elk and deer)

In riparian areas, the acreage potentially impacted by motorized big game retrieval (3,568 acres) is less than the no action alternative (31,581 acres), which is similar to alternative D. In wetlands, the acreage is reduced to 265 acres, which is an 83 percent reduction from the no action alternative (1,568), which is similar to alternative D.

Motorized Areas (37 areas: 1 motorcycle/ATV; 36 camping)

The motorcycle/ATV area is not located within a riparian area or wetland/wet meadow. In riparian areas and wetlands/wet meadows, this alternative virtually eliminates the acres of motorized areas available for potential impacts from motorized areas, similar to all action alternatives.

Summary

Each of the action alternatives was analyzed to determine how many acres of potential motorized disturbance would be possible relative to the no action alternative. The effects to riparian areas and wetland/wet meadow vegetation by a motorized route system 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. In general, observations on the Gila National Forest and other southwestern forests indicate 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 floodplains, 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.

In summary, for riparian areas:

- Alternative E reduces acres of motorized routes within *riparian areas* by 38 percent, followed by alternative D (-26 percent). Alternatives F and G show similar reductions (-14 percent and -16 percent, respectively) and alternative C shows no reduction (0 percent) in motorized routes within *riparian areas* from the no action alternative. All alternatives greatly (greater than 85 percent) reduce potential acres impacted by motorized dispersed recreation and motorized areas within *riparian areas*. Alternatives D, E, and G greatly (over 85 percent) reduce potential acres impacted by motorized big game retrieval within *riparian areas*. Alternatives F (-35 percent) and C (-13 percent) follow.

In summary, for wetlands/wet meadows:

- All alternatives reduce acres of motorized routes within *wetlands/wet meadows*. Alternative C (-6 percent) shows little change from the no action alternative. Alternatives D, F, and G reduce potential acres of disturbance ranging from 22 percent to 28 percent. Alternative E reduces potential acres impacted by motorized routes by the largest amount (-44 percent). All alternatives greatly (over 80 percent) reduce potential acres impacted by motorized dispersed recreation and motorized areas within *wetlands/wet meadows*. Alternatives D, E, and G greatly (over 80 percent) reduce potential acres impacted by motorized big game retrieval within *wetlands/wet meadows*. Alternatives F (-5 percent) and C (0 percent) show little to no reduction in potential acres impacted by motorized big game retrieval within *wetlands/wet meadows*, and are similar to the no action alternative.

Effects to Water Quality

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

The primary effect to water quality related to a motorized route system is sedimentation originating from road erosion. Roads are a major source of sediment and contribute more off-site sediment than any other land management activity (Gibbons and Salo 1973; Meehan 1991). 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. Motorized routes can cut across hillsides, often intercepting subsurface water flow and running it down ditches and through culverts where it can then pick up sediment and joined 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, research has concluded that sediment from roads can result in adverse effects to streams and aquatic habitat (Meehan 1991; Dissmeyer 2000; Gucinski et al. 2001; MacDonald and Stednick 2003).

A motorized route system 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 further away a road is from a stream channel, the less risk there is of direct deposits of sediment into the drainage. Literature supports that disturbance within 300 feet of streams has the greatest potential to impact water quality, via overland flow (Burroughs and King 1989; Belt et al. 1992). 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. Roads constructed near a stream not only pose a higher risk to water quality, but they can also modify hydrologic response of streamflow from runoff events. 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. Motorized routes can also disrupt a watershed's natural hydrologic flow by capturing surface and subsurface runoff on hillslopes. 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 stream flows. Stream channels will respond to increases in flow rates by widening or deepening in order to carry these greater flow rates. 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, Copstead et al. 1997). This can lead to higher peak flows, which may then lead to a higher risk of channel erosion.

Parent material that the road bed is situated on can also influence effects that a motorized route has on erosion and sedimentation. On the Gila National Forest, roads situated on decomposing granite and some types of rhyolite are highly susceptible to rutting and erosion. In addition, water temperature issues may also arise if roads are located adjacent to stream channels where riparian vegetation, which provides shade, is removed to accommodate the road, or where stream channel geometry has been altered, creating a wider, more shallow channel. 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 (Megahan 1978, Reid and Dunne 1984, Burroughs and King 1989, Luce and Black 2001).

Stream crossings create the most vulnerable point on the stream channel to adverse impacts from a motorized route system. The effects from stream crossings are two-fold. 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, or up and down the stream. Crossings, additionally, indirectly effect 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 routes adjacent to and within drier, ephemeral channels can also move large and small bedload material, which becomes further mobilized during large rain events. Streambanks that have been disturbed in these drier 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 increases in sediment in the channel that eventually 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 of a road (Reid and Dunne 1984; Clinton and Vose 2003; Maholland and Bullard 2005). 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 routes and unauthorized routes produce and deliver more sediment than improved, gravel roads. In-sloped, bar ditched roads tend to produce more sediment than all other roads types.

Similar to riparian areas and wetlands/wet meadows, adverse impacts to water quality related to motorized travel off of designated routes vary in magnitude. Short-lived negative impacts occur when motorists cross live streams in effort 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. As stated previously, water courses and riparian areas tend to be a natural draw for concentration of both 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. At current use levels in general, observations across the forest indicate that motorized dispersed recreation and motorized big game retrieval is infrequent enough that impacts are minimal forestwide. In a few locations however, motorized users have created visible routes that get repeatedly used by motorized vehicles for such things as recreation, big game hunting, antler hunting, and unrestricted cross-country travel. These locations, which include popular recreation and camping spots such as sections of the Gila River, Turkey Creek, Little Dry Creek and the San Francisco River, can continue to experience adverse impacts to the water quality, as long as the use is permitted.

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 road bed 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.

Alternative B

Impacts to water quality as a result of the current motorized route system on the Forest are detailed above in the Effects Common to All Alternatives. Across the Gila National Forest, there are 8,847 motorized stream crossings that impact perennial and intermittent streams and ephemeral channels. 187 of these crossing are located on impaired 303(d) streams, while the majority of the crossings (7,880) are located on ephemeral channels. There are no stream crossings impacting outstanding national resource waterss. Approximately 295 miles of perennial and intermittent streams, and 1,771 miles of ephemeral drainages are located within 300 feet of

motorized routes. Approximately 47 miles of impaired streams and less than 1 mile of outstanding national resource waterss are located within 300 feet of a motorized route.

Cross-country travel by motorized vehicles is permitted in all areas, except designated wilderness, roads, trails, or areas specified in Forest Orders, and restricted off-road vehicle areas identified in the Forest Land Management Plan. This cross-country travel includes access for motorized big game retrieval, motorized dispersed recreation and motorized camping and ATV/motorcycle areas. Currently, cross-country travel associated with motorized dispersed recreation, motorized big game retrieval, and motorized areas (both camping and ATV/motorcycle) has the potential to impact approximately 886 miles of perennial and intermittent streams, 9,410 miles of ephemeral channels, and 132 miles of impaired streams.

Alternative C

Motorized Routes

This alternative shows the least amount of change (relative to the no action alternative) in risk of potential impacts to perennial, intermittent, impaired and ephemeral drainages due to motorized routes of all the action alternatives. For all stream channels (perennial, intermittent, and ephemeral), this alternative increases the number of motorized crossings to 9,088 crossings, compared to the no action alternative (8,847 crossings). Motorized crossings on impaired streams are reduced to 165 crossings, compared to the no action alternative (187 crossings). Miles of perennial and intermittent streams within 300 feet of motorized routes is similar (293 miles) to the no action alternative (295 miles), while there is an increase to 1,785 miles of ephemeral channels within 300 feet of motorized routes from the no action alternative (1,771 miles). There are 43 miles of impaired waterbodies within 300 feet of motorized routes compared to the no action alternative (47 miles), while there is less than 0.05 mile of an outstanding national resource waters stream within 300 feet of a motorized route, comparable to the no action alternative (0.17 mile of stream). Overall, potential impacts to outstanding national resource waterss by motorized routes are negligible under all alternatives, with any adjacent routes being downstream of the outstanding national resource waters reach. Under all alternatives, miles of motorized routes within 300 feet of outstanding national resource waters wetlands are reduced to 0.69 mile, from 0.75 mile under the no action alternative, thus showing little change.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes)

There are 63 miles of perennial and intermittent stream miles located within areas designated for motorized dispersed recreation compared to the no action alternative (886 miles), while there are 582 miles of ephemeral channel found within motorized dispersed recreation zones compared to the no action alternative (9,410 miles). Miles of impaired streams potentially impacted by motorized dispersed recreation is decreased to 6 miles from the no action alternative (132 miles), while there are no acres of motorized dispersed recreation with 300 feet of any outstanding national resource waters stream or outstanding national resource waters wetland under any alternative. Miles of all stream channels potentially impacted by motorized dispersed recreation is reduced by greater than 90 percent under all action alternatives, thus there is no meaningful distinction between the alternatives for this issue.

Motorized Big Game Retrieval (1 mile corridor for elk, deer, bear, mountain lion, javelina, pronghorn)

Miles of perennial and intermittent streams potentially impacted by motorized big game retrieval is decreased to 688 miles from the no action alternative (886 miles), and potential ephemeral channel impacts are decreased to 7,994 miles from the no action alternative (9,410 miles), which is the least reduction of any action alternative. Miles of impaired waterbodies with potential impacts by motorized big game retrieval is decreased to 107 miles from the no action alternative (132 miles), which is the least of any action alternative. There is little change is potential impacts to outstanding national resource waterss as the acres of motorized big game retrieval decrease to 67 acres under alternative C from the no action alternative (70 acres). Acres of motorized big game retrieval with 300 feet of outstanding national resource waters wetlands decrease to 38 acres from the no action alternative of 96 acres. This represents the least reduction of impacts to outstanding national resource waters streams and wetlands of any action alternative.

Motorized Areas (37 areas: 1 motorcycle/ATV; 36 camping)

The Travel Management Rule defines ‘areas’ as open to all motorized vehicle use. The 36 camping areas proposed in this alternative are existing sites with traditional use related to camping. The majority of these sites are less than 1 acre in size. The motorcycle/ATV area covers approximately 3 acres, however it is not within 300 feet of any perennial, intermittent, ephemeral, or 303(d) stream. Miles of perennial, intermittent, ephemeral, 303(d), and outstanding national resource waters streams and outstanding national resource waters wetlands potentially impacted by motorized camping areas are virtually eliminated under all action alternatives.

Alternative D

Motorized Routes

Motorized stream crossings are reduced to 6,526 crossings on perennial, intermittent and ephemeral channels compared to the no action alternative (8,847 crossings), which is the second largest reduction of all action alternatives, behind Alternative E. Motorized stream crossing are reduced to 144 crossings on impaired water bodies, compared to the no action alternative of 187 crossings, which is similar to alternatives E, F, and G. Miles of perennial and intermittent streams within 300 feet of motorized routes (207 miles) is less than the no action alternative (295 miles), while there is a decrease to 1,346 miles of ephemeral channels within 300 feet of motorized routes from the no action alternative (1,771 miles). There are 37 miles of impaired water bodies within 300 feet of motorized routes compared to the no action alternative (47 miles), while there are no outstanding national resource waters streams within 300 feet of a motorized route, comparable to alternative E. See alternative C for further outstanding national resource waters discussion.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes)

There are 32 miles of perennial and intermittent stream miles located within areas designated for motorized dispersed recreation compared to the no action alternative (886 miles), while there are 445 miles of ephemeral channel found within motorized dispersed recreation zones compared to the no action alternative (9,410 miles). Miles of impaired streams potentially impacted by motorized dispersed recreation is decreased to 4 miles from the no action alternative (132 miles), while there are no acres of motorized dispersed recreation with 300 feet of any outstanding national resource waters stream or outstanding national resource waters wetland under any

alternative. Miles of all stream channels potentially impacted by motorized dispersed recreation is reduced by greater than 90 percent under all action alternatives, thus there is no meaningful distinction between the alternatives for this issue.

Motorized Big Game Retrieval (within 300-foot dispersed camping corridor)

Miles of perennial and intermittent streams potentially impacted by motorized big game retrieval is decreased to 32 miles from the no action alternative (886 miles), and potential ephemeral channel impacts are decreased to 445 miles from the no action alternative (9,410 miles), which is similar to alternative G. Miles of impaired waterbodies with potential impacts by motorized big game retrieval is decreased to 4 miles from the no action alternative (132 miles), which is similar to alternative G. There are no acres of motorized big game retrieval that would have potential impacts to outstanding national resource waters stream or wetlands under this alternative, similar to alternatives E and G.

Motorized Areas (no areas designated)

There would be no potential adverse impacts to perennial, intermittent, ephemeral, 303(d) and outstanding national resource waters streams and outstanding national resource waters wetlands due to camping areas under this alternative. Miles of perennial, intermittent, ephemeral, 303(d), and outstanding national resource waters streams and outstanding national resource waters wetlands potentially impacted by motorized camping areas are virtually eliminated under all action alternatives.

Alternative E

Motorized Routes

Motorized stream crossings are reduced to 4,971 crossings on perennial, intermittent and ephemeral channels compared to the no action alternative (8,847 crossings), which is the largest reduction of all action alternatives. Motorized stream crossing are reduced to 139 crossings on impaired water bodies, compared to the no action alternative of 187 crossings, which is similar to alternatives D, F, and G. Miles of perennial and intermittent streams within 300 feet of motorized routes (163 miles) is less than the no action alternative (295 miles), while there is a decrease to 1,069 miles of ephemeral channels within 300 feet of motorized routes from the no action alternative (1,771 miles). There are 35 miles of impaired water bodies within 300 feet of motorized routes compared to the no action alternative (47 miles), while there are no outstanding national resource waters streams within 300 feet of a motorized route, comparable to alternative D. These are the largest reductions of all action alternatives. See alternative C for further outstanding national resource waters discussion.

Motorized Dispersed Recreation (No camping corridors designated)

There are 32 miles of perennial and intermittent stream miles located within areas designated for motorized dispersed recreation compared to the no action alternative (886 miles), while there are 445 miles of ephemeral channel found within motorized dispersed recreation zones compared to the no action alternative (9,410 miles). Miles of impaired streams potentially impacted by motorized dispersed recreation is decreased to 4 miles from the no action alternative (132 miles), while there are no acres of motorized dispersed recreation with 300 feet of any outstanding national resource waters stream or outstanding national resource waters wetland under any

alternative. Miles of all stream channels potentially impacted by motorized dispersed recreation is reduced by greater than 90 percent under all action alternatives, thus there is no meaningful distinction between the alternatives for this issue.

Motorized Big Game Retrieval (No motorized big game retrieval permitted)

There would be no potential adverse impacts to perennial, intermittent, ephemeral, 303(d) or outstanding national resource waters streams and outstanding national resource waters wetlands due to motorized big game retrieval under this alternative. Miles of perennial, intermittent, ephemeral, impaired, and outstanding national resource waters streams, and outstanding national resource waters wetlands potentially impacted by motorized big game retrieval decreases by 95 percent or more under alternatives D, E, and G, making them all similar, and with greater reductions than alternative C and F.

Motorized Areas (no areas designated)

There would be no potential adverse impacts to perennial, intermittent, ephemeral, 303(d) and outstanding national resource waters streams and outstanding national resource waters wetlands due to camping areas under this alternative. Miles of perennial, intermittent, ephemeral, 303(d), and outstanding national resource waters streams and outstanding national resource waters wetlands potentially impacted by motorized camping areas are virtually eliminated under all action alternatives.

Alternative F

Motorized Routes

Motorized stream crossings are reduced to 7,516 crossings on perennial, intermittent and ephemeral channels compared to the no action alternative (8,847 crossings), which is similar to alternative G. Motorized stream crossing are reduced to 148 crossings on impaired water bodies, which is similar to alternative G, compared to the no action alternative of 187 crossings. Miles of perennial and intermittent streams within 300 feet of motorized routes (247 miles) is less than the no action alternative (295 miles), while there is a decrease to 1,502 miles of ephemeral channels within 300 feet of motorized routes from the no action alternative (1,771 miles). There are 38 miles of impaired waterbodies within 300 feet of motorized routes compared to the no action alternative (47 miles), while there is less than 0.05 mile of an outstanding national resource waters stream within 300 feet of a motorized route, comparable to alternative C and the no action alternative (0.17 mile of stream). See alternative C for further outstanding national resource waters discussion.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes)

There are 50 miles of perennial and intermittent stream miles located within areas designated for motorized dispersed recreation compared to the no action alternative (886 miles), while there are 555 miles of ephemeral channel found within motorized dispersed recreation zones compared to the no action alternative (9,410 miles). Miles of impaired streams potentially impacted by motorized dispersed recreation is decreased to 5 miles from the no action alternative (132 miles), while there are no acres of motorized dispersed recreation with 300 feet of any outstanding national resource waters stream or outstanding national resource waters wetland under any alternative. Miles of all stream channels potentially impacted by motorized dispersed recreation is

reduced by greater than 90 percent under all action alternatives, thus there is no meaningful distinction between the alternatives for this issue.

Motorized Big Game Retrieval (within one-half mile of motorized routes, elk only)

Miles of perennial and intermittent streams potentially impacted by motorized big game retrieval is decreased to 475 miles from the no action alternative (886 miles), and potential ephemeral channel impacts are decreased to 5,872 miles from the no action alternative (9,410 miles), which is the second least reduction behind alternative C. Miles of impaired waterbodies with potential impacts by motorized big game retrieval is decreased to 69 miles from the no action alternative (132 miles), which is the second least reduction behind alternative C. There is a reduction in potential impacts to outstanding national resource waterss as the acres of motorized big game retrieval decrease to 28 acres under alternative C from the no action alternative (70 acres). Acres of motorized big game retrieval with 300 feet of outstanding national resource waters wetlands decrease to 21 acres from the no action alternative of 96 acres. This represents the second least reduction of impacts to outstanding national resource waters streams and wetlands behind alternative C.

Motorized Areas (37 areas: 1 motorcycle/ATV; 36 camping)

The motorcycle/ATV area is not located adjacent to any stream channels or outstanding national resource waters wetlands. Miles of perennial, intermittent, ephemeral, 303(d), and outstanding national resource waters streams and outstanding national resource waters wetlands potentially impacted by motorized camping areas are virtually eliminated under all action alternatives.

Alternative G

Motorized Routes

Motorized stream crossings are reduced to 7,424 crossings on perennial, intermittent and ephemeral channels compared to the no action alternative (8,847 crossings), which is similar to alternative F. Motorized stream crossing are reduced to 148 crossings on impaired water bodies, which is similar to alternative G, compared to the no action alternative of 187 crossings. Miles of perennial and intermittent streams within 300 feet of motorized routes (240 miles) is less than the no action alternative (295 miles), while there is a decrease to 1,493 miles of ephemeral channels within 300 feet of motorized routes from the no action alternative (1,771 miles). There are 38 miles of impaired water bodies within 300 feet of motorized routes compared to the no action alternative (47 miles), while there is less than 0.05 mile of an outstanding national resource waters stream within 300 feet of a motorized route, comparable to alternatives B, C, and F. See alternative C for further outstanding national resource waters discussion.

Motorized Dispersed Recreation (300-foot corridor designated along specific routes)

There are 42 miles of perennial and intermittent stream miles located within areas designated for motorized dispersed recreation compared to the no action alternative (886 miles), while there are 512 miles of ephemeral channel found within motorized dispersed recreation zones compared to the no action alternative (9,410 miles). Miles of impaired streams potentially impacted by motorized dispersed recreation is decreased to 6 miles from the no action alternative (132 miles), while there are no acres of motorized dispersed recreation with 300 feet of any outstanding national resource waters stream or outstanding national resource waters wetland under any

alternative. Miles of all stream channels potentially impacted by motorized dispersed recreation is reduced by greater than 90 percent under all action alternatives, thus there is no meaningful distinction between the alternatives for this issue.

Motorized Big Game Retrieval (within 300-foot dispersed camping corridor)

Miles of perennial and intermittent streams potentially impacted by motorized big game retrieval is decreased to 42 miles from the no action alternative (886 miles), and potential ephemeral channel impacts are decreased to 512 miles from the no action alternative (9,410 miles), which is similar to alternative D. Miles of impaired waterbodies with potential impacts by motorized big game retrieval is decreased to 6 miles from the no action alternative (132 miles), which is similar to alternative D. There are no acres of motorized big game retrieval that would have potential impacts to outstanding national resource waters stream or wetlands under this alternative, similar to alternatives D and E.

Areas (37 areas: 1 motorcycle/ATV; 36 camping)

The motorcycle/ATV area is not located adjacent to any stream channels or outstanding national resource waters wetlands. Miles of perennial, intermittent, ephemeral, 303(d), and outstanding national resource waters streams and outstanding national resource waters wetlands potentially impacted by motorized camping areas are virtually eliminated under all action alternatives.

Summary

Each of the alternatives was analyzed to determine if there is potential for a motorized route system on the Gila National Forest to impact water quality. Water quality was evaluated on all perennial, intermittent, impaired (303d), outstanding national resource waters, and ephemeral waters. Analysis of effects to these waters was based on motorized routes and their proximity to drainages, motorized cross-country travel near drainages, and stream crossings if drainages. Impaired waters and outstanding national resource waterss 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 or requiring the highest level of protection water quality degradation.

The analysis area for water quality was designed by buffering 300 feet on either side of perennial, intermittent, impaired, and ephemeral drainages. Closed roads within this buffer were considered a net benefit to water quality due to limiting the use on the road, and the restriction of motorized stream crossings on these routes. Acres associated with roads proposed for closure were removed from the calculations of route impacts on water quality. A brief summary of these effects, based on a change from the no action alternative is described below:

- Alternative E provides the most reduction (-44 percent) of motorized crossings on perennial, intermittent and ephemeral streams, followed by alternative D (-26 percent) and alternatives G (-16 percent) and F (-15 percent). Alternative C increases motorized crossings by 3 percent. Alternatives D, E, F, and G are similar in reduction of motorized crossings on impaired streams (21 percent-26 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 45 percent, reduces miles of ephemeral channels potentially impacted by motorized routes by 40 percent and reduces potential miles impacted of impaired streams

by 26 percent, which is the most of any action alternative. Alternative D provides the second largest reduction in potential effects: miles of perennial and intermittent streams (-30 percent); miles of ephemeral streams (-24 percent); miles of impaired streams (-22 percent). Alternatives F and G are similar with reductions in miles of stream potentially impacted ranging from -16 percent to -19 percent, trailed by alternative C (-1 percent) which remains similar to the no action alternative.

- All action alternatives almost completely remove motorized camping areas from perennial, intermittent streams, and impaired streams. All action alternatives significantly (over 90 percent) reduce potential risk of impacts from motorized dispersed recreation on perennial, intermittent, ephemeral, impaired and outstanding national resource waters streams and wetlands. Alternatives D, E, and G significantly (over 90 percent) reduce risk of potential impacts from motorized big game retrieval on perennial, intermittent, ephemeral, impaired and outstanding national resource waters streams and wetlands. Alternative F provides for the next largest reduction followed by alternative C. Motorized areas are restricted in all action alternatives compared with no limits in alternative B. By limiting these motorized areas to 39 locations, with all but one being very small in size, indiscriminate motorized use in localized areas is almost eliminated across the forest, with little risk of impacts remaining to water quality.

For all action alternatives, less motorized routes would be designated for motorized use within 300 feet of perennial, intermittent, and impaired streams. Motorized routes adjacent to ephemeral streams are decreased under all alternatives, with the exception of alternative C where there would be a slight (1 percent) increase. Reducing motorized routes within 300 feet of streams is anticipated to improve water quality by limiting opportunities for overland flow to travel down motorized routes and deliver excess runoff and sediment into the drainage network. In addition, restricted access to these areas would allow these routes to reestablish 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 times can take decades. All of the action alternatives involve the closure of roads to motorized use rather than decommissioning (physical removal). In some instances, the risk of sedimentation may increase due to problems associated with lack of consistent maintenance, while in others the risk may decrease dramatically due to rapid recovery of a riparian area to more natural conditions.

Conclusions about Effects of Action Alternatives

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 acres associated with motorized routes open to the public, which reduces the relative risk of negative impacts to soil resources, riparian areas, wetlands, and water quality. It is recognized that there are, and will continue to be, localized direct and indirect negative impacts to watershed and soil resources as a result of a motorized route system, in particular in popular recreation and camping areas.

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 one-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 one-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 the 300-foot motorized dispersed recreation corridor, versus a one-half mile corridor 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 very few acres associated with 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.

Cumulative Effects

Watershed cumulative effects analyses for the Implementation of the Travel Management Rule on the Gila National Forest was conducted at the 6th-code watershed level. This analysis was done at a broad scale using the 2011 Watershed Condition Classification and is included as a separate report to this analysis, titled “Watershed, Soil and Aquatics Cumulative Effects Report” (USDA Forest Service 2013f). The cumulative effects analysis is based on full implementation of an alternative selected, and a project period of 10 years following the decision. The following information provides a summary of the cumulative effect report’s findings.

Alternative Comparison

The information found in the Watershed, Soils and Aquatics Cumulative Effects report describes how implementation of a motorized route system and cross-country travel across the Forest would have the ability to impact attributes that are used to assess watershed condition. Each alternative was then compared to alternative B – no action, to assess which one provided the greatest opportunity to reduce existing cumulative impacts related to motorized routes and cross-country travel. Simply, the less motorized disturbance to watershed, soil, and aquatic resources, the less opportunity for negative cumulative impacts to occur, and the greater the opportunity for beneficial effects to transpire.

Alternative B

The effects of past and present activities to watershed, soil, and aquatic conditions are described in the affected environment section of the FEIS. The reasonably foreseeable activities that are considered for this project are described on page 5 of this document. The motorized route system and unlimited cross-country access currently in place on the Gila National Forest contribute, in part, to cumulative impacts on watershed condition. In 2011, 6th-code watershed condition

classifications incorporated information related to the current motorized route system into the assessment, in addition to information related to eleven other watershed indicators. This recent assessment provides a "baseline" at which to assess all of the action alternatives versus the no action alternative.

Under the no action alternative, the existing motorized route system in place on the forest would not change, continuing to impact over 6,900 acres of forest where the routes are located. Contribution to cumulative impacts of watershed, soil and aquatic resources at the 6th-code watershed scale would continue to occur at the current rate, with little to no increases expected. In addition, unlimited cross-country travel would continue across the forest, outside of wilderness areas. 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, it is difficult for the Forest Service to control negative impacts as they occur. In general, adverse impacts related to cross-country travel for motorize dispersed camping and motorized big game retrieval are minimal forestwide. Some situations do exist, however, where forest users have created an "undesignated" route based on a favorite destination off of a designated route. Many of these routes are near favorite waterbodies such as the Gila, San Francisco, and Mimbres Rivers, or other favored recreational sites which are often most vulnerable to negative impacts by motorized vehicles.

Implementation of alternative B – no action would result in no change in cumulative impacts to watershed, soil and aquatic condition at the 6th-code level, and thus no change to watershed condition classification of any watershed.

Alternative C

Alternative C proposes the least decrease in acres impacted by motorized routes across the Forest of all action alternatives. Cross-country travel related to motorized dispersed recreation is reduced by 96 percent, which is comparable to all action alternatives. Cross-country travel related to motorized big game retrieval is reduced by 15 percent which is the least reduction of all action alternatives. Motorized areas (camping and OHV) are limited to 27 acres, similar to alternatives F and G. Alternative C would be similar to alternative B – no action in terms of cumulative effects, with some upward trends in watershed condition realized with reductions of motorized cross-country travel. However, these upward trends would be immeasurable at the watershed scale and are not expected to result in large enough improvement to change overall watershed condition classification.

Alternative D

Alternative D proposes the second largest decrease in motorized routes across the Forest, behind alternative E. Cross-country travel related to motorized dispersed recreation is reduced by 97 percent, which is comparable to all action alternatives. Cross-country travel for motorized big game retrieval is reduced by 97 percent, limiting it only to areas where motorized dispersed recreation is permitted. No motorized areas would be authorized under this alternative. Alternative D is second behind alternative E in terms of providing the most opportunity to decrease cumulative impacts to watershed, soil and aquatic conditions that may currently be occurring as a result of the forest's existing motorized route system and unrestricted cross-country travel. Alternative D poses the second best opportunity of all alternatives for upward trends to occur in watershed condition, related to the watershed indicators of water quality, water quantity,

aquatic habitat, aquatic biota, riparian/wetland condition, roads and trails, soils, and terrestrial invasive species. However, similar to alternative E, these upward trends are not expected to result in large enough improvement across any individual watershed to change overall watershed condition classification in the next 10 years.

Alternative E

Alternative E proposes the largest decrease in motorized routes across the Forest. In addition, there would be no cross-country travel allowed for motorized dispersed camping or motorized big game retrieval. No motorized areas would be authorized under this alternative. The only cross-country travel allowed would be for parking a vehicle and/or trailer immediately adjacent to the designated motorized route. With these limitations, alternative E provides the most opportunity to decrease cumulative impacts to watershed, soil and aquatic conditions that may currently be occurring as a result of the forest's existing motorized route system and unrestricted cross-country travel. Alternative E poses the best opportunity of all alternatives for upward trends to occur in watershed indicators of water quality, water quantity, aquatic habitat, aquatic biota, riparian/wetland condition, roads and trails, soils, and terrestrial invasive species. However, these upward trends are not expected to result in large enough improvement across a watershed within a 10-year period to change overall watershed condition classification.

Alternatives F and G

Alternatives F and G show similar reductions related to acres impacted by motorized routes and acres open to motorized dispersed recreation, behind alternatives E and D. These two alternatives differ only in acres related to motorized big game retrieval, where alternative G compares to alternative D, with this activity limited to the 300-foot motorized dispersed camping corridor. Alternative F provides for a one-half-mile corridor for this activity which results in a 38 percent reduction of acres compared to alternative B – no action. Although there may be some upward trends to the attributes as described in the above section, implementation of either alternative F or G is not expected to change the overall watershed condition classification in any watershed. Improvements expected in these two alternatives would be less than those expected in alternatives E or D.

Summary

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

Existing forest 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 earlier, 28 stream reaches are currently not attaining State Water Quality Standards. With many roads across the forest lacking

adequate drainage features, roads have been identified by the State as being one probable source of impairment for some of these streams. 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 likely be reduced slightly by project but still remains 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. Permitted livestock numbers that graze on the forest have decreased 28 percent in the last three decades. 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. There are several localized areas across the forest 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 permits, vegetation management projects, watershed and road/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. This neighboring forest shares several 6th-code watersheds with the Gila National Forest, and improvements on its adjacent forest lands would have beneficial cumulative impacts, watershed-wide.

Existing watershed, soil and aquatic conditions were used to determine current watershed condition classification (alternative B – existing watershed condition) which can be viewed as a collective assessment of all prior activities, both natural and human caused, that have cumulatively impacted watershed, soil, and aquatic resources. Careful planning should occur in watersheds that are Functioning at Risk or Impaired to ensure that future projects are spread out over space and time. Some programs and activities, Forestwide, may continue to have localized, short-term, adverse effects to watershed, soil, and aquatic 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.

None of the action alternatives address decommissioning; all scars from nonmotorized routes would remain, with the addition of a few routes to the system (i.e., converting of decommissioned routes to motorized route or trail). For the majority of motorized routes in the uplands, the changing of designation of a route 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 route 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. However, motorized route densities decrease in each of the action alternatives providing for reduced motorized use related to those routes that are nonmotorized.

In comparison to alternative B – no action, all alternatives provide for a net decrease in adverse cumulative watershed impacts by reducing acres related to motorized routes and limiting acreage available for cross-country travel. Closing of routes provides for the greatest benefit to aquatic, 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 (with localized exceptions).

Implementation of alternative E provides the most reduction of adverse cumulative impacts to watershed, soil, and aquatic resources forestwide by eliminating motorized cross-country travel and reducing the most miles of motorized routes and acres of motorized cross-country travel. 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 recreation corridors, similar to alternative D, while alternative F provides for cross-country travel within a one-half-mile corridor. Alternative C, while slightly reducing acres related to 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 aquatic resources, soil resources, riparian and wetland resources, and water quality or quantity would be expected with implementation of any of the action alternatives.

Effects of Forest Plan Amendments

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the Travel Management.

Aquatic Species and Habitat

This section summarizes the aquatics specialist report (USDA Forest Service 2013e).

Affected Environment

The Gila National Forest is situated within four river basins, the Gila-San Francisco, Mimbres, Little Colorado, and Rio Grande. Among them, species diversity, richness, and endemism are variable and depend, in part, on geologic history, relative proximity to more mesic and species-rich regions, climatic factors, and relative size and complexity of each drainage (Propst 1999). The Gila National Forest has three manmade lakes completely or partially on NFS lands and hundreds of miles of streams within 180 6th-code watersheds.

Aquatic features found on the Gila National Forest include both lotic (moving water) and lentic (still water) systems. There are over 1,700 miles of perennial and intermittent stream habitat that occur in watersheds of the Gila National Forest within the project area. These streams contain a variety of aquatic species (see table 51 for federally listed species and table 52 for Region 3 sensitive species), most significant of which are those native resident species that are key for aquatic habitat management. These species' designations as endangered, threatened, sensitive and/or as management indicator species (MIS) emphasize the need for not only conservation, but also recovery efforts as part of interagency management programs throughout the project area.

Table 51. Federally listed threatened or endangered species occurring on the Gila National Forest

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

Table 52. Gila National Forest, Southwestern Region sensitive aquatic species effects determinations by alternative

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

Species	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Effects Summary
Rio Grande cutthroat trout		NI	NI	NI	NI	NI	Currently there are no populations of Rio Grande cutthroat trout (RGCT) on the Gila National Forest. Animas Creek, in the Black Range Mountains, is the only known historical occurrence of the species on the forest. Suitable habitat in Animas Creek is located partially within the Aldo Leopold Wilderness and partially outside of wilderness. There is a motorized route, originating on private property, along Animas Creek. The current forest roads database indicates the status of this route as open. However, the route originates on private property and public access is not available. The route is for all purposes an administrative and private use route. All action alternatives include approximately 3 miles of road within 300 feet of Animas Creek and 16 stream crossings presenting the same level of relative risk to RGCT habitat as the no action alternative. Because currently there are no RGCT within the action area all alternatives will have no impact on the species. Relative risks to habitat will be reduced in all action alternatives due to the motorized route that exists in the one stream on the Forest changing status from motorized for all users to motorized for administrative and/or by written permit. This status change will reduce the potential use levels on the route. For the above-mentioned reasons the RGCT will not be impacted by any of the alternatives and suitable habitat will be maintained at current levels. Native trout are identified as Gila National Forest management indicator species (MIS). Rio Grande cutthroat trout are believed to have historically occurred in the Animas Creek drainage on the forest. The trout currently occupying this drainage are hybridized. Genetic studies confirm that the *O. c. virginalis* population in Holden Prong (Animas Creek Drainage) contains substantial amounts of nonnative genetic material (Pritchard et al. 2007; NMDGF 2008). Since there are currently no RGCT located within the forest, the determination will be no impact on the trend for the species.
Headwater chub		MI	MI	MI	MI	MI	All alternatives may impact this species, but will not result in loss of species viability or create significant trends toward Federal listing. Populations of headwater chub are found in four separate drainage basins that are isolated from one another (the Verde River, Tonto Creek, San Carlos River, and upper Gila River). Alternatives B, C, F, and G include the same miles of motorized routes within 300 feet of headwater chub habitat (3.30 miles). However, alternatives C, F, and G reduce the use on about one mile of motorized

Species	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Effects Summary
							route by designating the route as open for administrative use and/or with written permission, thus reducing the relative risk to headwater chub. Alternatives D and E include slightly less miles of road within 300 feet of headwater chub habitat (3.23 miles) and provide for further reduced use on slightly more miles of routes. Alternatives D and E have the lowest relative risk to the species. All alternatives include the same number of stream crossings in headwater chub habitat (8 stream crossings). Alternatives D and E are the same and present the lowest relative risk due to most of the stream crossings being open only for administrative use and subsequent reduced use.
Roundtail chub		MI	MI	MI	MI	MI	All alternatives may impact this species, but will not result in loss of species viability or create significant trends toward Federal listing. In New Mexico, the roundtail chub is extirpated from the San Francisco River drainage and very rare in the Gila River drainage. Alternative B includes the most miles of motorized routes that are open to all users and presents the highest relative risk to roundtail chub. Alternative C includes 0.32 mile less of motorized route and presents a slightly lower relative risk than alternative B due to reduced use on 0.58 mile of road. Alternatives D, E, F, and G are the same and present the lowest level of relative risk due to a reduction in miles of motorized routes within 300 feet of roundtail chub habitat. Alternative B includes the highest number of stream crossings in roundtail chub habitat. All of the action alternatives include the same number of stream crossings and reduce the number of crossing when compared to alternative B. All of the action alternatives reduce the relative risk to roundtail chub occupied habitat due to reduced use of roads that are only open for administrative use and the reduction of two stream crossings.
Gila springsnail New Mexico hot springsnail		NI	NI	NI	NI	NI	All action alternatives propose no motorized routes within 300 feet of known Gila and New Mexico hot springsnail locations. Alternative B presents some level of relative risk to the Gila springsnail due to 0.05 mile of motorized route being located within 300 feet of a known occupied site. All action alternatives would have no impact on the Gila and New Mexico hot springsnails. Alternative B may impact the Gila Springsnail, but will not result in loss of species viability or create significant trends toward Federal listing and would have no impact on the Gila springsnail.
Longfin dace Sonora sucker Desert sucker		MI	MI	MI	MI	MI	Longfin dace, Sonora, and desert sucker are widespread species in the Gila-San Francisco River basin on the Gila National Forest. Longfin dace also occur, as nonnative invasives, in the Rio Grande and Mimbres

Species	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Effects Summary
Rio Grande sucker							Drainage basins on the Forest. Rio Grande sucker is wide spread in the Rio Grande and Mimbres Drainage basins on the Forest. Rio Grande sucker also occurs, as a nonnative, in the Upper San Francisco River drainage and several streams in the Gila River drainage. Alternative E presents the lowest level of relative risk to these species due to including the fewest stream crossing, the fewest miles of motorized routes and the most miles of open routes that open only by written permission or for administrative use. Alternative D is similar to alternative E but presents a slightly increased level of risk to these species due to more stream crossings and fewer miles of motorized routes that will be nonmotorized. Alternative B presents the highest level of relative risk to these species due to having the highest number of stream crossings and the highest level of use on NFS motorized routes (i.e., all motorized routes are open to all users). Alternative C is similar to alternative B with a slightly lower level of risk due to reduced use on routes that will be nonmotorized and open only by written permission and/or for administrative use. Alternatives F and G are similar and present a level of relative risk that is less than alternatives B and C but higher than alternatives D and E. Alternative G presents a slightly lower level of relative risk than alternative F due to fewer stream crossings and fewer miles of motorized routes. All of the action alternatives reduce the miles of motorized routes, the number of stream crossings, and the level of motorized use when compared to the existing condition. All alternatives may impact these species, but will not result in loss of species viability or create significant trends toward Federal listing.
Rio Grande chub		MI	MI	MI	MI	MI	The Rio Grande chub currently or recently occupied several streams on the Gila National Forest. Current distribution is limited to Animas Creek downstream of the Forest and possibly South Fork Palomas and North Fork Seco creeks, on private property. All of the alternatives include the same number of miles of motorized route and stream crossings. Alternative B presents the highest level of relative risk to the species because all of the routes are open to all users and use will be higher. All of the action alternatives reduce the relative risk to Rio Grande Chub due to decreased use on routes that are designated as administrative and/or use by written permit only and the subsequent reduction in use of stream crossings associated with these roads. All alternatives may impact the species, but will not result in loss of species viability or create significant trends toward Federal listing.
Black Range Mountainsnails		MI (for all	MI (for all	MI (for all	MI (for all	MI (for all	All of the action alternatives reduce the relative risk to these species by eliminating cross-country travel, reducing or eliminate off-road use

Species	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Effects Summary
Oreohelix swopei *O. metcalfei acutidiscus* *O. metcalfei metcalfei* *O. pilsbryi* *O. metcalfei concentric* Bearded Mountainsnail *O. barbata* Subalpine Mountainsnail *O. subrudis* Whitewater Woodlandsnail *Ashmunella danielsi* Silver Creek Woodlandsnail *A. binneyi* Iron Creek Woodlandsnail *A. mendex* Dry Creek Woodlandsnails *A. tetradon inermis* *A. tetradon mutator* *A. tetradon tetradon* *A. tetradon*		species)	species)	species)	species)	species)	associated with motorized big game retrieval (MBGR) and motorized dispersed camping, reducing the miles of routes open for motorized use, and reducing use on some routes. Alternative E presents the lowest relative risk to these species by completely eliminating cross-country travel including for MBGR and motorized dispersed camping: and reduces the miles of open routes and motorized use the greatest. Alternative B presents the greatest relative risk by allowing cross-country travel, MBGR, and motorized dispersed camping across the entire forest, excluding wilderness, RNAs, and ORV areas, and having the most miles of open motorized routes. Alternative F and G present similar levels of relative risk with alternative G having a slightly reduced level over alternative F due to slightly fewer miles of motorized routes, reduced areas available for MBGR and motorized dispersed camping. Alternative D presents a level of relative risk that is higher than alternative E but substantially less than alternatives B,C,F and G. All alternatives may impact these species, but will not result in loss of species viability or create trends toward Federal listing.

Species	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Effects Summary
animorum Black Range Woodlandsnails *A. cockerelli cockerelli* *A. cockerilli argenticola* *A. cockerelli perobtusa*							

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 2013e) 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.
- Research has concluded that sediment from roads can result in adverse effects to streams and aquatic habitats (Dissmeyer 2000; Gucinski et al. 2001).
- 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.
- Habitat is being affected to some degree by cross-country motorized travel. Where motorized use is prohibited, riparian habitats will improve over the long term due to passive restoration and revegetation.

Because of the limitation posed by the assumptions described above, the analysis provided here is a relative risk assessment of each of the action alternatives compared to the no action alternative.

Environmental Consequences

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 approximately 302 miles of Gila National Forest motorized routes within 300 feet of streams and rivers and 8,847 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, water quality issues, and to a lesser degree, collection (includes fishing and hunting). The no action alternative includes the most miles of routes within 300 feet of streams including impaired waters, the highest number of motorized crossings on streams including impaired streams, and the highest density of motorized routes that will continue to have use on them. The risk of direct effects to stream banks, riparian habitat, and aquatic species at motorized stream crossings is the highest in this alternative. The risk of indirect effects from sediment movement, creation of drainage pathways, which channel water directly into streams instead of allowing runoff to be dispersed, is highest in this alternative. Stream crossings

on perennial and intermittent streams and rivers consist of 928 low water crossings, 5 bridges, and 34 culverts. There are 7,880 crossings on ephemeral streams. The direct channel disturbances and stream bank damage, caused by these crossings, leads to indirect effects of increased bank erosion and stream sedimentation.

In the no action alternative, the forest (2,443,391 acres), excluding currently designated nonmotorized areas, 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 stream banks are often directly impacted when vehicles cross streams. The no action alternative presents the highest risk to aquatic habitat and species.

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 (i.e., 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). The reduction of riparian vegetation and widening of the channel at stream crossings can impact water temperature (Heede 1980; Beschta 1997; Poole and Berman 2001). Sediment can influence several characteristics or components (i.e., slope, width, streambed topography) of a stream system which in turn influence flow rate, thermal stratification, and convective heat exchange (Poole and Berman 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 of 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 three-fold 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 (2000) 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. Total taxa richness of aquatic insect larvae (mayflies, stoneflies, and caddisflies) were negatively related to the number of stream crossings."
- "Several studies at broad scales document aquatic habitat or fish density changes associated with road density or indices of road density." In general, negative impacts to habitat and species increase with increasing 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 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). Large woody debris has been well studied in coastal forests of the Pacific Northwest

(Richmond and Fausch, 1995) and eastern warmwater streams (Angemeier and Karr 1984). However, little is known of its role in Rocky Mountain streams (Richmond and Fausch, 1995) and its importance to desert streams of the southwest has only been suggested (Minckley and Rinne 1985 in Rinne 1988; Rinne 1996). Road construction along streams inevitably includes the removal of trees and persistence of roads within riparian areas along streams may reduce the availability of large woody debris. Ephemeral streams indirectly support fish populations by helping to deliver required nutrients and other materials to the perennial segments (Levick et al. 2008). Roads not only impact perennial and intermittent streams where aquatic species are present but influence these habitats where they are located along or cross ephemeral channels in a watershed.

Common direct and indirect effects occurring in all alternatives include:

- The direct and indirect physical loss of riparian habitat and functions within the 100-year floodplain, as a result of motorized 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 floodplain, during periods of flooding.
- The indirect conversion of dispersed surface run-off and sediment filtering throughout the riparian area, to direct deliveries of accumulated runoff and sediment, following route tread pathways, leading from both the intercepted adjacent watershed areas, as well as channelized run-off 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 stream bank 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

Routes 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 away from roads can exceed 300 feet (Burroughs and King 1989). Road-stream crossings are addressed separately. Table 53 displays the total miles of 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 53. Miles of NFS motorized routes within 300 feet of perennial, intermittent, and ephemeral streams and rivers

Motorized Routes	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 less than 50 inches	4	14	7	0.32	14	14
Miles of NFS administrative motorized trail less than 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 alternatives C, F, and 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 six fewer miles of motorized route than alternative F. Alternative B does not include any administrative routes so all routes are open to all users. All of the action alternatives include changing the designated use from open to all users to administrative use only. Roads that are designated as administrative routes will have reduced use and risks to aquatic resources will be reduced due to this decreased use.

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). Numbers 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 are proposed to be 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 data sets were used for each alternative and actual crossing locations have been collected for most roads. Table 54 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 54. Number of NFS road crossings on perennial, intermittent, and ephemeral streams by crossing type

Crossing type	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	918	628	355	232	515	498
Low water administrative road	0	166	215	204	193	193
Low water motorized trail less than 50 inches	10	46	14	11	55	55
Low water administrative motorized trail less than 50 inches	0	4	10	10	4	4
Bridge	5	5	5	5	5	5
Culvert	34	33	32	27	33	33
Total Number of Intermittent and Perennial Crossings	**967**	**882**	**631**	**489**	**805**	**788**
Total Number of Ephermeral Crossings	**7,880**	**8,206**	**5,895**	**4,482**	**6,711**	**6,636**
Change in number of stream crossings expressed as a percent (+ or –) of the no action alternative: Perennial and intermittent stream		-9%	-35%	-49%	-17%	-19%
Change in number of stream crossings expressed as a percent (+ or –) of the no action alternative: Ephemeral stream		+4%	-25%	-43%	-15%	-16%

Alternative B, the no action alternative, has the greatest number of stream crossings on perennial and intermittent streams, followed by alternatives C, F, and G, respectively. Compared to alternative B, alternative C would add 326 crossings on ephemeral streams. Increasing the number of crossings would increase the risk to aquatic resources. When compared to alternative B, alternatives E and D reduce crossings by 49 percent and 35 percent on perennial and intermittent streams, and 43 percent and 25 percent on ephemeral streams, 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 route 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 17 fewer crossings on perennial and intermittent streams, and 75 fewer crossings on ephemeral streams than alternative F.

Impaired Water Quality Streams

The miles of routes within 300 feet of listed streams decreases in all alternatives when compared to alternative B (table 55). Alternatives D and E present the lowest relative risk to aquatic resources of all alternatives. Alternatives F and G are essentially the same and present a slightly greater relative risk to aquatic resources related to these streams than alternatives D and E. The relative risk to aquatic resources is lowest in alternatives D and E which are similar, however, the differences are likely not detectable. Alternative B presents the highest level of relative risk to aquatic resources associated with these impaired streams. The relative risk to aquatic resources

presented in alternative C is slightly less than alternative B, but considerably higher than the other action alternatives. Routes that are designated as administrative will present, to some degree, less relative risk to aquatic resources due to reduced use.

Table 55. Total miles of routes, by type, within 300 feet of impaired streams with off-road vehicles or highway/road/bridge runoff listed as probable source of impairment, by alternative

Crossing type	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Motorized	27.53	22.73	15.39	14.95	17.05	17.03
Administrative	0	3.41	4.21	5.05	4.49	4.49
Seasonal	0	0	0.05	0	0	0
Total	**27.53**	**26.14**	**19.65**	**20**	**21.54**	**21.52**

The number of stream crossings on listed streams decrease in all alternatives when compared to alternative B (table 56). Alternatives D and E present the lowest relative risk to aquatic resources of all alternatives. Alternatives F and G each include the same number of stream crossings and include two more crossings than alternatives D and E. The relative risk to aquatic resources by alternatives D, E, F, and G are similar and the differences are likely not detectable. Alternative B presents the highest level of relative risk to aquatic resources associated with these impaired streams. The relative risk to aquatic resources presented in alternative C is slightly less than alternative B, but considerably higher than the other action alternatives.

Table 56. Total number of stream crossing, by type, on impaired streams with off-road vehicles or highway/road/bridge runoff listed as probable source of impairment, by alternative

Crossing Type	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized	36	21	8	8	10	10
Bridge	3	3	3	3	3	3
Culvert	2	2	2	2	2	2
Low water administrative	0	13	17	17	15	15
Ephemeral	43	39	30	30	32	32
Total	**84**	**78**	**60**	**60**	**62**	**62**

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 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 land and resource management plans, and in that analysis, the route density for each national forest was compared to this recommendation. Table 57 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 over time naturally decommission as vegetation establishes on them.

Table 57. Miles and density of NFS routes for each alternative

NFS Route Measurements	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of NFS routes*	5,114	5,296	5,191	5,109	5,216	5,215
Density of NFS routes* (miles per square mile)	0.75	0.78	0.76	0.75	0.77	0.77

*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. Direct effects to stream banks and aquatic organisms will be eliminated where closed routes cross streams. Direct effects to aquatic organisms will also be reduced at stream crossings where use is reduced by designating a route as administrative. Table 58 displays the miles of routes that will be nonmotorized or designated as administrative for each of the alternatives.

Table 58. Miles of NFS routes with no or reduced use

NFS Routes	Alt. B Miles	Alt. C Miles	Alt. D Miles	Alt. E Miles	Alt. F Miles	Alt. G Miles
Routes proposed to be nonmotorized[1]	0	177	1,440	2,422	990	1,016
Routes proposed to be administrative routes[2]	0	212	382	439	328	327
Routes with no or reduced use	0	389	1,822	2,861	1.318	1,343

[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 maintain the existing route system and no administrative routes are proposed, this alternative 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 considerably more than 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-road vehicle restricted (ORV) 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 59 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 59. Miles of perennial and intermittent streams within motorized dispersed camping corridors

Measurements of stream within motorized camping corridors	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of stream within motorized camping corridors	886*	63	32	0	50	42
Change in miles of stream within motorized camping corridors		-823	-54	-886	-836	-844

*Includes all miles of perennial and intermittent streams that are not located within wilderness, RNAs, ORVs 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 ORVs, 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 60 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 60. Miles of perennial and intermittent stream within areas available for motorized big game retrieval

Streams 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	886	688	65	0	476	42
Change in miles of stream in areas available for motorized big game retrieval		-198	-854	-886	-410	-844

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 E 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 36 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 36 of the areas and the ATV area. 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 ORV 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 and Designated Critical Habitat

Within the project area, there are five U.S. Fish and Wildlife Service listed aquatic species and designated critical habitat (table 51).

Loach Minnow (Threatened)

In New Mexico, the loach minnow historically occupied about 330 stream kilometers (205 miles); now it is found in about 258 stream kilometers (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 is declining range wide. During the last century—both the distribution and abundance of the loach minnow have 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 (Propst et al. 1986; USFWS 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 61 displays the miles of NFS motorized routes within 300 feet of loach minnow critical habitat for each alternative.

Table 61. Miles of NFS motorized routes within 300 feet of loach minnow designated critical habitat

Motorized routes	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of motorized road	26	15	5	5	13	6
Miles of administrative road	0	10	12	12	12	12
Motorized trail less than 50 inches	2	2	1	0	1	1
Total miles of motorized routes	28	27	18	17	26	19
Change in number of miles of motorized routes expressed as a percent (+ or -) of the no action alternative		-3%	-36%	-39%	-7%	-32%

Alternative B and C have the greatest length of motorized routes within 300 feet of loach minnow critical habitat, followed by alternative F, and alternative 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 36 percent and 32 percent, respectively. Alternative E has the fewest miles of motorized routes within 300 feet of critical habitat 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.

Motorized routes create direct and indirect impact to streams, habitats, and aquatic species at route crossing points. Motorized route crossings can: (a) indirectly decrease fish egg hatching success and subsequent fish populations due to sedimentation; (b) directly dislocate fish spawning activity within ford crossings, depending on fish species and spawning suitability of stream substrate and flows; and (c) cause direct disturbances including streambank damage, leading to indirect effects of increased bank erosion and stream sedimentation. Table 62 displays the number of motorized route crossings within designated critical habitat for the loach minnow.

Table 62. Number of stream crossings in loach minnow designated critical habitat

Type of stream crossing	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	82	44	5	5	41	8
Low water administrative road	0	33	41	41	39	39
Low water motorized trail less than 50 inches	4	7	4	4	4	4
Bridge	1	1	1	1	1	1
Culvert	2	2	2	2	2	2
Total number of crossings	89	87	53	53	87	54
Change in number of stream crossings expressed as a percent (+ or –) of the no action alternative		-2%	-40%	-40%	-2%	-39%

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, D, and G reduce stream and river crossings by 40 percent and 39 percent respectively, and present the lowest relative risk to aquatic species and habitat related to the impacts from NFS motorized route 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 three more route crossings in loach minnow critical habitat that are motorized to all users and vehicle types. Where route crossings are closed direct effects to stream bank stability, riparian vegetation, and water quality will be eliminated or reduced. Where routes are designated for administrative purposes, as opposed to open to all motorized use, direct effects will be reduced at stream crossing as a result of reduces use of the route. Over time, riparian vegetation and stream bank stability would improve at stream crossings that are nonmotorized.

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, 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, USFWS 1986). By 2000, its range was estimated at only about 10 to 15 percent of the historical range and the status of the species within occupied areas ranged from common to very rare (USFWS 2000). Recent taxonomic and genetic work on spikedace, indicate there are substantial differences in morphology and genetic composition among remnant spikedace populations.

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 63 displays the miles of NFS motorized routes within 300 feet of spikedace critical habitat for each alternative.

Table 63. Miles of NFS motorized routes within 300 feet of spikedace designated critical habitat

Motorized routes	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of motorized road	24	13	4	3	12	5
Miles of administrative road	0	10	12	12	11	11
Motorized trail less than 50 inches	2	3	2	2	2	2
Total miles of motorized routes	26	26	18	17	25	18
Change in number of miles of motorized routes expressed as a percent (+ or -) of the no action alternative		0%	-31%	-35%	-4%	-31%

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. Alternatives D and G are similar with alternative D having a slightly lower relative risk due to one additional mile of road being designated for administrative use. Alternative E presents the lowest relative risk to spikedace and designated critical habitat. Where routes are nonmotorized effects to riparian vegetation, sediment movement, and water quality will improve over time. Where routes are designated for administrative purposes the use of the route will decrease and some improvement in water quality may be realized.

Motorized routes create direct and indirect impact to streams, habitats, and aquatic species at route crossing points. Motorized route crossing can indirectly decrease fish egg hatching success and subsequent fish populations due to sedimentation, can directly dislocate fish spawning activity within ford crossings, depending on fish species and spawning suitability of stream substrate and flows, and cause direct disturbances including stream bank damage, leading to indirect effects of increased bank erosion and stream sedimentation. Table 64 displays the number of motorized route crossings within designated critical habitat for the spikedace.

Table 64. Number of stream crossings in spikedace designated critical habitat

Type of stream crossing	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	79	42	4	4	39	6
Low water administrative road	0	32	40	40	38	38
Low water motorized trail less than 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	85	80	46	46	80	47
Change in number of stream crossing expressed as a percent (+ or –) of the no action alternative		-6%	-46%	-46%	-6%	-45%

Alternatives B, C, and F have the greatest number of stream crossings within spikedace critical habitat. All of the action alternatives decrease the number of stream crossings within critical habitat for the spikedace. Alternatives D, E, and G are similar with alternatives D and E having a slightly lower relative risk due to two additional miles of road being designated for administrative use. Alternatives D and E present the lowest relative risk to spikedace and designated critical habitat. Where route crossings are closed, direct effects to stream bank stability, riparian vegetation, and water quality will be eliminated or reduced. Where routes are designated for administrative purposes, as opposed to open to all motorized use, direct effects will be reduced at stream crossings as a result of reduced use of the route. Over time, riparian vegetation and stream bank stability would improve at stream crossings that are nonmotorized.

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 (Minckley 1973, 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. The current status of the Gila chub is poor and declining. 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 65 displays the miles of NFS motorized routes within 300 feet of Gila chub critical habitat for each alternative.

Table 65. Miles of NFS motorized routes within 300 feet of Gila chub designated critical habitat

Motorized routes	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of motorized road	3	3	2	2	2	2
Miles of administrative road	0	0	0.01	0.01	0.01	0.01
Motorized trail less than 50 inches	0	0	0	0	0	0
Total miles of motorized routes	3	3	2	2	2	2
Change in number of miles of motorized routes expressed as a percent (+ or -) of the no action alternative		0%	-33%	-33%	-33%	-33%

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

Motorized routes create direct and indirect impact to streams, habitats, and aquatic species at route crossing points. Motorized route crossing can indirectly decrease fish egg hatching success and subsequent fish populations due to sedimentation, can directly dislocate fish spawning activity within ford crossings, depending on fish species and spawning suitability of stream substrate and flows, and cause direct disturbances including stream bank damage, leading to indirect effects of increased bank erosion and stream sedimentation. Table 66 displays the number of motorized route crossings within designated critical habitat for the Gila chub.

Table 66. Number of stream crossings in Gila chub designated critical habitat

Stream crossings	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	4	4	3	2	3	3
Low water administrative road	0	0	0	0	0	0
Low water motorized trail less than 50 inches	0	0	0	0	0	0
Total number of crossings	4	4	3	2	3	3
Change in number of stream crossing expressed as a percent (+ or –) of the no action alternative		0%	-25%	-50%	-25%	-25%

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. Alternatives B and C include the greatest number of crossings and present 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. Where route crossings are closed, direct effects to stream bank stability, riparian vegetation, and water quality will be eliminated or reduced. Where routes are designated for administrative purposes, as opposed to open to all motorized use, direct effects will be reduced at stream crossings as a result of reduced use of the route. Over time, riparian vegetation and stream bank stability would improve at stream crossings that are nonmotorized.

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 kilometers (9.3 miles) 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.

Rangewide, populations appear to be decreasing, particularly in Mexico (Propst and Stefferud 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 warm water 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 (USFWS 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 67 displays the miles of NFS motorized routes within 300 feet of Chihuahua chub occupied habitat.

Table 67. Miles of NFS motorized routes within 300 feet of occupied Chihuahua chub habitat

Motorized routes	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 less than 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%

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.

Motorized routes create direct and indirect impact to streams, habitats, and aquatic species at route crossing points. Motorized route crossing can indirectly decrease fish egg hatching success and subsequent fish populations due to sedimentation, can directly dislocate fish spawning activity within ford crossings, depending on fish species and spawning suitability of stream substrate and flows, and cause direct disturbances including stream bank damage, leading to indirect effects of increased bank erosion and stream sedimentation. Table 68 displays the number of motorized route crossings within occupied Chihuahua chub habitat.

Table 68. Number of NFS route stream crossings in occupied Chihuahua chub habitat

Stream crossings	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	15	0	0	0	0	0
Low water administrative road	0	0	0	0	0	0
Total number of crossings	15	0	0	0	0	0
Change in number of stream crossings expressed as a percent (+ or –) of the no action alternative		-100%	-100%	-100%	-100%	-100%

Alternative B includes the highest number of stream crossing in occupied Chihuahua chub habitat and therefore presents the greatest relative risk to the species. All of the action alternatives eliminate all stream crossings in occupied habitat. Where route crossings are closed, direct effects to stream bank stability, riparian vegetation, and water quality will be eliminated or reduced.

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 (USFWS 2003). The Arizona populations were believed to be extirpated around the turn of the 20th century (USFWS 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). 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 (USFWS 1993). In 1992, a relict population in Whiskey Creek was discovered and, in 2013, fish from Iron Creek were determined to be pure Gila trout, constituting a 5th lineage. There are now five relict lineages: Main Diamond, South Diamond, Spruce Creek, Whiskey Creek, and Iron 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 (USFWS 2003) and approximately 62 miles (100 kilometers) of stream were occupied in June 2000 (USFWS 2003).

Major threats to this species include habitat alterations, competition, hybridization, and predation by non-indigenous 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 run-off and sediment filtering throughout the riparian area, to direct deliveries of accumulated runoff and sediment. Table 69 displays the miles of NFS motorized routes within 300 feet of occupied Gila trout habitat.

Table 69. Miles of NFS motorized routes within 300 feet of occupied Gila trout habitat

Motorized routes	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Miles of motorized road	0.89	1.07	1.07	1.0	1.07	1.07
Miles of administrative road	0	0.22	0.22	0.22	0.22	0.22
Motorized trail less than 50 inches	0	0	0	0	0	0
*Private road currently open to all motorized use converted to adminstrative system road	0.40	0	0	0	0	0
Total miles of motorized routes	1.29	1.29	1.29	1.22	1.29	1.29
Change in number of miles of motorized routes expressed as a percent (+ or -) of the no action alternative		0%	0%	+27%	0%	0%

*Existing road WR1 that accesses private property in Black Canyon. Proposed as an administrative route.

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 0.22 mile of route proposed as administrative. These alternatives present a slightly higher relative risk than alternative E.

Motorized routes create direct and indirect impact to streams, habitats, and aquatic species at route crossing points. Motorized route crossing can indirectly decrease fish egg hatching success and subsequent fish populations due to sedimentation, can directly dislocate fish spawning activity within ford crossings, depending on fish species and spawning suitability of stream substrate and flows, and cause direct disturbances including stream bank damage, leading to indirect effects of increased bank erosion and stream sedimentation. Table 70 displays the number of motorized route crossings within occupied Gila trout habitat.

Table 70. Number of stream crossings in occupied Gila trout habitat

Stream crossings	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Low water motorized road	1	1	1	1	1	1
Low water administrative road	0	1	1	1	1	1
Low water motorized trail less than 50 inches	0	0	0	0	0	0
Bridge	1	1	1	1	1	1
Culvert	0	0	0	0	0	0
*Private road currently open to all motorized use converted to adminstrative system road	1	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%

*Existing road WR1 that accesses private property in Black Canyon. The stream crossing is located on section of road that will be designated as an administrative route.

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 use only thus reducing use. Alternative B presents the highest relative risk to Gila trout as both low water crossings on Black Canyon along motorized routes open to all use.

Native trout are identified as Gila National Forest management indicator species. One stream, Black Canyon, occupied by Gila trout has three motorized routes within 300 feet of it 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. Alternative B presents the greatest relative risk to Gila trout due to all routes within 300 feet of the stream and all stream crossings being open to motorized use by the public. Alternatives C, D, F, and G reduce use on some of these routes and crossings by designating them as open to administrative use only to provide access to private property. Only alternative E reduces the length of motorized route within 300 feet of the stream. One stream crossing along this portion of the route would also see reduced use as a result of this designation. The relative risk, to Gila trout, from motorized routes would be slightly reduced in all action alternatives. Gila trout population trends will not be affected by any of the action alternatives.

Endangered Species Act, Section 7 Consultation Effects Determinations

Table 71displays 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.

Table 71. 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 (USDA Forest Service 2005)). 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 52 more details may be found in the aquatic specialist report (USDA Forest Service 2013e).

Gila National Forest Management Indicator Species

Gila trout and Rio Grande cutthroat trout are identified as Gila National Forest management indicator species. Refer to the previous sections:

- Gila trout see 'Threatened and Endangered Species' (page 251)
- Rio Grande cutthroat trout see 'Southwestern Region Sensitive Aquatic Species' (page 229)

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, the highest number of stream crossings, and motorized cross-country travel is permitted.
- 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, alternative C would be expected to present the greatest relative risk of adversely affecting aquatic habitats and aquatic-species of the action alternatives. 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 NFS 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 travel. 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 aquatic species of all action 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 route by proposing the most miles of routes that would only be available for use by written permit and/or for administrative uses.

- 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 then 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. Alternative 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

This is a general discussion of cumulative effects for aquatic resources on the Gila National Forest. The reader is directed to the 6th Code Watershed, Soils, and Aquatic Resources Cumulative Effects Report (USDA Forest Service, 2013f) for a detailed analysis of cumulative effects.

The report is divided into the following three sections: (1) past, present, and reasonably foreseeable activities within the 6th-code watersheds on the Gila National Forest; (2) the watershed condition classification rating for the 6th-code watersheds; and (3) the cumulative impacts to watershed, soil and aquatic conditions that are expected with implementation of the alternatives associated with the project. This analysis is based on full implementation the alternative selected, and a project period of 10 years following the decision. Activities that are discussed are an accumulation of projects and activities that have occurred within the watershed over the past 1 to 25 years. These activities were considered in 2011 when the Gila National Forest conducted Watershed Condition Classification across the entire forest using the Watershed Condition Classfication Guide (USDA Forest Service 2011). Watershed condition ratings were calculated based on existing condition, which includes the cumulation of effects from activities and events that have occurred within the watersheds in the past up to present day. Thus, for this report, these activities and the subsequent watershed condition rating are considered to reflect cumulative impacts related to these activities and events that have already occurred.

The analysis considers the 180 6th-code watersheds that are completely or partially within the boundaries of the Gila National Forest. Land ownership within these watersheds also includes the Apache-Sitgreaves National Forests, Bureau of Land Management lands, state lands, and private lands. Watershed condition ratings included in this report are for NFS lands only. The rating does not reflect off-forest conditions.

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 affects to aquatic species and habitats. Activities considered include those directly and indirectly affecting aquatic habitat and species. For activities that directly and indirectly affect water quality, riparian vegetation, and watershed condition see the hydrology report (USDA Forest Service 2013f). 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, the introduction of nonnative species, and other factors.

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, projects to restore fish populations and aquatic habitat, modification of range management methods including exclusion of livestock from major drainages, improved availability of large woody debris as a result of improving riparian habitat, 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 is stable or improving (pers. obs. J. Monzingo 2012). Recovery actions, including habitat enhancement and efforts to repatriate species to streams, have improved the trend on the forest for aquatic species such as Gila trout, Gila chub, Chihuahua chub, and spikedace.

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, continued livestock exclusion from occupied and critical habitat for loach minnow and spikedace, continued livestock exclusion from Gila trout, Chihuahua chub, and Gila chub occupied habitats, vegetation management projects (mechanical thinning and prescribed fire), fuel wood gathering, road and trail improvement and maintenance, aquatic habitat improvement projects, identified recovery actions that include native fish restoration projects, and development of nonmotorized recreational opportunities.

Effects of Forest Plan Amendments

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the travel management.

Wildlife

This section summarizes the wildlife specialist report (USDA Forest Service 2013g).

Affected Environment

Major drainages on the Forest include the main-stem and headwaters of the Gila, San Francisco, and Mimbres rivers. The Forest also has drainages that flow into the Rio Grande from the Black Range Mountains. Drainages that flow out of the Black Range that support perennial flow include Animas, Seco, Palomas, Chloride, and Percha Creeks. The southwest side of the Black Range is drained by the headwaters and main-stem of the Mimbres River. Major tributaries to this river include McKnight Creek, and Iron Creek. Major tributaries within the Gila and San Francisco watersheds include the West, Middle, and East forks of the Gila River; Beaver, Taylor, Diamond, South Diamond, Black Canyon, Little, Sapillo, Turkey, Mogollon, Bear, Sycamores, Willow, Negrito, Tularosa, Centerfire creeks and Dry Blue River. Major variables that relate directly to the spatial distribution of riparian vegetation along these drainages are flooding, groundwater conditions, and various soil properties (particularly soil moisture). The flow regimes of the Gila, San Francisco, and Mimbres Rivers are primarily unrestricted by major impoundments or diversions; therefore, channel configurations are widely variable and the vegetation communities are represented by a diverse mosaic of many communities. Within these drainages there are tributaries and associated springs and seeps that support perennial and intermittent waters sources with associated riparian vegetation. Lakes on the Gila include Lake Roberts, Snow Lake, and Quemado Lake.

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 semi-desert zones at lower elevations include mesquite, yucca, cacti, desert ceanothus, beargrass, and black grama in the various communities. Riparian zones range from the alder-narrow leaf cottonwood zones in higher elevations to sycamore-walnut-boxelder and Fremont cottonwood zones at the lower elevations.

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 was collected in the field, forestwide.

In 2012, the Whitewater-Baldy Complex wildfire burned approximately 300,000 acres of high elevation spruce-fir, mixed conifer forest on the Glenwood, Reserve, and Wilderness Ranger Districts. This included a large portion of the western side of the Gila Wilderness. Following the fire, a mid-scale post fire change condition assessment update was completed in January 2013, reflecting changes to the vegetation types within the fire perimeter.

A Region 3 riparian vegetation mapping project (RMAP) was initiated in 2009 and was completed in 2011. RMAP used a combination of GIS, remote sensing, photo interpretation in

conjunction with high resolution infrared photography and other ancillary data sources to map riparian vegetation communities region wide at a scale of 1:12,000. An independent accuracy assessment was completed, based on a random sample of 258 map polygons; the overall area-weighted user accuracy was estimated at 81 percent.

Table 72 provides the most up-to-date vegetation types within the administrative boundary of the Gila National Forest used for this assessment.

Table 72. Primary vegetation types on the Gila National Forest

Vegetation type	NFS acres	Non-wilderness acres	Wilderness acres
Desert shrub/Grassland	26,067	25,382	685
Grass - Stand replacement and seeding	18,415	5,050	13,364
High riparian	4,310	1,795	2,515
Lake	243	243	0
Low riparian	9,283	8,306	977
Mid riparian	20,859	14,370	6,489
Mixed conifer	126,399	70,295	56,103
Piñon-juniper/Shrub oak woodland	1,602,637	1,213,660	388,977
Plains grassland/Mountain grassland	232,217	223,051	9,166
Ponderosa pine	1,163,459	897,986	265,473
Sparsely vegetated	5,600	3,748	1,852
Sparsely vegetated - Stand replacement	58,354	12,770	45,585
Spruce/Fir	898	0	898
Wet meadow/Wetland	1,710	1,595	116
Grand Total	**3,270,450**	**2,478,250**	**792,200**

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, Mexican gray wolf, and adjacent to the forest, the lesser-long nosed bat.

In January 1998, the U.S. Fish and Wildlife Service published the Final Rule that allowed for the establishment of a Non-essential Experimental Population of the Mexican gray wolf on the Apache-Sitgreaves National Forests in Arizona and the Gila National Forest (USFWS 1998). As part of the Mexican Gray Wolf Reintroduction Program, the wolf has been trans-located 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 enroute 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 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. Birds of the Gila National Forest 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.

The forest lacks data related to smaller isolated type habitats like springs, caves, cliffs, rock slides, and other unique features on our landscape.

Species Considered

Species analyzed in this report include those that occur 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 (USDA Forest Service 2005)).

3. Migratory bird species that may occur on the Gila National Forest.
4. Gila National Forest management indicator species as listed in the Gila National Forest Plan (1986).
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 the 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 and Threatened Species, and Species of Concern were reviewed to determine the federally listed species that would need to be considered in this evaluation.

Table 73 identifies the federally listed species, and respective designated critical habitat considered in this evaluation, and the species dropped from additional evaluation.

Table 73. Federally listed species (endangered, threatened, and experimental) for Catron, Grant, Hidalgo, and Sierra County, New Mexico*

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	
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 effect determination; see analysis.
Leptonycteris nivalis	Mexican long-nosed bat	Endangered	Hidalgo	No habitat or occurance records on the Gila. No effect determination.
Lithobates chiricahuensis	Chiricahua leopard frog	Threatened and Critical Habitat	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	

Scientific name	Common name	Status	County	Species dropped from additional analysis and rationale
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.

*Accessed U.S. Fish and Wildlife Service County List website December 17, 2012.

Regional Forester Sensitive and Federal candidates

The United States Fish and Wildlife Service Proposed Species, and Forest Service Sensitive Species List for Region 3 were reviewed to determine the species that would need to be considered in the evaluation of this project. Table 74 identifies the sensitive species considered for this evaluation, and the species dropped from additional evaluation.

Table 74. 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 high traffic volume on major highways is less than 0.6 percent (Russell et al. 2009). Along forest roads with lower speeds and significantly less volume of traffic there would be no adverse effects to cliff-dwelling bats. The 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 Mountain 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	

Scientific name	Common name	Status	Species dropped from additional analysis and rationale
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	
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	Sensitive/proposed	
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			
Anaxyrus microscaphus microscaphus	Southwestern (Arizona) toad	Sensitive	
Lithobates yavapaiensis	Lowland leopard frog	Sensitive	Extensive surveys for leopard frogs over the last 15 to 25 years have failed to document this species. No Impact

Scientific name	Common name	Status	Species dropped from additional analysis and rationale
Reptiles			
Thamnophis rufipunctatus	Narrow-headed gartersnake	Sensitive/proposed	
Thamnophis eques megalops	Mexican gartersnake	Sensitive/proposed	
Heloderma suspectum suspectum	Reticulate Gila monster	Sensitive	
Insects			
Erpetogomphus heterodon	Dashed ringtail	Sensitive	
Lachiania dencyannae	A May fly	Sensitive	
Speyeria nokomis nitocris	Mountain silverspot butterfly (Nitocris fritillary)	Sensitive	
Euhyparpax rosea	A Notodontid moth	Sensitive	

Migratory Bird Species

This 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 check list, New Mexico Partners in Flight, and the National Audubon Society. This information provides a guide to local project and landscape planning and analysis. The Forest Service MOU with the U.S. Fish and Wildlife Service identifies specific activities for bird conservation, pursuant to EO 13186 (2001) including striving to protect, restore, enhance, and manage habitat of migratory birds, and prevent the further loss or degradation of remaining habitats on NFS lands. This includes identifying management practices that impact populations of migratory bird species on NFS lands. The Gila used New Mexico Partners in Flight (NMPIF) information to identify high priority/focal species, by vegetation types on the forest. Table 75 identifies focal species considered in this analysis.

Table 75. 2007 New Mexico Partners in Flight high-priority migratory bird species by vegetation type

Habitat type	NMPIF high-priority species
Chihuahuan desert grassland	Scaled quail
Wet meadow and montane grassland	Wilson's phalarope and bobolink
Southwestern riparian woodland (low to moderate elevation riparian)	Common black hawk, common ground dove, southwestern willow flycatcher, Bell's vireo, Lucy's warbler, Abert's towhee, bank swallow, yellow-billed cuckoo, Lewis's woodpecker, red-headed woodpecker, and painted bunting
High-elevation (montane) riparian	Black swift, painted redstart, and veery
Emergent wetlands and lakes	American bittern, bald eagle, and snowy plover
Chihuahuan desert shrub	Crissal thrasher, painted bunting, and black-throated sparrow.
Montane shrub	Virginia's warbler, Lazuli bunting, gray vireo, black-chinned sparrow
Piñon – juniper woodland	Gray vireo, piñon jay, and juniper titmouse.
Ponderosa pine	Mexican spotted owl, flammulated owl, Virginia's warbler, Grace's warbler, pygmy nuthactch, Lewis's woodpecker, and red-faced warbler.
Mixed conifer	Mexican spotted owl, Williamson's sapsucker, red-faced warbler, and flammulated owl
Spruce-fir	Blue grouse
Cliff/cave/rock	Prairie falcon, peregrine falcon, and white-throated swift

Management Indicator Species

The 11 Gila National Forest management indicator species and their associated habitats as listed by the Gila National Forest Land and Resource Management Plan are considered in this analysis; the forest-level management indicator species analysis is incorporated by reference into this analysis (USDA Forest Service 2012). Table 76 identifies the 11 management indicator species species and their associated habitats.

Table 76. Species and the vegetation types for each management indicator species

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

Other Species Considered in this Analysis

The following species that occur on the Gila National Forest were identified through scoping have the potential to be impacted by the implementation of an alternative; and therefore, are considered for this evaluation:

- Rocky Mountain elk
- Mountain lion
- Merriam wild turkey
- Pronghorn
- Black bear

Analysis Process

Assumptions

- **Administrative Route:** have less use than routes open to the public.
- **Seasonal Resource Protection:** motorized routes excluded during the Mexican spotted owl nesting.
- **Motorized Cross-country Area Calculations:** include slopes and vegetated stands that limit motorized cross-country travel, game retrieval, and camping.
- **Motorized Cross-country Travel:** the evaluation of excluding this use does not include evaluating authorized permission provided by a Forest Service Official with this authority. So motorized dispersed camping and authorized motorized big game retrieval are not considered cross-country travel for this analysis, but as an authorized use so will be analyzed separately by alternative.
- **Closed Routes**: benefit wildlife.

Motorized Use Effects on Terrestrial Wildlife

For this analysis, motorized travel includes motorized travel on roads, motorized travel on trails (by off-highway vehicles OHVs), cross-country motorized travel (including motorized big game retrieval), and motorized dispersed camping. The degree of impacts to wildlife and their habitat is influenced by the mode of motorized travel, type of road (size and surfacing), the associated volume and speed of traffic, noise generated by the traffic, and the season of use by both animal and traffic (Forman and Alexander 1998, Trombulak and Frissell 2000, Wisdom et al. 2000).

For over 80 years, biologists have recognized roads as a 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 motorized recreation negatively effects the biotic integrity of both terrestrial and aquatic ecosystems (Trombulak and Frissell 2000). Strittholt and Dellasala (2001), indicate that wilderness areas and designated roadless areas both small and large within the Klamath-Siskiyou ecoregion have a high level of plant, vertebrate, and invertebrate occurrence records; making a compelling case for the potential role of roadless areas as refugia for native biodiversity. 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. Some vehicle impacts are direct, causing mortality; others are indirect, like disturbance by vibration, noise, light, human activity, damage to forage, cover, shade, and water supplies; or can be large scale disrupting ecological communities or causing

habitat fragmentation (Fullerton et al. 2008). Several scientific papers and literature reviews have been written on the effects of motorized roads on terrestrial wildlife species with an emphasis on wide-ranging carnivores and ungulates. More recently researchers have started to look at the effects of OHV (ATV and motorcycles). ATV use on public lands is increasing and these vehicles have been described as the multiplier of man in terms of their impacts to the environment in an area (Karasin 2003).

The general impacts of motorized roads and trails on wildlife species are described below (Trombulak and Frissell 2000):

- Mortality from collisions with vehicles.
- Modification of animal behavior (e.g., displacement and avoidance of roads by wildlife, human-caused disruption of breeding).
- Alteration of terrestrial habitat (e.g., edge creation and habitat fragmentation).
- Increased contact and exploitation by humans.

Mortality from collision with vehicles

Animal mortality or injury from collision with vehicles is well documented in the literature. Trombulak and Frissell (2000) reported that mortality from vehicle collisions included a wide array of wildlife including deer, bear, hawks, owls, songbirds, snakes, lizards, and amphibians. Road associated mortality generally increases as traffic volume and speed increases. For large mammals, unpaved forest roads pose less of a concern of mortality or injury from vehicle related collisions. However, amphibians may be especially vulnerable to road collision mortality because their life history involves movement between wetland and upland habitats, and amphibians are inconspicuous and sometimes slow-moving (Trombulak and Frissell 2000). Raptors are also vulnerable to collisions from forest roads and trails because they often forage along roads (Loos and Kerlinger 1993); however, most reports of raptor mortality are in association with highways. OHV activity has been documented to also cause direct mortality due to breakage of nest-supporting vegetation, collapsed burrows, inner ear bleeding, and vehicle-animal collisions (Long et al. 1999; Ouren et al. 2007).

Modification of animal behavior

The ability or willingness of an animal to cross a road type varies greatly by species (Brody and Pelton 1989; Lovallo and Anderson 1996). Improved gravel roads have been found to inhibit crossings by mountain lions (Van Dyke et al. 1986). Even infrequently traveled single lane routes as narrow as an OHV trail (less than 3.3 yards) have been documented to alter crossing/movement patterns of prairie voles and cotton rats (Swihart and Slade 1984). Thurber et al. (1994) examined the response of wolves to different road types and found that radio-collared wolves avoided oil field access roads open to public use but were attracted to a gated pipeline access road and secondary gravel roads with limited human use. His speculation was that these roads with low human activity provide easy travel corridors for wolves.

Noise, and other disturbances associated with motorized use have the potential to cause stress responses to a broad spectrum of wildlife. The effect of noise on wildlife varies among species and individuals. Noise can alter animal behavior, affect breeding, the ability for some species to detect predators, and it has been documented to cause animals to emerge from their underground burrows at inappropriate times (Bondello and Brattstrom 1979, Long et al. 1999, Ouren et al.

2007). Noise generated by OHVs has been found to cause inner ear bleeding in kangaroo rats, and hearing loss in this species and in sand lizards. Motorized noise may simulate natural sounds causing species like the spadefoot toad to emerge prematurely from its burrow, most likely because the sound mimicked thunder (Brattstrom and Bondello 1983). Noise created by certain types of OHVs can be as high as 110 decibels, a level that is near the threshold for human pain (Lovich and Bainbridge 1999). This level of noise is not the loudest anthropogenic sounds in wildlife habitat areas, but they do tend to be emitted more frequently than other high-intensity sounds (Brattstrom and Bondello 1983). One cannot assume that noise will always cause a negative effect; it has been documented that frogs can modify their calling patterns in response to acoustic interferences (Wong et al. 2009). Dufour (1980) reports that there are studies that document animals may become accustomed to continual noise, showing no reaction to this sound (habituation); however habituation to intermittent noise occurs less frequently. Occasional traffic down a two track road is an intermittent type of noise that in this author's observation often solicits a response from the different species encounter on these roads.

Studies show that wildlife, including birds, reptiles, and large ungulates, respond to disturbance with accelerated heart rates and metabolic function, and suffer from increased levels of stress (Dufour 1980, MacArthur et al. 1979, Weimerskirch et al. 2002). Observed and documented responses include head raising, body shifting, short distance movements, flapping of wings, and flight or escape behavior. These responses can lead to bodily injury, energy loss, and decreased food intake (Dufour 1980). Longer term responses include changes or shifts in home ranges, changes in movement patterns, and habitat avoidance and abandonment (Dufour 1980, Kasworm and Manley 1990, Jalkotzy et al. 1997, Gaines et al. 2003). These responses can lead to vulnerability to predators, starvation, and reproductive failure.

Alteration of terrestrial wildlife habitat

Forman and Alexander (1998) documented that road corridors cover approximately 1 percent of the United States, and that 10 percent of the road length is in national forest and one percent is interstate highway. Roads can have the direct impact of converting large areas of habitat into non-habitat. Motorized activity reduces plant cover and along many roads completely eliminates vegetation. Vehicle activity on and off roads cause soils to be compacted altering the potential for vegetation, affects soil water contents, surface water flow patterns of run-off and sedimentation, adds dust to the air, and can modify surface temperatures (Trombulak and Frisell 2000). Forest roads and trails create edges that have an influence on ecological conditions well beyond the extent of the road prism (Trombulak and Frissell 2000). The road or trail creates edge habitat for species that are habitat generalists, particularly for some mammal species (e.g., coyote and deer mice) and some songbird species. Ravens are more common along roads since carrion is more available along these corridors. For habitat specialists, such as interior dwelling species that require intact, undisturbed patches of habitat such as the American marten and the spotted owl, roads fragment habitat. Interior-forest birds breeding adjacent to roads and trails may receive higher nest predation by a variety of bird and mammal predators and some songbird species have shown to have increased brown-headed cowbird parasitism rates. Roads and trails fragment or disrupt habitat by introducing exotic or noxious weeds.

Ouren et al. (2007) state: "The road-effect zone is the area over which significant ecological effects extend outward from a road and typically is many times wider than the road surface plus roadsides. The zone is asymmetric with convoluted boundaries, reflecting the sequence of ecological variables, plus unequal effect-distances due to slope, wind, and habitat suitability on

opposite sides of a road. Knowing the average width of the road-effect zone permits us to estimate the proportion of the land ecologically affected by roads."

Increased contact and exploitation by humans

Brocke et al. (1988) reported that increased road densities allow for increased access by humans. As human use increases so does noise, disturbance, use and alteration of adjacent habitats, and the potential for illegal activities.

Potential effects of motorized travel and recreation 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) and other authors who used this information to analyze the effects of roads on wildlife (Gaines et al. 2003) on Forest Service lands:

- Habitat Loss and Fragmentation Including Negative Edge Effects – Roads can have the direct impact of converting large areas of habitat into non-habitat, while the indirect effects of noise, dust, and exhaust (pollution) 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 over harvest/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 that provides 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 tails.

Travel management related impacts on wildlife vary with the volume, timing, and type of travel; the species of wildlife in the area; the types of habitats involved; time of day or season of year; and a host of other factors. Currently, the Gila does not have information related to the volume of use by different vehicles, the speed these vehicles travel at, noise generated by this use, and/or the areas and seasons of most use; therefore, this analysis is a relative risk assessment of each of the

action alternatives compared to the no action alternative. Known information for this analysis is species location or habitat location information, and changes in road or motorized trail by alternative; therefore, this information will be used to complete this analysis.

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 what is known about specific road and travel conditions that exist on the forest. An extensive amount of time was spent reviewing the most up to date and most relevant literature to use the best available science for this analysis.

Analysis Factors

Wisdom et al. (2000) road and trail effects (identified above) can be grouped into 8 categories, as shown in column 1 of table 77. 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. Knight and Cole (1995) developed a conceptual model of the responses of wildlife to recreational activities. Their model identified two immediate responses death (harvest) or behavior change (direct or indirect effects). The relevant motorized activities considered in the development of their model included vehicle, OHV, and motorcycle recreation on and off roads. I've reviewed these groupings and like Knight and Cole (1995) feel the effects from motorized recreation on and/or off roads, as identified by the many different researchers, can be grouped into these same two categories disturbance or harvest; as noted in column 4 of table 77.

Table 77. Responses of wildlife to various disturbance factors

Road and Trail Associated Factors as Summarized by Wisdom et al. 2000	Liddle 1997	Knight and Cole 1995 Response	Analysis Factors
Disturbance, Displacement, Avoidance, Harassment	Disturbance type 1	Behavior change	Disturbance/Indirect Effect
Physiological Response	Disturbance type 1	Behavior change	Disturbance/Indirect Effect
Habitat Loss and Fragmentation (including Negative Edge Effects)	Disturbance type 2	Behavior change	Disturbance/Indirect Effect
Snag and Downed Log Reductions	Disturbance type 2	Behavior change	Disturbance/Indirect Effect
Barriers to Animal Travel or Movement	Disturbance type 2	Behavior change	Disturbance/Indirect Effect
Route for competitors and predators	Disturbance type 2	Behavior change	Disturbance/Indirect Effect
Collisions	Disturbance type 3	Damaging Contact (Collisions)	Harvest/Direct Effect
Harvest or Collection Facilitated by Motorized travel	Disturbance type 3	Damaging Contact (Collection/Poaching)	Harvest/Direct Effect

Focal Species

Ecologists have used different systems to evaluate the potential effects of an activity on species (Millsap et al. 1990, Lambeck 1997). 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 R3 sensitive species in this region of the Forest Service is limited; using the focal species approach allows the Gila to use literature related to different groups of species and then use this information 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 a thorough 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 mammal, bird, reptile, and amphibian, 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 the "Primary Vegetation Types" (table 72). The Gila National Forest Plan (1986) 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.

Unique Habitat Area

The forest lacks data related to smaller isolated type habitats like springs, caves, cliffs, rock slides, and other unique features on our landscape, but by using listed and other sensitive species location information and the analysis process identified above the deciding official will have enough information to determine the potential effects (relative risk) by alternative to species that use these unique habitats. For example, the forest has peregrine galcon nesting location information, and so by completing an analysis of how each alternative has the potential to affect this species provides information on potential effects to other species that use cliff type habitat.

Analysis Questions

1. Wildlife Standards or Guidelines in the Gila National Forest Plan that are related to species, groups of species, or wildlife emphasis areas in the Gila National Forest Plan that

relate to the implementation of this project (see Wildlife Specialist Report (USDA Forest Service 2013g)).

2. Proposed forest plan amendments associated with this project (see Wildlife Specialist Report (USDA Forest Service 2013g)).
3. Issues identified during scoping related to terrestrial wildlife species.

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/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 of use. Table 78 identifies the ungulate species assessed in this section.

Table 78. Ungulates 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
Mule deer	Management Indicator Species

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, Hayes et al. 2002). Gratson and Whitman (2000) document that reduced hunter densities in road closure areas contributed substantially to greater survival rates of bulls compared to roaded areas. 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 (Lyon 1983, Johnson et al. 2000, Rowland et al. 2000, Wisdom et al. 2000, Gaines et al. 2003). MacArthur et al. (1982) generally found that bighorn sheep avoid areas of high vehicle use more than areas of lower vehicle use (table 79).

Table 79. Summary of potential motorized route affects, analysis factors, and analysis indicators for ungulate species

Focal Group	Road Associated Factors	Motorized Trail/ORV Associated Factors[1]	Combined Analysis Factors	Analysis Indicator
Ungulates	Hunting, Poaching, Collisions[3]	Hunting, Poaching	Harvest/direct effects	Route Miles
	Habitat Loss Disturbance, Displacement, Avoidance, Harassment	Habitat Loss Disturbance, Displacement, Avoidance, Harassment	Disturbance/indirect effects	Disturbance Zone Summarized In Acres

Elk (Game Species Identified as a Species of Concern during Scoping)

Several factors influence avoidance/disturbance (potential zone of influence) distances by elk adjacent to roads: traffic rates, cover adjacent to roads, topography, and type of road (Rowland et al. 2005). To analyze the change in potential disturbance effects of motorized activities to elk we will use 300 meters for motorized trails, and 650 meters for roads. These distances are approximately the middle distance between the different studies reviewed. Additionally, these distances will help account for variables like topography and cover.

The New Mexico Department of Game and Fish has mapped core elk habitat on the forest; for this analysis the analysis indicators (mile and disturbance zone) will analyze the change from the existing condition in these areas by alternative (table 80).

Bighorn Sheep (Forest Service Sensitive Species and Ungulate Focal Species)

Papouchis et al. (2001) reported that their findings were consistent with other research that roads cause a zone of influence larger than the road itself. In high use areas some sheep do habituate to road traffic but more typically the closer to a road the more likely sheep will flee. Papouchis et al. (2001) found that on average sheep fled when within 132 meters of a road, were alerted when within 363 meters, and did not respond at 821 meters. MacArthur et al. (1979) found vehicle traffic caused a change in bighorn sheep heart rates 14.3 percent of the time when a vehicle was within 200 meters. To analyze potential disturbance effects of motorized activities to bighorn sheep this analysis will use disturbance zone of 200 meters.

On the Gila National Forest, the New Mexico Department of Game and Fish started re-introductions of Rocky Mountain bighorn sheep back onto the forest in March 1964. Two populations continue to occur on the Gila in the Turkey Creek and San Francisco River populations.

The New Mexico Department of Game and Fish has mapped core bighorn sheep habitat on the forest; for this analysis the analysis indicators (mile and disturbance zone) will analyze the change in these areas by alternative from the existing condition (table 80).

Pronghorn (Game Species Identified as a Species of Concern during Scoping)

Avoidance/disturbance distance literature related to motorized affects to pronghorn is lacking. Several researchers discuss how roads fragment pronghorn habitat and cause flight responses, but do not provide response distance. Gagnon et al. (2007) completed a literature review of

traffic/road type effects on several ungulates, including pronghorn and came up with an average zone of influence distance of 200 meters for ungulates. Taylor and Knight (2003) examined pronghorn responses to mountain bikers and hikers. Biking activities caused pronghorn to be altered at an average distance of 328 meters and to flee at an average distance of 234 meters. To analyze disturbance effects of motorized activities to pronghorn this analysis will use disturbance zone of 200 meters.

The New Mexico Department of Game and Fish has mapped core pronghorn habitat on the forest; for this analysis the analysis indicators (mile and disturbance zone) will analyze the change in these areas by alternative from the existing condition (table 80).

Mule Deer (Management Indicator Species Representative of Desert Shrub and Pinon Juniper/Shrub Oak Woodland Vegetation Cover Types)

Wisdom et al. (2004) documents that mule deer do not exhibit the same flight response as elk in relation to off-road activities. Unlike elk mule deer showed very little flight response to off-road use. Yarmoloy et al. (1988) suggest that deer tend to seek cover when harassed by ATVs. Wisdom et al. (2004) also suggested that deer are responding by seeking cover. If deer are spending more time hiding in cover during periods of motorized use and less time foraging this could affect fitness levels. Rost and Bailey (1979) reported a road avoidance zone of 200 meters for deer. Wisdom et al. (2004) reported a 0.06 percent chance of flight for deer within 100 meters of ATV use. To analyze disturbance effects of motorized activities to deer this analysis will use disturbance zone of 200 meters (table 80).

Mule deer have been identified as a management indicator species on the Gila National Forest for species associated with desert shrub, piñon-juniper, and shrub oak woodland vegetation. For the analysis of this focal/management indicator species (mile and disturbance zone) the analysis indicators will analyze the change in these habitat/vegetation associations by alternative from the existing condition.

Table 80. 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/ORV Use	Route Miles	300 meters	Core Elk Habitat Mapped by NMDGF*
Elk	Motorized Roads	Route Miles	650 meters	Core Elk Habitat Mapped by NMDGF
Bighorn sheep	Motorized Trail/ORV and Roads	Route Miles	200 meters	Core Bighorn Sheep Habitat Mapped by NMDGF
Pronghorn	Motorized Trail/ORV and Roads	Route Miles	200 meters	Core Pronghorn Habitat Mapped by NMDGF
Mule deer	Motorized Trail/ORV and Roads	Route Miles	200 meters	Desert Shrub and Piñon-Juniper/ Shrub Oak Woodland

*New Mexico Department of Game and Fish

Ungulates – Effects by Alternative

Elk and Pronghorn

No Action Alternative (Alternative B): Under this alternative there are approximately 3,922 miles of motorized routes in the elk analysis area (table 81) and 315 miles of motorized routes in the pronghorn analysis area (table 82). These routes continue to cause habitat loss and the potential for other types of direct effects to this species. The potential for collision loss does exist on Forest Service routes; however, lower traffic rates and travel speeds on forest routes reduce this potential. Increases in road densities increases the potential for take associated with poaching. The potential disturbance zone in the elk analysis area (1,351,231 acres) and pronghorn analysis area (44,505 acres) along motorized routes continue to cause the potential for indirect effects. Under this alternative you continue to have motorized cross-country travel, dispersed camping, and big game retrieval allowed across the Gila National Forest. These three types of uses continue to have potential effects to elk and pronghorn. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of greater road densities. So, under this alternative through time the potential for the direct loss of individuals and habitat would increase, as would the potential for disturbance affects to the species and its habitat.

Action Alternatives (C, D, E, F, and G) (table 81 and table 82): 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 approximately 96 to 100 percent under all action alternatives; and in the pronghorn analysis area it is reduced by approximately 93 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, 94 percent under alternative D, 93 percent under alternative G, 20 percent under alternative F, and 3 percent under alternative C.

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

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; 16 percent under alternative F and G; and by less than 0.5 percent under alternative C. Within the pronghorn analysis area these effects are reduced by approximately 33 percent under alternative E; 22 percent under alternative D; 19 percent under alternative G; 18 percent under alternative F, and by less than 1 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.

Table 81. Elk analysis area - existing condition and proposed changes by alternative

Total NMDGF Core Elk Habitat on NFS land = 2,895,180 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	3,922.34	3,935.13	2,958.37	2,349.38	3,308.11	3,286.12
Percent miles of Alt. B (existing)		0.33%	-24.58%	-40.10%	-15.66%	-16.22%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.))	157.66 mi. 151,090.56 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00
U.S. Hwy, State Hwy, County Roads (miles (mi.) and acres (ac.))	634.96 mi. 297,226.77 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00
Motorized Dispersed Camping (acres)	2,102,646	-2,009,869.1	-2,030,011.4	-2,102,646.4	-2,014,445	-2,021,456.4
Percent acres of Alt. B (existing)		-95.59%	-96.55%	-100%	-95.81%	-96.14%
Motorized Areas						
Motorized Area - All Vehicles (acres)	23.69	0.00	-23.69	-23.69	0.00	0.00
Motorized Area - OHV Only (acres)	3.31	0.00	-3.31	-3.31	0.00	0.00
Motorized Big Game Retrieval (acres)	2,102,646	-297,467.5	-2,030,011.4	-2,102,646.4	-776,377.2	-2,021,456.4
Percent acres of Alt. B (existing)		-14.15%	-96.55%	-100%	-36.92%	-96.14%

Table 82. Pronghorn analysis area - existing condition and proposed changes by alternative

Total NMDGF Core Pronghorn Habitat on NFS land = 129,350 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	314.86	312.78	244.57	211.52	257.10	252.85
Percent miles of Alt. B (existing)		-0.66%	-22.33%	-32.82%	-18.35%	-19.70%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.)	22.79 mi. 4,661.40 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
U.S. Hwy, State Hwy, County Road (miles (mi.) and acres (ac.)	55.95 mi. 8,909.72 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
Motorized Dispersed Camping (acres)	126,016.6	-116,857.6	-118,049.3	-126,016.6	-117,022.4	-117,309.9
Percent acres of Alt. B (existing)		-92.73%	-93.68%	-100%	-92.86%	-93.09%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	126,016.64	-3,588.43	-118,049.31	-126,016.64	-25,560.34	-117,309.96
Percent acres of Alt.B (existing)		-2.85%	-93.68%	-100%	-20.28%	-93.09%

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 no alternatives will affect the viability of these species or the viability of any other wild ungulate on the Gila.

Bighorn Sheep

No Action Alternative (Alternative B): Under this alternative there are approximately 35 miles of motorized routes in bighorn sheep habitat (table 83), which continues to cause habitat loss and the potential for other types of direct effects to this species. The potential for collision loss does exist on Forest Service motorized routes; however, lower traffic rates and travel speeds on forest routes reduce this potential. Increases in road densities increases the potential for take associated with poaching. The potential disturbance zone (5,961 acres) along motorized routes in this analysis area continues to cause the potential for indirect effects. Papouchis et al. (2001) reported that their findings were consistent with other research that roads cause a zone of influence larger than the road itself. In high use areas some sheep do 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 you continue to have motorized cross-country travel, dispersed camping, and big game retrieval allowed across the Gila National Forest. These three types of uses continue

to have potential effects to bighorn sheep. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of greater road densities. 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.

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. Motorized dispersed camping is reduced by 97 to 100 percent under all action alternatives. Area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 99 percent under alternative D and G, 50 percent under alternative F, and 19 percent under alternative C (table 83).

Motorized areas are locations where we have had traditional uses like motorized 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.

Miles of motorized routes and trails and acres of potentially affected habitat within the analysis area are reduced by approximately 54 percent under alternative E; 31 percent under alternative D; 26 percent under alternative G; 5 percent under alternative F; and 1 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.

Table 83. Bighorn sheep analysis area - existing condition and proposed change by alternative

Total NMDGF Core Bighorn Habitat on NFS land = 68,737 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	34.89	34.46	24.12	16.07	33.22	25.92
Percent miles of Alt. B (existing)		-1.24%	-30.86%	-53.95%	-4.79%	-25.71%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.)	1.21 mi. 331.98 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
U.S. Hwy, State Hwy, County Roads (miles (mi.) and acres (ac.)	6.28 mi. 1,364.64 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
Motorized Dispersed Camping (acres)	46,160.20	-44,614.7	-45,675.7	-46,160.2	-45,260.8	-45,700.4
Percent acres of Alt. B (existing)		-96.65%	-98.95%	-100%	-98.05%	-99%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	46,160.20	-8,709.99	-45,675.7	-46,160.2	-23,082.7	-45,700.4
Percent acres of Alt. B (existing)		-18.87%	-98.95%	-100%	-50.01%	-99%

Table 84 displays the effects determination for bighorn sheep listed as a Forest Service sensitive species.

Table 84. Bighorn sheep Forest Service sensitive species determination by alternative

Sensitive Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Bighorn sheep		MI*	MI	MI	MI	MI

*MI – May impact

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.

Mule Deer

No Action Alternative (Alternative B): Under this alternative, there are 1,617 miles of motorized routes in deer habitat (table 85). These routes continue to cause habitat loss and the potential for other types of direct effects to this species. The potential for collision loss does exist on Forest Service routes; however, lower traffic rates and travel speeds on forest routes reduce this potential. Increases in road densities increases the potential for take associated with poaching. The potential disturbance zone (259,155 acres) along motorized routes in this analysis area continues to cause the potential for indirect effects.

Under this alternative, motorized cross-country travel, dispersed camping, and big game retrieval continues to be allowed across the Gila National Forest. These three types of uses continue to have potential effects to deer. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of greater road densities. 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.

Action Alternatives (C, D, E, F, and G) (table 85): 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. Motorized dispersed camping is reduced by 97 to 100 percent under all action alternatives. Area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 97 percent under alternative D and G, 46 percent under alternative F, and 19 percent under alternative C.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. Under alternatives D and E there is a reduction of 14.5 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 37 percent under alternative E; 21 percent under alternative D; and 15 percent under alternative 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 85. Mule deer analysis area - existing condition and proposed changes by alternative

Mule Deer Habitat* Analysis Area on NFS land = 1,628,703 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	1,617.24	1,656.85	1,272.07	1,020.73	1,370.30	1,367.82
Percent miles of Alt. B (existing)		2%	-21%	-37%	-15%	-15%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.)	76.96 mi. 21,437.54 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
U.S. Hwy, State Hwy, County Roads (miles (mi.) and acres (ac.)	393.77 mi. 61,155.13ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
Motorized Dispersed Camping (acres)	1,207,266	-1,165,617.9	-1,174,308.2	-1,207,266.2	-1,168,913.9	-1,171,095.6
Percent acres of Alt. B (existing)		-97%	-97%	-100%	-97%	-97%
Motorized Areas						
Motorized Area - All Vehicles (acres)	14.45	0.00	-14.45	-14.45	0.00	0.00
Motorized Area - OHV Only (acres)	0.26	0.00	-0.26	-0.26	0.00	0.00
Motorized Big Game Retrieval (acres)	1,207,266	-234,103.8	-1,174,308.2	-1,207,266.2	-549,684.5	-1,171,095.6
Percent acres of Alt. B (existing)		-19%	-97%	-100%	-46%	-97%

* Desert Shrub and Piñon-Juniper/Shrub Oak Woodland

Table 86 displays the effects determination for ungulates listed as Gila National Forest managagement indicator species.

Table 86. Mule deer Gila National Forest management indicator species determination by alternative

Management Indicator Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Mule deer		NA	NA	NA	NA	NA

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

Rationale for determination: Under all action alternatives, the potential effects to deer and deer habitat are reduced, particularly under alternative E. The potential to affect individuals and minor amounts of habitat 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.

Wide-ranging Carnivores

Table 87 identifies the carnivores assessed in this section.

Table 87. Wide-ranging carnivores - species selected to be analyzed and rationale for selection

Species Analyzed	Rationale For Selection
Mexican gray wolf	Federally listed as Endangered with a designation of Experimental Population
Mountain lion	Game species identified as species of concern during scoping
Black bear	Game species identified as species of concern during scoping

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 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, but this type of information is lacking for wolves and mountain lions. For wolves the literature related to motorized use effects is associated with road densities. Road density is the indicator that is used to analyze the potential for harvest and disturbance to wolves under the different alternatives. For mountain lions route miles will be used as the indicator for both direct and indirect effects, since no literature was located related to disturbance zones. For black bears route miles will be used as the indicator for potential harvest effects and 200 meters for a potential disturbance effects (see black bear write-up). 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 the 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.

Mexican Gray Wolf (Federally Listed as Endangered with a designation of Experimental Population on the Gila)

Claar et al. (1999) states that wolves are habitat generalist 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 motorized recreational activities (Claar et al. 1999). Much of the literature shows a strong negative relationship between wolves and increased road densities (Thiel 1985, Mech et al. 1988, Claar et al. 1999). Researchers have found that when road densities exceed about 1 mile per square mile (1.6 kilometers per 0.9 kilometer radius circle) wolves were displaced or avoided the area (Thiel 1985, Mech et al. 1988). 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 (Thiel et al. 1998; Claar et al. 1999).

Mexican gray wolves are the southernmost occurring, rarest, and most genetically distinct gray wolf in North America. They historically occurred in the mountainous regions of the Southwest from throughout portions of southern Arizona, New Mexico, and Texas into central Mexico. Mexican gray wolves were extirpated in the United States by aggressive predator control programs. Gray wolves were once common in the Gila National Forest, New Mexico (Frey, 1995).

On January 12, 1998, the U.S. Fish and Wildlife Service published an Endangered Species Act section 10(j) rule for the Mexican gray wolf that provided for the designation of specific populations of listed species in the United States as "experimental populations" (USFWS 1998). The Mexican gray wolf is in the process of being reintroduced 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 non-essential experimental population, pursuant to section 10(j) of the Endangered Species Act as amended.

The Mexican Wolf Reintroduction EIS (USFWS 1996) did not recognize road densities on the Gila National Forest as a problem. This EIS did recognize roads adjacent to dens as a concern. To mitigate the potential for motorized recreation to affect wolf dens the Gila will continue to issue closure orders adjacent to these areas as recommended by the U.S. Fish and Wildlife Service (see design criteria). Again, road density changes will be the indicator that is used to analyze the potential harvest and disturbance affects under the different alternatives, and the analysis area will be the 5th-code watershed (table 88 and table 89).

Mountain Lion (Game Species identified as a species of concern during scoping)

This species is adapted to thrive in a wide variety of habitats (Claar et al. 1999). Human development and disturbance are a long term threat to this species. Research in Arizona documented that lions selected areas with lower road densities than average in two areas, but in another area tolerated higher road densities (Van Dyke et al. 1986). Increased access for lion hunters poses one of the greatest road associated threats to mountain lions (Claar et al. 1999). Route miles will be the indicator that is used to analyze the potential harvest and disturbance affects under the different alternatives, and the analysis area will be mountain lion core habitats as mapped by the New Mexico Department of Game and Fish (table 88 and table 89).

Black Bear (Game Species identified as a species of concern during scoping)

This species habitat can generally be categorized as forested lands with suitable amounts food (Claar et al. 1999). Bears are natural scavengers and seek food opportunistically therefore they readily become habituated to human food sources. Claar et al. (1999) does report that habitat quality is the ultimate limiting factor for bear density. They also state that harvest can affect these densities. Claar et al. (1999), documents that black bears may react to increases in road densities by shifting their home range to an area of lower density. Claar et al. (1999) report that black bears prefer to stay a minimum of 50 yards away from a road, except when feeding. Kasworm and Manley (1990) found that in northwestern Montana bears avoided areas within 274 meters of a road. Route miles will be the indicator used to analyze the potential for harvest, and a zone of

influence of 200 meters will be the indicator used to analyze the potential disturbance affects, and the analysis area will be black bear core habitats as mapped by the New Mexico Department of Game and Fish (table 88 and table 89).

Table 88. Summary of potential motorized route affects, analysis factors, and analysis indicators of wide ranging carnivores

Road Associated Factors	Motorized Trail/ORV Associated Factors[1]	Combined Analysis Factors	Analysis Indicator
Hunting Poaching, Collisions, Trapping	Hunting Poaching Trapping	Harvest/Direct Effects	Route Density
Disturbance, Displacement, Avoidance, Harassment	Disturbance, Displacement, Avoidance, Harassment	Disturbance/Indirect Effects	Miles/Route Density or Disturbance Zone Summarized In Acres For Black Bears

Table 89. 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
Wolf	Motorized Trail/ORV Use	Route Density	Route Density	5th Code Watersheds Outside of Wilderness
Mountain lion	Motorized Trail/ORV and Roads	Route Miles	Route Miles	Core Mountain Lion Habitat Mapped by NMDGF
Black bear	Motorized Trail/ORV and Roads	Route Miles	200 meters	Core Black Bear Habitat Mapped by NMDGF

Wide Ranging Carnivores – Effects by Alternative

Mexican Gray Wolf

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. 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 densities 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 reduce this potential. Increases in road densities increases the potential for take associated with poaching. Poaching on the Gila 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.

Under this alternative, motorized cross-country travel and dispersed camping continue to be allowed across the Gila National Forest. These two types of uses continue to have the potential to have negative impacts to the Mexican gray wolf. Additionally, these two types of uses 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 0.98 mile per square mile (table 90). 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.

Effects Common to all Action Alternatives (C, D, E, F, and G) (table 90): 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. 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): Within the 49 5th-code watersheds that occur in whole or partially within the boundary of the Gila National Forest miles of motorized routes and trails and acres of potentially affected habitat within the analysis area are reduced by approximately 44 percent under alternative E; 26 percent under alternative D; 19 percent under alternative F, and 20 percent under alternative G. Under alternative C there is a 3.1 percent increase in the average routes per 5th-code watershed (see table 90 for specific numbers). Under alternative C, motorized routes are increased in 22 of the 49 watersheds above the no action alternative; in 10 of these watersheds the road density remains under 1 mile per square mile, in 8 the road density remains under 1.5 mile per square mile, in 3 the road density remains under 2 mile per square mile, and in one the road density is above 2 miles per square mile. In 1of the 49 5th-code watersheds you see an increase in road densities in alternative D, F, and G, and in 2 additional 5th-code watersheds you see an increase in alternatives F and G. The road density in the Cow Spring Draw-Seventy-six Draw 5th-code watershed under the existing condition is 0.95 mile per square mile; alternative E reduces the road density to approximately 0.7 mile per square mile; alternative D, F, and G increase it to 0.96 mile per square mile; and alternative C increases it to 1.13 miles per square mile. The road density in the Railroad Canyon 5th-code watershed under the existing condition is 1.32 miles per square mile; alternative E reduces the road density to approximately 0.6 mile per square mile; alternative D to 1.1 miles per square mile; alternatives F and G increase it to 1.1 miles per square mile; and alternative C increases it to 1.4 miles per square mile. The road density in the Mangas Creek 5th-code watershed under the existing condition is 1.11 miles per square mile; alternative E reduces the road density to approximately 0.5 mile per square mile; alternative D to 0.96 mile per square mile; alternative F increases it to 1.14 miles per square mile; alternative G increases it to 1.12 miles per square mile; and alternative C increases it to 1.56 miles per square mile. Besides in alternative C, in none of the remaining 46 of the 49 5th-code watersheds do any of the other action alternatives increase route densities above the existing condition. The greater the reduction in miles of routes 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 disperse camping in alternatives C to G is reduced by 95.6 percent to 100 percent within the analysis area.

Designated motorized dispersed recreation and 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 areas in 5 of the 49 5th-code watersheds that are affecting approximately 27 acres of habitat. 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, 97 percent under alternative D, 38 percent under alternative F, 96 percent under alternative G, and 15 percent under alternative C.

Table 90. Mexican gray wolf analysis area - existing condition and proposed changes by alternative

Mexican Gray Wolf Analysis Area - Summary	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Average of NFS routes and trails on Gila Admin. HUCs miles/mile²	0.98	0.03	-0.26	-0.43	-0.19	-0.19
Average percent change		3.08%	-26.4%	-44.1%	-19.4%	-19.8%
Average of acres of camping on Gila Admin. HUCs	49,863.7	-47,655.9	-48,141.5	-49,863.7	-47,783.8	-47,945.2
Average percent change		-96%	-97%	-100%	-96%	-96%
Average acres of game retrieval Gila Admin. HUCs	49,863.7	-7,443.1	-48,141.5	-49,863.7	-19,117.7	-47,945.2
Average percent change		-15%	-97%	-100%	-38%	-96%
Average acres of motorized area Gila Admin. HUCs	27	0	-27	-27	0	0
Average percent change		0%	-100%	-100%	0%	0%

Table 91 displays the effects determination for the federally listed Mexican gray wolf.

Table 91. Mexican gray wolf federally listed species determination by alternative

Federally Listed Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Mexican gray wolf		*NLJ	NLJ	NLJ	NLJ	NLJ

*NLJ – Not likely to jeopardize determination

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 degree than alternative E. Alternative C eliminates cross-country travel, but the change related to route density is very small, maintaining conditions that are similar to the no-action alternative. In comparison to the existing condition the relative risk to this species is reduced the most by alternative E then D, G, F, and C, respectively. 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.

Black Bear and Mountain Lion

No Action Alternative (Alternative B): Under this alternative, there are approximately 3,788 miles of motorized routes in the black bear analysis area (Table 92) and 2,942 miles of motorized routes in the mountain lion analysis area (table 93). These routes continue to cause

habitat loss and the potential for other types of direct effects to this species. Lower traffic rates and travel speeds on forest routes reduce the potential for collision loss; however, increases in road densities increases the potential for take associated with hunting and poaching. In the black bear analysis area the potential disturbance zone of 536,989 acres along motorized routes continue 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 densities increase so does the potential to cause indirect effects to mountain lions adjacent to motorized routes.

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

Action Alternatives (C, D, E, F, and G) (table 92 and table 93): 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 black bear analysis area, motorized dispersed camping is reduced by approximately 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, 44 percent under alternative F, and 18 percent under alternative C.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. In the bear analysis area under alternatives D and E, there is a reduction of approximately 22 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 9 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 bear analysis area are reduced by approximately 43 percent under alternative E; 26 percent under alternative D; 7 percent under alternative F; and 18 percent under alternative G. Under alternative C, motorized routes are increased by approximately 2 percent. Within the lion analysis area these effects are reduced by approximately 44 percent under alternative E; 26 percent under alternative D; 17 percent under alternative F; and 17.5 percent under alternative G. Under alternative C motorized routes are increased by 2.5 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.

Summary: Under all action alternatives except C the potential effects to black bears and mountain lions are reduced, particularly under alternative E. Alternative C increases the level of

effect above the existing condition related to motorized routes, but eliminates cross-country travel which benefits both these species. Under these alternatives the potential to affect individuals still exists, but none will affect the viability of these species or the viability of any other wide ranging carnivore on the Gila. In comparison to the existing condition, the relative risk to these species is reduced the most by alternative E, then D, G, F, and C, respectively.

Table 92. Black bear analysis area - existing condition and proposed changes by alternative

Total NMDGF Core Black Bear Habitat on NFS land = 2,825,466 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	3,787.86	3,848.86	2,797.75	2,162.37	3,140.28	3,112.20
Percent miles of Alt. B (existing)		1.61%	-26.14%	-42.91%	-17.10%	-17.84%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.))	142.63 mi. 30,304.65 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
U.S. Hwy, State Hwy, County Road (miles and acres)	545.14 mi. 84,080.52 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
Motorized Dispersed Camping	2,044,477.17	-1,954,997.3	-1,975,999.4	-2,044,477.2	-1,961,051.5	-1,967,672.6
Percent acres of Alt. B (existing)		-95.62%	-96.65%	-100%	-95.92%	-96.24%
Motorized Areas						
Motorized Area - All Vehicles (acres)	21.79	0.00	-21.79	-21.79	0.00	0.00
Motorized Big Game Retrieval (acres)	2,044,477.17	-321,323.96	-1,975,999.4	-2,044,477.2	-816,948.5	-1,967,672.6
Percent acres of Alt. B (existing)		-15.72%	-96.65%	-100%	-39.96%	-96.24%

Table 93. Mountain lion analysis area - existing condition and proposed changes by alternative

Total NMDGF Core Mtn. Lion Habitat on NFS land = 2,807,901 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt.F Change in Effects	Alt. G Change in Effects
Total NFS Routes and Trails (miles)	2,942.02	3,015.10	2,164.42	1,635.43	2,446.95	2,427.91
Percent miles of Alt. B (existing)		2.48%	-26.43%	-44.41%	-16.83%	-17.47%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles)	100.19	0.00	0.00	0.00	0.00	0.00
U.S. Hwy, State Hwy, County Road (miles)	377.99	0.00	0.00	0.00	0.00	0.00
Motorized Dispersed Camping (acres)	1,995,764.00	-1,928,001.90	-1,945,237.31	-1,995,764.00	-1,933,682.09	-1,939,577.47
Percent acres of Alt. B (existing)		-96.60%	-97.47%	-100%	-96.89%	-97.18%
Motorized Areas						
Motorized Area - All Vehicles (acres)	9.33	0.00	-9.33	-9.33	0.00	0.00
Motorized Area - OHV Only (acres)	2.26	0.00	-2.26	-2.26	0.00	0.00
Motorized Big Game Retrieval (acres)	1,995,764.00	-357,044.24	-1,945,237.31	-1,995,764.00	-886,965.46	-1,939,577.47
Percent acres of Alt. B (existing)		-17.89%	-97.47%	-100%	-44.44%	-97.18%

Small Mammals

Table 94 identifies the carnivores assessed in this section.

Table 94. Small mammal species selected to be analyzed and rationale for selection

Species Analyzed	Rationale For Selection
Lesser long-nosed bat	Endangered
Hooded skunk	Forest Service (FS) Sensitive Species
Botta's pocket gopher	FS Sensitive Species
Gunnison's prairie dog	FS Sensitive Species
White Mountain 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 wet land 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.

A large number of studies addressing the impact of roads on small mammals have assessed road barrier effects (table 95); less attention has been given to the effect of roads on the density and diversity of local communities. 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 and 2002), but have not described community attributes in natural areas without road influences.

Table 95. Summary of potential motorized route affects, analysis factors, and analysis indicators for small mammals

Road Associated Factors	Motorized Trail Associated Factors	Combined Analysis Factors	Analysis Indicator
Collisions, trapping	Collisions	Harvest/Direct Effects	Miles
Disturbance, displacement, avoidance, harassment	Disturbance, displacement, avoidance, harassment	Disturbance/Indirect effects	Disturbance zone summarized In acres

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 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 (table 96).

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.

Table 96. 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
Lesser long-nosed bat	Motorized trail/ORV use	Route miles	250 meters	Desert shrub/Grasslands habitat within the Burro Mountains
Hooded skunk Botta's pocket gopher	Motorized trail/ORV use	Route miles	250 meters	Desert shrub/Grasslands, and piñon-juniper/Shrub oak woodland
Gunnison's prairie dog White Mountain ground squirrel	Motorized trail/ORV and roads	Route miles	250 meters	Plains and mountain grasslands
Southern red-backed vole	Motorized trail/ORV and roads	Route miles	250 meters	Spruce/Fir
Long-tailed vole Arizona montane vole	Motorized trail/ORV and roads	Route miles	250 meters	Wet meadow, wetland, and high elevation riparian
Beaver	Motorized trail/ORV and roads	Route miles	250 meters	Low, middle, and high elevation riparian
White-nosed coati western red bat Arizona gray squirrel	Motorized trail/ORV and roads	Route miles	250 meters	Low and middle elevation riparian

Lesser Long-nosed Bat (Federally Listed as Endangered Species Representative of Desert Shrub/Grasslands Vegetation Cover Types in Burro Mountains of the Gila National Forest)

This species is found in a variety of vegetation communities including desert shrub, desert grasslands, Madrean oak woodlands, thorn scrub, and tropical deciduous forests (USFWS 2012a). In the U.S. portion of its range, this species primarily uses desert shrub habitat (USFWS 2001).

On the Gila, surveys for this species and other nectar-feeding bats were completed in the 1990s and early 2000s, in the Burro Mountain region of the forest. The experienced bat surveyors were unable to document this species; surveyed areas included abandoned mines and stands of blooming agave. This same surveyor was working on private land within the administrative boundary of the Gila National Forest in the Burro Mountains mist-netting for insectivorous bats and captured six male lesser long-nosed bats. Area residents contacted confirmed that nectar-feeding bats had been and continued to use a hummingbird feeder from 2010 to 2012. These captures represent a range expansion of approximately 120 kilometers from known summer roosts in southern New Mexico (Western Bat Working Group 2011).

There are no records of occurrences on the forest. No known roosts or potential roosts habitat is known to occur on the forest (survey of abandoned mines has been occurring and no nectar feeding bats have been documented). This species has not been documented foraging on the forest (agave habitat and other cacti flowering plant habitat is limited on the forest). It is likely that this species is coming from off-forest roosting areas to use the hummingbird feeder on private land; again, this species is known to travel long distances to forage. USFWS (2007a)

5-year review of this species identified habitat loss as threat to this bat, but did not specifically mention any road threats.

Hooded Skunk (Forest Service Sensitive Species Representative of Desert Shrub/Grasslands, and Piñon-Juniper/Shrub Oak Woodlands Vegetation Cover Types)

This species appears to be more common in desert and semi desert habitats, but specimens have been taken in the ponderosa pine forests. They can also be found in the riparian communities consisting of sycamore, cottonwood and rabbitbrush. In Arizona, they prefer rocky slopes, base of cliffs, and/or rocky sides of arroyos. They also prefer intermediate elevations above the deserts but not the high mountains (BISON-M 2008). This species is fairly common on the Gila National Forest (USDA Forest Service 2009a).

Botta's Pocket gopher (Forest Service Sensitive Species Representative of Desert Shrub/Grasslands, and Piñon-Juniper/Shrub Oak Woodlands Vegetation Cover Types)

Pocket gophers generally live where they can find good soils for excavation, which could mean any environment from the desert up into the mountains. This species is fairly common on the Gila National Forest (USDA Forest Service 2009b).

The hooded skunk and Botta's pocket gopher have been selected as focal species for small mammals that occur in desert shrub/grasslands, and piñon-juniper/shrub oak woodlands. For the analysis of this species the analysis indicators (road miles and acres of potential disturbance) will analyze the change in these habitats by alternative from the existing condition.

Gunnison's Prairie Dog (Forest Service Sensitive Species Representative of Plains and Mountain Grasslands Vegetation Cover Types)

This species occurs in New Mexico in the following habitat type(s): The mixed shrub habitat type occurs in lower elevations below the mesas (elevation less than 6,700 feet or 2,043 meters). Broom snakeweed is the dominant plant species. Rubber rabbitbrush and fourwing saltbush are interspersed with sparse stand of big sagebrush. The sagebrush habitat type is found below the mesas and is composed of dense stands of big sagebrush. Some small areas are dominated by blue grama grass, western wheatgrass, cheatgrass, and squirreltail grass. Bare ground is prevalent in some areas (BISON-M 2013). The southern limit of this species is reached in the Mogollon Mountains of southwestern New Mexico, may be extirpated or is uncommon on the Gila National Forest (USDA Forest Service 2009c).

White Mountain Ground Squirrel (Forest Service Sensitive Species Representative of Plains and Mountain Grasslands Vegetation Cover Types)

The thirteen-lined ground squirrel is a grassland species that is common only in the shortgrass plains of the northeastern part of New Mexico. Where there are relict grasslands in the foothills and valleys of certain mesic mountain ranges, small isolated colonies are sometimes found, for example, in the Sacramento Mountains, around the periphery of the San Augustin Plains, and in the White Mountains of Arizona. In 1932, Bailey reported them common in parks in the ponderosa forest of the Sacramentos, but we have found them very hard to observe and very uncommon in any montane areas (cited in USDA Forest Service 2009d). This species is uncommon on the Gila National Forest.

The Gunnisons's prairie dog and White Mountain ground squirrel have been selected as focal species for small mammals that occur in plains and mountain grasslands.

Southern Red-backed Vole (Forest Service Sensitive Species Representative of Spruce Fir Vegetation Cover Type)

The southern red-backed vole is a good indicator of cool, mesic sites within high-elevation spruce/fir forests. Standing water has not been present in the vicinity of any localities where specimens have been collected for this species in Catron and Socorro counties (BISON-M 2009a). Within the Gila they have been documented in the Mogollons around rock slides in deep forested habitat on north-facing slopes, both at Willow Creek and along the road between Willow Creek and Mogollon. Other specimens have been taken at Mogollon Baldy, Apache Cabin, Bill Lewis Cienega, and McKnight Cabin (USDA Forest Service 2009e).

This species has been selected as a focal species for small mammals that occur in spruce/fir habitats.

Long-tailed Vole (Forest Service Sensitive Species, and Gila Management Indicator Species Representative of Wet Meadow, Wetland, and High Elevation Riparian Vegetation Cover Types)

Long-tailed voles are commonly found in mixed conifer and spruce/fir forests associated with meadows (USDA Forest Service 2009f). They are good indicators of permanent water in montane forests and are most abundant where there is grassy vegetation present on the forest floor. They can also be found in riparian areas associated with cottonwood/willow habitat at higher elevations and rockslides. They are common in areas of natural disturbance such as wildfire and/or areas that have been recently cut (BISON-M 2009b). In New Mexico they are very dependent on well-developed mesic meadows and montane forests. On the Gila National Forest the Long-tailed vole has been found near Willow Creek in the Mogollon Mountains and in the Mimbres (USDA Forest Service 2009f).

Arizona Montane Vole (Forest Service Sensitive Species Representative of Wet Meadow, Wetland, and High Elevation Riparian Vegetation Cover Types)

Throughout its range in Arizona, this vole inhabits dense damp to wet grassy areas at high alpine-like elevations. It is found primarily in the mountains and can extend above timberline (AZGFD 2004). In New Mexico, they are found in wet sedge, grass meadows bordering marshes and open water and in mesic meadows with dense tall grass surrounded by ponderosa pine and mixed conifer (BISON-M 2009c). In Catron County, this species has been documented near Center Fire Bog and Jenkins Creek (USDA Forest Service 2009g).

Long-tailed vole and Arizona montane vole have been selected as focal species for small mammals that occur in wetlands, wet meadows, and high elevation perennial riparian habitats.

Beaver (Gila Management Indicator Species Representative of Low, Middle and High Elevation Riparian Vegetation Cover Types)

Beaver occur in association with aquatic habitats including large rivers, streams, ponds and lakes. In small stream situations, beaver will build dams to form a pond in which the lodge is constructed. In large rivers, lakes and ponds, beaver build lodges in shallow water or dig dens in

banks. Dams are normally constructed of branches of riparian trees. However, other material may be utilized. For example, beaver occur at Apache Creek marsh in Catron County, New Mexico (Frey 1995). Three essential habitat features have been identified: (1) a water supply at least equal to that which will flow freely through a 1-inch pipe, (2) an ample food supply of trees and other plant materials, and (3) a location where disturbance by man is at a minimum (USDA Forest Service 2010a). Aquatic habitat physical features – numerous physical features of lakes and streams influence suitability for occupation by beaver (BISON-M 2010a).

This species has been selected as a focal/management indicator species for small mammals that occur in low, middle, and high elevation riparian habitats with perennial water.

White-nosed Coati (Forest Service Sensitive Species Representative of Low and Middle Elevation Riparian Vegetation Cover Types)

In the southwestern U.S., this species is typically found in canyons, usually near water, within oak-sycamore-walnut, oak-pine, or shrub-grass communities (NatureServe 2009a). White-nosed coatis in Arizona concentrate in riparian habitats, primarily in the piñon-oak-juniper woodlands, and may live in natural retreats such as rock crevices, cavities among tree roots, and caves or mines. In New Mexico, coatis inhabit canyons characterized by riparian vegetation such as sycamore and oaks. Elevation ranges from 1,670 to 9,450 feet (508 to 2,879 meters) with most sightings at intermediate altitudes from 5,250 to 6,900 feet (1,600 to 2,100 meters) (Gompper 1995, BISON-M 2009d). This species is a fairly common species on the Gila National Forest in the Burro Mountains, Gila River up to about the Forks Campground Area, San Francisco River Valley up to about Glenwood, and within the major tributaries of these larger rivers.

Western Red Bat (Forest Service Sensitive Species Representative of Low and Middle Elevation Riparian Vegetation Cover Types)

Day roosts are typically in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. They are associated with intact riparian habitat (particularly mature cottonwood, sycamore, oak, and walnut forest) below 6,500 feet elevation. Roost sites are generally obscured from view except from below, allowing the bat to drop downward for flight, and are generally located on the south or southwest side of a tree. Hibernation sites are largely unknown, but it is thought they burrow into leaf litter or dense grass, similar to eastern red bats (Bat Conservation International 2009). Summer habitat associations include: coniferous forest; closed piñon-juniper woodlands; open encinal oak; Great Basin shrublands; Mohave and Sonoran desert scrub; Chihuahuan desert grassland; short grass steppe; deciduous riparian forest including cottonwood, sycamore, walnut, and oak; dry and irrigated agricultural lands; mines and quarries; and urban habitats (USDA Forest Service 2009h).

Arizona Gray Squirrel (Forest Service Sensitive Species Representative of Low and Middle Elevation Riparian Vegetation Cover Types)

This gray squirrel inhabits hardwood, mixed oak and pine forests. They are found in river valleys and canyons, and where black walnuts and acorns are abundant. Also they are found in cottonwood and sycamore groves, where they make leaf nests in trees (USDA Forest Service 2009i). The Arizona gray squirrel is primarily limited to the deciduous riparian forest on the Gila. On the forest, an individual was collected in Mogollon at the upper limit of its range (at 7,000 feet) from a ponderosa pine area (BISON-M 2009e).

White-nosed coati, western red bat, and Arizona gray squirrel have been selected as focal species for small mammals that occur in low and middle elevation riparian areas.

Small Mammals – Effects by Alternative

Lesser Long-nosed Bat

No Action Alternative (Alternative B): Under this alternative there are approximately 78 miles of motorized routes in this analysis area (table 97). These routes continue to cause habitat loss. The potential for other types of direct effects to this bat or any other nectar feeding bat are very low. Russell et al. (2009) documented 0.6 percent highway mortality rate in an area with high traffic rates and a large number of bats emerging from their roost location. The potential for collision loss or poaching loss is low on Forest Service motorized routes because of the low traffic rates, low travel speeds, comparatively speaking low bat number, and this species is only active at night.

The potential disturbance area within this analysis area is approximately 5,974 acres. The habitat along existing routes has already been modified; therefore, in most cases ongoing existing uses may proceed with the same intensity with little risk of disturbing this species. 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 continues to be allowed across the Gila National Forest. These two types of uses continue to have the potential to impact long-nosed bat habitat. Additionally, these two types of uses perpetuate the development of additional roads and OHV routes; potentially allowing for the development of more routes than the 78 miles that are currently identified in this analysis area. So, under this alternative, through time the potential for the direct loss of habitat would increase.

Effect Common to all Action Alternatives (C, D, E, F, and G) (Table 97): Under these alternatives motorized cross-country travel is no longer allowed. The authorization to allow dispersed camping in these alternatives is reduced by 85 percent to 100 percent in areas with potential long-nosed bat habitat. No motorized areas are designated in this analysis area. 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 there is no suspected or known suitable foraging or roosting habitat on Gila National Forest in this analysis area. The lack of these habitat characteristics further limits the potential to cause direct and indirect effects to this species. Since no motorized areas are located in this analysis area under any of the alternatives, none of these actions will have an effect to this species or its habitat. In this analysis area, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 86 percent under alternative D, 42 percent under alternative F, 85 percent under alternative G, and 12 percent under alternative C.

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 approximately 36 percent in this analysis area under alternative E; 19 percent under alternative D; 11 percent under alternative F, and 12 percent under alternative G (table 97). The greater the reduction in the miles of routes, in this analysis area the less potential for direct and indirect effects to this species and its potential habitat. Miles of motorized routes and trails and acres of potentially affected habitat increase by 16 percent under alternative C. Since these are new miles and acres of disturbance there is a greater potential to cause direct and indirect to this species and it potential habitat under alternative C.

Table 97. Lesser long-nosed bat analysis area - existing condition and proposed changes by alternative

Lesser Long-nosed Bat Habitat* Analysis Area Habitat on NFS land = 15,457 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	77.88	90.44	63.20	49.92	69.51	68.20
Percent miles of Alt. B (existing)		16.12%	-18.86%	-35.91%	-10.75%	-12.43%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.))	6.56 mi. 1,052.10 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
U.S. Hwy, State Hwy, County Road (miles and acres)	20.86 mi. 2,282.07 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
Motorized Dispersed Camping (acres)	14,398.66	-12,327.73	-12,335.50	-14,398.66	-12,301.11	-12,297.30
Percent acres of Alt. B (existing)		-85.62%	-85.67%	-100.00%	-85.43%	-85.41%
Motorized Areas						
Motorized Big Game Retrieval (acres)	14,398.66	-1,700.74	-12,335.50	-14,398.66	-6,055.51	-12,297.30
Percent acres of Alt. B (existing)		-11.81%	-85.67%	-100%	-42.06%	-85.41%

*Burros Mountains Desert Shrub/Grassland

Table 98 displays the effects determination for the federally listed lesser long-nosed bat.

Table 98. Lesser long-nosed bat federally listed species determinations by alternative

Federally Listed Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Lesser long-nosed bat		*MANLAA	No Effect	No Effect	No Effect	No Effect

*MANLAA - May affect not likely to adversely affect determination

Southern Red-backed Vole

No Action Alternative (Alternative B): Under the existing condition for the southern red-backed vole/Spruce Fir Analysis Area no habitat occurs outside designated wilderness area; therefore, motorized routes are not having an effect in this analysis area or on the species associated with this habitat.

Under this alternative you continue to have motorized cross-country travel, dispersed camping, and big game retrieval allowed across the Gila National Forest, but since these uses are not allowed in wilderness areas the no action alternative is not having an effect on this species.

Action Alternatives (C, D, E, F, and G): Again, under the existing condition for the southern red-backed vole no habitat occurs outside designated wilderness area, and none of the action alternatives propose motorized use that would affect this habitat type; therefore, none of the action alternatives would affect in this analysis area or the species associated with this habitat (table 99).

Table 99. Forest Service sensitive species determinations by alternative

Forest Service Sensitive Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Southern red-backed vole		*NI	NI	NI	NI	NI

*NI – No Impact

Rationale for determination: Since no motorized use occurs in spruce fir habitat, the potential to affect individuals of this species does not exist; therefore, a determination of "no impact" is made for all action alternatives. None of the alternatives would affect the viability of this species. None of the alternatives would cause a trend toward Federal listing.

Hooded Skunk, Botta's Pocket Gopher, Gunnison's Prairie Dog, White Mountain Ground Squirrel, Beaver, Long-tailed Vole, Arizona Montane Vole, White-nosed Coati, Western Red Bat, and Arizona Gray Squirrel

No Action Alternative (Alternative B): For upland species of small mammals under this alternative there are approximately 1,617 miles of motorized routes in the hooded skunk and Botta's pocket gopher analysis area (table 100), and 621 miles of motorized routes in the Gunnison's prairie dog and White Mountain ground squirrel analysis area (table 101). For riparian and wetland species of small mammals under this alternative there are approximately 203 miles of motorized routes in the beaver analysis area (table 102); 21 miles of motorized routes in the long-tailed and Arizona montane vole analysis area (table 103); and 194 miles of motorized routes in the white-nosed coati, western red bat, and Arizona gray squirrel analysis area (table 104). These routes continue to cause habitat loss and the potential for direct effects like vehicle collision, poaching, and trapping to these species. The potential for collision loss does exist on Forest Service routes; however, lower traffic rates and travel speeds on forest routes reduce this potential. The potential disturbance zone for hooded skunks and Botta's pocket gopher is approximately 320,373 acres, and 94,684 acres for Gunnison's prairie dog and White Mountain ground squirrel. The potential disturbance zone for beaver is approximately 13,318 acres, 2,112 acres for long-tailed and Arizona montane voles, and 12,902 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, dispersed camping, and big game retrieval continues to be allowed across the Gila National Forest. These three types of uses continue to have potential effects to upland, riparian, and wetland species of small mammals. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road densities. 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) (Table 100, table 101, table 102, table 103, and table 104): 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 hooded skunk and Botta's pocket gopher analysis area motorized dispersed camping is reduced by approximately 97 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 89 to 100 percent; long-tailed and Arizona montane vole analysis area 89 to 100 percent; and 89 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, 92 to 97 percent under alternative D, 90 to 97 percent under alternative G, 20 to 46 percent under alternative F, and 5 to 19 percent under alternative C.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. Under all action alternatives in the vole analysis areas no areas currently exist and none have been designated. For the remaining analysis areas in this group under existing conditions you have from less than 0.5 acres to 14 acres in motorized areas. All action alternatives remove all the acreage from motorized areas for each of the analysis's areas in this group.

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 approximately 26 to 37 percent under alternative E; 17 to 21 percent under alternative D; 13 to 15 percent under alternative F, and 13 to 15 percent under alternative G. Under alternative C motorized routes are increased by 2.5 percent in the hooded skunk and Botta's pocket gopher analysis area, and reduced by less than 0.2 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 approximately 43 to 47 percent under alternative E; 30 to 32 percent under alternative D; 15 to 23 percent under alternative F, and 17 to 23 percent under alternative G. Under alternative C there is a 1 to 2 percent reduction in riparian analysis areas for small mammals.

In the shrub and woodland communities used by hooded skunks and Botta pocket gophers alternative E adds approximately 9 miles; alternative D, 59 miles; alternative F, 72 miles; alternative G, 71 miles; and alternative C, 113 miles. Many of these are unauthorized, user created routes that are being used, since the entire Forest is currently open to cross-country travel. In the Plains and Mountain grassland communities used by prairie dogs and White Mountain ground squirrels alternative E adds approximately 1.5 miles; alternatives D, F, and G, 9 miles; and alternative C, 10 miles. In the low, middle and high elevation riparian communities used by beavers alternative E adds approximately 0.4 mile; alternatives D, F, and G, approximately 2 miles; and alternative C, 14 miles. In the Wet Meadow, Wetland, and High Elevation riparian analysis area used by the long-tailed vole and Arizona Montane vole no routes are added under alternatives D, E, F, or G; and 0.4 mile is added under alternative C. In the low and middle elevation riparian analysis area used by the white-nosed Coati, western red bat, and Arizona Gray Squirrel alternative E adds approximately 0.6 mile; alternatives D and F, 2 miles; alternative G, 3 miles; and alternative C, 14 miles of routes. As stated above, many of these routes are currently being used since the entire forest is currently open to cross-country travel; therefore, currently they are causing direct and indirect effect to the species that use these habitat types. Overall, in all the analysis areas for small mammals, alternatives D to G reduce the total routes by 13 to

47 percent. Alternative C provides the least amount of benefit to this group of species reducing the number of routes by 0.2 to 2.3 percent in the different analysis area, and in the Desert Shrub and Piñon-Juniper/shrub oak woodland actually increasing the number of routes by approximately 2.5 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. In analysis areas where alternative C increases the number of routes above the existing condition there will be an increase in the amount of direct and indirect effects from motorized routes.

Table 100. Hooded skunk and Botta's pocket gopher analysis area - existing condition and proposed changes by alternative

Hooded Skunk - Botta's Pocket Gopher Habitat* Analysis Area on NFS land = 1,628,703 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	1,617.24	1,656.85	1,272.07	1,020.73	1,370.30	1,367.82
Percent miles of Alt. B (existing)		2.45%	-21.34%	-36.88%	-15.27%	-15.42%
Motorized Dispersed Camping (acres)	1,207,266.24	-1,165,617.89	-1,174,308.15	-1,207,266.24	-1,168,913.87	-1,171,095.60
Percent acres of Alt. B (existing)		-96.55%	-97.27%	-100%	-96.82%	-97.00%
Motorized Areas						
Motorized Area - All Vehicles (acres)	14.19	0.00	-14.19	-14.19	0.00	0.00
Motorized Area - OHV Only (acres)	0.26	0.00	-0.26	-0.26	0.00	0.00
Motorized Big Game Retrieval (acres)	1,207,266.24	-234,103.82	-1,174,308.15	-1,207,266.24	-549,684.46	-1,171,095.60
Percent acres of Alt. B (existing)		-19.39%	-97.27%	-100%	-45.53%	-97.00%

*Desert Shrub and Piñon-Juniper/Shrub Oak Woodland

Table 101. Gunnison's prairie dog and White Mountain ground squirrel analysis area - existing condition and proposed changes by alternative

Gunnison's Prairie Dog - White Mtn. Ground Squirrel Habitat* Analysis Area on NFS land = 232,217 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	621.21	620.28	516.80	457.56	542.85	541.15
Percent miles of Alt. B (existing)		-0.15%	-16.81%	-26.34%	-12.61%	-12.89%

Gunnison's Prairie Dog - White Mtn. Ground Squirrel Habitat* Analysis Area on NFS land = 232,217 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Motorized Dispersed Camping (acres)	221,523.57	-206,062.72	-209,143.33	-221,523.57	-206,142.42	-207,318.43
Percent acres of Alt. B (existing)		-93.02%	-94.41%	-100%	-93.06%	-93.59%
Motorized Areas						
Motorized Area - All Vehicles (acres)	1.47	0.00	-1.47	-1.47	0.00	0.00
Motorized Area - OHV Only (acres)	3.05	0.00	-3.05	-3.05	0.00	0.00
Motorized Big Game Retrieval (acres)	221,523.57	-11,579.92	-209,143.33	-221,523.57	-43,480.83	-207,318.43
Percent acres of Alt. B (existing)		-5.23%	-94.41%	-100%	-19.63%	-93.59%

*Plains and Mountain Grassland

Table 102. Beaver analysis area - existing condition and proposed changes by alternative

Beaver Habitat* Analysis Area on NFS land = 34,452 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	203.04	200.95	141.35	115.47	172.16	167.56
Percent miles of Alt. B (existing)		-1.03%	-30.38%	-43.13%	-15.21%	-17.47%
Motorized Dispersed Camping (acres)	22,948.14	-20,507.85	-21,463.79	-22,948.14	-21,063.15	-21,326.34
Percent acres of Alt. B (existing)		-89.37%	-93.53%	-100%	-91.79%	-92.93%
Motorized Areas						
Motorized Area - All Vehicles (acres)	0.04	0.00	-0.04	-0.04	0.00	0.00
Motorized Big Game Retrieval (acres)	22,948.14	-3,998.41	-21,463.79	-22,948.14	-8,868.72	-21,326.34
Percent acres of Alt. B (existing)		-17.42%	-93.53%	-100%	-38.65%	-92.93%

*Low, Middle and High Elevation Riparian

Table 103. Long-tailed vole and Arizona montane vole analysis area - existing condition and proposed changes by alternative

Long-tailed Vole - Arizona Montane Vole Habitat (Wet Meadow, Wetland and High Elevation Riparian) Analysis Area on NFS land = 6,020 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	21.12	20.63	14.46	11.24	16.26	16.26
Percent miles of Alt. B (existing)		-2.28%	-31.54%	-46.75%	-23.01%	-23.01%
Motorized Dispersed Camping (acres)	3,363.58	-3,006.71	-3,104.85	-3,363.58	-3,009.80	-3,041.13
Percent acres of Alt. B (existing)		-89.39%	-92.31%	-100%	-89.48%	-90.41%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	3,363.58	-417.84	-3,104.85	-3,363.58	-965.90	-3,041.13
Percent acres of Alt. B (existing)		-12.42%	-92.31%	-100%	-28.72%	-90.41%

Table 104. White-nosed coati, western red bat, and Arizona gray squirrel analysis area - existing condition and proposed changes by alternative

White-nosed Coati, Western Red Bat, Arizona Gray Squirrel Habitat (Low and Middle Elevation) Analysis Area on NFS Land = 30,142 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	193.55	191.53	135.07	110.11	164.70	160.11
Percent miles of Alt. B (existing)		-1.04%	-30.22%	-43.11%	-14.91%	-17.28%
Motorized Dispersed Camping (acres)	21,153.04	-18,773.71	-19,688.83	-21,153.04	-19,328.62	-19,588.85
Percent acres of Alt. B (existing)		-88.75%	-93.08%	-100%	-91.38%	-92.61%
Motorized Areas						
Motorized Area - All Vehicles (acres)	0.04	0.00	-0.04	-0.04	0.00	0.00
Motorized Big Game Retrieval (acres)	21,153.04	-3,587.65	-19,688.83	-21,153.04	-7,986.47	-19,588.85
Percent acres of Alt. B (existing)		-16.96%	-93.08%	-100%	-37.76%	-92.61%

Table 105 and table 106 display the effects determinations for small mammals listed as Forest Service sensitive species and Gila National Forest management indicator species.

Table 105. Small mammal Forest Service sensitive species determination by alternative

Sensitive Species	Alt. B - Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. 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
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

*MI – May impact

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 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. In comparison to the existing condition the relative risk to these species are reduced the most by alternative E then D, G, F, and C, respectively.

Table 106. Small mammal Gila National Forest management indicator species determination by alternative

Management Indicator Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Long-tailed vole		NA	NA	NA	NA	NA
Beaver		NA	NA	NA	NA	NA

*NA – No adverse effects to the population or habitat trends

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 and minor amounts of habitat under all action alternatives still exists; but none will adversely affect population levels or habitat trends for these two species.

Amphibians and Reptiles

Table 107 identifies the amphibian and reptiles assessed in this section.

Table 107. Amphibian and reptile species selected to be analyzed and rationale for selection

Species Analyzed	Rationale For Selection
Chiricahua leopard frog	Federally Listed "Threatened" Species
Mexican gartersnake	FS Sensitive Species
Arizona toad	FS Sensitive Species
Narrow-headed gartersnake	FS Sensitive Species
Reticulate Gila monster	FS Sensitive Species

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.

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, habitat fragmentation, and herpetofauna have even been documented to suffer from vehicle noise (table 108). 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 USFWS), and the change in the number of road stream crossings within this zone (table 109).

Amphibian and Reptile Summary

Table 108. Summary of potential motorized route affects, analysis factors, and analysis indicators for amphibians and reptiles

Road Associated Factors	Motorized Trail/ORV Associated Factors	Combined Analysis Factors	Analysis Indicator
Collisions, collection	Collisions, collection	Harvest/Direct effects	Route miles
Disturbance, displacement, avoidance, harassment	Disturbance, displacement, avoidance, harassment	Disturbance/Indirect effects	Disturbance zone summarized in acres

Table 109. 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
Chiricahua leopard frog	Motorized trail/ORV 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 and the area within the disturbance zone.
Mexican gartersnake	Motorized trail/ORV and roads	Route miles	250 meters	Low elevation riparian
Arizona toad Narrow-headed gartersnake	Motorized trail/ORV and roads	Route miles	250 meters	Low, middle, and high elevation riparian
Retculate Gila monster	Motorized trail/ORV and roads	Route miles	250 meters	Desert shrub/Grassland

Chiricahua Leopard Frog (Federally "Threatened" Species)

Aquatic habitats used by this species include a variety of natural and human-constructed waters between elevations of 3,281 and 8,890 feet. Aquatic habitats include rivers, permanent streams and permanent pools in intermittent streams, beaver ponds, cienegas (i.e., wetlands), springs, and earthen livestock tanks. They are also occasionally found in livestock drinkers, irrigation sloughs or ditches, wells, abandoned swimming pools, ornamental ponds, and mine adits (Southwest Endangered Species Act Team 2008).

On the Gila National Forest we have eight reasonable dispersal areas (populations) considered occupied. 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. 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 (USFWS 2007b). 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 (R. Jennings, pers. comm. 2006; USFWS 2007b). Based on observations of various ranids in Arizona and New Mexico (USFWS 2007b), reasonable dispersal distances for the species are (1) 1 mile overland, (2) 3 miles along intermittent drainages, and (3) 5 miles along permanent water courses (USFWS 2007b), or some combination thereof.

Chiricahua Leopard Frog Summary - For Chiricahua leopard frogs, defining the action area of a proposed project must consider the reasonable dispersal capabilities of the species, and the likelihood/extent of any downstream or upstream effects that might arise from the proposed action. For this species, miles of road within the reasonable dispersal distances from occupied sites will be the indicator that is used to analyze the potential for harvest and disturbance under the different alternatives. Reasonable dispersal distances for the frog from occupied habitats to sites being evaluated for occupancy include: (a) within 1 mile overland, (b) within 3 miles along an ephemeral or intermittent drainage, or (c) within 5 miles along a perennial stream, or some combination thereof. The Gila has completed an extensive amount of survey work for this species over the 9 years; over this period of time the number of populations on the Gila has continued to decline as a result of Chytridiomycosis. 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 will provide the bases needed to determine the potential affects to this species from the different alternatives.

Mexican Gartersnake (Forest Service Sensitive Species (federally proposed) Representative of Low Elevation Riparian Vegetation Cover Types)

Despite the variety of terrestrial habitats that this species has been documented in, Mexican gartersnakes are typically an aquatic species. They are associated with marshes (rush/bulrush/sedge/cattail), lowland riparian (cottonwood/sycamore), and springs. The aquatic components of their habitats are characterized by shallow, slow-moving, and at least partially

vegetated waters. Mexican gartersnakes forage along the banks of waterbodies. An important component of suitable Mexican gartersnake habitat is a stable prey base. They feed primarily upon native fish, but also supplement their diet with vertebrates such as lizards, small rodents, salamanders, and hylid frogs (treefrogs), and earthworms, leeches, and slugs. Recently this species has been documented to occur in the Gila Bird Area of the forest.

This species has been selected as focal species for reptiles that occur in low elevation riparian areas.

Arizona Toad (Forest Service Sensitive Species Representative of Low, Middle, and High Elevation Riparian Vegetation Cover Types)

Arizona toads are usually associated with permanent ponds or rocky streams with relatively shallow water flowing over sandy or rocky bottoms. The species may also inhabit small streams and rivers, and temporary woodland pools (BISON-M 2009f). It is generally found in unaltered sycamore or cottonwood riparian areas. Normally breeds in early spring, February to July (earlier at lower elevations) shortly after the snowmelt in New Mexico, and often while there is still ice on the ponds (Degenhardt et al. 1996, BISON-M 2009f). Unlike many toads in New Mexico, *B. miscroscaphus* does not depend upon spring or summer rains to stimulate breeding activity. This may be a result of breeding in streams and ponds where there is usually permanent water. Adults are primarily nocturnal except during the breeding season, and estivate/hibernate in burrows dug within soil, fallen logs or other debris (BISON-M 2009f).

This species has been selected as focal species for amphibians that occur in low, middle, and high elevation riparian areas.

Narrow-headed Gartersnake (Forest Service Sensitive Species (federally proposed) Representative of Low, Middle, and High Elevation Riparian Vegetation Cover Types)

In New Mexico, the snake is known from the Gila and San Francisco watersheds within Hidalgo, Grant, and Catron counties in southwestern New Mexico. This species is considered highly aquatic, even for gartersnakes (Degenhardt et al. 1996). The species is found in clear water along the edges of riffles and pools of permanent and semi-permanent rocky streams. In New Mexico, the snake is found most associated with abundant streamside vegetation, presumably used for basking and for escape opportunities. This snake basks on rocks, boulders, and vegetation along stream banks, seeking shelter in crevices and under rocks. Hibernation takes place well above the flood line, in rocky outcroppings, during late fall and winter (USDA Forest Service 2010b). This species occurs along many of the perennial drainages on the forest.

This species has been selected as focal species for reptiles that occur in low, middle, and high elevation riparian areas.

Reticulate Gila Monster (Forest Service Sensitive Species Representative of Desert Shrub/Grassland Vegetation Cover Types)

In New Mexico, this species occurs in desert shrub and, more rarely, woodland and grassland habitats most commonly associated with rocky regions of mountain foothills and canyons. It is found from sea level to about 5,000 feet in elevation (Stebbins 2003). Dominant vegetation often includes creosote bush, mesquite, acacia, ocotillo, and snakeweed. The seasonal activity period extends from March to November, although Gila monsters can be encountered basking at shelter

entrances during the winter and early spring. Above-ground travels range from a few meters around shelter entrances, to forays over 1.5 kilometers, and these lizards can also climb (Degenhardt et al. 1996).

This species has been selected as focal species for reptiles that occur in desert shrub, and grassland vegetation areas.

Amphibians and Reptiles – Effects by Alternative

Chiricahua Leopard Frog

No Action Alternative (Alternative B): Under this alternative there are approximately 82 miles of motorized routes within a reasonable dispersal area of occupied chiricahua leopard frog sites, and 76 stream crossings within the this dispersal zone (table 110). In designated critical habitat there are approximately 5 miles of routes and 22 stream crossings (table 111). 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. ORVs have also been documented to cause direct mortality (Maxwell and Hokit 1999). Motor vehicles on roads and ORVs also affect habitat quality, habitat 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 even under lower travel speeds; even though these lower traffic rates and speeds do reduce this potential. The potential for take associated with poaching also exist. Increase in the level of use on these routes through time would increase the potential for direct and indirect effects. These miles of routes and stream crossings also modify, and cause the loss of habitat.

Under this alternative, motorized cross-country travel and dispersed camping continues to be allowed across the Gila National Forest. These two types of uses continue to have the potential to impact the Chiricahua leopard frog in habitats that are located within designated critical habitat (1,873 acres), and within the dispersal distances of this species (43,600 acres). Additionally, these two types of uses perpetuate the development of additional roads and OHV routes; potentially allowing for the development of more routes and stream crossings. 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) (Table 110 and table 111): 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 dispersed camping in these alternatives reduces the potential affects from this activity by 97 percent to 100 percent within the dispersal analysis area and 99 to 100 percent in designated critical habitat. No motorized areas are designated within these two analysis areas. 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.

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 dispersal analysis area are reduced by approximately 43 percent (-36 miles) under alternative E; 14 percent (-12 miles) under alternative D; 9 percent (-7 miles) under alternative F, 5 percent (-4 miles) under alternative G, and 1 percent (-1 mile) under alternative C (table 110). Miles of motorized routes and trails and acres of

potentially affected habitat within the designated critical habitat analysis area are reduced by approximately 24 percent under alternative E; 7 percent in alternatives D, F, and G; and 0 percent under alternative C (table 111). Under the existing condition 76 stream crossings are within the dispersal analysis area. This number is reduced by 57 percent under alternative E to 33 crossings; by 29 percent under alternative D to 54 stream crossings; by 24 percent under alternative F to 58 crossings; by 3 percent under alternative G to 74 stream crossings; and by 1 percent under alternative C to 75 crossings. Under alternative E, 25 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. Converting these routes to administrative routes greatly reduces the potential use; therefore, reducing the potential for direct effects. Under the existing condition you have 22 stream crossings within the designated critical habitat analysis area. Alternative E reduces the number of stream crossings by one; none of the other action alternative reduces the number of stream crossings in this analysis area. They all convert the majority of these crossings to administrative routes. In alternatives C, D, E, F, and G, 16 of the crossings go to administrative use only. 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 change 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 designated critical habitat is relative to the amount of miles and stream crossings reduced and the reduction in use on these routes.

The area of potentially affected habitat for motorized big game retrieval within the dispersal analysis area is reduced by 100 percent under alternative E, 98 percent under alternative D, 42 percent under alternative F, 97 percent under alternative G, and 13 percent under alternative C. The area of potentially affected habitat for motorized big game retrieval within the designated critical habitat analysis area is reduced by 100 percent under alternative E, 99.7 percent under alternative D, 51 percent under alternative F, 99 percent under alternative G, and 12 percent under alternative C.

Table 110. Chiricahua leopard frog analysis area - existing condition and proposed changes by alternative

Chiricahua Leopard Frog Reasonable Dispersal Analysis Area (8 reasonable dispersal areas) on NFS lands = 78,504 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	81.78	81.35	69.97	46.34	74.72	77.94
Percent miles of Alt. B (existing)		-1%	-14%	-43%	-9%	-5%
Cumulative Effects						
Private Rd Including ROW/Assert (miles)	9.59	0.00	0.00	0.00	0.00	0.00
U.S. Hwy, State Hwy, County Rd (miles)	17.00	0.00	0.00	0.00	0.00	0.00
Routes Crossing Streams						
Number of Open Existing ML 2 - ML 5	76	-21	-43	-68	-39	-23
Number of Administrative Routes	0	20	21	25	21	21
Total Number of NFS Routes and Trails Crossings	76	75	54	33	58	74
Percent change of Alt. B (existing)		-1%	-29%	-57%	-24%	-3%
Number of Private Rd. Stream Crossings	1	0	0	0	0	0
Motorized Dispersed Camping (acres)	43,599.82	-42,101.93	-42,516.70	-43,599.82	-42,223.96	-42,184.97
Percent acres of Alt. B Existing		-97%	-98%	-100%	-97%	-97%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	43,599.82	-5,489.36	-42,516.70	-43,599.82	-18,498.68	-42,184.97
Percent acres of Alt. B (existing)		-13%	-98%	-100%	-42%	-97%

Table 111. Chiricahua leopard frog critical habitat analysis area - existing condition and proposed change table by alternative

Chiricahua leopard frog Critical Habitat on NFS land = 3,259 acres (outside of wilderness)	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	5.22	5.22	4.83	3.94	4.83	4.83
Percent miles of Alt.B Existing		0%	-7%	-24%	-7%	-7%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles)	1.19	0.00	0.00	0.00	0.00	0.00
U.S. Hwy, State Hwy, County Road (miles)	4.22	0.00	0.00	0.00	0.00	0.00
Routes Crossing Streams						
Number of open existing ML 2 - ML 5	22	-16	-16	-17	-16	-16
Number of dministrative Routes	0	16	16	16	16	16
Total number of NFS Routes and Trails Crossings	22	22	22	21	22	22
Percent Change of Alt. B (existing)		0%	0%	-5%	0%	0%
Number of Private Rd. Stream Crossings	0	0	0	0	0	0
Motorized Dispersed Camping (acres)	1,873	-1,849	-1,868	-1,873	-1,862	-1,849
Percent acres of Alt. B (existing)		-99%	-99.7%	-100%	-99%	-99%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	1,873	-227	-1,868	-1,873	-951	-1,849
Percent acres of Alt. B (existing)		-12%	-99.7%	-100%	-51%	-99%

Table 112 displays the effects determination for the federally listed Chiricahua leopard frog and its designated critical habitat.

Table 112. Chiricahua leopard frog federally listed species determination by alternative

Federally Listed Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Chiricahua leopard frog		MALAA	MALAA	MALAA	MALAA	MALAA
Chiricahua leopard frog designated critical habitat		MANLAA	MANLAA	MANLAA	MANLAA	MANLAA

*MALAA- May affect likely to adversely affect determination

Rationale for species determination: Under alternative E, the change results in a 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 has the potential to cause direct effects, 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.

Rationale for critical habitat determination: All action alternatives reduce the level of effect to Chiricahua leopard frog critical habitat. Alternative E reduces the number of stream crossing by one, and the remainder of the alternative change 2.24 to 3.51 miles to administrative use only; reducing 16 stream crossing in each alternative to administrative use. Under all alternatives the level of effect is greatly reduced to critical habitat. Although these changes in motorized are primarily beneficial, authorized motorized use that will continue has some adverse effects on critical habitat.

Active sediment transport along the road will be reduced in correlation to reduced amount of use. However, since the road prism will remain intact, surface runoff that is intercepted by existing road prisms will continue to transport some sediment along roads and directly in the stream channel in areas. Similarly, stream crossings will persist. Additional sediment from roads and changes to vegetative habitat associated with stream crossings is known to have potential adverse effects to Chiricahua leopard frog breeding habitat in terms of water quality and cover.

The primary constituent elements of designated critical habitat are expected to remain intact and serve their intended function for potential breeding and dispersal considering that motorized use will be reduced from current levels, only a small amount of habitat is affected, and the use occurs on road prisms that are already present.

For these reasons, a determination of "May affect, Likely to Adversely Affect" is made for designated Chiricahua leopard frog critical habitat.

Mexican Gartersnake, Arizona Toad, Narrow-headed Gartersnake, and Reticulate Gila Monster

No Action Alternative (Alternative B): Under the existing condition for reptiles and amphibians, there are approximately 54 miles of motorized routes in the Mexican gartersnake analysis area (table 113), 203 motorized routes in the Arizona toad and narrow-headed gartersnake analysis area (table 114), and 92 miles of motorized routes in the reticulate Gila

monster analysis area (table 115). 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. ORVs have also been documented to cause direct mortality (Maxwell and Hokit 1999). Motor vehicles on roads and ORVs also affect habitat quality, habitat 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 even under lower travel speeds; even though lower traffic rates and speeds do reduce this potential. The potential for take associated with poaching also exists. Increase in the level of use on these routes through time would increase the potential for direct and indirect effects. These miles of routes and stream crossings also modify, and cause the loss of habitat.

The potential disturbance zone for Mexican gartersnake is approximately 4,008 acres, 13,352 acres for Arizona toad and narrow headed gartersnake, and 8,573 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 you continue to have motorized cross-country travel, dispersed camping, and big game retrieval allowed across the Gila National Forest. These three types of uses continue to have potential effects to upland, riparian, and wetland species of reptiles and amphibians. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road densities. 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 affects to these species.

Action Alternatives (C, D, E, F, and G) (Table 113, table 114, and table 115): 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 Mexican gartersnake, Arizona toad and narrow headed gartersnake, and Gila monster analysis areas motorized dispersed camping is reduced by 89 to 100 percent under all action alternatives. For these focal species, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 90 to 97 percent under alternative D, 37 to 40 percent under alternative F, 90 to 97 percent under alternative G, and 14 to 17 percent under alternative C.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. In the Mexican gartersnake and Gila monster analysis areas, no areas currently exist and no areas have been designated. In the Arizona toad and narrow-headed gartersnake analysis area under the existing condition you have 0.04 acre in a motorized area; all action alternatives eliminate this area in this analysis area. Since none of the alternatives maintain motorized areas within these analysis areas, there will be no direct or indirect effect to this group of species from activities associated with motorized areas.

Miles of motorized routes and trails and acres of potentially affected habitat within the analysis area for reptiles and amphibians are reduced by 30 to 43 percent under alternative E; 17 to 30 percent under alternative D; 3 to 15 percent under alternative F, and 12 to 17 percent under alternative G. Under alternative C, motorized routes are increased by 14 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.

In the low-elevation riparian analysis area used by the Mexican gartersnake, alternative E adds approximately 0 mile; alternative D, 0.4 mile; alternative F, 0.5 mile; alternative G, 1 mile; and alternative C, 2.6 miles. Many of these are unauthorized, user-created routes that are being used, since the entire Forest is currently open to cross-country travel. In the low, middle, and high elevation riparian analysis area used by Arizona toads and narrow-headed gartersnakes, alternative E adds approximately 0.6 mile; alternative D, 2.4 miles; alternative F, 2.5 miles; alternative G, 3.1 miles; and alternative C, 14.5 miles. In the desert shrub/grassland analysis area used by the Gila monster, alternative E adds approximately 1 mile; alternative D, 5.9 miles; alternative F, 11 miles; alternative G, 10 miles; and alternative C, 14.4 miles. As stated above, many of these routes are currently being used since the entire forest is open to cross-country travel; therefore, they are causing direct and indirect effects to the species that use these habitat types. Overall, in these three analysis areas for reptiles and amphibians, alternatives D to G reduce the total routes by 3 to 43 percent. Alternative C provides the least amount of benefit to this group of species, reducing the number of routes by 1 percent in the low, middle, and high riparian analysis area, and in the remaining analysis areas actually increasing the number of routes by 3 to 14 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. In analysis areas where alternative C increases the number of routes above the existing condition there will be an increase in the amount of direct and indirect effects from motorized routes.

Table 113. Mexican gartersnake analysis area - existing condition and proposed changes by alternative

Mexican Gartersnake Habitat (Low Elevation Riparian) Analysis Area on NFS Land = 9,283 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	54.37	55.85	44.53	37.93	52.52	46.14
Percent miles of Alt. B (existing)		2.72%	-18.09%	-30.24%	-3.39%	-15.13%
Motorized Dispersed Camping (acres)	6,944.62	-6,184.38	-6,722.36	-6,944.62	-6,506.50	-6,709.25
Percent acres of Alt. B (existing)		-89.05%	-96.80%	-100%	-93.69%	-96.61%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	6,944.62	-997.42	-6,722.36	-6,944.62	-2,567.47	-6,709.25
Percent acres of Alt. B (existing)		-14.36%	-96.80%	-100%	-36.97%	-96.61%

Table 114. Arizona toad and narrow-headed gartersnake analysis area - existing condition and proposed changes by alternative

Arizona Toad – Narrow-headed Gartersnake Habitat (Low, Middle and High Elevation Riparian) Analysis Area on NFS Land = 34,452 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	203.04	200.95	141.35	115.47	172.16	167.56
Percent in Miles of Alt. B (Existing)		-1.03%	-30.38%	-43.13%	-15.21%	-17.47%
Motorized Dispersed Camping (acres)	22,948.14	-20,507.85	-21,463.79	-22,948.14	-21,063.15	-21,326.34
Percent acres of Alt. B (existing)		-89.37%	-93.53%	-100%	-91.79%	-92.93%
Motorized Areas (acres)	0.04	0.00	-0.04	-0.04	0.00	0.00
Motorized Big Game Retrieval (acres)	22,948.14	-3,998.41	-21,463.79	-22,948.14	-8,868.72	-21,326.34
Percent acres of Alt. B (existing)		-17.42%	-93.53%	-100%	-38.65%	-92.93%

Table 115. Reticulate Gila monster analysis area - existing condition and proposed changes by alternative

Reticulate Gila Monster Habitat (Desert Shrub/Grassland) Analysis Area on NFS Land = 26,067 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	92.21	105.25	76.45	61.31	82.62	81.31
Percent miles of Alt. B (existing)		14.14%	-17.09%	-33.51%	-10.40%	-11.82%
Motorized Dispersed Camping (acres)	23,476.04	-20,851.30	-21,090.69	-23,476.04	-20,843.61	-20,973.64
Percent acres of Alt. B (existing)		-88.82%	-89.84%	-100%	-88.79%	-89.34%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	23,476.04	-2,679.96	-21,090.69	-23,476.04	-9,330.32	-20,973.64
Percent acres of Alt. B (existing)		-11.42%	-89.84%	-100%	-39.74%	-89.34%

Table 116 displays the effects determination for amphibians and reptiles listed as Forest Service sensitive species.

Table 116. Amphibian and reptile Forest Service sensitive species determination by alternative

Sensitive Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. 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

*MI – May impact

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 these 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. In comparison to the existing condition the relative risk to these species are reduced the most by alternative E then D, G, F, and C, respectively.

Raptorial Birds

Table 117 identifies the raptorial birds assessed in this section.

Table 117. Raptorial birds - species selected to be analyzed and rationale for selection

Species Analyzed	Rationale For Selection
Mexican spotted owl[1]	Federally Listed "Threatened" Species with designated critical habitat, Management Indicator Species Representative of Mixed Conifer Habitat Cover Type, and NM PIF High Priority Species.
Northern goshawk[2]	FS Sensitive Species, Management Indicator Species Representative of Ponderosa Pine Habitat Cover Type, and NM PIF High Priority Species
Peregrine falcon[3]	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

[1] 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, flammulated owl, and red-faced warbler. The disturbance zone for these upland birds is similar to that of the Mexican spotted owl).

[2] 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, Virginia's warbler, Grace's warbler, pygmy nuthatch, Lewis's woodpecker, and red-faced warbler).

[3] 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 and white-throated swift).

Analyses for this document in regard to avian species are based on an extensive literature review, the Gila National Forest Plan (USDA Forest Service 1986), The Mexican Spotted Owl Recovery Plan (USFWS 1995 and 2012b), Northern Goshawk Management Recommendations (Reynolds et al. 1992), and the New Mexico Partners in Flight (NMPIF) Draft Land Bird Conservation Plan for the State of New Mexico (New Mexico Partners in Flight 2007).

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, habitat modification, and road effects to migratory bird species (table 118). 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 to be 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 (table 119).

Human activities can impact raptorial birds (hawks, falcons, and owls) by physically harming or killing birds, altering habitats, or by 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 (Holmes et al. 1993; Richardson and Miller 1997). 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, Grubb et al. 1998). 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 pre-dates 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 2007c).

Table 118. Summary of potential motorized route affects, analysis factors, and analysis indicators for raptors

Road Associated Factors[1]	Motorized Trail/ORV Associated Factors	Combined Analysis Factors	Analysis Indicator
Collisions collection poaching	Collisions collection poaching	Harvest/Direct effects	Route miles
Disturbance, displacement, avoidance, harassment	Disturbance, displacement, avoidance, harassment	Disturbance/Indirect effects	Disturbance zone summarized in acres

Table 119. 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
Mexican spotted owl	Motorized trail and roads	Route miles	105 meters	PACs Critical Habitat Mixed Conifer
Northern goshawk	Motorized trail/ORV and roads	Route miles	400 meters	PFAs Ponderosa Pine
Peregrine falcon	Motorized trail/ORV and roads	Route miles	2,200 meters	Peregrine Nest Area
Bald eagle	Motorized trail/ORV and roads	Route miles	500 meters	Quemado Lake, Snow Lake, and Lake Roberts
Golden eagle	Motorized trail/ORV and roads	Route miles	200 meters	Desert shrub/Grassland

Mexican Spotted Owl [Federally "Threatened" Species with designated critical habitat, Management Indicator Species Representative of Mixed Conifer Habitat Cover Type, and NM PIF High Priority Species with Known Management Areas Defined on the Gila National Forest]

The Mexican spotted owl (MSO) occurs in varied habitat, consisting of mature montane forest and woodland, shady wooded canyons, and steep canyons. In forested habitat, uneven-aged stands with a high canopy closure, high tree density, and a sloped terrain appear to be key habitat components. They can also be found in mixed conifer and pine-oak vegetation types. Generally nests are in older forests of mixed conifer or ponderosa pine/Gambel oak. Nests are found in live trees in natural platforms (e.g., dwarf mistletoe brooms), snags, and on canyon walls. Elevation ranges from 1,249 to 2,743 meters (4,100 to 9,000 feet). The Mexican Spotted Owl Recovery Plan divided the range of the owl into five geographic areas called "ecological management units." Two ecological management units partially occur within the boundary of the Gila National Forest the Basin and Range West and the Upper Gila Mountains. No known owl PACs occur in the Basin and Range West ecological management units. The Upper Gila Mountains Ecological Management Unit contains the largest known number of Mexican spotted owls of all the ecological management units with 55 percent of known Mexican spotted owl territories in 1995 (USFWS 1995). The forest plan 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 287 protected activity centers (PACs); and approximately 604,825 acres of designated critical habitat outside of wilderness areas. The Gila has the highest number of PACs 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 (70,295 acres non-wilderness and 56,103 acres wilderness). Ganey 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.

The Mexican Spotted Owl Recovery Plan (USFWS 2012b) 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.

> "Depending on the extent, intensity, and duration, recreational disturbance may have negative impacts on owl habitat. For example, the number of people who drive OHVs off road has increased over 109% in the U.S. since completing the 1995 Recovery Plan (Cordell 2004). In addition, from 1997 to 2001, the number of OHVs in use increased by almost 40%, OHV drivers increased by 36%, and OHV driving hours increased by 50% (68 FR 19975; April 23, 2003). The significant increase in OHV use, OHV-associated impacts to natural resources, and a desire to provide better OHV management have precipitated development of Travel Management Plans for all NFS lands as well as implementation of a 2009 Arizona OHV Law (SB1167). These actions illustrate that both Federal and state agencies have identified OHV recreational activity as a concern."

The 1995 USFWS recovery plan also states that noise produced from vehicles may disturb spotted owls at important nesting and roost sites. On a local scale, roads and trails through PACs may fragment habitat continuity, alter natural movement patterns, and increase disturbance to resident owls. Roads in nest/roost, forested, and riparian recovery habitat may also result in loss of habitat components (e.g., large logs, large snags, hardwoods) as people access these areas for fuelwood cutting, and in sensitive riparian areas, roads and trail can inhibit hydrological processes that affect proper functioning ecological conditions (USFWS 2012b). 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 owls, Delaney et al. (1999) found that owls did not flush from roosts or nests when chainsaws 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 2004). A study investigating noise disturbance from helicopters on the Lincoln National Forest indicated that a 105-meter buffer zone for helicopter over flights 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 PACs, 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 with in PACs, Critical habitat, and Mixed Conifer vegetation types as it pertains to the existing condition and to the change proposed in each alternative.

Northern Goshawk (Regionally Sensitive Species, Management Indicator Species Representative of Ponderosa Pine Habitat Cover Type, and NM PIF High Priority Species with Known Management Areas Defined on the Gila National Forest)

Northern goshawks occupy a variety of habitats including mature coniferous and deciduous forests, typically from approximately 4,750 to 9,120 feet in elevation (AZGFD 2003). The principal forest types occupied by the goshawk in the Southwest are ponderosa pine, mixed-species, and spruce/fir. Nest sites are generally in stands of larger trees with dense canopy cover, and generally in larger tracts of forests over smaller tracts. Reynolds (1983), reports that goshawks apparently prefer to nest within one-quarter mile of water in forest blocks greater than 80 hectares in size which contain small openings. In Arizona, goshawks nest most commonly in ponderosa pine forests along the Mogollon Rim (AZGFD 2003). On the Gila National Forest, nests have also typically been located in ponderosa pine vegetation.

A post-fledgling family area (PFA) is the area of concentrated use by the goshawk family after the young leave the nest (Reynolds et al. 1992). The PFA surrounds the nest and is approximately 600 acres. Fifty-eight PFAs have been identified on the Gila National Forest. The forest plan amendment standards and guidelines state: Limit human activity in PFAs during the breeding season; limit human activities in or near nest sites and post-fledgling family areas during the breeding season; manage road densities at the lowest level possible.

Certain kinds of human disturbances to goshawk nests have been speculated to cause nest abandonment (Reynolds et al. 1992). A study investigating effects of logging truck noise caused no discernible behavioral response by goshawks at distances greater than 400 meters from nest sites (Grubb et al. 1998). Gaines et al (2003) suggest that the nesting period and post-fledgling periods for goshawks be critically evaluated for disturbance affects. The PFA is an area of use from the time the young fledge to the time when they are no longer dependent on the adults for food. Managers recommend a 400- to 500-meter radius to buffer goshawk nest sites to protect them from disturbance during the breeding season (Call 1979, Jones 1979). Loss of goshawk habitat due to fragmentation from roads bisecting forested areas was identified as a detrimental effect to the species due to reduction in prey base (Wisdom et al. 2000). This species is sensitive to changes in canopy closure and habitat fragmentation (BISON-M 2010b). To analyze effects to this species from the existing condition and the change proposed in each alternative of the Travel Management Project on the Gila National Forest, analysis will focus on two factors:

1. To analyze the potential for direct effects of motorized activities to northern goshawks, we will measure road miles within PFAs and within the ponderosa pine vegetation type as

these densities pertain to the existing condition and the change proposed in each alternative.

2. To analyze disturbance effects, we will use a disturbance zone of 400 meters within PFAs, and within the [onderosa [ine vegetation type as it pertains to the existing condition and the change proposed in each alternative.

Peregrine Falcon (Regionally Sensitive Species and NM PIF High Priority Species with Known Management Areas Defined on the Gila National Forest)

This raptor takes virtually all of its prey on the wing, typically after a stoop or dive from above (Bison-M 2010c). Prey consists almost entirely of birds, ranging in size from swallows to ducks and large shorebirds. Jays, woodpeckers, swifts, mourning doves and pigeons are among the commonly taken prey species. In New Mexico, the American subspecies, *F.p.anatum*, breeds locally in mountain areas and migrates essentially statewide; the tundra subspecies, *F.p.tundrius*, is a very rare migrant through the state (Bison-M 2010c). Peregrine falcons are uncommon permanent residents that breed on the Gila National Forest (Bison-M 2010c). In New Mexico, peregrine falcons are found on rocky, steep cliffs near water (Bison-M 2010c). They prefer elevations from 6,500 to 8,599 feet, but may be found from 3,500 to 9,000 feet (Bison-M 2010c). In New Mexico, the breeding territories of peregrine falcons center on cliffs that are in wooded/forested habitats, with large "gulfs" of air nearby in which these predators can forage (Bison-M 2010c). Most suitable peregrine habitat on NFS lands in New Mexico was mapped and designated in 1986, but refinement of suitability criteria and reevaluation of designated habitat are ongoing tasks (Johnson 1994). Management practices have progressed further, since 1986, by incorporating a series of zones, called a Peregrine Falcon Management Area in which different activities may be permitted at different times of the year. The Gila National Forest has 14 designated Peregrine Falcon Management Areas. Peregrine falcon habitat management in New Mexico focuses on conserving habitat quality and minimizing disturbance (Johnson 1994). A review of the literature indicates that 800 to 3,400 meters, depending on topography, from nests sites is the reported distance by which recreation activities will cause disturbance effects to this species (Call 1979, Johnson 1994, Richardson and Miller 1997, Hamann 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 effects of motorized activities to peregrine falcons, we will measure changes in miles of road within peregrine falcon management areas, as these miles pertain to the existing condition and the change proposed in each alternative.
2. To analyze potential disturbance effects, we will use a disturbance zone of 2,200 meters (median distance described above) from known nests within peregrine falcon management areas as it pertains to the existing condition and the change proposed in each alternative.

Bald Eagle (Regionally Sensitive Species Representative of Lake Habitat, and Protected Under the Bald and Golden Eagle Protection Act of 1962)

Over the last three years, a pair of bald eagles has attempted to nest at Quemado Lake. The success of these nesting attempts is unknown. No other nests are currently known to occur on the Gila National Forest. This species commonly roosts communally, especially in winter (NatureServe Explorer 2009b). Most eagles that breed in Canada and the northern U.S. move south for winter. Bald eagles migrate widely over most of North America (NatureServe Explorer

2009b). They winter along oceans or in areas where carrion is present (Birds of North America 2009a). They are nearly always found near water, along rivers, lakes, or the sea coast and coastal marshes, reservoirs, and large lakes (Birds of North America 2009a). Mid-winter surveys conducted annually by the New Mexico Department of Game and Fish (NMDGF) showed that the number of bald eagles wintering in New Mexico steadily increased during the preceding 15 years, from an annual average of 220 birds in the early 1980s to 450 by the mid-1990s (Bison-M 2009g). Only two pairs of bald eagles currently nested in the state (at the time of publication) (Bison-M 2009g). In New Mexico, on the Gila National Forest, bald eagles congregate during the winter at Snow Lake and Lake Roberts. The independent biological consulting agency Geo-Marine was contracted to survey the Gila National Forest for bald eagles in the winter season of 2008–2009. Results of the Gila National Forest survey indicate that 2 to 4 bald eagles wintered around Lake Roberts, and 26 wintered around the Snow Lake area (Preliminary Survey Report Data from Geo-Marine 2009, and personal communication with Robin Ives, Field Biologist for Geo-Marine Inc.). The National Bald Eagle Management Guidelines (USFWS 2007c) offer recommendations for avoiding disturbance at foraging areas and communal roost sites, though no distances are discussed in this document for communal roost site disturbance. Richardson and Miller (1997) show vehicle disturbance distances from 9 to 990 meters, though no mention of non-breeding, roosting eagles is discussed. Given the literature's lack of discussion on this temporal period of communal roosting and the USFWS recommendations, it is likely that at the locations on the Gila National Forest where bald eagles communally roost during the winter months (Lake Roberts, Snow Lake, and Quemado Lake), a roads buffer of 500 meters from known roost sites should provide adequate conditions to keep vehicles from disturbing eagles at these locations. The USFWS (2007c) recommendations also state that eagles are unlikely to be disturbed by routine use of roads, homes, and other facilities where such use pre-dates the eagles' 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 bald eagles (USFWS 2007c). 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 effects of motorized activities to bald ragles, we will measure road miles within 500 meters of lake habitat with known bald eagle sites, as these densities pertain to the existing condition and the change proposed in each alternative.
2. To analyze potential disturbance effects, we will use a disturbance zone of 500 meters from known bald eagle sites as it pertains to the existing condition and the change proposed in each alternative.

Golden Eagle [(Aquila chrysaetos Canadensis)/ NM Species of Greatest Conservation Need (SGCN) Representative of Plain/Mountain Grasslands and Dessert Shrub/Grassland Habitat Cover Type, Protected Under the Bald and Golden Eagle Protection Act of 1962]

Golden eagles occur in generally open country, in prairies, arctic and alpine tundra, open wooded country, and barren areas, especially in hilly or mountainous regions. The species nests on rock ledges of cliffs or in large trees (e.g., oak or eucalyptus in California, white pine in eastern North America). The pairs may have several alternate nests, and may use the same nest in consecutive years or shift to alternate nests used in different years (NatureServe Explorer 2010). The golden eagle breeds in open and semi-open habitats from near sea level to 3,630 meters (Birds of North America 2010). Golden eagles occur primarily in mountainous canyon land, rim-rock terrain of

open deserts and grassland areas of western United States. The golden eagle typically forages in open habitats: grasslands or steppe like vegetation. During migration in the western United States and Canada, this species may hunt over wetlands, agricultural areas, and grassy foothills. In western Canada, they may select areas with strong thermal activity and uplifts for energy-efficient migration (Birds of North America 2010). Golden eagles winter primarily in humid temperate and dry eco-region domains from southern Alaska and Canada to central Mexico. Golden eagles are fairly common breeding permanent residents to the Gila National Forest (Zimmerman 1995). While Zimmerman (1995) included this species as a fairly common breeding resident to the forest, no known nests have been reported by leading ornithologists working on the Gila National Forest (Roland Shook, Personal Communication) or by the Raptor Biologist for Hawks Aloft, New Mexico (Personal Communication, Ron Kellermueller 03/17/2010). Further, Kellermueler stated that while incidents of ponderosa pine nesting were documented on Bison M, he currently knows of no occupied golden eagle territories in New Mexico in ponderosa pine habitat. He stated that the habitat type preferred by this species in New Mexico is plains/grassland and desert shrub (Kellermueler personal communication 03/17/2010). Holmes et al. (1993), document vehicle disturbance to wintering golden eagles up to 190 meters. 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 golden eagles, we will measure road miles within plains/grassland and desert shrub/grassland vegetation types, as these densities pertain to the existing condition and the change proposed in each alternative.
2. To analyze disturbance/indirect effects, we will use a disturbance zone of 200 meters from plains/mountain grassland and desert shrub/grassland vegetation cover types as it pertains to the existing condition and the change proposed in each alternative.

Raptorial Birds – Effects by Alternative

Mexican Spotted Owl

No Action Alternative (Alternative B): Under this alternative, there are approximately 245 miles of motorized routes in PACs (table 120), 1,310 miles in designated Mexican spotted owl critical habitat (table 121), and 95 miles in mixed conifer habitat (table 122). 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 loss 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 (R. Ward, District Ranger, Silver City Ranger District, Gila National Forest. 2013 personnel communication).

The potential disturbance area in PACs is approximately 19,430 acres, Mexican spotted owl critical habitat 101,298 acres, and mixed conifer habitat 8,773 acres continues to cause the potential for indirect effects (see Mexican spotted owl tables in Wildlife Report (USDA Forest Service 2013g)). The literature suggests that raptors are unlikely to be disturbed by routine use of roads, homes, and other facilities where such use pre-dates 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 2007c). 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 continues to be allowed across the Gila National Forest. These two types of uses continue to have the potential to impact Mexican spotted owl PAC habitat, designated critical habitat, and yet to be identified PACs in unsurveyed mixed conifer habitat. Additionally, these two types of uses perpetuate the development of additional roads and OHV routes; potentially allowing for the development of more routes than the 245 miles currently identified in PACs, 1,310 miles in designated Mexican spotted owl critical habitat, and 95 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.

Effects Common to All Action Alternatives (C, D, E, F, and G) (Table 120, table 121, and table 122): Under these alternatives motorized cross-country travel is no longer allowed. The authorization to allow disperse camping in these alternatives is reduced by 95 percent to 100 percent in areas with Mexican spotted owl habitat. No motorized areas are designated in Mexican spotted owl PACs 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/steep canyons with a dense canopy cover and a 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 owl and Mexican spotted owl habitat from dispersed camping. In Mexican spotted owl critical habitat under the existing condition approximately one acre of a motorized area occurs in this habitat; under alternatives C, F, and G, our analysis shows that this one acre of disturbance remains, and is removed under alternatives D and E. This disturbance does not affect any of the primary constituent elements in designated critical habitat. Since no motorized areas are located in PACs or mixed conifer habitat, and the one acre within the boundary of critical habitat does not affect the primary constituent elements, none of these actions will affect Mexican spotted owls or Mexican spotted owl habitat.

In these analysis areas, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 97 to 99 percent under alternative D, 36 to 42 percent under alternative F, 96 to 98 percent under alternative G, and 12 to 17 percent under alternative C.

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 53 percent to 67 percent in all analysis areas under alternative E; 33 percent to 48 percent under alternative D; and 19 percent to 26 percent under alternatives F and G (table 120, table 121, and table 122). Additionally, under alternative E, more of the routes are only open to administrative use, which also reduces the potential for direct and indirect effects. Under alternative D, you have a seasonal restriction and administrative routes in areas that have several established PACs, 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 percent to 11 percent in all analysis area 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.

Alternative E adds 0 mile of currently closed or unauthorized routes in the PAC analysis area. Alternative D adds 1.1 miles of an unauthorized route to within the boundary of a PAC, but this

route is designed for administrative use only. This same route is also designated for administrative use only in alternatives F and G; but, under these two alternatives you have an additional 4 miles of unauthorized or closed routes converted to open to OHV use. Alternative C adds 1.1 miles of administrative route, 2 miles of currently closed motorized trail and 6.5 miles of unauthorized routes to the PAC analysis area. Alternative C is the only one of the action alternatives that increases the overall miles of routes, and this occurs in each analysis area.

In mixed conifer habitat, alternative C adds 10.8 miles of currently closed or unauthorized routes; alternative E, no miles; alternative D, 0.2 mile; and alternatives F and G, 0.4 mile. In critical habitat, alternatives D to G add or reopen 0.7 to 6.8 miles of routes. Alternative C adds approximately 54 miles of which only 1.4 miles goes to administrative use. Alternative E adds 1.5 miles of closed road to critical habitat that is open to all the public. Alternative D adds 3.7 miles of routes of which 1.4 miles becomes designated to administrative use only. Alternatives F and G add 14.5 miles of routes of which 1.4 miles becomes designated to administrative use only. The opening or reopening of these routes has the 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.

Many of the added unauthorized or closed routes are user-created, or if closed, are still being used since the entire forest is open to cross-country travel; therefore, they are causing direct and indirect effects to this species where Mexican spotted owl occur in these three analysis areas. By designating those routes or converting the use from motor vehicle to off-road vehicles, these changes do have the potential to increase the direct and indirect effects to this species. Overall, in these three analysis areas for the Mexican spotted owl, alternatives D to G reduce the total routes by 19 to 67 percent. Alternative C provides the least amount of benefit to this species as this alternative increases the number of routes above the existing condition in all three analysis areas; therefore, there will be an increase in the amount of direct and indirect effects from motorized routes.

The greater the reduction in miles in each analysis area, 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 area being analyzed.

Table 120. Mexican spotted owl analysis area - existing condition and proposed changes by alternative

Mexican Spotted Owl Protected Activity Centers (PACs) Analysis Area Mexican spotted owl PACs on NFS lands = 287	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	245.08	252.38	127.87	80.42	184.36	182.01
Percent miles of Alt. B (existing)		3%	-48%	-67%	-25%	-26%
Cumulative Effects						

Mexican Spotted Owl Protected Activity Centers (PACs) Analysis Area Mexican spotted owl PACs on NFS lands = 287	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.))	1.13 mi. 107.92 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
U.S. Hwy, State Hwy, County Road (miles and acres)	22.13 mi. 1,769.69 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
Motorized Dispersed Camping (acres)	132,729.44	-128,781.92	-131,184.17	-132,729.44	-129,261.42	-130,157.64
Percent acres of Alt. B (existing)		-97%	-99%	-100%	-97%	-98%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	132,729.44	-16,387.74	-131,184.17	-132,729.44	-49,900.63	-130,157.64
Percent acres of Alt. B (existing)		-12%	-99%	-100%	-38%	-98%

Table 121. Mexican spotted owl critical habitat analysis area - existing condition and proposed changes by alternative

Mexican Spotted Owl Critical Habitat Analysis Area on NFS lands = 604,825 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	1,310.41	1,347.42	880.31	568.74	1,046.89	1,042.75
Percent miles of Alt. B (existing)		2.8%	-32.8%	-56.6%	-20.1%	-20.4%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.))	8.84 mi. 906.17 ac.	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00
U.S. Hwy, State Hwy, County Road (miles and acres)	82.50 mi. 6,691.98 ac.	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00
Motorized Dispersed Camping (acres)	604,771.03	-577,378.24	-584,603.66	-604,771.03	-578,282.56	-580,834.47
Percent acres of Alt. B (existing)		-95%	-97%	-100%	-96%	-96%
Motorized Areas						
Motorized Area - All Vehicles (acres)	1.20	0.00	-1.20	-1.20	0.00	0.00
Motorized Big Game Retrieval (acres)	604,771.03	-77,797.34	-584,603.66	-604,771.03	-220,106.67	-580,834.47
Percent acres of Alt. B (existing)		-13%	-97%	-100%	-36%	-96%

Table 122. Mexican spotted owl mixed conifer habitat analysis area – existing condition and proposed changes by alternative

Mexican Spotted Owl Habitat Mixed Conifer Analysis Area on NFS land = 126,399 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	94.56	104.86	63.40	44.15	76.68	76.45
Percent miles of Alt. B (existing)		10.89%	-32.96%	-53.31%	-18.91%	-19.15%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.))	0.74 mi. 88.69 ac.	0.00	0.00	0.00	0.00	0.00
U.S. Hwy, State Hwy, County Road (miles and acres)	6.39 mi. 646.46 ac.	0.00	0.00	0.00	0.00	0.00
Motorized Dispersed Camping (acres)	70,053.19	-67,941.16	-68,323.64	-70,053.19	-68,051.63	-68,278.37
Percent acres of Alt. B (existing)		-96.99%	-97.53%	-100%	-97.14%	-97.47%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	70,053.19	-11,647.18	-68,323.64	-70,053.19	-29,612.24	-68,278.37
Percent acres of Alt. B (existing)		-16.63%	-97.53%	-100%	-42.27%	-97.47%

Table 123, table 124, and table 125 display the effects determinations for the federally listed Mexican spotted owl and the Mexican spotted owl listed as a Gila National Forest management indicator species and New Mexico Partners in Flight high-priority species.

Table 123. Mexican spotted owl federally listed species and critical habitat determinations by alternative

Federally Listed Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Mexican spotted owl		*MALAA	MALAA	**MANLAA	MALAA	MALAA
Mexican spotted owl critical habitat		MALAA	MALAA	MALAA	MALAA	MALAA

*MALAA - May affect likely to adversely affect determination
**MANLAA - May affect not likely to adversely affect determination

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 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. Alternative E does not add any closed roads in protected activity centers, and does not increase, but rather decreases disturbance in occupied habitat; therefore, a determination of "may affect, not likely to adversely affect" is made for this alternative. Alternatives D, F, and G add closed and currently unauthorized routes to Mexican spotted owl protected activity centers, critical habitat, and mix conifer habitat providing for the potential for new direct and disturbance effects. Alternative C adds 3 to 11 percent closed and/or currently unauthorized routes above the existing condition to Mexican spotted owl protected activity centers, critical habitat, and 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. Even though alternatives C, D, F, and G would have long-term beneficial effects to the Mexican spotted owl and its habitat, the adding of routes can cause adverse effects, requiring that a "may affect likely to adversely affect" determination be made for these four 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.

Rationale for critical habitat determination: Alternatives C, D, E, F, and G add closed and/or currently unauthorized routes to Mexican spotted owl critical habitat providing for the potential for new direct and disturbance effects to primary constituent elements. Again, alternative C is the only alternative that allows for an actual increase in miles of routes above the existing condition; this alternative provides for the greatest potential to adversely affect critical habitat. Alternatives C, D, E, 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 alternatives.

Table 124. Mexican spotted owl Gila National Forest management indicator species determination by alternative

Management Indicator Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Mexican spotted owl		Adverse effects	*NA	NA	NA	NA

*NA – No adverse effects to the population or habitat trends

Rationale for determination: Alternative C increases the the total miles of routes in occupied habitat and designated critical habitat adversely affecting habitat conditions for this species. Under alternatives D, E, F, and G, the potential effects to the Mexican spotted owl and Mexican spotted owl habitat are reduced, particularly under alternative E. The potential to affect individuals and minor amounts of habitat under all action alternatives still exist; but none will adversely affect the population levels or habitat trends.

Table 125. New Mexico Partners in Flight (NMPIF) high-priority species determination by alternative

NMPIF High Priority Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Mexican spotted owl[1]		Adverse effect	*NA	NA	NA	NA

[1]Species with the same determination by alternative – Williamson's sapsucker, flammulated owl, and red-faced warbler
*NA – No adverse effects to the population or habitat trends

Rationale for determination: Under alternatives D, E, F, and G, the potential effects to these species are reduced, particularly under alternatives E and D. The potential to affect individuals under all these 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. alternative C, there is an increase in motorized routes in the analysis areas; adversly affecting additional habitat.

Northern Goshawk, Peregrine Falcon, Bald Eagle, and Golden Eagle

No Action Alternative (Alternative B): Under the existing condition for raptors, there are approximately 97 miles of motorized routes in the northern goshawk PFA analysis area (table 126), 1,980 miles of motorized routes in the northern goshawk ponderosa pine analysis area (table 127), 19.5 miles of motorized routes in the peregrine falcon analysis area (table 128), 7 miles of motorized routes in the bald eagle analysis area (table 129), and 92 miles of motorized routes in the golden eagle analysis area (table 130). These routes continue to cause habitat loss and the potential for direct effects like poaching, and collection. The potential disturbance zone for goshawks in the PFA analysis area is approximately 20,414 acres, 459,781 acres in the goshawk ponderosa pine analysis area, 19.5 miles of road in the peregrine falcon analysis area, 1,694 acres in the bald eagle analysis area, and 7,361 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 pre-dates 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 2007c). 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, dispersed camping, and big game retrieval continues to be allowed across the Gila National Forest. These three types of uses continue to have the potential to affect raptors. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road densities. 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 affects to these species.

Action Alternatives (C, D, E, F, and G) (Table 126, table 127, table 128, table 129, and table 130): 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 goshawk PFA 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 89 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, 90 to 99.7 percent under alternative D, 7 to 56 percent under alternative F, 89 to 99.7 percent under alternative G, and 0 to 27 percent under alternative C. The wide range of change between focal species under alternative F is more specifically, a reduction of 7 percent in the bald eagle analysis area; 19.5 percent reduction in the goshawk PFA analysis area; 33 percent reduction in the goshawk ponderosa pine analysis area; 56 percent reduction in the peregrine falcon analysis area; and 40 percent reduction in the golden eagle analysis area.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. For all focal species, except for the goshawk ponderosa pine analysis area, there are currently no areas and no areas have been designated under any of the action alternatives. In the goshawk ponderosa pine analysis area currently there are 8 acres of habitat being affect 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 is reduced respectively by 49, 66, 26, and 27 percent in the goshawk PFA analysis area; 30, 48, 19, and 20 percent in goshawk ponderosa pine analysis area; 36, 47, 14 and 25 percent in peregrine analysis area; 3, 3, 3, and 3 percent in the bald eagle analysis area; and 17, 34, 10 and 12 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 PFA analysis area; less than 1 percent in goshawk ponderosa pine analysis area; by 0 percent in peregrine analysis area; and 14 percent in the golden eagle analysis area. Under this alternative miles of motorized routes and trails and acres of potentially affected habitat 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 approximately 0 to 1 mile of route, alternative D adds 0 to 20 miles, alternative F adds 0 to 32 miles, alternative G adds 0 to 32 miles, and alternative C adds 0 to 52 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 currently allows cross-country travel some proposed routes even

though unauthorized are currently being used. By designating unauthorized routes to open or converting the use from motor vehicle to off-road vehicles, these changes do have the potential to increase the direct and indirect effects to these species.

The greater the reduction in miles in each analysis area 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 area being analyzed.

Table 126. Northern goshawk analysis area - existing condition and proposed changes by alternative

Northern Goshawk PFA Analysis Area on NFS land = 34,360 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	97.32	106.23	49.97	33.36	71.96	71.09
Percent miles of Alt. B (existing)		9.16%	-48.65%	-65.72%	-26.05%	-26.95%
Motorized Dispersed Camping (acres)	32,701.46	-30,670.00	-31,754.97	-32,701.46	-30,790.07	-31,053.48
Percent acres of Alt. B (existing)		-93.79%	-97.11%	-100%	-94.16%	-94.96%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	32,701.46	-186.75	-31,754.97	-32,701.46	-6,360.32	-31,053.48
Percent acres of Alt. B (existing)		-0.57%	-97.11%	-100%	-19.45%	-94.96%

Table 127. Goshawk ponderosa pine habitat analysis area - existing condition and proposed changes by alternative

Northern Goshawk Ponderosa Pine Analysis Area on NFS land = 1,163,459 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	1,979.72	1,993.78	1,391.76	1,034.88	1,607.42	1,586.10
Percent miles of Alt. B (existing)		0.71%	-29.70%	-47.73%	-18.81%	-19.88%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.))	24.21 mi. 17,150.17 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
U.S. Hwy, State Hwy, County Road (miles and acres)	108.46 mi. 43,645.34 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
Motorized Dispersed Camping (acres)	895,845.14	-849,990.67	-860,491.05	-895,845.14	-852,163.94	-856,147.21
Percent acres of Alt. B (existing)		-94.88%	-96.05%	-100%	-95.12%	-95.57%
Motorized Areas (acres)	7.99	0.00	-7.99	-7.99	0.00	0.00

Northern Goshawk Ponderosa Pine Analysis Area on NFS land = 1,163,459 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Motorized Big Game Retrieval (acres)	895,845.14	-97,953.39	-860,491.05	-895,845.14	-292,477.59	-856,147.21
Percent acres of Alt.B (existing)		-10.93%	-96.05%	-100%	-32.65%	-95.57%

Table 128. Peregrine falcon analysis area - existing condition and proposed changes by alternative

2,200-meter Buffers of 14 Peregrine Falcon Nests on NFS land = 47,161 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	19.49	19.49	12.43	10.42	16.72	14.68
Percent miles of Alt. B (existing)		0.00%	-36.19%	-46.52%	-14.22%	-24.67%
Motorized Dispersed Camping (acres)	20,764.44	-20,221.20	-20,511.78	-20,764.44	-20,221.20	-20,511.78
Percent acres of Alt.B (existing)		-97.38%	-98.78%	-100%	-97.38%	-98.78%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	20,764.44	-5,644.03	-20,511.78	-20,764.44	-11,688.49	-20,511.78
Percent acres of Alt.B (existing)		-27.18%	-98.78%	-100%	-56.29%	-98.78%

Table 129. Bald eagle analysis area - existing condition and proposed changes by alternative

Lake Habitat 500-meter Buffer on NFS land = 2,154 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	6.87	6.86	6.66	6.66	6.66	6.66
Percent miles of Alt. B (existing)		-0.14%	-3.17%	-3.17%	-3.17%	-3.17%
Motorized Dispersed Camping (acres)	1,963.28	-1,957.61	-1,957.61	-1,963.28	-1,957.61	-1,957.61
Percent acres of Alt. B (existing)		-99.71%	-99.71%	-100%	-99.71%	-99.71%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	1,963.28	0.00	-1,957.61	-1,963.28	-137.83	-1,957.61
Percent acres of Alt. B (existing)		0.00%	-99.71%	-100%	-7.02%	-99.71%

Table 130. Golden eagle analysis area - existing condition and proposed changes by alternative

Golden Eagle Habitat (Desert Shrub/Grassland) Analysis Area Total Habitat on NFS land = 26,067 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	92.21	105.25	76.45	61.31	82.62	81.31
Percent miles of Alt. B (existing)		14.14%	-17.09%	-33.51%	-10.40%	-11.82%
Motorized Dispersed Camping (acres)	23,476.04	-20,851.30	-21,090.69	-23,476.04	-20,843.61	-20,973.64
Percent acres of Alt. B (existing)		-88.82%	-89.84%	-100%	-88.79%	-89.34%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	23,476.04	-2,679.96	-21,090.69	-23,476.04	-9,330.32	-20,973.64
Percent acres of Alt. B (existing)		-11.42%	-89.84%	-100%	-39.74%	-89.34%

Table 131, table 132, and table 133 display the determinations for raptorial birds that are listed as Forest Service sensitive species; management indicator species; and New Mexico Partners in Flight high-priority species.

Table 131. Raptorial birds Forest Service sensitive species determination by alternative

Sensitive Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Northern goshawk		*MI	MI	MI	MI	MI
Peregrine falcon		MI	MI	MI	MI	MI
Bald eagle		MI	MI	MI	MI	MI

*MI – May impact

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 both goshawk analysis areas. 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.

Table 132. Northern goshawk Gila National Forest management indicator species determination by alternative

Management Indicator Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Northern goshawk		*NA	NA	NA	NA	NA

*NA – No adverse effects to the population or habitat trends

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

and minor amounts of habitat under all action alternatives still exist; but none will adversely affect the population levels or habitat trends.

Table 133. New Mexico Partners in Flight (NMPIF) high-priority raptorial bird species determination by alternative

NMPIF High-Priority Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Northern goshawk[1]		*NA	NA	NA	NA	NA
Peregrine falcon[2]		NA	NA	NA	NA	NA
Golden eagle		NA	NA	NA	NA	NA

[1] Species with the same determination by alternative – flammulated owl.
[2] Species with the same determination by alternative – praire falcon, and white-throated swift.
*NA – No adverse effects to the population or habitat trends

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 both goshawk and the golden eagle 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.

Primary Cavity Nesters / Excavators

The hairy woodpecker is the species selected to be analyzed as a primary cavity nester/excavator bird species. It is a management indicator species representative of ponderosa pine and mixed conifer snag component.

Disturbance to primary cavity nesters from roads (table 134), including negative edge effects and snag and downed log reduction from wood harvesting, prescribed fire, and safety implementation is well documented (Raphael and White 1984, Milne and Heijl 1989,Bull and Holthausen 1993, Hutto 1995, Kreisel and Stein 1999). 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. 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 type 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 type was used as it pertains to the existing condition and the change proposed in each alternative (table 135).

Table 134. Summary of potential motorized route affects, analysis factors, and analysis indicators for cavity nesters

Road Associated Factors	Motorized Trail/ORV Associated Factors	Combined Analysis Factors	Analysis Indicator
Nesting Loss	Nesting Loss	Harvest/Direct Effects	Miles
Disturbance, Displacement, Avoidance, Harassment	Disturbance, Displacement, Avoidance, Harassment	Disturbance/Indirect Effects	Disturbance Zone Summarized In Acres

Table 135. 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/ORV Use	Route Miles	60 meters	Ponderosa Pine Mixed Conifer

Hairy Woodpecker (Management Indicator Species Representative of Ponderosa Pine and Mixed Conifer Snag Component)

The hairy woodpecker is an indicator of high seral stage ponderosa pine and mixed conifer because the older age classes within these vegetation types provide snags and an abundance of insects. The hairy woodpecker uses tree cavities for roosting and winter cover. Overall, the 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 presence of suitable cavity trees is a more important consideration (Bushman and Therre 1988). It nests in holes dug mostly by the male in live or dead trees or shrubs, at an average height of 29.5 feet (9 meters) above ground. In most areas, it favors dying parts of live trees, especially where fungal heart rot has softened the heartwood. Limiting factors for the hairy woodpecker include predation and habitat modification. Snags (25centimeters (approximately 10 inches) or more in d.b.h.) an average of five snags per hectare are assumed optimal for woodpecker reproduction, but may not be adequate for foraging. With over 1,289,858 acres of ponderosa pine, and mixed conifer vegetation on the Gila National Forest, snag habitat is abundant for this species. Again, the hairy woodpecker is the focal species for this group/guild of species.

Effects by Alternative

No Action Alternative (Alternative B): Under the existing condition for this focal species and its associated analysis area there are approximately 2,074 miles of motorized routes (table 136). These routes continue to cause habitat loss and the potential for direct effects like collision, poaching, and collection. The potential disturbance zone for this species and its associated analysis area is approximately 97,398 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, dispersed camping, and big game retrieval continue to be allowed across the Gila National Forest. These three types of uses continue to have potential effect cavity nesting birds. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road densities. 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 affects to these species.

Action Alternatives (C, D, E, F, and G) (Table 136): 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. 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 alternative D and G, 33 percent under alternative F, and 11 percent under alternative C.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. In this analysis area, currently there are 8 acres of habitat being affected by a motorized area. Alternatives D and E 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, respectively by approximately 30 percent, 48 percent, 19 percent, and 20 percent 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 approximately 1 mile of routes; alternative D adds 20 miles; alternative F, 32 miles; alternative G, 33 miles; and alternative C adds 63 miles of unauthorized routes. Alternatives D, E, F, and G do not allow for an actual increase in the total miles of routes through the associated analysis areas; additionally, these alternatives convert approximately 65 to 138 miles of routes to administrative use only routes. Alternative C allows for a 1 percent increase. Because the Gila currently allows cross-country travel some proposed routes even though unauthorized are currently being used. By designating unauthorized routes to open or converting the use from motor vehicle to off-road vehicles these changes do have the potential to increase the direct and indirect effects to this species.

The greater the reduction in miles in each analysis area, 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 area being analyzed.

Table 136. Hairy woodpecker analysis area - existing condition and proposed changes by alternative

Hairy Woodpecker Habitat (Ponderosa Pine and Mixed Conifer) Analysis Area Total Habitat on NFS land = 1,289,858 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	2,074.28	2,098.63	1,455.16	1,079.03	1,684.10	1,662.55
Percent miles of Alt. B (existing)		1.17%	-29.85%	-47.98%	-18.81%	-19.85%
Motorized Dispersed Camping (acres)	965,898.33	-917,931.84	-928,814.69	-965,898.33	-920,215.57	-924,425.58
Percent acres of Alt. B (existing)		-95.03%	-96.16%	-100%	-95.27%	-95.71%
Motorized Areas (acres)	7.99	0.00	-7.99	-7.99	0.00	0.00
Motorized Big Game Retrieval (acres)	965,898.33	-109,600.56	-928,814.69	-965,898.33	-322,089.83	-924,425.58
Percent acres of Alt. B (existing)		-11.35%	-96.16%	-100%	-33.35%	-95.71%

Table 137 displays the effects determination for the hairy woodpecker that is listed a Gila National Forest management indicator species.

Table 137. Hairy woodpecker Gila National Forest management indicator species determination by alternative

Management Indicator Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Hairy woodpecker[1]		*NA	NA	NA	NA	NA

[1] Species with the same determination by alternative – Lewis's woodpecker.
*NA – No adverse effects to the population or habitat trends

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 affect individuals and minor amounts of habitat under all action alternatives still exist; but none will adversely affect the population levels or habitat trends.

The potential to affect individuals under all these 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.

Riparian Birds

Table 138 identifies the riparian birds assessed in this section.

Table 138. Riparian bird species selected to be analyzed and rationale for selection

Species Analyzed	Rationale For Selection
Southwestern willow flycatcher	Federally "Endangered" species with designated critical habitat, and NMPIF high-priority species
Northern gray hawk	FS Sensitive Species
Western yellow-billed cuckoo[1]	FS Sensitive Species (federally proposed) and NMPIF high-priority species in low and middle elevation riparian areas.
Arizona Bell's vireo[1]	FS Sensitive Species and NMPIF high-priority species in low and middle elevation riparian areas.
Albert's towhee[1]	FS Sensitive Species and NMPIF high-priority species in low and middle elevation riparian areas.
Gila woodpecker	FS Sensitive Species
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 Species, and NMPIF high-priority species in low and middle elevation riparian areas.
Painted redstart[2]	NMPIF high-priority species for high elevation riparian
Neotropic cormorant[3]	FS Sensitive Species and focal species of NMPIF high-priority species for lakes.
Wilson's phalarope[4]	NMPIF high-priority species for wetland/wet meadow habitat
Bobolink[4]	NMPIF high-priority species for wetland/wet meadow habitat

[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 (Lucy's Warbler, Bank Swallow, Lewis Woodpecker, Red-headed Woodpecker, and Painted Bunting).
[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, and Veery).
[3] The lakes 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 (American Bittern and Snowy Plover).
[4] The wet meadow and montane grassland 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.

Avian species that occupy riparian habitat on the Gila National Forest can be affected by vehicular traffic and roads (table 139) 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 (table 140).

Table 139. Summary of potential motorized route effects, analysis factors, and analysis indicators for riparian birds

Road Associated Factors	Motorized Trail/ORV Associated Factors	Combined Analysis Factors	Analysis Indicator
Collisions Nesting Loss Poaching	Collisions Nesting Loss Poaching	Harvest/Direct Effects	Miles
Disturbance, Displacement, Avoidance, Harassment	Disturbance, Displacement, Avoidance, Harassment	Disturbance/Indirect Effects	Disturbance Zone Summarized In Acres

Table 140. 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
Southwestern willow flycatcher	Motorized Trail/ORV Use	Route Miles Number of stream crossings	100 meters	Occupied Sites Critical Habitat
Northern grayhawk Yellow-billed cuckoo Arizona Bell's vireo Abert's towhee Gila woodpecker Common ground dove Black hawk	Motorized Trail/ORV and Roads	Route Miles	100 meters	Low and Middle Elevation Riparian
Painted redstart	Motorized Trail/ORV and Roads	Route Miles	100 meters	High Elevation Riparian
Neotropic cormorant	Motorized Trail/ORV and Roads	Route Miles	100 meters	Lake
Wilson's phalarope bobolink	Motorized Trail/ORV and Roads	Route Miles	100 meters	Wetland and Wet Meadow

Southwestern Willow Flycatcher [(SWWF) Federally "Endangered" Species with Designated Critical Habitat, and NM PIF High Priority Species with Known Territories on the Gila National Forest]

The southwestern willow flycatcher breeds in dense riparian habitats in southwestern North America, and winters in southern Mexico, Central America, and northern South America (USFWS 2002). 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). The size of the New Mexico population in 2007 was estimated at 800 to 900 birds, based on the documentation of approximately 514 territories and 403 nests (New Mexico Partners In Flight 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 (New Mexico Partners In Flight 2010). On the Gila National Forest, two sites have been consistently occupied for over 10 years along the Gila River. These two areas are in locations known as the Gila Bird Management Area and the Fort 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 2009b). 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. In 2011 and 2012, the site was occupied, but no breeding was documented. In 2013, our initial data indicate that birds are breeding.

The 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.

Northern Gray Hawk (Forest Service Sensitive Species Representative of Low to Middle Elevation Riparian Vegetation Cover Type)

Gray hawks inhabit lowland riparian woodlands, desert riparian deciduous woodland, and marshes (USDA Forest Service 2009j). Woodlands, especially of cottonwoods, that occur where desert streams provide sufficient moisture for a narrow band of trees and shrubs along the margins are preferred (USDA Forest Service 2009j). In New Mexico the species was reported in the Gila and Mimbres valleys and once at San Simon Cienaga, Hidalgo Co. (Hubbard 1977). If one accepts alleged records of eggs or young from the Grant County area as an indication of this species' former status, recent data suggest that this breeding population has now become extirpated. However, occasional birds are still reported in the state, presumably as stragglers from Arizona, Texas, or Mexico (BISON-M 2009h).

Western Yellow-billed Cuckoo (Forest Service Sensitive Species [federally proposed] and Partners In Flight High Priority Migratory Bird Species Representative of Low to Middle Elevation Riparian Vegetation Cover Type)

The yellow-billed cuckoo occupies a wide array of vegetation types across its large geographic range, but generally prefers open woodland with clearings and low, dense, scrubby vegetation. In the southwestern United States, it is most associated with riparian woodlands dominated by Fremont cottonwood or dense mesquite. Cuckoos prefer mature or late-successional cottonwood/willow associations with a dense understory. In parts of the west, they also breed in orchards adjacent to river bottoms. Habitat in New Mexico may be primarily native, mixed native and exotic, or primarily exotic plant species, the latter including riparian salt cedar, orchards, and ornamental/shade plantings (Bison-M 2009i). In New Mexico, yellow-billed cuckoos breed along the major river valleys, including the San Juan, Rio Grande, Pecos, Canadian, San Francisco, and Gila Rivers (Bison-M 2009i).

Arizona Bell's Vireo (Forest Service Sensitive Species and Partners In Flight High Priority Migratory Bird Species Representative of Low to Middle Elevation Riparian Vegetation Cover Type)

Across its range, Bell's Vireo breeds in dense, lowland shrub and understory vegetation, including riparian areas, second-growth forests and mesquite brushlands (NM Partners in Flight 2009b). Dense shrubby vegetation appears to be a fundamental requirement of Bell's Vireo habitat; overhead canopy cover, patch size, and proximity to water may also be important (NM Partners in Flight 2009b). The subspecies *V. b. arizonae* summers locally in the lower Gila Valley and in Guadalupe Canyon (Hidalgo Co.), with occasional birds in the lower San Francisco Valley and at San Simon Cienaga in Hidalgo Co. Bell's vireos summer locally in the south northward to the lower Gila, lower, and middle Rio Grande and lower Pecos valleys – occasionally north in the lower San Francisco Valley and casual elsewhere and are considered rare to fairly common. This species breeds in North America and winters primarily south of the United States-Mexico border. Bell's vireo is a rare summer resident that breeds in Gila National Forest. They are summer residents and they probably occur in the riparian and wooded lowland areas (including cienegas). The *V.b. arizonae* race occurs in southwestern New Mexico, with known populations in the lower Gila Box, San Simon Cienaga, and Guadalupe Canyon (NM Partners in Flight 2009b).

Abert's Towhee (Forest Service Sensitive Species and Partners In Flight High Priority Migratory Bird Species Representative of Low to Middle Elevation Riparian Vegetation Cover Type)

The Abert's Towhee occupies dense brush and woodland areas in the Sonoran Desert, primarily riparian areas or adjacent to dense agricultural edges (NM Partners In Flight 2009a). Its preferred streamside habitat consists of well-developed cottonwood-willow gallery forest with a dense understory of shrubs (NM Partners In Flight 2009a). In New Mexico, this species is especially common along the edges of mature mixed broadleaf forest along the Gila River (NM Partners In Flight 2009a). It is uncommon to nonexistent in early successional habitats such as pure Russian olive or willow (NM Partners In Flight 2009a). Along the Gila, nests have been observed in mesquite, boxelder, Russian olive, New Mexico locust, and Fremont cottonwood (NM Partners In Flight 2009a). Albert's towhees are rare permanent residents that breed in Gila National Forest (BISON-M 2010d).

Gila Woodpecker (Forest Service Sensitive Species Representative of Low to Middle Elevation Riparian Vegetation Cover Type)

The Gila woodpecker is a characteristic species of Sonoran Desert regions of the United States and Mexico (NM Partners in Flight 2009c). It is found in river bottoms with mesquite or cottonwood groves and dry washes (NatureServe Explorer 2012). In New Mexico, Gila woodpeckers are confined to lower elevation woodlands, especially those dominated by mature cottonwoods and/or sycamores, along stream courses (BISON-M 2009j). Gila woodpeckers are residents in the lower Gila Valley and in Guadalupe Canyon and are considered rare to fairly common (BISON-M 2009j). Gila woodpeckers are rare summer residents that breed in Gila National Forest (Zimmerman 1995).

Common Ground Dove (Forest Service Sensitive and Partners In Flight High Priority Migratory Bird Species Representative of Low to Middle Elevation Riparian Vetation Cover Type)

Common ground doves are found in woodlands, especially of cottonwoods, that occur where desert streams provide sufficient moisture for a narrow band of trees and shrubs along the margins (BISON-M 2009k). Common ground doves prefer native shrublands and weedy areas, including such habitats in riparian areas (BISON-M 2009k). This dove is a very local, mainly warm-season (April to September) visitor to the southernmost part of the state, including presently at San Simon Cienaga (Hidalgo Co.) The common ground dove was formerly a resident in southern New Mexico, but is now apparently only a rare visitor here (BISON-M 2009k).

Black Hawk (Forest Service Management Indicator Species, Forest Service Sensitive Species, and Partners In Flight High Priority Migratory Bird Representative of Low and Middle Elevation Riparian Habitat)

The common black hawk is a primary indicator of low/mid riparian habitat. Common black hawks are characteristically found in the Southwest in cottonwood (*Populus* spp.) and other woodlands along permanent lowland streams. The common black hawk nests and forages in tall riparian gallery trees (usually cottonwoods) near flowing water. Black hawks are fairly common summer breeding residents in the Gila National Forest (Zimmerman 1995). On the Gila National Forest, this species is most likely to occur in larger-sized drainages in lower elevations, but has also been documented at mid elevation levels. Forest personnel have noted this species in the west, middle, and east forks of the Gila River, mainstem of the Gila River, San Francisco River, Mimbres River, and Animas River. Some of the other drainages on the Gila that are believed to have habitat include: the mainstem, south and north forks of Negrito Creek; the mainstem, south and north forks of the Tularosa River; Sapillo Creek; Main and South Diamond Creeks; Black Canyon; and Seco Creek. This species has habitat on all ranger districts of the Gila National Forest.

Painted Redstart [(Myioborus pictus)/NM Partners In Flight High Priority Species Representative of High Elevation Riparian Habitat Cover Types]

Primarily a Mexican species that breeds in upland riparian areas of southern Arizona and New Mexico. It breeds locally in Mogollon highlands north to the San Francisco River and Magdalena Mountains, east to the Black Range, and south to Peloncillo and Animas Mountains (Hubbard 1977). Painted redstarts may be rare to fairly common in middle- and upper-elevation riparian woodlands, and adjacent pine-oak woodlands.

Populations in New Mexico may be threatened by any loss (e.g., catastrophic/uncharacteristic fire) or alteration of quality breeding habitat in upland riparian areas. Habitat loss in wintering areas may also be a concern. Painted redstarts have shown sensitivity to human disturbance around the nest, including research activities and recreational land use (Barber et al. 2000).

Neotropic Cormorant (Forest Service Sensitive Species Representative of Lake Habitat and Focal species for NM PIF high priority lake species)

Neotropic cormorants nest near or over water, in vegetation such as dead snags or trees. Nesting neotropic cormorants require stands of trees or shrubs in or near water and that are free from human disturbance (BISON-M 2009l). In New Mexico, cormorants are generally found on larger

bodies of water such as reservoirs, where they prey on fish—probably mainly "rough" species in New Mexico (BISON-M 2009l). The neotropic cormorant reaches its northernmost breeding limits in New Mexico, where it is resident in the lower Rio Grande Valley. The neotropic cormorant is a rare transient of the Gila National Forest (Zimmerman 1995).

Wilson's Phalarope [(Phalaropus tricolor)/Focal Species for NM Partners in Flight Representative of Wet Meadow/Wetland Vegetation Cover Type]

Wilson's phalaropes are rare transients through the Gila National Forest. In New Mexico, these phalaropes are found on water at lower and middle elevations (2,800 to 7,500 feet). They occur along rivers, riparian woodlands and subalpine marshes (BISON-M 2010f). Spring migrants use shallow wetlands in the central United Sates.

Bobolink [(Dolichonyx oryzivorus)/Focal Species for NM Partners in Flight Representative of Wet Meadow/Wetland Vegetation Cover Type]

Isolated breeding outposts are near Springerville, Arizona, and Los Ojos, New Mexico. On the Gila Bird Checklist this species is identified as a casual or accidental species on or closely adjacent to the forest. Nests tend to be located in wet areas, though with some drainage (Wittenberger 1978). The nest is typically placed on the ground at the base of a large forb in areas of higher than average grass density. Bobolinks tend to avoid nesting close to woodland, forest, crop field or road edges (Bollinger and Gavin 2004, Renfrew et al. 2005).

Riparian Birds – Effects by Alternative

Southwestern Willow Flycatcher

No Action Alternative (Alternative B): Under this alternative, 0.7 mile of motorized routes occur within the three occupied areas (table 141), and 3 miles within designated southwestern willow flycatcher southwestern willow flycatcher critical habitat (table 142). 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 is approximately 56 acres, and within southwestern willow flycatcher critical habitat 240 acres; this acreage continues to cause the potential for indirect effects. Knight and Cole (1991) 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 continues to be allowed across the Gila National Forest outside of designated wilderness areas and other special management areas. These two types of uses continue to have the potential to impact approximately 62 acres of occupied sites; and 949 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 currently identified in occupied sites, and 3 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. No stream crossings occur in occupied sites, but nine occur within designated critical habitat.

Effect Common to all Action Alternatives (C, D, E, F, and G): Under these alternatives motorized cross-country travel 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 dispersed camping in occupied sites is reduced by approximately 93 to 100 percent and 94 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 approximately 0.6 mile of the 0.7 mile to administrative use, leaving just over 0.1 mile open to the public. 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.

Table 141. Southwestern willow flycatcher analysis area - existing condition and proposed changes by alternative

Southwestern Willow Flycatcher Occupied Sites (3 occupied areas) Analysis Area on NFS lands = 234 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	0.73	0.73	0.73	0.73	0.73	0.73
Percent miles of Alt. B (existing)		0.00%	0.00%	0.00%	0.00%	0.00%
Cumulative Effects						
Private Rd (Including ROW/Assert) (miles (mi.) and acres (ac.))	0.00 mi. 0.19 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
U.S. Hwy, State Hwy, County Road (miles and acres)	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.	0.00 mi. 0.00 ac.
Motorized Dispersed Camping (acres)	61.96	-57.51	-57.51	-61.96	-57.51	-57.51
Percent acres of Alt. B (existing)		-92.81%	-92.81%	-100%	-92.81%	-92.81%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	61.96	0.00	-57.51	-61.96	0.00	-57.51
Percent acres of Alt.B (existing)		0.00%	-92.81%	-100%	0.00%	-92.81%

Table 142. Southwestern willow flycatcher critical habitat analysis area - existing condition and proposed changes by alternative

Southwestern Willow Flycatcher Critical Habitat Analysis Area on NFS lands = 1,547 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	3.02	3.12	2.62	2.41	2.62	2.62
Percent miles Alt. B (existing)		3.20%	-13.12%	-20.16%	-13.12%	-13.12%
Cumulative Effects						
Private Rd (Including ROW/Assert)	1.46 mi. 155.50 ac.	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00
U.S. Hwy, State Hwy, County Road	1.37 mi. 168.58 ac.	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00
Motorized Dispersed Camping (acres)	949.02	-894.75	-896.06	-949.02	-896.06	-896.06
Percent acres of Alt. B (existing)		-94.28%	-94.42%	-100%	-94.42%	-94.42%
Motorized Areas (acres)	0	0	0	0		0
Motorized Big Game Retrieval (acres)	949.02	-64.55	-896.06	-949.02	-240.97	-896.06
Percent acres of Alt. B (existing)		-6.80%	-94.42%	-100%	-25.39%	-94.42%
Routes Crossing Streams						
Number of Open Existing ML 2 - ML 5	9	-6	-7	-7	-7	-7
Number of Administrative Routes	0	6	7	7	7	7
Number of Add Admin. Unauthorized	0	1	1	0	1	1
Total FS Routes and Trails Crossings	9	10	10	9	10	10
Percent change of Alt. B (existing)		0.11	0.11	0.00	0.11	0.11

Differences among the Action Alternatives (C, D, E, F, and G) (table 141 and table 142): 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; 13 percent under alternatives D, F, and G; and 3 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, the 3 miles of the existing routes open to the public to go to approximately 2; approximately 1 mile goes to administrative use only. Under alternative C, 1.1 miles go to administrative use only. Under the existing condition you have 9 stream crossings open to the public. Under alternatives C, D, E, and F, an additional administrative route crossing is added for a total of 10 total crossings; 7 go to administrative crossings only under alternative C and 8 under alternatives D, E, and F. No administrative crossing is added under alternative G, and 7 of the 9 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 and use reduced in these analysis areas. Going to administrative use reduces the level of effect to both the species and its habitat.

In occupied habitat, the area of potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 93 percent under alternatives D and G, and is unchanged from the existing condition (alternative B) in alternatives C and F. In designated critical habitat potentially affected habitat for motorized big game retrieval is reduced by 100 percent under alternative E, 94 percent under alternatives D and G, 25 percent in alternative F, and 7 percent under alternative C.

For the southwestern willow flycatcher, none of the action alternatives added any unauthorized or closed routes to the occupied site analysis area. None of the action alternatives allow for an actual increase in the total miles of routes through the associated analysis areas. Within designated critical habitat alternatives C, D, F, and G add approximately 0.2 mile of unauthorized route to administrative use only. None of the action alternatives allow for an actual increase in the total miles of routes through the critical habitat analysis area; except alternative C, which allows for 0.1 mile increase above the existing condition. This tenth of a mile is designated for administrative use only.

Table 143 displays the effects determination for the federally listed southwestern willow flycatcher and its habitat. Table 144 displays the effects determination for the southwestern willow flycatcher as a high priority species listed by the New Mexico Partners in Flight.

Table 143. Southwestern willow flycatcher federally listed species and critical habitat determinations by alternative

Federally Listed Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Southwestern willow flycatcher		*MANLAA	MANLAA	MANLAA	MANLAA	MANLAA
Southwestern willow flycatcher critical habitat		MANLAA	MANLAA	MANLAA	MANLAA	MANLAA

*MANLAA - May affect not likely to adversely affect; **MALAA- May affect likely to adversely affect determination

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 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 are reduced to an insignificant and discountable level; therefore, a determination of “may affect, not likely to adversely affect” is made for these the 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.

Table 144. Southwestern willow flycatcher New Mexico Partners in Flight high-priority species determination by alternative

NMPIF High Priority Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Southwestern willow flycatcher		*NA	NA	NA	NA	NA

*NA – No adverse effects to the population or habitat trends

Rationale for determination: Under alternatives C, D, E, F, and G, the potential effects to this species are reduced. These alternatives will not negatively affect population levels.

Other Riparian Birds

No Action Alternative (Alternative B): Under the existing condition for riparian birds there are approximately 7 miles of motorized routes in the neotropic cormorant analysis area (table 145), 9.5 miles of motorized routes in the painted redstart analysis area (table 146), 12 miles of motorized routes in the Wilson's phalarope and Bobolink analysis area (table 147, and 194 miles of motorized routes in the low to middle elevation riparian bird focal species analysis area (table 148). These routes continue to cause habitat loss and the potential for direct effects like collision, poaching, and collection. The potential disturbance zone for cormorant areas is approximately 436 acres, 450 acres in painted redstart area, 722 acres for Wilson's phalarope area, and 8,519 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. Increase 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, dispersed camping, and big game retrieval allowed across the Gila National Forest. These three types of uses continue to have potential effect riparian birds. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road densities. 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 affects to these species.

Action Alternatives (C, D, E, F, and G) (Table 145, table 146, table 147, and table 148): 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 cormorant analysis area motorized dispersed camping is reduced by 99.7 to 100 percent under all action alternatives; sapsucker analysis area 97 to 100 percent; phalarope analysis area 81 to 100 percent; and 89 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, 85 to 99.7 percent under alternative D, 5 to 49 percent under

alternative F, 83 to 99.7 percent under alternative G, and 0 to 23 percent under alternative C. The wide range of change between focal species under alternative F is a reduction of approximately 7 percent in the cormorant analysis area; 49 percent reduction in the sapsucker analysis area; 5 percent reduction in the phalarope analysis area; and 38 percent reduction in the low to middle elevation riparian bird analysis area.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. Under the existing condition none of the analysis areas in this group have any acres affected except in the low and middle elevation riparian area where there is approximately 0.04 acre affected; under all action alternatives, no motorized areas would affect the analysis areas in this group.

Under alternatives C, D, E, F, and G, miles of motorized routes and trails and acres of potentially affected habitat are reduced, respectively by less than 1, 3, 3, 3, and 3 percent in the cormorant analysis area; 1, 34, 44, 21, and 21 percent in sapsucker analysis area; 4, 30, 49, 24, and 24 percent in the phalarope analysis area; and 1, 30, 43, 15, and 17 percent in the low to middle elevation riparian bird analysis area.

For the focal species and their associated analysis areas, alternative E adds 0 to 0.6 mile of routes; alternative D adds 0 to 2.4 miles of routes; alternative F adds 0 to 2.5 miles of routes; alternative G adds 0 to 3.1 miles; and alternative C adds 0 to 14 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 currently allows cross-country travel, some proposed routes even though unauthorized are currently being used. By designating unauthorized routes to open or converting the use from motor vehicle to off-road vehicles these changes do have the potential to increase the direct and indirect effects to this group of species.

The greater the reduction in miles in each analysis area, 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 area being analyzed.

Table 145. Neotropic cormorant analysis area - existing condition and proposed changes by alternative

Neotropic Cormorant Habitat (Lakes) Analysis Area (Habitat 500-meter Buffer) on NFS land = 2,154 acres	Percent acres of Alt. B (existing)	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	6.87	6.86	6.66	6.66	6.66	6.66
Percent miles Alt. B (existing)		-0.14%	-3.17%	-3.17%	-3.17%	-3.17%
Motorized Dispersed Camping (acres)	1,963.28	-1,957.61	-1,957.61	-1,963.28	-1,957.61	-1,957.61
Percent acres of Alt. B (existing)		-99.71%	-99.71%	-100%	-99.71%	-99.71%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	1,963.28	0.00	-1,957.61	-1,963.28	-137.83	-1,957.61
Percent acres of Alt. B (existing)		0.00%	-99.71%	-100%	-7.02%	-99.71%

Table 146. Painted redstart analysis area - existing condition and proposed changes by alternative

Painted Redstart Habitat (High Elevation Riparian) Analysis Area on NFS land = 4,310 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	9.48	9.42	6.28	5.36	7.46	7.46
Percent miles Alt. B (existing)		-0.69%	-33.74%	-43.52%	-21.35%	-21.35%
Motorized Dispersed Camping (acres)	1,795.10	-1,734.14	-1,774.96	-1,795.10	-1,734.54	-1,737.49
Percent acres of Alt. B (existing)		-96.60%	-98.88%	-100%	-96.63%	-96.79%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	1,795.10	-410.76	-1,774.96	-1,795.10	-882.24	-1,737.49
Percent acres of Alt. B (existing)		-22.88%	-98.88%	-100%	-49.15%	-96.79%

Table 147. Wilson's phalarope and bobolink analysis area - existing condition and proposed changes by alternative

Wilson's Phalarope and Bobolink Habitat (Wetland/Wet Meadow) Analysis Area on NFS land = 1,710 Acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	11.63	11.22	8.17	5.89	8.80	8.80
Percent miles Alt. B (existing)		-3.58%	-29.75%	-49.39%	-24.37%	-24.37%
Motorized Dispersed Camping (acres)	1,568.48	-1,272.57	-1,329.89	-1,568.48	-1,275.26	-1,303.64
Percent acres of Alt. B (existing)		-81.13%	-84.79%	-100%	-81.31%	-83.11%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	1,568.48	-7.08	-1,329.89	-1,568.48	-83.65	-1,303.64
Percent acres of Alt. B (existing)		-0.45%	-84.79%	-100%	-5.33%	-83.11%

Table 148. Low to middle elevation riparian bird species analysis area - existing condition and proposed changes by alternative

Riparian Bird Species* Habitat (Low, Middle Riparian) Analysis Area on NFS land = 30,142 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)		191.53	135.07	110.11	164.70	160.11
Percent miles Alt. B (existing)		-1.04%	-30.22%	-43.11%	-14.91%	-17.28%
Motorized Dispersed Camping (acres)	21,153.04	-18,773.71	-19,688.83	-21,153.04	-19,328.62	-19,588.85
Percent acres of Alt. B (existing)		-88.75%	-93.08%	-100%	-91.38%	-92.61%
Motorized Areas (acres)	0.04	0.00	-0.04	-0.04	0.00	0.00
Motorized Big Game Retrieval (acres)	21,153.04	-3,587.65	-19,688.83	-21,153.04	-7,986.47	-19,588.85
Percent acres of Alt. B (existing)		-16.96%	-93.08%	-100%	-37.76%	-92.61%

*Species include: Northern Gray Hawk, Gila Woodpecker, Western Yellow-billed Cuckoo, Arizona Bell's Vireo, Common Ground Dove, Abert's Towhee, and Black Hawk.

The following tables display the effects determinations for the riparian bird species that are listed as Forest Service sensitive species (table 149), Gila National Forest management indicator species (table 150), and New Mexico Partners in Flight high-priority species (table 151).

Table 149. Forest Service sensitive riparian bird species determinations by alternative

Sensitive Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. 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

*MI – May impact

Rationale for determination: Under alternatives C, D, E, F, and G, the potential effects to riparian birds are reduced; particularly for the low to middle elevation species under alternatives E and D, to a lesser degree for alternatives F and G, and only a small amount under alternative C. 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.

Table 150. Gila National Forest management indicator riparian bird species determinations by alternative

Management Indicator Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Black hawk		*NA	NA	NA	NA	NA

*NA – No adverse effects to the population or habitat trends

Rationale for determination: Under alternatives C, D, E, F, and G, the potential effects to black hawks are reduced. The potential to affect individuals and minor amounts of habitat under all action alternatives still exist; but none will adversely affect the population levels or habitat trends.

Table 151. New Mexico Partners in Flight high-priority riparian bird species determinations by alternative

NMPIF High Priority Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Yellow-billed cuckoo[1]		*NA	NA	NA	NA	NA
Arizona Bell's vireo[1]		NA	NA	NA	NA	NA
Abert's towhee[1]		NA	NA	NA	NA	NA
Common ground dove[1]		NA	NA	NA	NA	NA
Black hawk[1]		NA	NA	NA	NA	NA
Painted redstart[2]		NA	NA	NA	NA	NA
Neotropic cormorant		NA	NA	NA	NA	NA
Wilson's phalarope[3]		NA	NA	NA	NA	NA
Bobolink[3]		NA	NA	NA	NA	NA

[1] Species with the same determination by alternative – Lucy's warbler, bank swallow, Lewis woodpecker, red-headed woodpecker, and painted bunting.
[2] Species with the same determination by alternative – black swift and veery
[3] American bittern and snowy plover.
*NA – No adverse effects to the population or habitat trends

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.

Forested, Woodland and Grassland Areas

Table 152 displays the species assessed in this section.

Table 152. Forested, woodland and grassland bird 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	Gila MIS Species 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 (pygmy nuthatch, red-faced warbler, olive warbler, and Virginia'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 (scaled quail, Crissal thrasher, painted bunting, and black-throated sparrow).
[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 (Virginia's warbler, Lazuli bunting, black-chinned sparrow, piñon jay, and juniper titmouse).

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) (table 153). Another study found that brown creepers were twice as likely to occur in habitats that were more than 100 meters 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, Brand and George 2001).

Roads and motorized trails reduced forest bird reproduction up to a distance of 200 meters adjacent to a major highway (Foppen and Reijnen 1994). Wear and Greis, 2002 Summary Report documents that "Linear corridors, such as roads and power lines, can exclude sensitive forest wildlife from the adjoining habitat for distances ranging up to 330 feet or more. Effects to sensitive forest birds are of more concern in fragmented landscapes." 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 (Payne and Payne 1993; Burke and Nol 1998; Haas 1998; Belisle et al. 2001). 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 meters. 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, 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 effects of motorized activities to birds from forested and grassland areas, road miles within forest and grassland, vegetation cover types were measured.
2. To analyze disturbance/indirect effects, a disturbance zone of 75 to 100 meters from roads within forested and grassland vegetation cover types was used as it pertains to the proposed action and to each alternative (table 154).

Table 153. Summary of potential motorized route affects, analysis factors, and analysis indicators for forested, woodland, and grassland birds

Road Associated Factors	Motorized Trail/ORV Associated Factors	Combined Analysis Factors	Analysis Indicator
Collisions Nesting Loss Poaching	Collisions Nesting Loss Poaching	Harvest/Direct Effects	Route Miles
Disturbance, Displacement, Avoidance, Harassment	Disturbance, Displacement, Avoidance, Harassment	Disturbance/Indirect Effects	Disturbance Zone Summarized In Acres

Table 154. Summary of the harvest indicator, disturbance indicator, and analysis area used to analyze the effects of the different alternatives to forested, woodland and grassland birds

Focal Species	Motorized Activity	Harvest Indicator	Disturbance Zone	Analysis Area
Plains titmouse Gray vireo	Motorized Trail/ORV Use and Roads	Route Miles	100 meters	Piñon-Juniper/ Shrub Oak Woodland
Costa's hummingbird	Motorized Trail/ORV and Roads	Route Miles	100 meters	Desert Shrub/Grassland
White-eared hummingbird	Motorized Trail/ORV and Roads	Route Miles	100 meters	Ponderosa Pine
Burrowing owl	Motorized Trail/ORV and Roads	Route Miles	75 meters	Plains and Mountain Grassland

Plains titmouse (Management Indicator Species, and Forest Service Sensitive Species Representative of Piñon-Juniper/Shrub-Oak Woodland Habitat Cover Type)

The plain titmouse is an indicator of piñon-juniper/shrub-oak woodland habitats. The plain titmouse inhabits evergreen trees in dry woodlands of the Southwest (USDA Forest Service 1991). It usually builds nests in natural cavities or old woodpecker holes, primarily in oak trees, but it is capable of excavating its own cavity in rotted wood. Trend estimates on the forest indicate an increasing trend in plain titmouse on the Gila National Forest. Limiting factors for the plain titmouse include cavities in snags and hollow trees. With approximately 1,643,096 acres of woodland vegetation type on the Gila National Forest, cavities are expected to be abundant for this species.

Gray Vireo (Forest Service Sensitive Species and Partners In Flight High Priority Migratory Bird Representative of Piñon Juniper/Shrub-Oak Woodland Vegetation Cover Type)

The breeding habitat of this species is generally open woodlands/shrublands featuring evergreen trees and shrubs of various kinds. Junipers (*Juniperus* spp.) are the dominant element in most areas of occurrence in New Mexico, although oaks (*Quercus* spp.*)* are also frequent in the southern part of the range (USDA Forest Service 2009k). In New Mexico, gray vireos have been reported in rocky hills covered with sparse bushes and scrub, in juniper, hackberry and Grave's oak (NatureServe Explorer 2009d). Gray vireos breed in close ecological proximity to solitary

and Bell's (*V. bellii*) vireos, the former occurring as low as piñon-juniper woodland, while the latter are typically in lowland riparian areas. Gray vireos are rare summer residents of Gila National Forest (Zimmerman 1995).

Costa's Hummingbird (Forest Service Sensitive Species, and Focal Species NM PIF High Priority Species Representative of Chihuahuan Desert shrub/grassland Vegetation Cover Type)

Costa's hummingbirds inhabit microphyll shrubland and canyons at lower elevations (2,800 to 5,500 feet) (BISON-M 2010g). Typically, this species inhabits deserts or desert-like washes, mesas or side-hills, especially where sages of different kinds, encelias, yuccas, and cholla cactuses [sic] abound (Birds of North America 2009b). This species occurs in spring and early summer in Guadalupe Canyon (Hidalgo Co.), which is the key habitat area in the state.

White-eared Hummingbird (Forest Service Sensitive Species Representative of Ponderosa Pine Vegetation Cover Type)

This species typically occurs in montane habitats in Mexico, and in the United States it has been found in similar types—including pine (*Pinus* spp.) forest and in oak (*Quercus* spp.) and pine-oak woodland and adjacent riparian sites (BISON-M 2010h). In New Mexico, this species has only recently been found, but it may have been overlooked in the past particularly as the range in which it occurs is infrequently visited and has not been studied in detail. In the years 1993 to 1995, there were records from two sites in the Pinos Altos Mountains (Zimmerman 1995).

Burrowing Owl (Forest Service Sensitive Species Representative of Grassland Vegetation Cover Type)

Burrowing owl habitat is dry, open, short grass, and treeless plains, often associated with burrowing mammals. Optimum habitat for burrowing owls is typified by short vegetation and presence of fresh small mammal burrows (NatureServe Explorer 2013a). The nest location and type of nest that burrowing owls tend to select their burrows in are areas with other burrows, close to roads, surrounded by bare ground or short grass. Burrowing owls are uncommon summer residents that breed in Gila National Forest (Zimmerman 1995). The New Mexico Departmenet of Game and Fish published guidelines and recommendations for burrowing owl surveys and mitigation in 2007. They recommend the following mitigation actions to avoid negative impacts to the species (NMDGF 2007):

- No disturbance should occur within 50 meters of occupied burrows during the non-breeding season (September through February) or within 75 meters during the breeding season (March through August) (table 154).

Forested, Woodland and Grassland Areas – Effects by Alternative

No Action Alternative (Alternative B): Under the existing condition for non-game birds, there are approximately 621 miles of motorized routes in the burrowing owl analysis area (table 155), 92 miles of motorized routes in the Costa's hummingbird analysis area (table 156), 1,980 miles of motorized routes in the white-eared hummingbird analysis area (table 157), and 1,525 miles of motorized routes in the plains titmouse/gray vireo analysis area (table 158. These routes continue to cause habitat loss and the potential for direct effects like collision, poaching, and collection. The potential disturbance zone for burrowing owls is approximately 34,107 acres, 4,682 acres in

Costa's hummingbird area, 150,316 acres for white-eared hummingbird area, and 125,472 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. 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, dispersed camping, and big game retrieval continue to be allowed across the Gila National Forest. These three types of uses continue to have potential effect non-game upland birds. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road densities. 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 affects to these species.

Action Alternatives (C, D, E, F, and G) (Table 155, table 156, table 157, and table 158): 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 burrowing owl analysis area motorized dispersed camping is reduced by approximately 93 to 100 percent under all action alternatives; Costa's humming bird analysis area 89 to 100 percent; white-eared hummingbird analysis area 95 to 100 percent; and 97 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, 90 to 97 percent under alternative D, 20 to 46 percent under alternative F, 90 to 97 percent under alternative G, and 5 to 20 percent under alternative C.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. In the burrowing owl analysis area currently there are approximately 5 acres of habitat being affect by a motorized area; 8 acres of habitat in the white-eared humming bird area; and 14 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, respectively by approximately 17, 26, 13, and 13 percent in the burrowing owl analysis area; 17, 34, 10, and 12 percent in Costa's analysis area; 30, 48, 19 and 20 percent in the white-eared analysis area; and 22, 37, 16, and 16 percent in the plains titmouse/gray vireo analysis area. Alternative C adds approximately 13 miles of routes above the existing condition in the Costa's analysis area, 14 miles in the white-eared analysis area, and 27 miles in the plains titmouse/gray vireo analysis area. In the burrowing owl analysis area, alternative C reduces the miles of motorized routes by approximately 1 mile. Alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis areas.

New previously closed or unauthorized routes added under the different alternatives for the focal species and their associated analysis are 0 to 5 miles under alternative E, 3 to 46 miles under alternative D, 1 to 59 miles under alternative F, 1 to 57 miles under alternative G, and 1 to 97 miles under alternative C. Again, 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 cross-country travel, most proposed routes even though unauthorized are

currently being used. By designating unauthorized routes to open or converting the use from motor vehicle to off-road vehicles these changes do have the potential to increase the direct and indirect effects to this group of species.

The greater the reduction in miles in each analysis area 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 area being analyzed.

Table 155. Burrowing owl analysis area - existing condition and proposed changes by alternative

Burrowing Owl Habitat (Plains and Mountain Grassland) Analysis Area on NFS lands = 232,217 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	621.21	620.28	516.80	457.56	542.85	541.15
Percent miles Alt. B (existing)		-0.15%	-16.81%	-26.34%	-12.61%	-12.89%
Motorized Dispersed Camping (acres)	221,523.57	-206,062.7	-209,143.3	-221,523.6	-206,142.4	-207,318.4
Percent in acres of Alt. B (existing)		-93.02%	-94.41%	-100%	-93.06%	-93.59%
Motorized Areas (acres)						
Motorized Area - All Vehicles	1.47	0.00	-1.47	-1.47	0.00	0.00
Motorized Area - OHV Only	3.05	0.00	-3.05	-3.05	0.00	0.00
Motorized Big Game Retrieval	221,523.57	-11,579.9	-209,143.3	-221,523.6	-43,480.8	-207,318.4
Percent acres of Alt. B (existing)		-5.23%	-94.41%	-100%	-19.63%	-93.59%

Table 156. Costa's hummingbird analysis area - existing condition and proposed changes by alternative

Costa's Hummingbird Habitat (Desert Shrub/Grassland) Analysis Area on NFS lands = 26,067 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	92.21	105.25	76.45	61.31	82.62	81.31
Percent miles Alt. B (existing)		14.14%	-17.09%	-33.51%	-10.40%	-11.82%
Motorized Dispersed Camping (acres)	23,476.04	-20,851.30	-21,090.69	-23,476.04	-20,843.61	-20,973.64
Percent acres of Alt. B (existing)		-88.82%	-89.84%	-100%	-88.79%	-89.34%
Motorized Areas (acres)	0	0	0	0	0	0
Motorized Big Game Retrieval (acres)	23,476.04	-2,679.96	-21,090.69	-23,476.04	-9,330.32	-20,973.64
Percent acres of Alt. B (existing)		-11.42%	-89.84%	-100%	-39.74%	-89.34%

Table 157. White-eared hummingbird analysis area - existing condition and proposed changes by alternative

White-eared Hummingbird Habitat (Ponderosa Pine) Analysis Area on NFS lands = 1,163,459 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Motorized Routes						
Total NFS routes and trails (miles)	1,979.72	1,993.78	1,391.76	1,034.88	1,607.42	1,586.10
Percent miles Alt. B (existing)		0.71%	-29.70%	-47.73%	-18.81%	-19.88%
Motorized Dispersed Camping (acres)	895,845.14	-849,990.67	-860,491.05	-895,845.14	-852,163.94	-856,147.21
Percent acres of Alt. B (existing)		-94.88%	-96.05%	-100%	-95.12%	-95.57%
Motorized Areas (acres)	7.99	0.00	-7.99	-7.99	0.00	0.00
Motorized Big Game Retrieval (acres)	895,845.14	-97,953.39	-860,491.05	-895,845.14	-292,477.59	-856,147.21
Percent acres of Alt. B (existing)		-10.93%	-96.05%	-100%	-32.65%	-95.57%

Table 158. Plains titmouse and gray vireo analysis area - existing condition and proposed changes by alternative

Plains Titmouse and Gray Vireo Habitat (Piñon-Juniper/Shrub Oak Woodland) Analysis Area on NFS lands = 1,602,637 Acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	1,525.03	1,551.60	1,195.62	959.41	1,287.68	1,286.52
Percent miles Alt. B (existing)		1.74%	-21.60%	-37.09%	-15.56%	-15.64%
Motorized Dispersed Camping (acres)	1,183,790	-1,144,767	-1,153,217	-1,183,790	-1,148,070	-1,150,122
Percent acres of Alt. B (existing)		-96.70%	-97.42%	-100%	-96.98%	-97.16%
Motorized Areas						
Motorized Area - All Vehicles (acres)	14.19	0.00	-14.19	-14.19	0.00	0.00
Motorized Area - OHV Only (acres)	0.26	0.00	-0.26	-0.26	0.00	0.00
Motorized Big Game Retrieval (acres)	1,183,790	-231,424	-1,153,217	-1,183,790	-540,354	-1,150,122
Percent acres of Alt. B (existing)		-19.55%	-97.42%	-100%	-45.65%	-97.16%

The following tables display the effects determination for the riparian bird species listed as Forest Service sensitive species (table 159), Gila National Forest management indicator species (table 160), and New Mexico Partners in Flight high-priority species (table 161).

Table 159. Forest Service sensitive species determination by alternative

Sensitive Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. 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

*MI – May impact

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. For this group of focal species direct and indirect effects are reduced the most under alternative E, then D, G, F, and C. 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.

Table 160. Gila National Forest management indicator species determination by alternative

Management Indicator Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Plain titmouse		*NA	NA	NA	NA	NA

*NA – No adverse effects to the population or habitat trends

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 and minor amounts of habitat under all action alternatives still exist; but none will adversely affect the population levels or habitat trends.

Table 161. New Mexico Partners in Flight high-priority species determination by alternative

NMPIF High Priority Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
White-eared hummingbird[1]		*NA	NA	NA	NA	NA
Costa's hummingbird[2]		NA	NA	NA	NA	NA
Gray vireo[3]		NA	NA	NA	NA	NA

[1] Species with the same determination by alternative – pygmy nuthatch, red-faced warbler, Virgina's warbler, and Grace's warbler.

[2] Species with the same determination by alternative – scaled quail, Crissal thrasher, painted bunting, and black-throated sparrow

[3] Species with the same determination by alternative – Virginia's warbler, Lazuli bunting, black-chinned sparrow, piñon jay, and juniper titmouse.

*NA – No adverse effects to the population or habitat trends

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.

Game Birds

Table 162 displays the game bird species assessed in this section.

Table 162. Game bird species selected to be analyzed and rationale for selection

Species Analyzed	Rationale For Selection
Mearn's quail	Gila MIS Species
Merriams' wild turkey	Game Species identified as species of concern during scoping
Blue grouse	NMPIF High Priority Species representative of Spruce Fir Vegetation

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 (table 163). 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 2013). 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 meters from roads, + 50 meters. 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 164).

Table 163. Summary of potential motorized route affects, analysis factors, and analysis indicators for game birds

Road Associated Factors[1]	Motorized Trail/ORV Associated Factors[1]	Combined Analysis Factors	Analysis Indicator[2]
Hunting Collisions Nesting Loss Poaching	Hunting Collisions Nesting Loss Poaching	Harvest/Direct Effects	Route Miles
Disturbance, Displacement, Avoidance, Harassment	Disturbance, Displacement, Avoidance, Harassment	Disturbance/Indirect Effects	Disturbance Zone Summarized In Acres

Table 164. 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/ORV Use	Route Miles	300 meters	Plains and Mountain Grassland
Merriam's wild turkey	Motorized Trail/ORV and Roads	Route Miles	300 meters	Ponderosa Pine Mixed Conifer
Blue grouse	Motorized Trail/ORV and Roads	Route Miles	300 meters	Spruce-Fir

Mearn's Quail (Management Indicator Species and Regionally Sensitive Species Representative of Plains/Mountain Grassland Vegetation Cover Type)

The Mearns' quail is an indicator of plains and mountain grassland vegetation cover types. Mearns' quail are present in most of the mountain ranges in southeastern Arizona, southwestern New Mexico, southwestern Texas and northwestern Mexico. The species inhabits warm, temperate forests and woodlands. Their principal habitat is open oak or pine-oak woodland areas with an understory of grassland savanna in foothills and montane areas between 5,000 and 10,000 feet (USDA Forest Service 2001b). They seldom go far from pine-oak woodlands due to dependence on succulent, bulb-producing forbs that grow in the understory.

Mearns' quail are uncommon, breeding residents of the Gila National Forest (Zimmerman 1995). Censusing for Mearns' quail has begun on the forest (Montoya pers. Com), with coveys detected on all five transects conducted on the Black Range District of the Gila National Forest. Further, over the past five years the species has been observed in various locations where they were previously unknown. More numerous and larger coveys of Mearns' quail have been seen on the Reserve, Wilderness, Black Range and Silver City Ranger Districts (Jerry Monzingo, Supervising Office Fishery Biologist, pers. comm.; Russell Ward, Range and Wildlife Assistant Staff, Gila National Forest, pers. comm.; Justin Schofer, Reserve District Wildlife Biologist).

Merriam's Wild Turkey [(Meleagris gallopavo merriami)/ Game species]

Merriam's wild turkey is an indicator of mixed conifer, and ponderosa pine cover types. Wild turkey habitat consists of forest and open woodland, scrub oak, deciduous and mixed deciduous-

coniferous areas, especially in mountainous regions. In New Mexico, most mountain ranges support healthy, self-sustaining populations of Merriam's turkey. This subspecies typically roosts in ponderosa pine, Douglas-fir, white fir, limber pine, western white pine, cottonwoods, large oaks, and piñon pine.

Blue Grouse [(Dendragapus obscurus)/ NM PIF High Priority Species Representative of Spruce-Fir Vegetation Cover Type]

The species inhabits coniferous forest, especially fir, mostly in open situations with a mixture of deciduous trees. The species spends winter, usually at higher elevations than summer habitat, in conifer forest of various categories of age and density. Blue grouse roost in large conifers with dense foliage. Limiting factors for blue grouse populations include predation, habitat modification, and inclement weather during brooding. The New Mexico Department of Game and Fish manages blue grouse through annual hunting permits. Hunting is another factor that affects population levels. Blue grouse populations appear to be stable (USDA Forest Service 2001a).

Game Birds – Effects by Alternative

No Action Alternative (Alternative B): Under the existing condition for the blue grouse/spruce fir analysis area no habitat occurs outside designated wilderness area; therefore, motorized routes are not having an effect in this analysis area or on the species associated with this habitat.

Under the existing condition for the remaining game birds there are 621 miles of motorized routes in the Mearn's quail analysis area (table 165), and 2,074 miles of motorized routes in the Merriam's wild turkey analysis area (table 166). These routes continue to cause habitat loss and the potential for direct effects like collision, hunting, and poaching. The potential disturbance zone in the Mearn's quail analysis area is 108,939 acres, and 400,057 acres in Merriam's wild turkey analysis area. Within these potential disturbance zones 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 you continue to have motorized cross-country travel, dispersed camping, and big game retrieval allowed across the Gila National Forest. These three types of uses continue to have potential effect to upland game birds. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road densities. 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 affects to these species.

Action Alternatives (C, D, E, F, and G) (Table 165 and table 166): Again, under the existing condition for the blue grouse/spruce fir analysis area no habitat occurs outside designated wilderness area, and none of the action alternatives propose motorized use that would affect this habitat type; therefore, none of the action alternative would affect in this analysis area or the species associated with this habitat.

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 approximately 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 33 percent under alternative F, 94 to 96 percent under alternative G, and 5 to 11 percent under alternative C.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. In the Mearn's Quail analysis area currently there are approximately 5 acres of habitat being affect by a motorized area; and 8 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, respectively by 17, 26, 13, and 13 percent in the Mearn's quail analysis area, and 30, 48, 19, and 20 percent in the Merriam's wild turkey analysis area. Alternative C adds approximately 24 miles of routes above the existing condition in the Merriam's wild turkey analysis area. In the Mearn's quail analysis area, alternative C reduces the miles of motorized routes by approximately 1 mile. Alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis areas.

New previously closed or unauthorized routes added under the different alternatives for the focal species and their associated analysis are approximately 1 to 1.5 miles under alternative E, 9 to 20 miles under alternative D, 9 to 32 miles under alternative F, 9 to 33 miles under alternative G, and 10 to 63 miles under alternative C. Again, alternative C is the only alternative that allows for an actual increase in miles of routes through the associated analysis areas. Because the Gila currently allows cross-country travel, most proposed routes even though unauthorized are currently being used. By designating unauthorized routes to open or converting the use from motor vehicle to off-road vehicles, these changes do have the potential to increase the direct and indirect effects to this group of species.

The greater the reduction in miles in each analysis area 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 area being analyzed.

Table 165. Mearn's quail analysis area - existing condition and proposed changes by alternative

Mearn's Quail Habitat (Plains and Mountain Grassland) Analysis Area on NFS lands = 232,217 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	621.21	620.28	516.80	457.56	542.85	541.15
Percent miles Alt. B (existing)		-0.15%	-16.81%	-26.34%	-12.61%	-12.89%
Motorized Dispersed Camping (acres)	221,523.57	-206,062.72	-209,143.33	-221,523.57	-206,142.42	-207,318.43
Percent acres of Alt. B (existing)		-93.02%	-94.41%	-100%	-93.06%	-93.59%
Motorized Areas						
Motorized Area - All Vehicles (acres)	1.47	0.00	-1.47	-1.47	0.00	0.00
Motorized Area - OHV Only (acres)	3.05	0.00	-3.05	-3.05	0.00	0.00
Motorized Big Game Retrieval (acres)	221,523.57	-11,579.92	-209,143.33	-221,523.57	-43,480.83	-207,318.43
Percent acres of Alt. B (existing)		-5.23%	-94.41%	-100%	-19.63%	-93.59%

Table 166. Merriam's wild turkey analysis area - existing condition and proposed changes by alternative

Merriam's Wild Turkey Habitat (Ponderosa Pine and Mixed Conifer) Analysis Area on NFS lands = 1,289,857 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	2,074.28	2,098.63	1,455.16	1,079.03	1,684.10	1,662.55
Percent miles Alt. B (existing)		1.17%	-29.85%	-47.98%	-18.81%	-19.85%
Motorized Dispersed Camping (acres)	965,898.33	-917,931.84	-928,814.69	-965,898.33	-920,215.57	-924,425.58
Percent acres of Alt. B (existing)		-95.03%	-96.16%	-100%	-95.27%	-95.71%
Motorized Areas (acres)	7.99	0.00	-7.99	-7.99	0.00	0.00
Motorized Big Game Retrieval (acres)	965,898.33	-109,600.56	-928,814.69	-965,898.33	-322,089.83	-924,425.58
Percent acres of Alt. B (existing)		-11.35%	-96.16%	-100%	-33.35%	-95.71%

The following tables display the effects determination for game bird species listed as Gila National Forest management indicator species (table 167) and New Mexico Partners in Flight high-priority species (table 168). Effects determination for Merriam's wild turkey is displayed in table 169.

Table 167. Gila National Forest management indicator species determination by alternative

Management Indicator Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Mearn's quail		*NA	NA	NA	NA	NA

*NA – No adverse effects to the population or habitat trends

Rationale for determination: Under alternatives C, D, E, F, and G, the potential effects to upland game birds are reduced. For this species direct and indirect effects are reduced the most under alternative E, then D, G, F, and C. The potential to affect individuals and minor amounts of habitat under all action alternatives still exist; but none will adversely affect the population levels or habitat trends.

Table 168. Mexico Partners in Flight high-priority species determination by alternative

NMPIF High Priority Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Blue grouse		*NE	NE	NE	NE	NE

*NE – No effect

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 that occurs in this vegetation type.

Table 169. Merriam's wild turkey determination by alternative

Game Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Merriam's wild turkey		*NA	NA	NA	NA	NA

*NA – No adverse effects to the population or habitat trends

Rationale for determination: Under alternatives C, D, E, F, and G, the potential effects to this upland game bird are reduced. For this species direct and indirect effects are reduced the most under alternative E, then D, G, F, and C. 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.

Insects

Table 170 displays the insect species assessed in this section.

Table 170. 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

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 (table 171), 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 meters 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 two-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 (one- or two-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 stream course) all insect orders showed an increase in numbers. All mayfly species also showed an increase in numbers from pre-disturbance conditions to post-disturbance 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 pre-crossing turbidity within 700 feet (approximately 215 meters) 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 215 meters from roads was used as it pertains to the proposed action and to each alternative (table 172).

Table 171. Summary of potential motorized route affects, analysis factors, and analysis indicators for insects

Road Associated Factors	Motorized Trail/ORV Associated Factors	Combined Analysis Factors	Analysis Indicator
Collisions	Collisions	Harvest/Direct Effects	Route Miles
Disturbance, Displacement, Avoidance, Harassment Improved Habitat	Disturbance, Displacement, Avoidance, Harassment Improved Habitat	Disturbance/Indirect Effects	Disturbance Zone Summarized In Acres

Table 172. 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	Disturb Zone	Analysis Area
A notodontid moth	Motorized Trail/ORV Use	Route Miles	215 meters	Desert Shrub/ Piñon-Juniper/Shrub Oakland/Ponderosa pine
Nitocris fritillary (butterfly)	Motorized Trail/ORV and Roads	Route Miles	215 meters	Wet Meadow, Wetland, and High Elevation Riparian
A may fly	Motorized Trail/ORV and Roads	Route Miles	215 meters	Middle Elevation Riparian (Only within the Gila Draainage)
Dashed ringtail (dragonfly)	Motorized Trail/ORV and Roads	Route Miles	215 meters	Wet Meadow, Wetland, and High Elevation Riparian

Nitocris Fritillary [(Speyeria nokomis nitocris) (Forest Service Sensitive Species Representative of Wet Meadow/Wetland/High Elevation Riparian Vegetation Cover Types)

The species is found in lush Canadian zone meadows, near seeps, marshes, and along streams. The adults show a preference for feeding upon red thistles of various species. For the species the host plant for caterpillars is Viola nephrophylla. The species occurs at elevations of 5,400 to 8,500 feet in the Mogollon and White Mountains of Arizona and the extension of the Mogollon Mountains into New Mexico. It is also found in isolated pockets in a few other New Mexico locations (USDA Forest Service 2010c).

A Notodontid Moth [(Euhyparpax rosea) (Forest Service Sensitive Species Representative of Desert Shrub/Piñon-Juniper/Shrub Oakland/Ponderosa pine Vegetation Cover Types)]

According to NatureServe, this species is probably an oak feeder like the related *H. aurora*. For the family the larvae of most species feed on trees and shrubs, and some attack orchard trees. Many specialize on plants containing toxic substances. Family members are most commonly found on shrubs, trees, and leguminous plants. Probably oak-juniper or oak-pine-juniper in our area (USDA Forest Service 2010d).

A May Fly [(Lachlania dencyannae) (Forest Service Sensitive Species Representative of Middle Elevation Riparian Vegetation Cover Type (Only within the Gila River drainage)]

A may fly larvae have been taken in the East Fork of the Gila River at its junction with the Gila River, where it is a warm, turbid and rapid stream, mostly 6 inches to 2 feet deep with a 6- to 10-foot width. The stream is unshaded for most of the day. Larvae cling to woody debris and vegetation caught in the crevices of rocks (USDA Forest Service 2010e). High gradient medium-sized rivers are considered as habitat for the species.

Dashed Ringtail [(Erpetogomphus heterodon) (Forest Service Sensitive Species Representative of Wet Meadow/Wetland/High Elevation Riparian Vegetation Cover Types)

The species is found in higher altitude rivers and streams with swift current and mixed rocky or cobble and sand bottoms above 1,000 meters (3,200 feet) (USDA Forest Service 2010f).

Insects – Effects by Alternative

No Action Alternative (Alternative B): Under the existing condition for insects there are approximately 54 miles of motorized routes in the a may fly analysis area (table 173), 21 miles of motorized routes in the nitocris fritillary analysis area (table 174), 215 miles of motorized routes in the dashed ringtail analysis area (table 175), and 3,597 miles of motorized routes in the a notodontide moth analysis area (table 176). These routes continue to cause habitat loss and the potential for direct effects like collision, and collection. The potential disturbance zone for a may fly is 3,639 acres, 1,921 acres in nitocris fritillary area, 13,904 acres for dashed ringtail area, and 570,638 acres for the a notodontide moth analysis area. Within these potential disturbance zones motorized routes continue to cause the potential for disturbance, and displacement. 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, dispersed camping, and big game retrieval continue to be allowed across the Gila National Forest. These three types of uses continue to have potential effect insects. Additionally, these three types of uses perpetuate the development of additional roads and motorized trails; potentially allowing for the development of higher road densities. 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 affects to these species.

Action Alternatives (C, D, E, F, and G) (Table 173, table 174, table 175, and table 176): 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 a may fly analysis area motorized dispersed camping is reduced by 90 to 100 percent under all action alternatives; nitocris fritillary analysis area 89 to 100 percent; dashed ringtail analysis area 89 to 100 percent; 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, 92 to 97 percent under alternative D, 29 to 40 percent under alternative F, 90 to 97 percent under alternative G, and 12 to 16 percent under alternative C.

Motorized areas are locations where we have had traditional uses like motorized camping and OHV use. In the a may fly, nitocris fritillary, and dashed ringtail analysis areas, there are 0 acres of habitat being affect by a motorized area under all alternatives. In the a notodontide moth analysis area there are 25 acres of habitat 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, respectively by approximately 18, 30, 3, and 15 percent in the a may fly analysis area; 32, 47, 23, and 23 percent in nitocris fritillary area; 30, 43, 16 and 18 percent in the dashed ringtail analysis area; and 26, 43, 17, and 18 percent in the a notodontide moth analysis area. Alternative C adds approximately 1.5 miles of unauthorized routes above the existing condition in the a may fly analysis area, eliminates 0.5 mile in the nitocris fritillary analysis area, eliminates 2.5 miles in the dashed ringtail, and adds 53 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.

New previously closed or unauthorized routes added under the different alternatives for the focal species and their associated analysis are approximately 0 to 7 miles under alternative E, 0 to 79 miles under alternative D, 0 to 104 miles under alternative F, 0 to 103 miles under alternative G, and less than1 to 165 miles under alternative C. The a notodontide moth habitat (Desert shrub/Grassland, Piñon-Juniper/Shrub Oak Woodland, and Ponderosa Pine vegetation types) is the species in this group that will have the highest level of miles added to its analysis area (see tables). Since this species has the potential to occur in several vegetation types and the other focal species in this group have narrower ranges of potential habitat that is the reason for the big difference in miles of routes between analysis areas. Again, alternative C is the only alternative that allows for an actual increase in miles of routes in this focal group. Because the Gila currently allows cross-country travel, most proposed routes even though unauthorized are currently being used. By designating unauthorized routes to open or converting the use from motor vehicle to off-road vehicles, these changes do have the potential to increase the direct and indirect effects to this group of species.

The greater the reduction in miles in each analysis area, 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 area being analyzed.

Table 173. A may fly analysis area - existing condition and proposed changes by alternative

A May Fly Habitat (Low Elevation Riparian) Analysis Area on NFS land = 9,283 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	54.37	55.85	44.53	37.93	52.52	46.14
Percent miles Alt. B (existing)		2.72%	-18.09%	-30.24%	-3.39%	-15.13%
Motorized Dispersed Camping (acres)	6,944.62	-6,184.38	-6,722.36	-6,944.62	-6,506.50	-6,709.25
Percent acres of Alt. B (existing)		-89.05%	-96.80%	-100%	-93.69%	-96.61%
Motorized Areas (acres)	0.00	0.00	0.00	0.00	0.00	0.00
Motorized Big Game Retrieval (acres)	6,944.62	-997.42	-6,722.36	-6,944.62	-2,567.47	-6,709.25
Percent acres of Alt. B (existing)		-14.36%	-96.80%	-100%	-36.97%	-96.61%

Table 174. Nitocris frtillary analysis area - existing condition and proposed changes by alternative

Nitocris Fritillary Habitat (Wet Meadow/Wetland and High Elevation Riparian) Analysis Area on NFS land = 6,020 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	21.12	20.63	14.46	11.24	16.26	16.26
Percent miles Alt. B (existing)		-2.28%	-31.54%	-46.75%	-23.01%	-23.01%
Motorized Dispersed Camping (acres)	3,363.58	-3,006.71	-3,104.85	-3,363.58	-3,009.80	-3,041.13
Percent acres of Alt. B (existing)		-89.39%	-92.31%	-100%	-89.48%	-90.41%
Motorized Areas (acres)	0.00	0.00	0.00	0.00	0.00	0.00
Motorized Big Game Retrieval (acres)	3,363.58	-417.84	-3,104.85	-3,363.58	-965.90	-3,041.13
Percent acres of Alt. B (existing)		-12.42%	-92.31%	-100%	-28.72%	-90.41%

Table 175. Dashed ringtail analysis area - existing condition and proposed changes by alternative

Dashed Ringtail Habitat (Wet Meadow/Wetland and High, Middle and Low Elevation Riparian) Analysis Area on NFS land = 36,163 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	214.67	212.17	149.53	121.36	180.96	176.36
Percent miles Alt. B (existing)		-1.17%	-30.35%	-43.47%	-15.70%	-17.84%
Motorized Dispersed Camping (acres)	24,516.62	-21,780.42	-22,793.68	-24,516.62	-22,338.42	-22,629.98
Percent acres of Alt. B (existing)		-88.84%	-92.97%	-100%	-91.12%	-92.30%
Motorized Areas (acres)	0.04	0.00	-0.04	-0.04	0.00	0.00
Motorized Big Game Retrieval (acres)	24,516.62	-4,005.49	-22,793.68	-24,516.62	-8,952.37	-22,629.98
Percent acres of Alt. B (existing)		-16.34%	-92.97%	-100%	-36.52%	-92.30%

Table 176. A notodontide moth analysis area - existing condition and proposed changes by alternative

A Notodontide Moth Habitat* Analysis Area on NFS lands = 2,792,162 acres	Existing Effects Alt. B	Alt. C Change in Effects	Alt. D Change in Effects	Alt. E Change in Effects	Alt. F Change in Effects	Alt. G Change in Effects
Total NFS routes and trails (miles)	3,596.96	3,650.63	2,663.83	2,055.61	2,977.72	2,953.92
Percent miles Alt. B (existing)		1.49%	-25.94%	-42.85%	-17.22%	-17.88%
Motorized Dispersed Camping (acres)	2,103,111.37	-2,015,608.56	-2,034,799.19	-2,103,111.37	-2,021,077.81	-2,027,242.81
Percent acres of Alt. B (existing)		-95.84%	-96.75%	-100%	-96.10%	-96.39%
Motorized Areas						
Motorized Area - All Vehicles (acres)	22.18	0.00	-22.18	-22.18	0.00	0.00
Motorized Area - OHV Only (acres)	0.26	0.00	-0.26	-0.26	0.00	0.00
Motorized Big Game Retrieval (acres)	2,103,111.37	-332,057.21	-2,034,799.19	-2,103,111.37	-842,162.05	-2,027,242.81
Percent acres of Alt. B (existing)		-15.79%	-96.75%	-100%	-40.04%	-96.39%

*Desert Shrub/Grassland, Piñon-Juniper/Shrub Oak Woodland, Ponderosa Pine

Table 177 displays the effects determination for insect species listed as Forest Service sensitive species.

Table 177. Insects listed as Forest Service sensitive species determinations by alternative

Sensitive Species	Alt. B Existing Condition	Alt. C	Alt. D	Alt. E	Alt. F	Alt. 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

*MI – May impact

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 Frtillary 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 alternatives would cause a trend toward Federal listing.

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) within the area of potentially affected habitat. The time frame considered in this analysis goes back to signing/implementation of the current forest plan and its subsequent amendments, and actions that have the potential to occur over the next 5 years. In this case, the area of potentially affected habitat is the entire Gila National Forest, and lands within the boundary of the forest.

The process used to complete this analysis starts by considering habitat conditions at the start of our time frame for species of concern (federally listed species, Forest Service sensitive species, management indicator species species, migratory bird species and species identified through scoping for this travel management analysis); habitat changes to date as a result of management actions taken within the action area; and potential habitat changes in the near future (table 178). Management activities that influence effects to wildlife can include landownership, mining, livestock grazing, vegetation management (prescribed fire, wildfire response, and non-fire related treatments), roads, recreational activities, game management, and other land disturbing actions that can cause effects to species and/or their habitat. Other more natural events that influence wildlife habitat conditions are insect and disease outbreaks, high severity wildfires, drought, and climate change. The effects from these events will be discussed as they relate to wildlife on the Gila and will continue to be considered in our current and future planning and management decisions, but are not phenomena that as managers we have much control or influence over.

Table 178. Primary vegetation types on the Gila National Forest

Vegetation Type	1986 Gila NF Acres as Identified In Forest Plan	2010 Acres as Identified Through Mid –scale Vegetation Mapping (FS Owned)	Percent Change Since Forest Plan	2013 Acres as identified Through Re-mapping to Consider Effects of Bear, Wallow, and Whitewater-Baldy Wildfires	Percent Change Since Forest Plan
Spruce-Fir	Not identified believed to be grouped with Mixed Conifer	2,540	Unknown	898	-65%
Mixed Conifer	277,436	161,635	-42%	126,399	-54%
Ponderosa Pine	1,119,773	1,173,938	+5%	1,163,459	+4%
Piñon-Juniper/Shrub Oak Woodland	1,591,082	1,630,930	+2%	1,602,637	+1%
Plains Grassland/Mountain Grassland	284,121	231,758	-18.5%	232,217	-18.3%
Desert Shrub/Grassland	43,454	26,029	-40%	26,067	-40%
High Riparian	26,741	4,310	+22%	4,310	+22%
Mid Riparian	(FP combined these acres)	20,859		20,859	
Low Riparian		9,283		9,283	
Lake		243	Unknown	243	
Wet Meadow/Wetland		1,710	Unknown	1,710	
Sparsely Vegetated		5,600	Unknown	5,600	
Grass - Stand Replacement and Seeding				18,415	
Sparsely Vegetated - Stand Replacement				58,354	

Note: 1986 Forest Plan used less accurate data; therefore, some changes are due to mapping abilities.
Note: Four classifications not considered as primary vegetation types in the forest plan; therefore, not mapped separately in 1986 (these include: Spruce/Fir, Lake, Wet Meadow/Wetland, and Sparsely Vegetated).
Note: Gila NF surface ownership increased in 2012 to include Bear Creek and San Francisco River private land acquisitions (primarily riparian acres acquired).
Note: Percent change is the last column is from the forest plan except for Spruce/fir which is the percent change since the Mid-scale Vegetation Mapping.

Land Ownership: The Gila National Forest National Forest has increased its land base since 1986. Private land inholdings acquired within the Forest boundary have increased important habitat types and benefited wildlife. Some of the more significant ones include, Aldo Leopold 1 (2,781 acres Seco Creek), Diamond Creek (741 acres), Spruce Creek Tract (99 acres), Aldo Leopold II (401 acres), Gila River Tract (123 acres), Aldo Leopold III (120 acres), Bear Creek (1,294 acres), and a corridor along the San Francisco River (320 acres). Riparian habitat is

associated with most of these acquisitions and made up the major vegetation type in most. In the desert southwest and on a dry forest like the Gila this habitat type is very important to the majority of species of concern on the forest.

Recreation: Dispersed recreation durning the summer and fall months is the time and type of use we get the most on the Gila. We have approximately 752 miles of foot trails outside of wilderness areas and another 873 miles in wilderness areas. We have a few larger developed sites at Lake Roberts, Snow Lake and Quemado Lake, and several other developed and more primitive sites. Effects to species of concern and their habitats is very localized and can be considered insignificant and discountable from developed and dispersed recreation on the Gila.

Mining: The Gila National Forest has had a long history of mining activities that have occurred, or are still occurring, on patented land within the forest's boundaries. For the most part, mining activities have minimal, localized impacts where they occur. These mining activities are primarily below-ground and are minimal to terrestrial habitat conditions and the species that use these habitats.

Grazing: Since 1986, there have been significant improvements in grazing practices on the Gila National Forest. The projected livestock numbers considered in the 1986 Forest Plan are approximately 350,000 head months per year. However, the permitted use in 2006 through 2010 averaged less at 254,500 head months annually. The amount of use that was actually authorized each of those years was even lower averaging approximately169, 000 head months. In summary, the annual permitted use level averaged 73 percent of that projected by the forest plan, and the annual use that was actually authorized averaged 48 percent of that projected by the forest plan. In addition, livestock have been excluded from grazing on approximately 200 additional miles of riparian habitat through fence exclosures.

Site-specific analysis of livestock grazing is conducted and consulted on with the U.S. Fish and Wildlife Service. Mitigation measures have been put in place that reduce affects from grazing management on federally listed species. Direct and indirect effects to species of concern from grazing management have been diminished due to mitigation projects including exclusion of livestock from major streams, implementation of conservative grazing intensities, livestock dispersal improvement, and decisions that align grazing with changing forage production (USDA Forest Service 2013d).

Vegetation Management: There have been a number of vegetation management activities across the forest over the past 25 years. These have included activities like commercial thinning, salvage cutting, precommercial thinning for wildlife, watershed, vegetation and forest health improvement, precommercial thinning, overstory removal, road closures, fuels reduction thinning, and prescribed fire. Timber harvest has decreased from the 1980s to present. Timber harvest activities across the forest have declined by over 50 percent, going from an average of 25,000 CCF (100 cubic feet) per year in the early 1980s, to a current average of 10,000 CCF per year. This decline started around 1993 and has continued since, for over a period of approximately the last 20 years. This reduction in timber harvest has, in turn, reduced the number of roads constructed for these activities. The forest plan FEIS projected harvest levels would cause habitat conditions for management indicator species to be exceeded. Since the actual annual harvest rate has been approximately 18 percent of that projected by the forest plan, the forest is well within its ability to maintain viable populations for all species of concern on the Gila.

The Gila has a long history of using prescribed fire as a management tool to maintain the different vegetation types on the forest. Our records show that we have used prescribed fire on over 184,000 acres. A limitation in the database does not allow us to determine first entry treatments from areas that have been treated multiple times; therefore, to some level these fires have re-burned the same acreage. Most of these acres burned at lower intensity levels in an effort to meet management objectives.

The Gila has lost a high percentage of its grassland habitat due to shrub and tree encroachment.

Roads: The forest plan FEIS determined that management indicator species would be managed at levels exceeding viable populations at the projected open road levels. The actual open road level is 20 percent greater than the projected level for this time period. This increase in open road miles could adversely affect species of concern and their associated habitats through direct and indirect effects from road use. One mile per square mile is usually considered to be at a level that can maintain good habitat conditions for species sensitive to impacts by roads. Researchers have found that when road densities exceed about 1 mile per square mile (1.6 kilometers per 0.9 kilometer radius circle) wolves were displaced or avoided the area (Mech et al. 1988; Thiel 1985). Gaines et al. 2003 rates routes at a density 1 mile per square mile typically low for several species. The average road density of Forest Service routes per 5th-code watershed on the forest is 0.98 mile per square mile within the forest boundary (due to the variable sizes of the habitat type polygons, ranging from very small to large, this information is not available by habitat type). The average road density of Forest Service routes and other routes (private, county, State, and Federal) per 5th-code watershed on the forest is 1.2 miles per square mile within the forest boundary. Of the 49 5th-code watersheds on the forest, 3 have no roads, approximately 23 watersheds are below or within an approximate 1.3 miles per square mile, 19 are at around 1.5 miles per square mile, and 4 are above 2.0 miles per square mile. Some areas on the forest are considered high for some species; however, the majority of these are dirt routes, small spur routes, or two track trails that get very little use. With the level of traffic on most of these routes in all but a very few localized areas, the density of motorized routes within the forest boundary are not at a level of concern to species of concern. Most action alternatives except C reduce the level of motorized routes below the existing condition.

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

> "In the Southwest, climate modelers agree there is a drying trend that will continue well into the latter part of 21st century (IPCC 2007; 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 time frame of years to decades."

A new U.S. Forest Service report predicts that most of the Southwest, parts of California and the southern and central Great Plains will be the most vulnerable areas in the nation to water shortages during the next 60 years.

The National Climate Assessment Development Advisory Committee (NCADAC) has overseen the development of a Draft Climate Report that was recently released for public comment (January 2013). Summarized below are some of the findings from the report.

> "The Southwest is the hottest and driest region in the U.S., where the availability of water has defined its landscapes, history of human settlement, and modern economy. Climate changes pose challenges for an already parched region that is expected to get hotter and, in its southern half, significantly drier. Widespread tree death and fires, which already have caused billions of dollars in economic losses, are projected to increase, forcing wholesale changes to forest types, landscapes, and the communities that depend on them. Climate change is increasing the vulnerability of forests to ecosystem change and tree mortality through fire, insect infestations, drought, and disease outbreaks. Western U.S. forests are particularly vulnerable to increased wildfire and insect outbreaks.
>
> "Factors affecting tree death, such as drought, higher temperatures, and/or pests and pathogens, are often interrelated, which means that isolating a single cause of mortality is rare (Allen et al. 2010; Dukes et al. 2009; McDowell et al. 2008). However, rates of tree mortality due to one or more of these factors have increased with higher temperatures in western forests (Van Mantgem et al. 2009; Williams et al. 2010) and are well correlated with both rising temperatures and associated increases in evaporative water demand (Williams et al. 2012). Trees die faster when higher temperatures accompany drought; thus a shorter drought can trigger mortality. Short droughts occur more frequently than long droughts, therefore the direct effect of rising temperatures, without a change in drought frequency, could result in substantially greater mortality (Adams et al. 2009). Western forests are currently considered limited by moisture and thereby highly susceptible to future changes in environmental conditions.
>
> Fire naturally shapes southwestern landscapes. Indeed, many Southwest ecosystems depend on periodic wildfire to maintain healthy tree densities, enable seeds to germinate, and reduce pests (Bowman et al. 2009; Keeley and Zedler 2009). Excessive wildfire destroys homes, exposes slopes to erosion and landslides, threatens public health, and causes economic damage (Frisvold et al. 2011; Morton and Global Institute of Sustainable Forestry 2003; Richardson et al. 2011; WFLC 2010). Given strong relationships between climate and fire, even when modified by land use and management, projected climate changes suggest that western forests in the United States will be increasingly affected by large and intense fires that occur more frequently (Bowman et al. 2009; Keane et al. 2009; Littell et al. 2009; Westerling et al. 2011; Williams et al. 2010)."

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. This will continue to affect the different vegetation types and habitats that species on the Gila depend on. The level of affect to the different species is unknown. As stated in the Watershed Specialist Report (USDA Forest Service 2013d): "Forest management activities should strive for promoting resilience and resistance to our forest from potential impacts of climate change. Implementing should focus on maintenance and restoration of resilient native ecosystems..." Even prior to the signing of the existing forest plan the Gila has had a history of not trying to suppress all natural

ignitions. Wildfires have affected important vegetation types on the forest but at the same time may have made the remaining habitat more resilient to the potential effect of climate change, helping to preserve the diversity of habitat types on the forest. The forest also has a long history of using prescribed fire to maintain natural processes; again, with the intent of using these management actions to help maintain a more resilient ecosystem to avoid uncharacteristic fire type of events.

Wildland Fire: Between 1986 and 2006, wildland fires have burned approximately 785,000 acres within the Gila National Forest (USDA Forest Service 2012). Acres burned through wildfire have averaged more than six times the projected forest plan levels. Many of these fires have been smaller in size and have actually benefited the resources. It is the uncharacteristically large patches of high severity fire across the landscapes that have the potential to adversely affect species and habitat conditions for these species. Between 2007 and 2012, several large events occurred on the forest: the Bear, Wallow, and Whitewater-Baldy fires burning approximately another 460,800 acres. Large scale high severity fires have reduced the amount of spruce/fir vegetation by approximately 65 percent, and our mixed conifer vegetation by 54 percent. Species most likely to be negatively affected by high severity fire are those that are old growth dependent (later seral stage vegetation) in habitat types vulnerable to fire, and aquatic species that may be indirectly adversely affected by changes in water quality after large fires. If the Forest continues to experience drought, potentially caused by climate change, within the reasonably foreseeable future we can expect to continue to see larger areas of high severity fire; that will result in negative effects to aquatic species and species dependent on later seral stage vegetation. Changes to date on the forest as a result of fire have occurred for a larger part in a mosaic pattern scattered across the landscape, leaving important pockets of mixed conifer vegetation.

Insects/Disease: Since 1986, the Gila National forest has experienced some noticeable western pine beetle and bark beetle infestation. These insect infestations have resulted in pockets of tree mortality. Data between the years 2002 to 2006 suggest that an average of approximately 15,000 acres per year was affected by insect/disease mortality. This data suggested that 82 percent of the affected acres are in ponderosa pine, 8 percent in mixed conifer vegetation, and 10 percent in woodland vegetation (USDA Forest Service 2012). The data also suggested that most of the mortality caused by insects and disease occurs in middle aged stand, and to a lesser degree in older aged stands. Data between 2007 and 2011 indicates a higher rate of affected stands averaging approximately 29,000 acres per year. If the Forest continues to experience drought, potentially caused by climate change, within the reasonably foreseeable future we can expect to continue to see a higher level of affect from insects and disease.

Present and Future Activities: Activities currently occurring in the Gila National Forest and adjacent lands are expected to continue. Ongoing activities expected to continue in the near future include fuelwood and timber harvesting (approximately 10,000 CCF per year), prescribed burns and thinning work (approximately 10,000 acres per year), road and trail use, construction and maintenance, rangeland grazing, recreational activities including OHV use, and hazardous fuels reduction. New activities include the future decision and implementation of the Tucson Electric Power Company Transmission Vegetation Management and Facilities Maintenance Program project, which may result in 11 to 13 miles of new road across 20 6th-code watersheds found on the Gila. In addition, the Reserve Ranger District is in the planning stages of the 60,000 acres Burro Analysis for Restoration of Forest Health project, which includes a variety of vegetation treatment activities. This project is planned for decision in 2014, with implementation scheduled to begin the same year. Other vegetation treatment projects within the watersheds will be

identified as a result of the Forest's ongoing efforts to restore fire adapted ecosystems. There has been an increased emphasis on the reduction of fuel loading on the forest to reduce the risk of vegetative stand replacement-type wildfires.

Cumulative Affects Assessment and 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 affects to wildlife species or their habitat on the forest. More specifically, the incremental impacts of the action alternatives of travel management when added to other past, present, and reasonably foreseeable actions of land ownership, mining, grazing, vegetation management projects, and recreation activities are at levels that do not cause significant affects to species of concern identified in this analysis. This analysis shows that if the effects of all open roads are considered (private, county, State, and Federal), there are localized areas of concern for species like ungulates, wide ranging carnivores, and the Chiricahua leopard frog. More natural occurring events like drought, potentially caused by climate change, have resulted in larger high-intensity fires and potentially larger outbreaks of insect and disease infestations. If a warmer and drier climate persists, the level of concern increases for species like the blue grouse and Mexican spotted owl, which use spruce/fir and mixed conifer habitat.

Ungulates: The incremental impacts of the action alternatives of travel management when added to other past, present, and reasonably foreseeable actions of land ownership, mining, grazing, vegetation management projects, and recreation activities are at levels that do not cause significant affects to ungulates. This analysis shows that if the effects of all open roads are considered (private, county, State, and Federal), there are localized areas of concern for 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. Roads invite human activity of all sorts, creating zones of relatively higher use, which can lead to poaching, over-hunting and over-fishing (Strittholt et al. 2006). Elk vulnerability is highest in areas with open roads, reduced in areas with closed roads, and lowest in roadless areas.

Private, county, State and Federal motorized routes add approximately 793 miles within the elk analysis area, 79 miles within the pronghorn analysis area, 7.5 miles in the bighorn sheep analysis area, and 471 miles in the deer analysis area (table 85). All action alternatives except alternative C reduce the level of Forest Service motorized routes fairly significantly. Alternative C increases the level of motorized routes in the elk and deer analysis areas adding 0.33 percent (12.8 miles) and 2 percent (39.6 miles), respectively; adding to the relatively high level of private, county, and State roads within these analysis areas 729 miles and 470.7 miles, respectively. Under alternative C, population levels of elk and deer have the potential to be adversely affected by these other roads, but the alternative does not significantly increase the routes for ungulates. Under alternatives D, E, F, and G, road densities are substantially reduced. A few localized areas 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. Under alternatives C, D, E, F, and G, these localized areas of higher road densities would not cause a significant effect to wild ungulates or any of the habitat types they depend on within the Gila National Forest.

Carnivores: The incremental impacts of the action alternatives of travel management when added to other past, present, and reasonably foreseeable actions of land ownership, mining, grazing, vegetation management projects, and recreation activities are at levels that do not cause

significant affects to carnivores. This analysis shows that if the effects of all open roads are considered (private, county, State, and Federal), there are localized areas of concern for this group of species.

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 (Thiel 1985, Mech et al. 1988, Claar et al. 1999). Researchers have found that when road densities exceed about 1 mile per square mile (1.6 kilometers per 0.9 kilometer radius circle) wolves were displaced or avoided the area (Mech et al. 1988). 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, within the recovery area in Arizona and New Mexico illegal shootings and vehicle collisions have been the greatest source of wolf mortality. Of the 74 wolf deaths, between 1998 and June 1, 2009, 32 are associated with shooting and 12 with vehicle collision (USFWS 2009).

Forest Service motorized routes within the boundary of the Gila average approximately 1.0 mile per square mile within the 49 5th-code watersheds that occur on the forest (table 179). If private, county, State and Federal routes are combined, motorized route densities increase to approximately 1.1 mile per square mile (table 180).

Table 179. Mexican gray wolf cumulative effects analysis area

Note: 5th-code watershed motorized route density on watershed area within the Gila National Forest administrative area (3 5th codes with no roads not included on table)

5th-Code Watershed and Route Proposal (includes all open NFS routes; Private Rds.; and US Hwy, State Hwy, and County Rds.)	Alt. B Miles/ Mile²	Alt. C Miles/ Mile²	Alt. D Miles/ Mile²	Alt. E Miles/ Mile²	Alt. F Miles/ Mile²	Alt. G Miles/ Mile²
1302020804 Nester Draw	1.77	1.72	1.58	1.28	1.58	1.58
1302020806 Y Canyon	1.39	1.37	1.07	0.81	1.15	1.13
1302020807 Patterson Lake	1.90	1.89	1.34	1.14	1.45	1.43
1302021106 Headwaters Alamosa Creek	1.02	0.62	0.56	0.54	0.58	0.58
1303010101 Cuchillo Negro Creek	0.74	0.67	0.58	0.54	0.61	0.61
1303010102 Palomas Creek-Rio Grande	0.37	0.35	0.23	0.21	0.32	0.32
1303010103 Percha Creek	0.84	0.83	0.70	0.68	0.77	0.77
1303010104 Caballo Reservoir	0.13	0.12	0.09	0.09	0.12	0.12
1303010202 Cuervo Arroyo-Rio Grande	0.60	0.63	0.49	0.46	0.56	0.56

5th-Code Watershed and Route Proposal (includes all open NFS routes; Private Rds.; and US Hwy, State Hwy, and County Rds.)	Alt. B Miles/ Mile²	Alt. C Miles/ Mile²	Alt. D Miles/ Mile²	Alt. E Miles/ Mile²	Alt. F Miles/ Mile²	Alt. G Miles/ Mile²
1303020201 Gallinas Canyon-Mimbes River	0.85	0.99	0.67	0.52	0.74	0.74
1303020202 Headwater San Vincente Draw	1.33	1.23	1.11	1.12	1.13	1.13
1303020203 Outlet San Vincente Draw	1.73	2.64	1.20	0.52	1.32	1.32
1303020204 Lampbright Draw	3.06	3.04	1.88	1.87	2.01	2.01
1303020205 Lampbright Draw-Mimbres R.	0.57	0.58	0.42	0.41	0.55	0.56
1303020213 Upper Seventysix Draw	2.17	2.35	2.02	1.85	2.02	2.02
1303020214 Cow Spring Draw-Seventysix Draw	0.95	1.13	0.95	0.66	0.95	0.95
1502000103 Coyote Creek	1.93	1.90	1.28	1.10	1.46	1.46
1502000301 Rito Creek	1.88	1.80	1.40	1.11	1.40	1.40
1502000302 Upper Largo Creek	1.37	1.36	1.07	0.97	1.07	1.07
1502000305 Agua Fria Creek	1.34	1.34	1.15	1.08	1.21	1.19
1502000307 LA Draw-Cienega Amarilla	2.37	2.38	1.87	1.70	1.91	1.87
1504000101 Railroad Canyon	1.60	1.67	1.40	0.85	1.66	1.66
1504000102 Corduroy Draw	1.64	1.58	1.21	1.09	1.49	1.49
1504000103 Beaver Creek	1.14	1.14	0.83	0.71	1.02	1.03
1504000104 Headwaters East Fork Gila River	0.52	0.51	0.39	0.33	0.47	0.47
1504000105 Middle Fork Gila River	0.97	0.97	0.71	0.50	0.79	0.80
1504000106 West Fork Gila River	0.06	0.06	0.06	0.06	0.06	0.06
1504000107 Outlet East Fork Gila River	0.16	0.16	0.16	0.16	0.16	0.16
1504000108 Sapillo Creek	1.21	1.24	0.89	0.66	1.01	1.00
1504000109 Sapillo Creek-Gila River	0.07	0.06	0.06	0.06	0.06	0.06
1504000201 Bear Creek	0.66	0.66	0.54	0.51	0.54	0.54
1504000202 Duck Creek	2.02	1.91	1.36	1.07	1.41	1.41
1504000203 Mangas Creek	1.44	1.88	1.29	0.86	1.47	1.45
1504000204 Sycamore Cr-Upper Gila River	1.48	1.49	1.29	1.25	1.26	1.26
1504000205 Blue Creek	1.00	1.00	1.00	0.00	1.00	1.00
1504000206 Blue Creek-Upper Gila River	0.82	0.94	0.64	0.57	0.69	0.69
1504000208 Apache Creek-Gila River	0.30	0.30	0.30	0.28	0.30	0.30
1504000302 Headwaters Burro Cienega	1.78	1.85	1.41	1.05	1.43	1.43
1504000304 Lordsburg Draw	1.61	1.72	1.28	1.10	1.31	1.31
1504000401 Headwaters Tularosa River	1.60	1.61	1.35	1.17	1.42	1.40
1504000402 Outlet Tularosa River	1.38	1.42	1.06	0.70	1.24	1.25
1504000403 Centerfire Cr-San Francisco River	1.58	1.58	1.29	1.12	1.38	1.34
1504000404 Deep Cr-San Francisco River	1.05	1.08	0.89	0.74	0.94	0.95
1504000405 Upper Blue River	0.98	0.97	0.79	0.56	0.88	0.89
1504000406 Pueblo Cr-San Francisco River	1.05	1.08	1.00	0.93	1.02	1.02
1504000408 Mule Cr-San Francisco River	1.32	1.26	1.01	0.87	1.07	1.03

Table 180. 5th-code watersheds per route density category by alternative (49 watersheds within Gila National Forest boundary)

Cumulative Route Density Categories	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
0 to ≤ 1.0 mile/mile²	24	21	27	33	26	27
1.1 to 1.5 miles/mile²	10	12	18	13	18	17
1.6 to 1.9 miles/mile²	11	12	3	3	3	3
≥ to 2.0 miles/mile²	4	4	1	0	2	2

Alternative C increases the level of motorized routes in 18 of the 49 5th-code watersheds (table 179). Under this alternative you have a reduction from 24 to 21 watersheds in the 0 to less than 1.0 mile per square mile range (preferred category). Alternative D decreases the route densities in 44 watersheds and maintains the density in 5 of the 49 5th-code watersheds on the forest. The 5 that are maintained at the same level are within the 0 to less than or equal to 1 mile per square mile range. Alternative E decreases the route densities in 45 watersheds and maintains the density in 4 of the 5th-code watersheds on the forest. The 4 that are maintained at the same level are within the 0 to less than 1 mile per square mile range. Under this alternative, no watersheds remain in the greater than or equal to 2.0 miles per square mile range. Alternatives F and G decrease road densities in almost all 5th-code watersheds. Two exceptions occur in these alternatives where the density in five watersheds is maintained at the same level (at less than or equal to 1 mile per square mile), and two watersheds actually minimally increase the road density, but this density still remains at a level of about 1.5 miles per square mile. In these two alternatives, you have 5 watersheds that remain in the 2 worst categories, compared to 15 under the existing condition.

Localized areas with higher road densities will continue to maintain higher exposure rates between humans and wolves, facilitating the potential for additional harvest of these species. Alternative C actually increases the potential for this to occur, adversely affecting at least to a low level wolf population levels. Habitat conditions improve for the wolf under alternatives E, D, G, and F, respectively, above the existing conditions; but cumulatively you do continue to have localized areas of concern particularly under alternatives F, G, and D, respectively. These localized areas of higher road densities would not cause a significant effect to wolves.

Private, county, State and Federal motorized routes add approximately 688 miles within the black bear analysis area (table 92), and 478 miles in the mountain lion analysis area (table 93). All action alternatives except alternative C reduce the level of Forest Service motorized routes fairly significantly. Alternative C increases the level of motorized routes in both these analysis areas adding to the already relatively high level of cumulative effects. Under alternative C, population levels of black bears and mountain lions have the potential to be adversely affected. Under alternatives D, E, F, and G, route miles are substantially reduced. None of the alternatives would cause a significant effect to wide ranging carnivores.

Chiricahua Leopard Frog: The incremental impacts of the action alternatives of travel management when added to other past, present, and reasonable foreseeable actions of land ownership, mining, grazing, vegetation management projects, and recreation activities are at levels that do not cause significant effects to this species. This analysis shows that if the effects of all open roads are considered (private, county, State, and Federal) localized areas of concern may

exist for this species. 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 are currently eight reasonable dispersal areas considered occupied. 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.

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 (table 110). Private, county, State, and Federal motorized routes add approximately 26.5 miles and 1 stream crossing within the dispersal zone of occupied Chiricahua leopard frog sites. All action alternatives reduce the level of Forest Service motorized use by converting the use to administrative use only or by reducing the number of routes. Alternative C reduces this level by a lower level but still reduces it; the remaining action alternatives reduce use and the number of routes by a relatively high level. Under alternatives C, D, E, F, and G the number of routes are reduced, stream crossings are reduced, and use is reduced; therefore, none of the action alternatives would cause a significant effect to this species.

Lesser Long-nosed Bat: Private, county, State, and Federal motorized routes add approximately 27.4 miles of motorized use within the affected habitat area of this species (table 97); but, again this bat is only known to forage in the area at night when traffic levels are significantly reduced**.** The incremental impacts of the action alternatives of travel management when added to other past, present, and reasonable foreseeable actions of land ownership, mining, grazing, vegetation management projects, recreation activities and roads are at levels that do not cause significant affects to this species.

Southwestern Willow Flycatcher: Private, county, State, and Federal motorized routes add 0 miles of motorized use within the affect habitat area of occupied sites, and approximately 2.8 miles of motorized use within the affected habitat area of southwestern willow flycatcher critical habitat (table 142). The incremental impacts of the action alternatives of travel management when added to other past, present, and reasonable foreseeable actions of land ownership, mining, grazing, vegetation management projects, recreation activities and roads are at levels that do not cause significant affects to this species.

Mexican Spotted Owl: Across the Gila National Forest, it is expected that there is a decreased acreage of mature/late seral mixed conifer important to Mexican spotted owl because of recent stand-replacing fires including the Whitewater-Baldy Fire Complex in 2012 (300,000 acres), Wallow Fire and Bear Fire in 2008, and pine bark beetle and other forest insect epidemics in the 1990s.

In 2012, the Whitewater-Baldy Fire complex burned among a substantial amount of Mexican spotted owl suitable habitat. According to the BAER Wildlife Resource Report (USDA Forest Service 2012a) prepared for the fire, approximately 101 protected activity centers (PACs) were within the fire perimeter amounting to 56,891 acres of PACs potentially affected. Based on an assumption that high fire intensity over 80 percent of a PAC would result in total loss of suitable nesting habitat in the PAC, a total of 3 PACS were lost. An additional 12 PACs had a moderate

loss of nesting habitat based on fewer acres (50 percent to 79 percent) within a PAC having high intensity fire. Since it is unknown whether stands suitable for nesting were retained post-fire in these 12 PACs, it is likely that some of these PACs will continue to provide nesting habitat while others will not. In summary, the BAER report shows that of the 101 PACs, 3 are considered to be at high risk of loss for the owls associated with that individual PAC. Another 12 PACs were considered to be at moderately high risk. Therefore, 15 of the PACs within the Whitewater-Baldy Complex (14 percent) have been seriously compromised in terms of supporting successfully breeding Mexican spotted owls in the future. North slopes, within or adjacent to PACs, that burned at low severity or were unburned may provide refugia for displaced owls. In numerous but not all cases, low severity or unburned areas within PACs included ponderosa pine or other Mexican spotted owl habitat types. The report concludes that Mexican spotted owls were found to be at low risk based on the number of nest sites (PACs) that occur within the fire perimeter, the probability of damage or loss of the species or habitat within one to three years being low, and the magnitude of the consequences to this species and its habitat being minor overall.

The incremental impacts of the action alternatives of travel management when added to other past, present, and reasonable foreseeable actions of land ownership, mining, grazing, vegetation management projects, and recreation activities are at levels that do not cause significant affects to this species. Private, county, State and Federal motorized routes add approximately 23 miles of road within the Mexican spotted owl PAC analysis area (table 120). All action alternatives except alternative C reduce the level of Forest Service motorized routes within these PACs. Alternative C increases the level of motorized routes in this analysis area negatively affecting this habitat and potentially owls associated with these PACs. Under alternatives D, E, F, and G, route densities are reduced fairly significantly within PACs. Under alternatives D, E, F, and G, there would be not significant impacts to this species or the habitat associated with this species from the implementation of these alternatives.

Mixed Conifer Habitat Type Analysis Area: The Gila has lost approximately 54 percent of this habitat type due to high-severity wildfire and insect/disease outbreaks. Private, county, State, and Federal motorized routes add approximately 7 miles of road within this analysis area (table 122). All action alternatives except alternative C reduce the level of Forest Service motorized routes. Alternative C increases the level of motorized routes in this analysis area, negatively affecting this habitat type and potentially the species associated with this habitat. Under alternatives D, E, F, and G, road densities are reduced. Under alternatives D, E, F, and G, these localized areas of higher road densities would not cause a significant effect to species associated with this vegetation type.

Spruce-Fir Habitat Type Analysis Area: The Gila has lost approximately 65 percent of this habitat type due to high-severity wildfire. Private, county, State, and Federal motorized routes do not add any miles of routes within this vegetation type. None of the action alternatives have routes in this habitat type; therefore, none of the action alternatives would adversely affect species that occur in this vegetation type.

Effects of Forest Plan Amendments

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the Travel Management Rule.

Sensitive Plants

This section is a summary of the sensitive plant species specialist report (USDA Forest Service, 2013h).

Existing Condition

For this analysis, acres of suitable habitat within vegetation types were used to determine the effects of motorized dispersed camping, motorized big game retrieval and motorized route off-road parking. The number of OHV users has grown substantially in the last two decades. Some of these routes are causing natural resource damage throughout the forest. The development of unauthorized routes is continuous and difficult to accurately measure. Since unauthorized routes are not engineered or analyzed, direct habitat damage occurs 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 OHV by crushing, shearing and uprooting which can change plant characteristics by reducing flower and seed production and carbohydrate reserves which inhibits a plant to grow (Cole and Landres 1995). Motorized routes can create an 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 range wide 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. The proliferation of unauthorized routes indicate increasing motorized intrusions into areas that previously had no motorized disturbances and that provide undisturbed habitat for plant species.

Affected Environment

Currently no plant species that occur within the Gila National Forest are threatened, endangered, proposed, or species of concern. The Regional Forester’s Sensitive Plant Species include 22 species that have the potential to occur within the Gila National Forest.

Designated sensitive plant species are identified as species for which population viability is a concern as evidenced by current or predicted downward trends in population numbers, density or habitat (FSM 2670.5 (USDA Forest Service 2005)). The Forest Service must implement management practices that ensure sensitive species do not become threatened or endangered and must implement management objectives for populations or habitat of sensitive species (FSM 2670.22 (USDA Forest Service 2005))

Sensitive plant species that are expected or known to occur on the Gila National Forest are listed in table 181 (USDA Forest Service 2007). The following species were excluded from analysis and would not be impacted because they are located within wilderness areas where no motorized

use is allowed: yellow lady's slipper, Hess's fleabane, Mogollon death camas and Mogollon hawkweed. Mogollon death camas is mostly found within the Gila Wilderness, however, there were isolated observances in 2008 and 2009 along the Bursum Road, but no location was documented (USDA Forest Service 2013h). Also, the following species were excluded from analysis and would not be impacted due to no known occurrences within the forest: greene milkweed, Metcalf's tick-trefoil, Arizona coralroot, and Maguire's beardtongue.

Table 181. Southwestern Region sensitive plant species (USDA Forest Service 2007) known or expected to occur on the Gila National Forest

Common - Scientific Name	Habitat Association	Reported Occurrences	Present in Analysis Area
Heartleaf groundsel - *Packera cardamine* *Scenecio cardamine*	Understory of late seral spruce-fir	Nine records on Gila in Catron County. East of the Silver Creek Divide, south of Bursum around the area of trail 182.	Yes
Blumer's dock - *Rumex orthoneurus*	Middle to high elevation wetlands with moist, organic soil adjacent to perennial springs or streams in canyons or meadow situations.	Has been documented in Grant and Catron counties on the forest; and probably occurs on all ranger districts (R.D.).	Yes
Davidson's cliff carrot - *Pteryxia davidsonii*	Moist, rocky areas including drainages and mountainsides., Sheer cliffs, wet areas (potentially wetlands, seeps, springs, and riparian areas).	Grant and Catron counties. One occurrence record along Mangas Creek in Grant County.	Yes
Gila thistle - *Cirsium gilense*	Moist mountain meadows in coniferous forests.	Occurrence record on Glenwood R.D. within the wilderness, and one on Reserve R.D. outside of wilderness.	Yes
Goodding's onion - *Allium gooddingi Ownbey*	Mixed Conifer and Spruce Fir Zones, generally in north trending drainages	Occurrence records from Quemado, Glenwood, Wilderness and Reserve R.D., potential occurrence on the Black Range and Silver City R.D.s	Yes
Villous groundcover milkvetch - *Astragalus humistratus* var. *crispulus*	Pine Forest on slopes, benches, and ledges. Vegetated Road Banks.	Occurrence record from Quemado RD, and private land adjacent to Quemado RD.	Yes
Metcalfe's penstemon - *Penstemon metcalfei*	Mixed Conifer and Spruce-Fir - All stages.	13 occurrence records on Gila. Most records from Black Range R.D.	Yes
Rusby hawkweed - *Hieracium abscissum* *H. rusbyi*	Mixed Conifer Forest.	Records from Black Range R.D., one record in Wilderness and one record outside (around Hoyt Cr. and Indian Cr.	Yes
Mimbres figwort - *Scrophularia macrantha*	Typically steep, rocky, usually north facing igneous cliffs and talus slopes.	35 occurrence records in Mimbres Watershed. Noonday, Railroad, and Upper Gallinas canyons. Silver City and Wilderness R.D.	Yes

Common - Scientific Name	Habitat Association	Reported Occurrences	Present in Analysis Area
Pinos Altos flame flower - *Talinum humile*	Madrean grassland, oak woodland, piñon-oak woodland or piñon-juniper woodland.	Grant and Hidalgo counties in NM. 6 occurrence records on Gila. Cherry Creek, beartooth drainages on the Silver City Ranger District; and Noonday drainage on the Wilderness Ranger District.	Yes
Porsild's starwort - *Stellaria porsildii*	Mixed conifer and aspen forests.	One occurrence on Silver City R.D. near Signal Peak.	Yes
Mogollon clover - *Trifolium longipes* spp. *Neurophyllum*	Riparian zones in mixed conifer forest. High elevation permanently wet meadows along streams, and springs.	Catron County NM; documented on the Black Range, Quemado, Glenwood, Wilderness, and Reserve Ranger Districts.	Yes
Wooton's hawthorn - *Crataegus wootoniana*	Canyon bottoms and forest understory in lower montane coniferous forests	Records for Grant and Catron counties on Glenwood, Wilderness, and Silver City R.D.s. Populations in Cherry Cr. and Telephone Canyon within the Pinos Altos Mtn Range.	Yes
Wright's dogweed - *Adenophyllum wrightii* var. *wrightii*	Drainages within piñon-juniper woodlands (sandy/silty soils)	Grant County; 3 records, Wilderness and Silver City Ranger Districts (R.D.)	Yes
Mogollon death camas - *Anticlea mogollonensis*	Understory of upper montane and subalpine coniferous forest. Often with Aspen.	Range mostly within Gila Wilderness, around the area of White Water Baldy.	No
Yellow lady's dlipper - *Cypripedium parviflorum pubescens*	Mid to high elev. 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.	Records for Grant County within the Gila Wilderness, at Little Creek and Little Turkey Creek within wilderness	No
Hess' fleabane - *Erigeron hessii*	Bedrock cracks in open areas of upper montane to subalpine conifer forests.	All known populations are within the Gila Wilderness area of White Water Baldy	No
Mogollon hawkweed - *Hieracium fendleri* var. *mogollense*	Understory of montane coniferous forest.	No known occurrence records on the Gila NF.	No
Greene milkweed - *Asclepias uncialis uncialis*	Yucca grasslands with scattered juniper trees	No occurrence records on the Forest. Two occurrence records north of Silver City on private land.	No
Metcalfe's tick–trefoil - *Desmodium metcalfei*	Rocky slopes, in canyons, and in ditches within oak/piñon-juniper woodlands/grasslands	Historically, in Grant and Sierra Counties in Caballo watershed. No recent records.	No

Common - Scientific Name	Habitat Association	Reported Occurrences	Present in Analysis Area
Arizona coralroot - *Hexalectris spicata* var. *arizonica*	Heavy leaf litter under the drip line of oaks, pines, and junipers. Canyon bottoms and wooded canyon sides most commonly over limestone.	Hidalgo and Sierra Counties. No known occurrence records on the Gila NF.	No
Maguire's beardtongue - *Penstemon linarioides* ssp.*maguirei*	Limestone cliffs in piñon-juniper woodlands.	Not seen in NM in over 100 years. Mining was cited as threat to the only known population in AZ.	No

Methods

The following tables display the number of occurrences, on the Forest, for each plant species and the acres of potential area disturbed by motorized dispersed camping, motorized big game retrieval, and motorized route off-road parking (50 feet) for each alternative. Thirty-foot buffers were designated around each plant occurrence record and overlaid with geographic information data layers to determine if the known locations were within areas where OHV use would be allowed in each alternative.

The tables represent the number of known observations locations that have been documented within the Gila National Forest for each species. The acres are associated with points or polygons representing the observations. The tables were used to determine effects to species associated with alternatives. The observation points or polygons and roads were analyzed within GIS to determine the effects of motorized dispersed camping, motorized big game retrieval, and motorized route off-road parking. Within the tables, each alternative shows a change in the number of known plant locations and acres within polygons around those sites that could potentially be impacted by motorized uses.

Environmental Consequences

Heartleaf Groundsel (*Packera cardamine*) (= *Scenecio cardamine*)

The species is likely to occur within mixed conifer and spruce-fir zones. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that heartleaf groundsel would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from motorized uses during big game retrieval, dispersed camping and parking activities (table 182). Alternative B presents the highest relative risk to known sites where the species occurs due to those sites being open to motorized big game retrieval, off-road travel, and dispersed camping. Alternatives B, C, and F all present some level of relative risk to the species at known or historical locations. Alternatives C and F are the same and present a slightly reduce relative risk to known sites, due to those sites only being potentially impacted by motorized big game retrieval, when compared to alternative B. Alternatives D, E, and G will have no impact on known, occupied or historical sites.

Table 182. Number and acres of potential disturbance to heartleaf groundsel by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	3	3	0	0	3	0
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	0.23	0.23	0	0	0.23	0
MDC – Number of recorded plant locations in area of potential disturbance	3	0	0	0	0	0
MDC – Acres of potential disturbance by OHV use at recorded plant locations	0.23	0	0	0	0	0
ORP – Number of recorded plant locations in area of potential disturbance	0	0	0	0	0	0
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0	0	0	0	0	0

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Blumer's Dock (Chiricahua dock) *Rumex orthoneurus*

The species is likely to occur within high-elevation wetlands with moist, organic soil adjacent to perennial springs or streams in canyons or meadows. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Blumer's dock would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from either motorized uses during big game retrieval, dispersed camping and parking activities (table 183). Alternative B presents the highest relative risk to known sites where the species occurs due to those sites being open to motorized big game retrieval, off-road travel, and dispersed camping. All alternatives present some level of relative risk to the species at known or historical locations. Alternatives C and F are the same and present a slightly reduce relative risk to known sites, due to those sites not being impacted by motorized dispersed camping, when compared to alternative B. Alternatives D, E, and G present the lowest relative risk to known sites where the species occurs because only two of the six sites could potentially be impacted by motorized uses. Alternatives D, E, and G have two known locations that could be impacted by motorized uses; however, all of these sites are located in areas where topography or vegetation would not allow off-road use.

Table 183. Number and acres of potential disturbance to Blumer's dock by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	6	6	0	0	6	0
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	0.45	0.45	0	0	0.45	0
MDC – Number of recorded plant locations in area of potential disturbance	6	0	0	0	0	0
MDC – Acres of potential disturbance by OHV use at recorded plant locations	0.45	0	0	0	0	0
ORP – Number of recorded plant locations in area of potential disturbance	2	2	2	2	2	2
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0.04	0.04	0.04	0.04	0.04	0.04

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Davidson's Cliff Carrot (*Pteryxia davidsonii)*

The species is likely to occur within moist rocky areas. This species has been documented to occur on sheer cliffs; in rocky, damp, drainages; and mountain sides. The literature documents that the species grows in wet areas (potentially wetlands, seeps, springs, and riparian areas). Given the habitat where this species has been found, motorized access would have limited, if any impacts to the species. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Davidson's cliff carrot would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from motorized uses during big game retrieval, dispersed camping and parking activities (table 184). Alternative B presents the highest relative risk to known sites where the species occurs due to those sites being open to motorized big game retrieval, off-road travel, and dispersed camping. Alternatives B, C, and F all present some level of relative risk to the species at known or historical locations. Alternatives C and F are the same and present a slightly reduce relative risk to known sites, due to those sites only being potentially impacted by motorized big game retrieval, when compared to alternative B. Alternatives D, E, and G will have no impact on known, occupied or historical sites.

Table 184. Number and acres of potential disturbance to Davidson's cliff carrot by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	3	3	0	0	3	0
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	0.23	0.23	0	0	0.23	0
MDC – Number of recorded plant locations in area of potential disturbance	3	0	0	0	0	0
MDC – Acres of potential disturbance by OHV use at recorded plant locations	0.23	0	0	0	0	0
ORP – Number of recorded plant locations in area of potential disturbance	0	0	0	0	0	0
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0	0	0	0	0	0

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Gila Thistle (*Cirsium gilense*)

The species is likely to occur within coniferous forests in moist mountain meadows. It is thought that it could possibly be extirpated. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Gila thistle would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from motorized uses during big game retrieval, dispersed camping and parking activities (table 185). Alternative B presents the highest relative risk to known sites where the species occurs due to those sites being open to motorized big game retrieval, off-road travel, and dispersed camping. Alternatives B, C, and F all present some level of relative risk to the species at known or historical locations. Alternatives C and F are the same and present a slightly reduce relative risk to known sites, due to those sites only being potentially impacted by motorized big game retrieval, when compared to alternative B. Alternatives D, E, and G will have no impact on known, occupied or historical sites.

Table 185. Number and acres of potential disturbance to Gila thistle by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	1	1	0	0	1	0
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	0.08	0.08	0	0	0.08	0
MDC – Number of recorded plant locations in area of potential disturbance	1	0	0	0	0	0
MDC – Acres of potential disturbance by OHV use at recorded plant locations	0.08	0	0	0	0	0
ORP – Number of recorded plant locations in area of potential disturbance	0	0	0	0	0	0
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0	0	0	0	0	0

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Goodding's Onion (*Allium gooddingi Ownbey*)

The species is likely to occur within mixed conifer and spruce/fir zones. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Goodding's onion would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from motorized uses during big game retrieval, dispersed camping and parking activities (table 186). Alternative B presents the highest relative risk to known sites where the species occurs because those sites are open to motorized big game retrieval, off-road travel, and dispersed camping. Alternative C also presents a high relative risk because 31 of 33 known sites where the species occurs have the potential of being affected by motorized uses. Alternative F reduces the relative risk below that of alternatives B and C, but still presents risk to 20 of 33 sites where the species is known to occur. Alternatives E and G are similar. However, alternative E presents the lowest relative risk because only 1 of 33 known locations for the species is potentially affected by motorized uses.

Table 186. Number and acres of potential disturbance to Goodding's onion by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	33	31	1	0	20	2
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	18.02	17.72	0.08	0	13.83	0.21
MDC – Number of recorded plant locations in area of potential disturbance	33	2	1	0	2	2
MDC – Acres of potential disturbance by OHV use at recorded plant locations	18.02	0.21	0.08	0	0.21	0.21
ORP – Number of recorded plant locations in area of potential disturbance	2	2	0	1	2	2
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0.15	0.15	0	0.08	0.15	0.15

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Villous Groundcover Milkvetch (*Astragalus humistratus* var. *crispulus*)

The species is likely to occur within xeric pine forest and open vegetated road banks. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Villous groundcover milkvetch would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from either motorized uses during big game retrieval, dispersed camping and parking activities (table 187). Alternative B presents the highest relative risk to known sites where the species occurs due to those sites being open to motorized big game retrieval, off-road travel, and dispersed camping. Alternatives C, D, E, F, and G will have no impact on known locations where this species occurs.

Table 187. Number and acres of potential disturbance to villous groundcover milkvetch by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	1	0	0	0	0	0
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	0.08	0	0	0	0	0
MDC – Number of recorded plant locations in area of potential disturbance	1	0	0	0	0	0
MDC – Acres of potential disturbance by OHV use at recorded plant locations	0.08	0	0	0	0	0
ORP – Number of recorded plant locations in area of potential disturbance	0	0	0	0	0	0
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0	0	0	0	0	0

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Metcalfe's Penstemon (*Penstemon metcalfei)*

The species is likely to occur within canyon bottoms and east facing slopes. However, specimens have been taken on cliffs and or steep slopes on a north-facing aspect. Given the habitat where this species has been found, motorized access would have limited, if any impacts to the species. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Metcalfe's penstemon would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from either motorized uses during big game retrieval, dispersed camping, or parking activities (table 188). Alternative B presents the highest relative risk to known sites where the species occurs because those sites are open to motorized big game retrieval, off-road travel, and dispersed camping. Alternative C presents a reduced relative risk when compared to alternative B because only one of six known locations for the species could potentially be impacted by motorized uses. Alternatives D, E, F, and G will not present any relative risk from motorized uses to known locations for the species and will have no impact on known locations where this species occurs.

Table 188. Number and acres of potential disturbance to Metcalf's penstemon by alternative

Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	6	1	0	0	0	0
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	0.40	0.08	0	0	0	0
MDC – Number of recorded plant locations in area of potential disturbance	6	0	0	0	0	0
MDC – Acres of potential disturbance by OHV use at recorded plant locations	0.40	0	0	0	0	0
ORP – Number of recorded plant locations in area of potential disturbance	0	0	0	0	0	0
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0.40	0	0	0	0	0

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Rusby Hawkweed (*Hieracium abscissum*) (*H. rusbyi*)

The species is likely to occur within high-elevation and mixed conifer forests. Given the habitat where this species has been found, motorized access would have limited, if any impacts to the species. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Rusby hawkweed would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from motorized uses during big game retrieval, dispersed camping and parking activities (table 189). Alternative B presents the highest relative risk to known sites where the species occurs because those sites are open to motorized big game retrieval, off-road travel, and dispersed camping. Alternatives C and F reduce relative risk slightly when compared to alternative B because one known site is protected from motorized use. Alternatives D, E, and G are the same and present the lowest level of relative risk to known sites for the species. However, all alternatives present some level of risk to the single known occupied site that is within an area potentially impacted by motorized use.

Table 189. Number and acres of potential disturbance to Rusby hawkweed by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	1	1	0	0	1	0
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	0.08	0.08	0	0	0.08	0
MDC – Number of recorded plant locations in area of potential disturbance	1	0	0	0	0	0
MDC – Acres of potential disturbance by OHV use at recorded plant locations	0.08	0	0	0	0	0
ORP – Number of recorded plant locations in area of potential disturbance	1	1	1	1	1	1
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0.08	0.08	0.08	0.08	0.08	0.08

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Mimbres Figwort (*Scrophularia macrantha*)

Given the habitat where this species is typically found on, steep, rocky, usually north facing igneous cliffs and talus slopes, motorized access would have limited, if any impacts to the species. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Mimbres Figwort would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from motorized uses during big game retrieval, dispersed camping and parking activities (table 190). Alternative B presents the highest relative risk to known sites where the species occurs because those sites are open to motorized big game retrieval, off-road travel, and dispersed camping. Alternatives C and F are the same and present a slightly reduced relative risk to known sites by reducing the number of known locations that could potentially be impacted by motorized uses from 23 to 20. Alternatives D, E, and G reduce the number of known sites that may be impacted by motorized uses from 23 to 5, and present the lowest relative risk to the species.

Table 190. Number and acres of potential disturbance to Mimbres figwort

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	23	20	0	0	20	0
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	1.67	1.44	0	0	1.44	0
MDC – Number of recorded plant locations in area of potential disturbance	23	0	0	0	0	0
MDC – Acres of potential disturbance by OHV use at recorded plant locations	1.67	0	0	0	0	0
ORP – Number of recorded plant locations in area of potential disturbance	5	5	5	5	5	5
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0.11	0.11	0.11	0.11	0.11	0.11

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Pinos Altos Flame Flower (*Peranthus humile)*

Given the habitat where this species has been found, rocky south facing slopes or pockets of soil that accumulate among rhyolite boulders and outcrops, motorized access would have limited, if any impacts to the species. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Pinos Altos flame flower would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from motorized uses during big game retrieval, dispersed camping and parking activities (table 191). Alternative B presents the highest relative risk to known sites where the species occurs because those sites are open to motorized big game retrieval, off-road travel, and dispersed camping activities. Alternatives C and F are similar and present a slightly reduced relative risk to known sites when compared to alternative B, by reducing the number of known locations that could potentially be impacted by motorized uses. Alternatives D, E, and G are the same and reduce the number of known sites that may be impacted by motorized uses from nine to four. Alternatives D, E, and G prevent impacts from motorized big game retrieval and dispersed camping and present the lowest relative risk to the species.

Table 191. Number and acres of potential disturbance to Pinos Altos flame flower by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	9	8	0	0	6	0
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	3.87	3.8	0	0	3.65	0
MDC – Number of recorded plant locations in area of potential disturbance	9	0	0	0	0	0
MDC – Acres of potential disturbance by OHV use at recorded plant locations	3.87	0	0	0	0	0
ORP – Number of recorded plant locations in area of potential disturbance	4	4	4	4	4	4
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0.11	0.11	0.11	0.11	0.11	0.11

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Porsild's Starwort (*Stellaria porsildii*)

The species is likely to occur within mixed conifer and aspen forests. It has also been documented along roadsides with steep, loamy and rocky embankments. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes, and the decrease in acres available for motorized big game retrieval would decrease the potential that Porsild's starwort would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from motorized uses during big game retrieval, dispersed camping and parking activities (table 192). Alternative B presents the highest relative risk to known sites where the species occurs because those sites are open to motorized big game retrieval, off-road travel, and dispersed camping. Alternative C also presents a high relative risk because seven of eight known sites where the species occurs have the potential of being affected by motorized uses. Alternative F reduces the relative risk below that of alternatives B and C, but still presents risk to six of eight known sites where the species is known to occur. Alternatives D and G present a lower relative risk to the species than alterntives B, C, and F. Alternative E presents the lowest relative risk to this species because only two of eight known locations for the species could potentially be affected by motorized uses. Alternatives D, E, and G have three known locations that could be impacted by motorized uses however, only one of these locations is in an area where topography or vegetation would allow off-road use.

Table 192. Number and acres of potential disturbance to Porsild's starwort by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	8	7	3	0	6	3
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	0.53	0.49	0.21	0	0.45	0.21
MDC – Number of recorded plant locations in area of potential disturbance	8	3	3	0	3	3
MDC – Acres of potential disturbance by OHV use at recorded plant locations	0.53	0.21	0.21	0	0.21	0.21
ORP – Number of recorded plant locations in area of potential disturbance	2	2	2	2	2	2
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0.15	0.15	0.15	0.15	0.15	0.15

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Mogollon Clover (*Trifolium longipes* spp. *Neurophyllum = T. neurophyllum*)

The species is likely to occur within riparian zones in mixed conifer forest. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Mogollon clover would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from motorized uses during big game retrieval, dispersed camping, and parking activities (table 193). Alternative B presents the highest relative risk to known sites where the species occurs because those sites are open to motorized big game retrieval, off-road travel, and dispersed camping. Alternative C also presents a high relative risk because 25 of 26 known sites where the species occurs have the potential of being affected by motorized uses. Alternative F reduces the relative risk below that of alternatives B and C, but still presents risk to 21 of 26 sites where the species is known to occur. Alternatives D and G are the same and present a lower relative risk to the species than alternatives B, C, and F. Alternative E presents the lowest relative risk to this species because only 2 of 26 known locations for the species could be potentially affected by motorized uses.

Table 193. Number and acres of potential disturbance to Mogollon clover by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	26	25	4	0	21	4
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	1.89	1.85	0.25	0	1.59	0.25
MDC – Number of recorded plant locations in area of potential disturbance	26	4	4	0	4	4
MDC – Acres of potential disturbance by OHV use at recorded plant locations	1.89	0.25	0.25	0	0.25	0.25
ORP – Number of recorded plant locations in area of potential disturbance	2	2	2	2	2	2
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0.11	0.11	0.11	0.11	0.11	0.11

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Wooton's Hawthorn (*Crataegus wootoniana*)

The species is likely to occur within canyon bottoms in lower montane mixed coniferous forests. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Wooton's hawthorn would be impacted by motorized vehicles.

All of the action alternatives reduce the relative risk of disturbance to this species from motorized uses during big game retrieval, dispersed camping, or parking activities (table 194). Alternative B presents the highest relative risk to known sites where the species occurs because those sites are open to motorized big game retrieval, off-road travel, and dispersed camping activities. Alternatives C and F are similar and present a slightly reduced relative risk to known sites when compared to alternative B, by reducing the number of known locations that could potentially be impacted by motorized dispersed camping. Alternatives D, E, and G are the same and reduce the number of known sites that may be impacted by motorized uses from three to one. Alternatives D, E, and G prevent impacts from motorized big game retrieval and dispersed camping and present the lowest relative risk to the species.

Table 194. Number and acres of potential disturbance to Wooton's hawthorn by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	3	3	0	0	3	0
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	1.60	1.60	0	0	1.60	0
MDC – Number of recorded plant locations in area of potential disturbance	3	0	0	0	0	0
MDC – Acres of potential disturbance by OHV use at recorded plant locations	1.60	0	0	0	0	0
ORP – Number of recorded plant locations in area of potential disturbance	1	1	1	1	1	1
ORP – Acres of potential disturbance by OHV use at recorded plant locations	1.09	1.09	1.09	1.09	1.09	1.09

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Wright's Dogweed (*Adenophyllum wrightii* var. *wrightii*)

The species is likely to occur within habitat of piñon-juniper with sandy or silty soils. Cross-country travel is being eliminated in these alternatives compared to the no action alternative. The elimination of acres available for cross-country travel, the decrease in acres available for motorized dispersed camping, the decrease in motorized routes and the decrease in acres available for motorized big game retrieval would decrease the potential that Wright's dogweed would be impacted by motorized vehicles.

Alternatives B, C, D, F, and G are the same and present potential risk to all known sites where the species occurs by motorized uses during big game retrieval and dispersed camping (table 195). Alternative E eliminates risk to the species by not allowing off-road uses at the known sites for the species.

Table 195. Number and acres of potential disturbance to Wright's dogweed by alternative

Potential Disturbance	Alt.B	Alt.C	Alt.D	Alt.E	Alt.F	Alt.G
MBGR – Number of recorded plant locations in area of potential disturbance	3	3	3	0	3	3
MBGR – Acres of potential disturbance by OHV use at recorded plant locations	0.23	0.23	0.23	0	0.23	0.23
MDC – Number of recorded plant locations in area of potential disturbance	3	3	3	0	3	3
MDC – Acres of potential disturbance by OHV use at recorded plant locations	0.23	0.23	0.23	0	0.23	0.23
ORP – Number of recorded plant locations in area of potential disturbance	0	0	0	0	0	0
ORP – Acres of potential disturbance by OHV use at recorded plant locations	0	0	0	0	0	0

MBGR=Motorized big game retrieval, MDC=Motorized dispersed camping in designated corridors, ORP=Off-road parking within 1 vehicle length of road.

Summary

Table 196 provides the effects determination for each sensitive plant species listed as potentially occurring on the Southwestern Regional Foresters Sensitive Plant Species List. Eight species will not be impacted by any of the alternatives because known occurrences are either completely within wilderness areas or there are no known occurrences within the Gila National Forest boundary.

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. All action alternatives except alternative B reduce the miles available for motorized use, motorized dispersed camping, motorized big game retrieval, and motorized route off-road parking.

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 many 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. Alternative E, with the proposed reduced motorized big game retrieval, motorized dispersed camping, and motorized route off-road parking, allows for the greatest benefit for sensitive plants. Alternatives D and G also decrease acreage available for motorized dispersed camping and motorized big game retrieval. Alternative F allows for a greater amount of motorized big game retrieval. Overall, the cumulative impacts to sensitive plants would be minimal with the action alternatives listed.

Effects of Forest Plan Amendments

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the Travel Management Rule.

Table 196. Sensitive plant effects determinations by alternative

Common Name	Scientific Name	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Heartleaf groundsel	*Packera cardamine* *Scenecio cardamine*	**MINL**	**MINL**	**NI**	**NI**	**MINL**	**NI**
Blummer's dock	*Rumex orthoneurus*	**MIL**	**MIL**	**MINL**	**MINL**	**MIL**	**MINL**
Davidson's cliff carrot	*Pteryxia davidsonii*	**MIL**	**MIL**	**NI**	**NI**	**MIL**	**NI**
Gila thistle	*Cirsium gilense*	**MIL**	**MINL**	**NI**	**NI**	**MINL**	**NI**
Goodding's onion	*Allium gooddingii*	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**
Villous groundcover milkvetch	*Astragalus humistratus* var. *crispulus*	**MINL**	**NI**	**NI**	**NI**	**NI**	**NI**
Metcalfe's penstemon	*Penstemon metcalfei*	**MINL**	**MINL**	**NI**	**NI**	**NI**	**NI**
Rusby hawkweed	*Hieracium abscissum*	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**
Mimbres figwort	*Scrophularia macrantha*	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**
Pinos Altos flame flower	*Pheranthus humile*	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**
Porsild's starwort	*Stellaria porsildii*	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**
Mogollon clover	*Trifolium longipes* spp. *neurophyllum*	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**
Wooton's hawthorn	*Crataegus wootoniana*	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**	**MINL**
Wright's dogweed	*Adenophyllum wrightii* var. *wrightii*	**MINL**	**MINL**	**MINL**	**NI**	**MINL**	**MINL**
Mogollon death camas	*Anticlea mogollonensis*	**NI**	**NI**	**NI**	**NI**	**NI**	**NI**
Yellow lady's slipper	*Cypripedium parviflorum pubescens*	**NI**	**NI**	**NI**	**NI**	**NI**	**NI**
Hess' fleabane	*Erigeron hessii*	**NI**	**NI**	**NI**	**NI**	**NI**	**NI**
Mogollon hawkweed	*Hieracium fendleri var. mogollense*	**NI**	**NI**	**NI**	**NI**	**NI**	**NI**
Greene milkweed	*Asclepias uncialis uncialis*	**NI**	**NI**	**NI**	**NI**	**NI**	**NI**
Metcalfe's tick – trefoil	*Desmodium metcalfei*	**NI**	**NI**	**NI**	**NI**	**NI**	**NI**
Arizona coralroot	*Hexalectris spicata* var. *arizonica*	**NI**	**NI**	**NI**	**NI**	**NI**	**NI**
Maguire's beardtongue	*Penstemon linarioides* ssp.*maguirei*	**NI**	**NI**	**NI**	**NI**	**NI**	**NI**

NI= No Impact
MINL= May impact individuals, but not likely to result in loss of species viability or create trend toward Federal listing

Invasive Species

This section is a summary of the invasive species specialist report (USDA Forest Service 2013i).

Introduction

Executive Order 13112 (February 1999) established the Invasive Species Council and authorizes the Forest Service to conduct invasive species management activities through the use of relevant programs and authorities. The Forest Service relies on this executive order to provide the basis for labeling certain organisms as invasive. The term invasive species is defined by this order as a species that is nonnative (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human, animal or plant health. These invasive species include terrestrial or aquatic species including insects, animals, plants and pathogens including seeds, eggs, spores or any other biological material capable of propagating that species.

Pathways are the means by which species are transported from one location to another. Natural pathways include wind, water, wildlife and other forms of dispersal in which a specific species have developed morphological and behavioral characteristics to employ. Man-made pathways are those pathways which are created or enhanced by human activity and consist of two types. The first type is intentional as in deliberate movement of living seeds, plants or animals. The second type is unintentional as in ship ballast, soil associated with nursery stock, importation of fruits and vegetables, the international movement of people, local recreational and commercial associated activities. In these and countless other unintentional pathways the movement of invasive species is an indirect by-product of our activities.

Current Condition – Invasive Aquatic Species

Aquatic invasive species are organisms that occur in aquatic, riverine, or wetland environments. Many of these species come from outside of the United States; however, some are native to other parts of the country and have been introduced into areas where they are not considered endemic. When established, these species threaten native populations by altering habitat, affecting diversity, providing risk for genetic alteration, changing distribution patterns of native species and threatening overall ecosystem balance and health. Pathways for these introductions can include but certainly are not limited to vehicular and water vessel transportation, water transfer, fishing bait releases, aquaria releases, and stocking with nonnative fish. Both the New Mexico Aquatic Invasive Species Management Plan (NMAISAC 2008) and the Priority Aquatic Invasive Species list, Appendix A of the Management Plan, identify four priority levels for management of aquatic species much like “Class A, B, or C” classes of priority for invasive plants.

> **Priority Class 1** are aquatic species not known to occur in the wild in New Mexico but have a high potential to invade and for which there are limited or no known management techniques. Appropriate management for this class includes prevention of introductions and eradication of pioneering populations. Currently, there are no known populations of Class 1 aquatic invasive species within the project area.
>
> **Priority Class 2** aquatic species are present and established in New Mexico, but with impacts that may be mitigated or controlled through appropriate management. These species can be managed by actions that involve mitigation of impact, control of population size, and prevention of dispersal to other waterbodies. Currently one site of

purple loosestrife (priority class 2) has been identified in the project area and is hand-pulled and monitored annually.

Priority Class 3 represent aquatic species that are firmly established throughout New Mexico and that may have both ecological and economic impacts, but feasible management techniques are not currently available. These species warrant further evaluation to determine the extent of their distribution and effort to prevent introduction to new waterbodies. This list includes four species of nonnative crayfish which have been introduced to New Mexico. Crayfish occurring in the project area most likely include some or all of these four species. Bullfrogs are also included in priority class 3 and are present throughout the project area wherever suitable habitat exists.

Priority Class 4 species are not present in New Mexico and are currently considered to have a low potential to invade and establish, either because of physiological or dispersal limits. These species warrant proactive measures to prevent their importation or introduction into the State.

Current Condition – Invasive Plant Species

The term invasive plant species is often used interchangeably with noxious weeds. Whether introduced intentionally or unintentionally these plant species demonstrate an incredible ability to establish and spread in a variety of landscape conditions. They are prolific reproducers through seed production, roots, and rhizomes, and reproductive parts are disseminated in a variety of ways including wind, water, animals, people and associated activities. When established, these species threaten native populations by altering habitat, affecting diversity, providing risk for genetic alteration, changing distribution patterns of native species and threatening overall ecosystem balance and health. Many times these species out compete native vegetation for water, nutrients and space displacing entire native plant communities. They often have an environmental advantage over native species in that they arrive in new areas unaccompanied by their natural predators that would normally keep populations in check thus presenting an ominous risk to overall ecosystem health.

Four categories of noxious weeds are identified for the State of New Mexico (Class A, B, C and "Watch" invasive species). In the most current list as of April 2009, approximately 21 species were identified as Class A category, 10 species as Class B category, 6 species as Class C category, and 8 species as Watch List category.

Class A weeds, all of which are nonnative to New Mexico, are species currently not present or have limited distribution. These are the highest priority for prevention and eradication. Four of these species have been known to occur on the Gila National Forest. Purple loosestrife, scotch thistle, spotted knapweed, and yellow starthistle sites have been identified, and are currently treated and monitored by Forest Service personnel.

Class B weeds, species limited to portions of the State, are species that should be treated as Class A weeds in uninfested areas but should have management plans developed and designed to contain the infestation and stop further spread in areas of severe infestations. Species in this class known to occur on the Gila National Forest include musk thistle, and tree of heaven.

Class C weeds, species that are widespread, are species that should have management decisions determined at the local level based on feasibility of control and level of infestations. Species in this class known to occur on or immediately adjacent to the Gila National Forest include salt cedar, bull thistle, Russian olive, and Siberian elm. Of these species, salt cedar and bull thistle are currently being treated within the project area.

A **"Watch List"** is also used to identify species of concern in the State, and have the potential to become problematic. These species include crimson fountaingrass, giant cane, meadow knapweed, pampas grass, quackgrass, Sahara mustard, spiny cocklebur, and wall rocket. More data are needed to determine if these species should be listed, and when encountered, should be documented and the appropriate authorities contacted. Currently, these species have not been documented on the Gila National Forest.

Methodology and Assumptions

The project area includes all NFS lands within the administrative boundary of the Gila National Forest.

Methodology

The effects analysis for invasive species is based on the amount of relative risk for invasive species to become introduced, established and spread in the project area as associated with each alternative in terms of authorized travel routes in miles, and open cross-country travel available in acres, as compared to the current situation (alternative B). The analysis also considers roads available for motorized travel by alternative that are located within known infestations or in riparian areas and the number of stream crossings for each alternative. It is very improbable to attribute the amount of invasive species distribution or presence to any one of the many vectors. This analysis attempts to demonstrate the change in miles or acres of authorized motorized vehicle travel routes by alternative relative to the risk for invasive species introduction, establishment and spread through this pathway only while recognizing there are many pathways. Other pathways are discussed in the introduction and cumulative effects section in the specialists report. The alternatives discussion below includes effects of the alternatives to both invasive plants and invasive aquatic species.

Relative Risk Analysis

This analysis uses a relative risk method of assessing differences between alternatives. Relative risk is considered the potential impact that can result from one action (alternative) measured against the potential impact that might result from a different action (alternative) or no action (alternative).

Assumptions

There are limited data to support invasive species information across the project area as there has not been a forestwide invasive species inventory since 1997 (Gila National Forest Noxious Weed Survey 1997). This survey focused on 12 species in high-risk areas and primary forest roads. Consequently, GIS data and mapping of invasive species infestations are deficient. Other than specific projects relating to fire activities, range improvement and upland and riparian vegetation restoration projects, and range we do not know the extent of other possible populations that could exist in those areas lacking inventories such as in the un-roaded areas.

For this reason it is assumed invasive plant species have the potential to exist along all un-inventoried riparian areas, roadways and out across the landscape in roadless areas; although this assumption is most likely overstated. It is also assumed bullfrogs are present wherever their habitat exists, and that all waterbodies likely have some type of aquatic invasive species present such as crayfish and nonnative fish (personal communication-Jerry Monzingo, Gila National Forest Wildlife/Fisheries Program Manager, 2012).

Because of the limitations posed by the lack of data, and the assumptions above, the analysis provided here is a relative risk assessment of each of the action alternatives as compared to no action, alternative B.

Effects Common to All Alternatives

Invasive Aquatic Species

Invasive aquatic species in the analysis area include American bullfrog, crayfish and various nonnative freshwater fish (J. Monzingo, personal communication, Gila National Forest Wildlife/Fisheries Program Manager, 2012). Natural movement of these established species through connected waterways will most likely continue to occur to a certain degree throughout the project area regardless of the alternative. Authorized travel routes with all alternatives would also allow for a certain degree of risk for transporting these species within the analysis area. Recreational sites such as lakes, boat launches, fishing areas and associated activities will remain open pathways for aquatic invasive species regardless of the alternative chosen. Invasive species management efforts by the Gila National Forest to inventory, prevent, control or eradicate, and monitor aquatic invasive species will continue under all alternatives.

Invasive Plant Species

The risk for invasive plant species to be introduced and spread by various pathways and vectors throughout the analysis area will remain to a certain degree with all alternatives. Established roadbeds even if untraveled will take many years to re-vegetate (if at all) and could remain optimal sites for certain species of invasive plants to establish and spread. Some degree of authorized open travel routes, (with the exception of alternative E which does not allow for any motorized dispersed camping or big game retrieval) will remain with all alternatives providing certain degrees of risk for seed dispersal by motorized travel associated with these routes and open areas. Known infestations of invasive species along currently motorized areas such as salt cedar on the Gila River and tributaries, and bull thistle along Beaver Creek, will continue to be treated and monitored regardless of the alternative chosen. Pathways including animals, wind, water, and human activities will continue to disperse invasive plant species across the landscape to a certain degree regardless of the alternative. Invasive species dispersal risks at high impact areas such as campgrounds and trailheads will also continue to a certain extent regardless of the alternative.

All alternatives with the exception of alternative B eliminate motorized cross-country travel, reduce miles of roads open to the public, and put restrictions on off-road motorized dispersed camping and off-road motorized big game retrieval to certain degrees. Being one of many vectors for invasive species introduction, establishment and spread, the fewer authorized travel routes for motorized vehicle travel equates to less risk for this activity to contribute to the introduction, establishment and spread of both invasive animal and plant species. Invasive species management

efforts by the Gila National Forest to inventory, prevent, control or eradicate, and monitor invasive plant species will continue under all alternatives.

Effects by Alternative (includes plant and aquatic invasive species)

The magnitude of effects of motorized travel to these invasive species specific to each alternative can be related to the different levels of motorized travel routes authorized and acres associated with motorized dispersed camping, stream crossings and motorized travel as allowed in each alternative. Fewer motorized travel routes equates to less risk for dispersal, establishment and spread of invasive species due to this pathway. Effects (including cumulative), resulting from this analysis are expected to last for at least five years into the future.

Alternative B (No Action)

Under this alternative, authorized motorized travel routes within the analysis area would continue at the current level on all NFS lands. Currently, the Gila National Forest travel management system provides for unlimited motorized cross-country routes for big game retrieval for all species, which would be basically year round access due to sequential hunting seasons, unlimited motorized dispersed camping and numerous stream crossings. Motorized routes in riparian corridors and at stream crossings can alter native habitat through disturbance of vegetation, compaction and streambank alteration providing optimum habitat for invasive species, increasing the risk for establishment. Alternative B allows for the maximum access through motorized routes in the project area, therefore the risk for introduction, establishment and spread through this pathway would be expected to continue at the current rate, which is most likely at a higher level than the action alternatives. All other alternatives restrict authorized travel routes, limit motorized cross-country travel for big game retrieval and dispersed camping, and reduce stream crossings to certain degrees, therefore reducing the risks.

Alternative C

This alternative provides for the highest number of miles of open motorized travel routes when compared with all other alternatives, with the exception of alternative B. Miles of authorized ATV trails with this alternative is significantly higher than all other alternatives. There are fewer miles of open roads closed with this alternative as compared to all other alternatives, with the exception of alternative B. Although somewhat limited, dispersed motorized camping opportunities remain quite high with this alternative. Big game motorized retrieval with this alternative is limited to within 1 mile of open forest and county roads and also State and Federal highways for big game species that include deer, elk, bear, lion, javelina and pronghorn within the analysis area. Because this alternative allows for the above species of big game retrieval, season of use could be year around due to subsequent hunting seasons; therefore acres available for motorized big game retrieval under this alternative is very similar to alternative B. The number of stream crossings and routes through riparian habitat does not change significantly with this alternative as compared with other alternatives including B. The increased acres for motorized big game retrieval with this alternative as compared to alternatives D, E, F and G could increase the risk for introduction, establishment and spread of invasive species through this activity due to more acres available and a longer time frame of access due to big game species and associated season. In summary, effects to invasive species introduction, establishment and spread due to open travel routes with alternative C would be very similar to those of alternative B and when compared with the other alternatives (with the exception of alternative E) would allow for the second largest amount of

potential for invasive plant and aquatic species introduction, establishment and spread within the analysis area due to motorized travel routes.

Alternative D

This alternative allows for fewer miles of roads open to the public than all other alternatives with the exception of alternative E, and the fewest miles of open ATV trails with the exception of alternative B. The number of miles of open roads closed is similar to those as identified in alternative E. Access for game retrieval (deer and elk only), and motorized dispersed camping would both be limited to 300 feet on either side of open roads, which is significantly lower than all alternatives with the exception of E. Fewer ATV trails would equate to less risk for invasive species introduction, establishment, and spread by ATV routes. Motorized travel within riparian areas and at stream crossings is more restrictive with this alternative than all others, with the exception of alternative E. In general, with the exception of alternative E, alternative D as compared to all other alternatives would provide the least amount of potential for invasive species introduction, establishment, and spread by motorized travel.

Alternative E

This alternative proposes the highest degree of change when compared to the no action alternative (alternative B) and the action alternatives for the key elements. Under this alternative, fewer miles of roads are open to the public; there are no motorized trails, and the highest number of miles of open roads to be closed. In addition, there would be no areas open to motorized dispersed camping and no motorized off-road access to big game retrieval for any species. This alternative also allows for the fewest number of stream crossings and motorized routes within riparian areas. Overall, this alternative provides the least risk for invasive plant and aquatic species introduction, establishment and spread due to motorized travel routes as compared to all the other alternatives.

Alternative F

Alternative F proposes a reduction in miles of roads currently open to the public from the amount in alternatives B and C, but an increase over alternatives D and E. Miles of roads closed is lower in this alternative from all others with the exception of B and C. Dispersed camping is limited to 300 feet within open routes, however, big game retrieval is proposed at one-half mile from each side of designated open roads, county roads, and State and Federal highways, but for retrieving elk only. The difference in acres available to motorized travel with the one-half mile restriction as compared to 300 feet is significant and poses a higher risk for invasive species introduction, establishment, and spread by vehicles, to a significant degree when compared to alternatives D, E, and G. Stream crossings and miles of motorized routes are also increased when compared to alternatives D, E, and G. This alternative has effects similar to alternative G with the exception of increased authorized travel (acres) for big game retrieval. Alternative F would have a lower overall potential for invasive plant and aquatic species introduction, establishment, and spread due to motorized open routes, big game retrieval opportunities, and stream crossings as compared to alternatives B and C, but a higher riak than alternatives D, E, and G.

Alternative G

Alternative G, as proposed is similar to alternative F in that miles of roads open to the public, miles of motorized trails, miles of closed roads, dispersed camping opportunities, stream

crossings and motorized routes within riparian areas are all either the same or very comparable in miles and/or acres. The major difference between alternatives F and G is in the acres available for motorized big game retrieval and season of use. Alternative G available acres is significantly lower, however, the season of use is for elk and deer rather than just elk, as in alternative F.

There is most likely not a significant difference in the effects of allowing motorized retrieval for deer and elk, which lengthens the season of use, usually by 15 days. However, the decrease in total available acreage with alternative G reduces the risk for motorized big game retrieval to provide a pathway for invasive species introduction, establishment, and spread as compared to alternatives B, C, and F. Stream crossings and miles of motorized routes within riparian areas are higher than alternatives D and E, but less than in alternatives B, C, and F. In summary, implementation of alternative G would reduce the risk of invasive species introduction, establishment, and spread as compared to all alternatives with the exception of alternatives D and E.

Cumulative Effects

An assortment of past, present, and future ground-disturbing activities such as utility corridors, existing roads and travel routes, unlimited nonmotorized cross-country access, foot trails, developed and dispersed campsites, livestock grazing, timber removal, recreation uses, wildland fire management, road maintenance and developed rangeland structural improvements such as stock ponds and pipelines have all certainly contributed to the introduction, establishment, and spread of invasive species and will continue to do so to certain degrees. In addition, fuel wood gathering, trail maintenance, high impact areas such as trailheads and camp sites will continue to provide for a certain degree of risk for invasive species introduction, establishment, and spread. These types of ground disturbances in conjunction with natural pathways such as wind, water, flood events, and wildlife will continue to some degree in to the future and cumulatively affect the spread of invasive plant and aquatic species within the analysis area. As human population increases and subsequently an increase in public land use, cumulative effects to the introduction, establishment and spread of invasive species associated with these activities will most likely increase. In addition, untreated invasive species located on private land adjacent to the Gila National Forest will continue to contribute to the introduction, establishment and spread of invasive species on the forest if not properly managed.

Implementation of alternative B toward these cumulative effects would remain at the current level and provides the most opportunity for the introduction, establishment, and spread of invasive species by motorized travel. This is because alternative B allows more motorized travel routes, no restrictions on cross-country travel and the highest number of stream crossings and miles of motorized routes in riparian areas when compared to all other alternatives. Alternative E would contribute the least due to a reduction in motorized travel routes open to the public, elimination of dispersed camping areas and big game retrieval, reduction in miles of motorized riparian routes and a significant reduction in number of stream crossings. Alternatives C, D, F, and G would continue to contribute to cumulative effects for invasive species, but at a lower level when compared with alternative B.

Alternative B’s influence on invasive species toward these cumulative effects would remain at the current level and provides the most opportunity for the introduction, establishment, and spread of invasive species by motorized travel by allowing more motorized travel routes, no restrictions on cross-country travel and the highest number of stream crossings and miles of motorized routes in

riparian areas when compared to all other alternatives. Alternative E would contribute the least due to a reduction in motorized travel routes open to the public, elimination of dispersed camping areas and big game retrieval, reduction in miles of motorized riparian routes and a significant reduction in number of stream crossings. Alternatives C, D, F and G would continue to contribute to cumulative effects for invasive species, but at a lower level when compared with alternative B.

In summary, negative cumulative effects are not expected under any alternative. No change would be expected under the no action alternative, while positive cumulative effects may occur under all of the action alternatives, based on limiting opportunities for motorized travel, therefore reducing risks of invasive species dispersal, establishment, and spread due to this activity across the forest.

Effects of Forest Plan Amendments

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the Travel Management Rule.

Cultural Resources

This section is a summary of the cultural resources specialist report (USDA Forest Service 2013j).

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 (before 9,500 B.C. to 5,500 B.C) (ARMS 1993). 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. to A.D. 200) follows the Paleoindian Period (ARMS 1993). Archaic peoples were also mobile and relied on hunting and gathering. However, this is the period in which people began to rely more on plants, and horticulture began (Cordell 1997). The Mogollon Culture (A.D. 200 to 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 to A.D. 1000, and then pueblos, A.D 1000 to A.D.1400) were hallmarks of the period (ARMS 1993; Cordell 1997; Diehl and LeBlanc 2001; 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; Martin and Rinaldo 1950). The Mogollon people are the most widely studied on the Gila National Forest. Most prehistoric sites found on the Gila National Forest are Mogollon, including habitation remains in the form of pithouses or masonry dwellings; roasting pits; lithic (stone) and pottery artifact scatters; some agricultural features like check dams; cultural landscapes; etc.

The historic period began in New Mexico with Spanish contact in 1539. On the Gila National 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 to 1821), Mexican (A.D. 1821 to 1848), and American (A.D.

1848 to 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 Gila National Forest in 1905, ranger stations, administrative sites, lookouts, and recreational areas have been built as well. Finally, Civilian Conservation Corps associated camps and infrastructure like roads, bridges and campgrounds are found on the Gila National Forest.

Today, land use in the Gila National 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 Gila National Forest for traditional activities including plant gathering and visits to special places. Tribes have not identified any traditional cultural properties or sacred sites within the Travel Management Project area through travel management consultation, nor have any been identified as being affected by the project.

Affected Environment

For the past 35 years or more, Forest Cultural Resource Specialists (archeologists), in compliance with Sections 106 and 110 of the National Historic Preservation Act of 1966, as amended, have inventoried about 421,709 acres (12 percent) of the Gila National Forest's 3.3 million acres to professional standards (also referred to as "surveyed to standard"). A total of approximately 6,656 cultural sites are in Gila National Forest electronic databases, which contain the best available baseline information for known cultural resources and archeological surveys on the forest.

For the Gila National 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). In practical terms, cultural resource sites 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.

Within the boundaries of the Gila National Forest, 47 sites or groups of sites known as Districts are listed on the National Register of Historic Places. About 1,840 sites have been determined eligible for the National Register of Historic Places, and about 424 have been determined ineligible. About 4,345 sites remain unevaluated 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 (SHPO). Unevaluated sites require further study before it can be determined whether they are eligible to the National Register of Historic Places.

Cultural Resource Compliance with National Historic Preservation Act

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 SHPO 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 Programmatic Agreement (USDA-Forest Service Southwestern Region; New Mexico SHPO; Advisory Council on Historic Preservation et al. 2003) and TM Protocol streamline and standardize the Section 106 consultation process for Forests in Region 3, including the Gila National Forest. For example, the TM 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 prior consultation with the State Historic Preservation Officer for sample surveys. Through the development of the TM Protocol, the direct, indirect, and cumulative effects of travel management have been considered.

The TM Protocol exempts existing road prisms and associated constructed features (culverts, ditches, etc.) from Section 106 compliance and consultation. In the protocol, 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. This does not prohibit implementing protection measures for known sites where use is known to be causing unacceptable impacts.

Travel management designations that are considered new undertakings under the National Historic Preservation Act will go through Section 106 consultation and compliance per R3 Programmatic Agreement and the TM Protocol before they appear on the motorized visitor use map. The protocol defines the following designations as new undertakings:

- previously closed roads and trails not open to motor vehicle use
- non-system roads and trails, such as unauthorized user-created roads, old temporary roads, and other unclassified roads and trails
- non-system fixed routes or spurs and their associated features to access dispersed camp sites or areas, including the dispersed camp sites and areas themselves
- fixed-distance corridors along certain roads, including exempt roads, that will be designated for dispersed camping
- areas open to cross-country motorized travel
- roads or trails that are considered to be historic properties
- proposed new construction, reroutes, and realignments

If effects to cultural resources are identified, they will be addressed by the forest in consultation with the State Historic Preservation Officer and other consulting parties. Adverse effects will be minimized or avoided through mitigation. Under the TM Protocol, the Travel Management Rule

NEPA decision can be signed based on existing cultural resource data. Additional cultural surveys and compliance may be phased up to three years after the decision has been signed.

The Gila National Forest has consulted with the New Mexico State Historic Preservation Officer on travel management in the Consolidated Cultural Resource Compliance Report for the Travel Management Rule. This report not only outlined the Gila National Forest travel management survey strategy, survey methods, and protection measures for sites, but also asked for concurrence on travel management effects to cultural resource sites provided in the report. This consolidated report was submitted and concurred upon by the State Historic Preservation Officer in September 2012.

Several reports are currently being written for travel management survey. These should be submitted to the State Historic Preservation Officer by early 2014. After these reports are completed, only a few hundred acres of motorized dispersed camping corridors, newly proposed routes, and areas remain to be surveyed. It is anticipated that phasing will consist only of some loose ends in survey, site visits, and report writing. It is also anticipated that most of this work will be completed by the development of the first motor vehicle use map.

Methods

The NEPA analysis considers only the 'change' to the existing condition. Changes include proposals of motorized big game retrieval, motorized dispersed camping corridors, motorized areas, and newly proposed routes. Existing routes (roads and trails) that are part of the existing National Forest System are not being analyzed. Only those routes that are being newly added to the system will be analyzed. These routes include unauthorized routes, routes being re-opened, and routes changing status from nonmotorized to motorized. (These routes will be referred to as new routes or newly proposed routes throughout this analysis.)

The area of potential effect for Travel Management FEIS NEPA analysis is based on the current condition:

- Miles of proposed motorized roads and trails are analyzed at 15 meters (49 feet) either side of the centerline.
- Miles of fixed-width corridors for motorized access to dispersed camping at 300 feet either side of the centerline (600-foot total width)
- Number of acres for motorized big game retrieval proposed per alternative (300 feet from open roads or on roads where motorized dispersed camping is allowed, one-half mile, 1 mile, or no distance restriction from roads)
- Acreage of motorized areas proposed per alternative for motorized cross-country use

The Gila National Forest believes that this area of potential effect adequately measures and addresses direct and indirect effects, given the recommended minimum distances identified in the TM Protocol and the results of a recent looting and vandalism analysis (see appendix F of Cultural Resource report (USDA Forest Service 2013j)).

Analysis

The purpose of the analysis is to analyze the potential effects of travel management on cultural resources on the Gila National Forest.

Relative Risk Analysis

This report uses a relative risk analysis to compare alternatives. Relative risk is considered the potential impact that can result from one action (alternative) measured against the potential impact that might result from a different action (alternative).

For cultural resources, the measure for direct and indirect effects for all actions will be the number of sites within the area of potential effect for the action. The number of known sites is directly related to how many miles or acres are proposed for each action per alternative. The alternatives with higher numbers of miles and acres show higher numbers of known sites, and vice versa. Therefore, the alternatives proposing more miles or acres per action will pose a higher risk of direct and indirect effects to cultural resources conversely those proposing fewer miles will pose a lower risk of these effects.

Background Assumptions

- Motorized access, including newly proposed routes, motorized areas, motorized big game retrieval, and motorized dispersed camping corridors, may provide easier access and a potential risk to cultural resources from existing, ongoing, or new direct, indirect, or cumulative effects related to these activities.
- Some data suggest that cultural sites located near routes may be more susceptible to looting (Spangler et al. 2006 and Hedquist and Ellison 2010).
- On the Gila National Forest, new analysis on looting and vandalism does not show a strong relationship between the distance a site is located from a route and the presence or absence of looting and vandalism. On the Gila National Forest, looting and vandalism occur forestwide, and the presence of routes may not be a precursor for these disturbances (Appendix F of Cultural Resources Specialist Report (USDA Forest Service 2013j)).
- Cultural resources are analyzed under the assumptions that the public will comply with the regulations set forth by the Travel Management Rule.

Measures

Motorized Routes

The measure for determining the relative risk of designating newly proposed motorized routes is the number of known sites per alternative for this action. GIS was utilized to determine how many known sites are located within the analysis area for each alternative. GIS also provided information like the total number of miles for newly proposed routes, the existing route system, and the entire route system for each alternative.

The number of acres surveyed to standard is displayed for each action. This gives some information on the number of acres surveyed per alternative and to demonstrate how accurate the number of known sites may be for each alternative. The greater percentage of acreage surveyed to standard, the more accurate the number of known sites.

For this analysis, all routes were analyzed at 15 meters either side of centerline. This distance is great enough to include adjacent roadside parking.

Assumptions:

- While existing routes are not considered part of the 'change' that requires analysis for cultural resource, the Gila National Forest does include an existing route system for each alternative for comparison to alternative B, the no action alternative. Existing routes included for this comparison are those within the forest boundaries under Forest Service jurisdiction, excluding closed and decommissioned routes. In addition to these routes, U.S. highways, State highways, and county roads are also included, because they may allow access to forest lands.
- Analysis of motorized routes combined roads and trails, because direct and indirect effects from these routes are similar in nature.

Motorized Dispersed Camping Corridors

The measure for determining the relative risk of designating motorized dispersed camping corridors to cultural resources is the number of known sites within each alternative for this action. GIS was utilized to determine the number of sites within the motorized dispersed camping corridor for each alternative. GIS also provided data on the number of acres of motorized dispersed camping corridors, and the number of acres surveyed to standard per alternative for comparison.

Analysis of motorized dispersed camping corridors covers 300 feet either side of road centerlines per alternative.

Motorized Areas

The measure for determining the relative risk of designating motorized areas to cultural resources is the number of known sites within each alternative for this action. GIS was utilized to determine the number of known sites within motorized areas. GIS also provided information on the number of total acres in motorized areas for each alternative and how many of these acres are surveyed to standard.

Analysis for motorized areas covers the exact proposed acreage for each motorized area.

Assumptions

- Thirty-seven motorized areas have been proposed in alternatives C, F, and G. These motorized areas allow any type of motorized vehicle activity within them, but 36 of the 37 have traditionally been used as camping areas and this is the expected ongoing use. The remaining motorized area is located on the Reserve Ranger District, and open to unrestricted OHV and motorcycle use. This 3.31-acre motorized area is located within a borrow pit near an old landfill.
- Motorized areas will be analyzed separately, the 36 that have traditionally used as camping areas will be analyzed together and the one open to unrestricted OHV and motorcycle use will be analyzed separately.
- The direct and indirect effects of the 36 motorized areas traditional used as camping areas are very similar to motorized dispersed camping corridors. However, these actions are analyzed separately. The results of the motorized area analysis do not take into account the number of known sites analyzed for motorized dispersed camping camping and vice-versa. For area, the potential risk of direct and indirect effects to known cultural resources from motorized areas is very low in alternatives C, F, and G, and non-existent in

alternatives D and E. However, motorized dispersed camping corridors are proposed for alternatives C, D, F, and G. Therefore, a potential risk of similar effects from motorized dispersed camping corridors to known sites is still present and varies depending upon the alternative.

Motorized Big Game Retrieval

The measure for determining the relative risk of designating motorized big game retrieval to cultural resources is the number of known sites within each alternative for this action. GIS was utilized to determine number of known sites that are within motorized big game retrieval designations for each alternative. GIS also provided the total number of acres and the number of acres surveyed to standard for comparison. This information was evaluated in the context of potential motorized big game retrieval disturbance, calculated from New Mexico Game and Fish harvest records for 2006 through 2009, the number of vehicle trips used to retrieve game, vehicle size, type of animal being harvested, and number of days in the hunt season.

Analysis for motorized big game retrieval covers the exact proposed acreage per alternative.

Assumptions

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 through 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 is 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 197).

Table 197. 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 (2.08 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 (84,388 acres)				
Deer and elk	108	2,633	220	0.3%
Alternative F corridor – one-half mile from each side of road (1.51 acres)				
Elk	89	1,311	954	0.06%
Alternative G corridor – 300 feet – same as motorized dispersed camping corridors (94,008 acres)				
Deer and elk	108	2,633	220	0.2%

New Mexico Department of Game and Fish rules and regulations concerning hunting may vary slightly year to year. Specifically, the season or number of days allowed for hunting and the available number of tags per species may vary. Harvest data may also vary slightly. As a result, the number of acres of potential disturbance from motorized big game retrieval may also vary slightly year to year.

Environmental Effects

For all alternatives, cultural resources (heritage resources) have been analyzed with respect to potential effects from four issues: newly proposed 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.

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 for existing routes. Roadside parking adjacent to existing roads is exempt from Section 106 consultation under the TM Protocol, because continued motor vehicle use has already disturbed and compromised the

integrity of cultural sites in these areas (USDA-Forest Service Southwestern Region; New Mexico State Historic Preservation Officer 2007).

The analysis area for motorized roads (15 meters either side of centerline) does capture roadside parking limits for those roads considered new undertakings. Roadside parking has potential to cause direct and indirect effects to cultural resources near roads. Direct effects may include, but are not limited to, vehicles driving over cultural 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 result from 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 newly designated roads are reduced. All action alternatives will substantially benefit the condition of cultural resources on forest by greatly reducing miles of roads and roadside parking as compared to the current condition which includes motorized cross-country travel. Many fewer cultural resources will be subject to indirect effects from roadside parking, because parking may occur only along designated roads.

Looting and Vandalism

In this analysis, looting and vandalism are recognized as potential indirect effects of motorized access to the forest. The current condition allows motorized cross-country travel over 2.44 million acres where some 5,346 known sites are located. Direct and indirect effects of motorized cross-country travel include activities that recreationalists may participate in once they have reached their destination. These may include, but are not limited to, dispersed camping, fuel wood 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/or prehistoric features; and mixing of modern trash litter with historic artifacts or collection of historic trash mistaken for modern trash.

With the prohibition of motorized cross-country travel, the potential risk of these effects will decrease from the current condition. Action alternatives that propose higher numbers of proposed miles and acres available for motorized dispersed camping corridors, motorized areas, motorized big game retrieval, and newly proposed route designations will pose a higher relative risk of looting and vandalism than will those proposing lower numbers.

Effects Common to Alternatives C, D, E, F, and G

Motorized Cross-country Travel Prohibition

Motorized cross-country travel is prohibited under all action alternatives. This means that vehicular travel off the designated system would not be permitted, except as defined in appropriate motorized dispersed camping corridors, motorized areas, motorized big game retrieval, or under a special use authorization. Vehicles must stay in the confines of routes or corridors for driving; access outside of these routes would be reduced to foot traffic or other authorized access (equestrians, pack animals, special uses, 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, Schiffman 2005). These can 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.

Under the current condition, motorized cross-country travel is allowed across 2.44 million acres. Approximately 5,346 known sites are found within that space. This has been allowed without specific Section 106 consultation and compliance for decades. Therefore, effects from these actions on cultural resources have gone unchecked. However, through the passage of the Travel Management Rule, motorized cross-country travel is prohibited. Actions that may be proposed through the action alternatives like motorized dispersed camping corridors, motorized areas, and newly proposed route designations will require Section 106 consultation and compliance. This will allow archaeologists to assess and mitigate or avoid potential adverse effects to cultural resources from these actions, as appropriate. This is highly beneficial to cultural resources.

Prohibiting motorized cross-country travel under any of the action alternatives would be highly beneficial to cultural resources by reducing ease of access to sites located in areas that do not have designated routes. This would considerably reduce the potential for direct, indirect, and cumulative effects from motorized use. The potential risk of other indirect effects associated with recreational use of NFS lands may be reduced because access would be limited to nonmotorized traffic. However, foot traffic off routes can result in some indirect effects like looting or camping within a cultural site (Schiffman 2005). While this may be true, limitations 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 Gila National Forest lands and the cultural resources located within them. However, all action alternatives prohibit motorized cross-country travel which will greatly reduce motorized access to forest lands, and sites, from the current condition. The reduction of miles of motorized routes and prohibition of motorized cross-country travel in each action alternative are highly beneficial to cultural resources by reducing the number of cultural resources exposed to potential direct and indirect effects of motorized vehicle use.

The NEPA analysis for travel management requires analyzing the change from the present condition. For motorized routes, the change is represented by the newly proposed route designations for each action alternative and the prohibition of motorized cross-country. As a result, the existing routes in each alternative are not analyzed. Instead, these numbers are presented and discussed generally within this section.

There are no newly proposed route designations in alternative B. However, alternative B does allow motorized cross-country travel. Analysis for motorized routes in the action alternatives consists of the number of miles of new routes and the number of known sites within this area compared to the number of sites exposed to motorized cross-country in alternative B.

The analysis area for routes is 15 meters on either side of the centerline for a total width of 30meters. The average total widths of all newly proposed routes are either 8 feet (2.4 meters) or 12 feet (3.7 meters) wide. Therefore, the route analysis width of 15 meters either side of the

centerline exceeds the land that will be disturbed by motorized use authorized, including roadside parking, under this decision.

Unless covered by previous complete survey from 1980 or later, all newly proposed routes will receive 100 percent survey. The survey for these new routes will follow the TM Protocol. All previously recorded sites will be visited. Sites discovered or visited through this process will be assessed and potential adverse effects mitigated or avoided when appropriate. This will reduce the potential risk of known sites from effects of newly proposed motorized routes. Most of the new motorized routes have been surveyed, the remaining will be surveyed and go through Section 106 consultation and compliance before they appear on the motor vehicle use map.

Alternative B

There are no newly proposed route designations in alternative B. Analysis of the route system shows that alternative B has 5,432.11 miles of routes and 1,598 known sites within that area (table 198). However, it must be considered that alternative B allows motorized cross-country travel over 2.44 million acres which contains 5,346 known cultural sites.

While no newly proposed route designations are found in alternative B, most of the miles being proposed in the other alternatives are user-created routes that have resulted from current motorized cross-country travel. These routes are the result of repeated use of off-road tracks. The others are being re-opened from closed or decommissioned status. While these routes are not supposed to be motorized, some of these are being used under the current condition.

Motorized cross-country travel and its effects on cultural resources have gone unchecked for many years. Under alternative B, cultural resources 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 cross-country travel include activities that recreationalists may participate in once they have reached their destination. These may include, but are not limited to, dispersed camping, fuel wood 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/or 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 or near sites may cause vegetation to become disturbed, thereby exposing soils. This may cause erosion which can displace artifacts and cultural deposits.

In all the action alternatives, motorized cross-country travel is prohibited. This is a great reduction in motorized access to forest lands, and will reduce direct and indirect effects like cars driving over sites, erosion, and rutting. Because motorized access would be limited, indirect effects like looting and camping-related disturbances may also decline. Even though the action alternatives add some route miles to the system through newly proposed route designations, any of these alternatives would create a better situation for cultural resources than alternative B.

It should be noted that in all action alternatives existing number of route miles decline due to proposed nonmotorized route closures (table 198). Dependent upon the action alternative, this

reduction ranges from 143.9 to 1,856.38 miles. The number of known sites found within this area ranges from 45 to 668 depending on the alternative. Route closure would be beneficial to these cultural resources because this reduces motorized access to forest lands and direct contact between vehicles and sites. Routes that are closed may also promote natural reclamation of the routes, including vegetation growth. This may also benefit cultural resources through stabilizing soil erosion.

Because motorized cross-country travel is prohibited in all action alternatives, it is worth comparing the percentage of sites that are located within the total road system to those found in alternative B (table 198). When comparing the action alternatives to alternative B in this way, the number of known sites decline by 70 to 79 percent dependent upon alternative. It becomes apparent that any of the action alternatives will be better than the current condition.

Discussion of Newly Proposed Routes or the 'Changes in the Route System' Among the Action Alternatives

All of the action alternatives propose new routes. These newly proposed routes would allow access to forest lands, and have the potential to cause direct and indirect effects to cultural resources. However, alternative B allows motorized-cross-country travel. This action allows motorized use on approximately 2.44 million acres of land which contains 5,346 known cultural sites. While adding some new routes to the system has the potential to increase effects to cultural resources, the prohibition of motorized cross-country and proposed closure of routes in all action alternatives reduces the overall effects to cultural resources through limitation of motorized use.

Table 198. Gila National Forest known sites, routes, and proposed changes by alternative

Sites and Routes	Existing Condition Alt. B	Changes Proposed Alt. C	Changes Proposed Alt. D	Changes Proposed Alt. E	Changes Proposed Alt. F	Changes Proposed Alt. G
Existing # of route miles	5,432.11	5,287.76	4,197.73	3,560.59	4,557.85	4,528.06
Changes in route system (newly proposed route designations) in miles	N/A	204.52	93.19	11.93	119.62	118.88
Total miles	5,432.11 (2.44 million acres for motorized cross-country)	5,492.28	4,290.92	3,572.52	4,677.47	4,646.94
Change in number of miles of NFS motorized routes expressed as a percent (+or-) from Alt. B		+1.11%	-21.01%	-34.23%	-13.89%	-14.45%
Total number of known sites	1,598 (5,346 due to motorized cross-country)	1,613	1,376	1,139	1,453	1,444
Change in # of known sites within NFS motorized routes as expressed as a percent (+or-) of Alt. B (from motorized cross-country)		+1.01% (-69.83%)	-13.89% (-74.26%)	-28.72% (-78.69%)	-9.07% (-72.82%)	-9.64% (-72.99)
Existing # of route miles proposed as nonmotorized (does not include miles already closed or decommissioned) and # of known sites	0	143.90 45 Sites	1,228.15 387 Sites	1,856.38 668 Sites	873.80 294 Sites	903.60 308 Sites

Common Effects of Alternatives C, D, E, F, and G

Potential effects of the designation of newly proposed routes to cultural resources are very similar, if not the same, as those found in alternative B for motorized cross-country travel. Cultural sites found within route prisms 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 on 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, fuel wood 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/or prehistoric features; and mixing of modern trash litter with historic artifacts or collection of historic trash mistaken for modern trash.

Also, use of vehicles near or within sites may cause vegetation to become disturbed, thereby exposing soils. This may cause erosion which can displace artifacts and cultural deposits.

Beneficial Effects of Alternatives C, D, E, F, and G

Beneficial effects of alternatives C, D, E, F, and G are connected to the prohibition of motorized cross-country travel and closure of some existing routes.

In all the action alternatives, motorized cross-country travel is prohibited. This is a great reduction in motorized access to forest lands, and will reduce direct and indirect effects like cars driving over sites, erosion, and rutting. Because motorized access would be limited, indirect effects like looting and camping-related impacts may also decline.

In the action alternatives, some existing motorized routes are proposed to become nonmotorized (table 198). These route closures would be beneficial to cultural resources because this reduces motorized access to forest lands and direct contact between vehicles and sites. Routes that are closed may also promote natural reclamation of the routes, including vegetation growth. This may also benefit cultural resources through stabilizing soil erosion.

Motorized cross-country travel has resulted in the creation of user-created routes. These routes were created without Section 106 consultation and compliance. Those user-created routes that are proposed to become part of the National Forest System and all other newly proposed routes will or have gone through this process. As a result, all sites discovered or visited within newly proposed routes will be or have been assessed for travel management effects. Potential adverse effects will be mitigated or avoided, as appropriate.

Alternative C

Alternative C proposes about 204.52 miles of newly proposed routes (table 199). There are 49 known sites within this area. The changes represented in alternative C shows a 99 percent reduction in number of sites at risk for potential effects from alternative B.

Table 199. Proposed route system changes and number of known sites by alternative

Sites and Routes	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Changes in route system (newly proposed route designations) in miles	N/A	204.52	93.19	11.39	119.62	118.88
Known sites	5,346 Sites (due to motorized cross-country)	49 Sites	27 Sites	6 Sites	33 Sites	34 Sites
Change in number of known sites expressed as a percent (+or-) from Alt. B	N/A	-99.08%	-99.49%	-99.89%	-99.38%	-99.36%

Alternative D

Alternative D proposes about 93.19 miles of newly proposed routes. There is a decrease of 99 percent in number of known cultural sites from alternative B (table 199). Alternative D

provides a vast decrease in the number of known sites at risk for potential effects from alternative B and a small decrease from alternative C.

Due to the reduction in number of known sites, relative risk of direct and indirect effects is greatly decreased from alternative B and slightly from alternative C.

Alternative E

Alternative E proposes about 11.93 miles of newly proposed routes. There is a 99 percent decrease of in number of known cultural sites from alternative B (table 199).

Alternative E proposes the least amount of newly proposed miles with the least number of known sites at risk for potential effects within those miles of all action alternatives. Therefore, it would also provide the least relative risk of direct and indirect effects of this action to cultural resources among all action alternatives. Also, beneficial effects associated with the prohibition of motorized cross-country travel would be greatest in alternative E.

Alternative F

Alternative F proposes 119.62 miles of newly proposed routes. There is a decrease of 99 percent in the number of known cultural sites at risk for potential effects from alternative B (table 199). Alternative F reduces both the number of miles of proposed miles and known sites from alternative C, but these numbers increase from alternatives D and E.

With the reduction in the number of known sites from alternative B and C, the relative risk of direct and indirect effects of proposed motorized routes to known sites in alternative F is decreased. With the increase of known sites from alternatives D and E, this relative risk increases in alternative F.

Alternative G

Alternative G proposes about 118.88 miles of newly proposed routes. There is a decrease of 99 percent in number of known cultural sites at risk for potential effects from alternative B (table 199). Alterative G reduces both number of proposed miles and known sites from alternative C, these numbers are very similar to alternative F and an increase from alternatives D and E.

With the number of known sites, the relative risk of direct and indirect effects seen in alternative G is greatly decreased from alternative B and slightly decreased from alternative C. The relative risk of direct and indirect effects seen in alternative G is very similar to alternative F and an increase from alternatives D and E.

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 the purpose of 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 NFS roads. Motorized dispersed camping corridors would not be available for unrestricted motor vehicle use.

Unless covered by previous complete survey from 1980 or later, all camping corridors with high cultural site density will receive 100 percent survey of the total 600-foot corridor (300 feet on either side of the road's centerline). Sample survey may take place in camping corridors with low site density. All previously recorded sites within the camping corridors will be revisited. Sites discovered or visited through this process will be assessed and potential adverse effects mitigated or avoided as appropriate. This will reduce the potential risk of known sites from effects of motorized dispersed camping. Most of the motorized dispersed camping corridors have been surveyed, the remaining will be surveyed and go through Section 106 consultation and compliance before they appear on the motor vehicle use map.

Effects Common to Alternatives B, C, D, F, and G

Direct effects related to motorized dispersed camping, may 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 on sensitive soils, vehicles may cause rutting and erosion that could disturb cultural deposits.

Additional direct and indirect effects of motorized dispersed camping relate to camping activities that may include, but 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/prehistoric features; and mixing of modern trash litter with historic artifacts or collection/removal of historic trash mistaken for modern trash.

Also, use of vehicles near or within sites may cause vegetation to become disturbed, thereby exposing soils. This may cause erosion which may displace artifacts and cause impacts to cultural deposits.

Beneficial Effects Common to Alternatives C, D, E, F, and G

Beneficial effects would increase as acres available for motorized dispersed camping are reduced and motorized dispersed camping corridors are designated. Reducing motorized dispersed camping to specific corridors would help reduce the potential of direct and indirect effects to cultural sites. Sites located outside motorized dispersed camping corridors should benefit from this action because vehicles would not be allowed to drive outside road corridors except as defined for motorized big game retrieval, motorized areas, or special use. These beneficial effects are common to alternatives C, D, E, F, and G.

Beneficial Effects Common to Alternatives C, D, F, and G

Motorized dispersed camping corridors proposed in alternatives C, D, F, and G require Section 106 consultation and compliance before they appear on the motor vehicle use map. As a result, all sites discovered or visited within proposed motorized dispersed camping corridors will be or have been assessed for travel management effects. Any potential adverse effects will be mitigated or avoided, as appropriate. Currently, the forest plan allows motorized dispersed camping without Section 106 consultation and compliance, which may be causing some effect to cultural resources.

Alternative B

Alternative B allows motorized dispersed camping on 2.44 million acres of Gila National Forest lands (table 200). There are about 5,346 known cultural sites within this area.

Table 200. Motorized dispersed camping corridor acres available by alternative

Motorized Dispersed Camping Corridor Acres and Sites	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Number of acres available	2.44 million	108,180	84,388	0	101,915	94,008
Change in number of acres of motorized dispersed camping corridors expressed as a percent (+ or -) of alternative B		-96%	-97%	-100%	-96%	-96%
Number of known cultural sites	5,346	983	657	0	844	755
Change in number of known cultural sites within motorized dispersed camping corridors expressed as a percent (+ or -) of alternative B		-82%	-88%	-100%	-84%	-86%

Alternative C

Changes under alternative C result in about 108,180 acres available for motorized dispersed camping corridors, a reduction of 96 percent in acres from alternative B (table 200). This alternative shows a reduction of 82 percent in number of known sites from alternative B. Alternative C greatly reduces the number of acres available for motorized dispersed camping and known sites from alternative B.

Alternative C provides a lower relative risk of direct and indirect effect to known sites when compared to alternative B due to the great reduction of number of known sites.

Alternative D

Changes under alternative D result in 84,388 acres for motorized dispersed camping corridors, a reduction of 97 percent from the acres in alternative B (table 200). This alternative also has a reduction of 88 percent in number of known sites from alternative B. Alternative D greatly reduces the number of acres and known sites in comparison to alternative B and provides a reduction from alternative C. This reduction would benefit cultural resources both inside and outside the motorized dispersed camping corridors.

With the reduction in number of known sites, alternative D provides a lower relative risk of direct and indirect effects to known sites than alternatives B and C.

Alternative E

Alternative E does not propose motorized dispersed camping corridors (table 200). This would be a 100 percent reduction in acres and known sites from alternative B. Therefore, this alternative poses no potential risk to cultural resources from motorized dispersed camping corridors.

Dispersed camping may still occur, but motorized access to dispersed camping sites would not be allowed. Alternative E provides the most beneficial effects to cultural resources.

Alternative F

Changes under alternative F result in about 101,916 acres for motorized dispersed camping corridors, a reduction of 96 percent from alternative B (table 200). There is a reduction of 84 percent in number of known sites from alternative B. This alternative reduces the number of acres available for motorized dispersed camping and known sites from alternatives B and C, but increases acres and known sites from alternatives D and E. Alternative F provides greater potential beneficial effects than alternatives B and C given the reduction in number of known 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.

With the reduction of known sites from alternatives B and C, alternative F provides a lower relative risk of such effects. With the increase of known sites from alternatives D and E, alternative F provides a higher relative risk of these types of effects.

Alternative G

Changes under alternative G result in about 94,008 acres for motorized dispersed camping corridors, a reduction of 96 percent from alternative B (table 200). This alternative shows a reduction of 86 percent in the number of known cultural sites from alternative B. This alternative reduces the number of acres and known sites compared to alternatives B, C, and F, these slightly increase from alternative D, and greatly increase from alternative E. Alternative G provides greater potential beneficial effects than alternatives B, C, and F given the reduction in number of known 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.

With the reduction of known sites from alternatives B, C, and F, alternative G provides a lower relative risk of such effects. With the increase of known sites from alternatives D and E, alternative G provides a higher relative risk of these types of effects.

Motorized Big Game Retrieval

Motorized big game retrieval allows hunters to retrieve downed animals using motorized cross-country travel. Hunters cannot hunt from their vehicles, so they are limited to using the vehicle for retrieval only. Because this action is limited, seasonal, and occurs over a vast area, the probability of any one cultural site being driven over by any one hunter is minimal. Therefore, this action poses only a slight potential of risk to cultural resources (refer to motorized big game retrieval assumptions).

However, this activity provides limited ease of motorized access to forest lands and cultural resources located within them. Each alternative has a proposed corridor distance for motorized big game retrieval. The reduction in acres for this activity will directly relate to reduction in number of cultural resources having potential risk of direct and indirect effects associated with motorized big game retrieval. Analysis uses the number of acres proposed per alternative and the number of known cultural sites, compared to the number of potential acres of disturbance from motorized big game retrieval activities (table 201).

Common Effects to Alternatives B, C, D, F, and G

Direct and indirect effects of motorized big game retrieval would be similar in scope to other motorized-cross-country activities. Vehicles may be driven over sites causing disturbance to features and artifact displacement. In wet weather or on 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. There is also potential for disturbance of vegetation within a site, causing erosion which may displace artifacts and impact cultural deposits. Under alternatives B, motorized big game retrieval provides access to remote places on the forest, which has the potential to result in deliberate or opportunistic looting and artifact collecting. There is also varying potential for this effect with alternatives C, F, D, and G, however, relative risk would be directly related to the number of known sites and number of proposed acres for the activity. The lower the number of known sites and proposed acres, the lower the relative risk.

Alternative B

Alternative B allows unlimited motorized access for game retrieval on 2.44 million acres containing 5,346 known sites (table 201). Disturbance acreage per year was not determined for alternative B (table 201). However, general information about alternative B indicates this disturbance to be somewhat comparable to alternative C, yet, at least slightly larger. For alternative B, game retrieval is not limited by any species or distance from road. In the current condition, there are no guidelines on how to use the retrieval vehicle. A hunter is allowed to take any route through the forest to get to the downed animal. This provides some indication that disturbance acreage for alternative B would be slightly larger than that seen in alternative C (table 201).

Table 201. Motorized big game retrieval acres, proposed changes and number of known sites by alternative

Motorized Big Game Retrieval Acres* and Sites	Existing Conditions Alt. B	Changes Proposed Alt. C	Changes Proposed Alt. D	Changes Proposed Alt. E	Changes Proposed Alt. F	Changes Proposed Alt. G
Acreage available for motorized big game retrieval (MBGR)	2.44 million	2.08 million	84,388	0	1.51 million	94,008
Change in number of acres of MBGR expressed as a percent (+or-) of alternative B		(-15%)	-97%	-100%	-38%	-96%
Known sites within MBGR areas	5,346	5,181	657	0	4,721	755
Change in number of known sites within MBGR expressed as a percent (+or-) of alternative B		-3%	-88%	-100%	-12%	-86%
Number of possible disturbance acreage per year		4,852.5	220	0	953.3	220
Number of acres surveyed to standard	395,483 (16%)	382,275 (18%)	60,342 (72%)	N/A	342,392 (23%)	66,546 (71%)

*All numbers are rounded to the nearest whole number.

Alternative C (One Mile from Roads, Elk, Deer, Bear, Mountain Lion, Javelina, and Antelope)

Changes to alternative C limits 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 15 percent of forest lands available for this action and a reduction of 3 percent of known sites when compared to alternative B. Possible total disturbance acreage per year is about 4,852.5 acres (table 201).

Due to the reduction in number of sites, alternative C shows a small reduction in the relative risk of direct and indirect effects to known sites from alternative B.

Alternative D (300 feet from Open Roads, Deer and Elk)

Changes provided in alternative D result in motorized big game retrieval being allowed only within motorized dispersed camping corridors. This includes about 84,388 acres. This is a reduction of 97 percent of forest lands available for this action and a reduction of 88 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 201).

With the known number of sites, alternative D poses a much lower relative risk of direct and indirect effects to known sites than do alternatives B and C due to the great reduction of known sites and greatly reduces the number of known sites that have a potential risk of direct and indirect effects when compared to alternatives B and C.

In alternative D, motorized big game retrieval would only be allowed in motorized dispersed camping corridors. These corridors will go through Section 106 consultation and compliance as described in the motorized dispersed camping corridor section. Individual camping corridors, and motorized big game retrieval corridors in alternative D, will not appear on the motor vehicle use map until this is complete. This process will help identify cultural resources within motorized big game retrieval corridors for alternative D. These sites will be assessed, and potential adverse effects mitigated or avoided as appropriate. This will be highly beneficial to cultural resources located within motorized big game retrieval corridors for this alternative.

Alternative E (No Motorized Big Game Retrieval)

Alternative E does permit motorized big game retrieval (table 201). This alternative poses no potential risk to cultural resources and is a 100 percent reduction in relative risk of direct and indirect effects to known sites from alternative B and all other alternatives.

Alternative F (One-half Mile from Open Roads, Elk Only)

Changes represented by 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 1.51 million acres. This is a reduction of 38 percent of forest lands available for motorized big game retrieval and a reduction of 12 percent of known sites when compared to alternative B. Because retrieval is reduced to elk, the possible disturbance acreage/year is 953.3 acres (table 201).

With the known number of sites, this alternative reduces the relative risk of direct and indirect effects to known sites when compared to alternatives B and C, but increases the potential risk of effects 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 only being allowed within motorized dispersed camping corridors, which includes about 94,008 acres. This is a reduction of 96 percent of forest lands available for motorized big game retrieval and a reduction of 86 percent of known sites when compared to alternative B. Possible disturbance acreage at this distance is about 220 acres per year (table 201).

With number of known sites, alternative G reduces the relative risk of direct and indirect effects to known sites from alternatives B, C, and F; is comparable to alternative D; and is an increase from alternative E.

In alternative G, motorized big game retrieval would only be allowed in motorized dispersed camping corridors which will go through Section 106 consultation and compliance, as described in the motorized dispersed camping corridor section. This process will help identify cultural resources within motorized big game retrieval corridors for alternative G. These sites will be assessed, and potential adverse effects mitigated or avoided as appropriate. This will be highly beneficial to cultural resources located within motorized big game retrieval corridors for this alternative.

Motorized Areas

Thirty-seven motorized areas have been proposed in alternatives C, F, and G. These motorized areas allow any type of motorized vehicle activity within them, but 36 of the 37 have traditionally been used as camping areas and this is the expected ongoing use. The remaining motorized area is located on the Reserve Ranger District, and open to unrestricted OHV and motorcycle use. This 3.31-acre motorized area is located within a borrow pit near an old landfill.

Unless covered by previous complete survey from 1980 or later, all motorized areas will receive 100 percent survey. All previously recorded sites will be visited. Sites found within motorized areas will be assessed and effects mitigated or avoided when appropriate. This will reduce the potential risk of known sites from effects of motorized areas.

Alternative B

There are no designated motorized areas in alternative B. However, motorized cross-country travel and motorized dispersed camping are allowed in alternative B. These activities are similar in scope to those that would occur in motorized areas. They also pose similar potential effects to cultural resources. Alternative B allows motorized cross-country travel and motorized dispersed camping upon 2.44 million acres. There are about 5,346 known cultural sites within this area (table 202).

Effects from motorized dispersed camping and motorized cross-country travel mirror those that would occur in motorized areas. Vehicles may be driven over sites causing disturbance to features and artifact displacement. In wet weather or on sensitive soils, vehicles may cause rutting and erosion that could disturb cultural deposits.

Additional direct and indirect effects of motorized dispersed camping in motorized 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 firewood; deliberate or opportunistic looting and artifact collecting; graffiti on historic and/or prehistoric features; mixing of modern trash litter with historic artifacts, or collection of historic trash mistaken for modern trash.

Table 202. Acreage and sites by alternative

Acreage and Sites	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Number of known sites	5,346	1	0	0	1	1
Acres for traditional camping	2.44 million	23.69	0	0	23.69	23.69
Acres for OHV play	2.44 million	3.31	0	0	3.31	3.31
Total acres	2.44 million	27	0	0	27	27
Total acres surveyed to standard	421,709 (12%)	19.3 (71.48%)	0	0	19.3 (71.48%)	19.3 (71.48%)

Alternatives C, F, and G

Changes incorporated in alternatives C, F, and G result in 36 motorized areas traditionally used for camping. These motorized areas comprise a total of 23.69 acres; the majority of them are less than 1 acre in size. Only one known cultural site is located partially within a motorized area. The changes represented in alternatives C, F, and G result in a great reduction of acres and known sites from alternative B, which allows similar activities on 2.44 million acres with 5,346 known sites (table 202).

The effects of camping to cultural resources in motorized areas are the same as seen in alternative B. This action reduces the potential for direct and indirect effects from 5,346 cultural sites in alternative B to one site in alternatives C, F, and G for this action.

Motorized areas would be delineated to help recreationalists identify their boundaries. This would decrease the potential for effects to cultural resources near motorized areas. Most motorized areas have been surveyed, the remaining will be surveyed and go through Section 106 compliance before they appear on the motor vehicle use map. This should further decrease the relative risk of direct and indirect effects to known sites when compared to alternative B.

The 3.31-acre motorized area open to unrestricted OHV and motorcycle use has been surveyed and does not have any cultural resources. There would be no potential risk to cultural resources in this motorized area due to OHV activities being limited to this specific location.

Alternatives D and E

Alternatives D and E do not permit motorized areas. These alternatives pose no potential risk to affect cultural resources and are a 100 percent reduction in potential effects from alternatives B, C, F, and G.

Conclusions on Direct and Indirect Travel Management Effects to Cultural Resources

Alternative B provides the maximum potential of motorized access to forest service lands through motorized cross-country travel. This action allows motorized use on 2.44 million acres where some known 5,346 sites are located. All other alternatives prohibit motorized cross-country travel (except as defined for motorized areas, motorized dispersed camping corridors, motorized big game retrieval, and administrative use/ written authorization) limiting the number of sites that may be exposed to potential direct and indirect effects. Therefore, alternative B provides the highest relative risk of direct and indirect effects when compared to all other alternatives.

Changes presented in alternative C result in the most mileage for routes, the greatest acreage for motorized dispersed camping corridors, the greatest distance for motorized big game retrieval, and motorized areas of all action alternatives. Outside of alternative B, alternative C provides the highest relative risk of direct and indirect effects to cultural resources.

Changes presented in alternative D result in the second least potential risk for direct and indirect effects and the second highest potential beneficial effects to cultural resources following alternative E. Alternative D results in fewer route miles/acres, less acreage for motorized dispersed camping and motorized big game retrieval than seen in alternative B or proposed in alternatives C, F, and G. Alternative D does not propose any motorized areas, unlike alternatives C, F, and G. This means alternative D provides a lower relative risk of direct or indirect effects to cultural resources when compared to alternatives B, C, F, and G.

Changes presented in alternative E result in the least potential for direct and indirect effects and the highest potential beneficial effects to cultural resources of all alternatives. Alternative E proposes the lowest number of miles/acres for routes, no motorized dispersed camping corridors, no motorized big game retrieval, and no motorized areas. Alternative E provides the lowest relative risk to cultural resources when compared to all other alternatives.

Alternative F proposes less mileage/acreage for routes than seen in alternative B or proposed in alternative C; comparable to alternative G; and more than alternatives D and E. Alternative F proposes less motorized dispersed camping acreage than seen in alternative B or proposed in alternative C and more than alternatives D, E, and G. Alternative F proposes less motorized big game retrieval acreage than seen in alternative B or proposed in alternative C, and more than alternatives D, E, and G. Alternative F proposes the same acreage of motorized areas as do alternatives C and G. Alternative F presents higher potential beneficial effects to cultural resources than alternatives B and C, but less than alternatives D, E, and G. Changes in alternative F result in less relative risk of direct and indirect effects to cultural resources when compared to alternatives B and C, but a higher relative for risk when compared to alternatives D, E, and G.

Alternative G proposes less mileage/acreage for routes than seen in alternative B or proposed in alternative C; comparable to alternative F; and more than alternatives D and E. Alternative G proposes less motorized dispersed camping acreage than seen in alternative B or proposed in alternatives C and F; comparable to alternative D; and more than alternative E. Alternative G proposes less motorized big game retrieval acreage than seen in alternative B or proposed in alternatives C and F; comparable to D; and more than alternative E. Alternative G proposes the same acreage of motorized areas as do alternatives C and F. Alternative G presents higher potential beneficial effects to cultural resources than alternatives B and C, but less than alternatives D, E, and F. Changes presented in alternative G result in less relative risk for direct

and indirect effects to cultural resources when compared to alternatives B, C, and F, but poses a higher relative risk when compared to alternatives D and E.

Cumulative Effects

Cumulative effects to cultural resources relate to potential effects to National Register-eligible or unevaluated properties resulting from incremental impacts of travel management actions when added to other past, present, and reasonably foreseeable future actions that cause ground-disturbing activities. Cumulative effects for travel management are based upon the boundary of the Gila National Forest and extend about five years into the future.

Since the 1966 National Historic Preservation Act was fully implemented in the 1970s, cultural resource surveys have been conducted and potential effects to cultural resources addressed through consultation between the Gila National Forest, the State Historic Preservation Officer, tribes, Advisory Council on Historic Preservation, and interested public. Future projects occurring on Gila National Forest lands will require appropriate compliance with National Historic Preservation Act including cultural resources inventories and evaluation of effects of the undertaking. If effects are identified, they will be addressed by the Gila National Forest in consultation with the State Historic Preservation Officer and other consulting parties under the Section 106 process of the National Historic Preservation Act. Adverse effects will be minimized through avoidance or mitigation measures, as appropriate.

Past Projects

About 4,389 past projects have occurred on the Gila National Forest dating since the 1970s to July 2013. In addition to routine National Historic Preservation Act compliance, some projects are related to the 1979 Archeological Resources Protection Act, the 1990 Native America Graves Protection and Repatriation Act, or Section 110 of the National Historic Preservation Act including public outreach, monitoring, data recovery plans, excavations, volunteer projects, damage assessments, inventorying collected materials, etc. These types of projects may or may not have affected specific cultural sites located in the current Travel Management Project area. This list of projects represents an overview of the type and 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; gire; land/survey; mining; range; roads; soil/watershed; timber; utilities; and wildlife. Table 203 lists these project types along with some examples of the projects carried out on forest.

Table 203. Types of projects that have occurred on the forest with National Historic Preservation Act compliance since 1980

Project Type	Project Examples
Heritage/Archaeology	Section 110; Para-professional Archeologist Inventory; deferred maintenance; Native America Graves Protection and Repatriation Act; Archeological Resources Protection Act investigations; interpretation; data recovery; Passport In Time; educational outreach; field schools; FOIA searches; damage assessments; special use permits
Fire	Prescribed burns; fire lines; heliport; landing strip; training area; hand lines
Construction and maintenance	Administrative site improvement; building demolition; parking lots; landfill extension
Lands/Survey	Acquisition; exchanges; Forest Service property fence lines
Mining	Exploration; closures/waste removal; abandoned mine lands projects
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 closures and openings; plating; righ-of-way work
Soil/Watershed	Soil Terrestrial Ecosystem Survey; watershed Improvements; water gap fences; channel alignments; groundwater monitoring; well drill pads; spring/seep development
Timber	Tree planting; fuel wood harvest; thinning; timber/salvage sales; vegetation management; Christmas trees
Wildlife	Wildlife studies/improvements; fish structures; enclosures; exclosures
Utilities	Pipelines; phone lines; power lines; fiber-optic cables

The National Historic Preservation Act became law in 1966, but was not fully implemented until the mid-1970s after the passage of the 1974 Archeological and Historic Preservation Act. Ground-disturbing projects meeting the definition of a "Federal undertaking" have gone through Section 106 consultation and compliance since that time. This process formally considers potential effects of the forest's activities on cultural resources, thereby eliminating or reducing the likelihood of cumulative effects.

Forest projects taking place before the 1970s were not required to conduct the type of cultural resource compliance mandated by the National Historic Preservation Act, relying instead on less stringent and less applicable laws like the Antiquities Act of 1906, the Historic Sites Act of 1935, and the Reservoir Salvage Act of 1960. Therefore, projects and activities taking place on the Gila National Forest before the 1970s, and even before the forest was established in 1905, could have impacted cultural resources, including what are now considered historic resources (roads, mines, sawmills, forts, homesteads, etc., over 50 years of age).

Before the implementation of Section 106 of the National Historic Preservation Act, motorized routes were generally created without consideration of cultural resources. This resulted in motorized routes intersecting and overlapping with sites. In some cases, cultural features and artifacts are within the route prism and may have been damaged by vehicular contact or route maintenance. As stated above, these existing routes and their associated constructed features are exempt from further Section 106 compliance and consultation through the TM Protocol (USDA

Forest Service Southwestern Region; New Mexico State Historic Preservation Officer 2007). These direct, indirect and cumulative effects were considered during the development of the TM Protocol.

Activities like grazing, timber harvesting, mineral exploration, installing utilities etc. have been practiced on the Gila National Forest for many years. Before the National Historic Preservation Act, these types of activities had the potential to cause some cumulative effects to cultural sites, including but not limited to erosion and the disturbance of cultural deposits and/or structures. However, since the mid-1970s, these types of activities receive separate and individual consideration as part of Section 106 compliance.

Motorized cross-country travel and motorized dispersed camping have been authorized through the Gila National Forest Plan for decades. These actions have been allowed without specific Section 106 consultation and compliance. Therefore, effects from these actions on cultural resources have gone unchecked. However, through the passage of the Travel Management Rule, motorized cross-country travel is prohibited and motorized dispersed camping will either be eliminated or limited to specific corridors that will require Section 106 consultation and compliance.

The risk analysis completed for motorized dispersed camping and motorized areas during the DEIS supports this discussion. This analysis consisted of a hardcopy search of some 1,019 cultural sites within and outside motorized dispersed camping corridors and motorized areas (Appendix D of Cultural Resources report (USDA Forest Service 2013j) for information on this study). Each site was evaluated based on its site condition at the time of recordation. This analysis includes about 19 percent of all known eligible and unevaluated sites relating to existing site condition. Information from that analysis has not been updated; however, it is still pertinent to this discussion. Several categories of the analysis have been quantified (motorized dispersed camping disturbances, route-site intersections, and Forest Service-authorized activities).

Known cultural sites with existing disturbances from motorized dispersed camping range from 104 sites in alternative B to 54 sites in alternative D; cultural sites that overlap or intersect with a route range from 268 sites in alternative B to 140 sites in alternative D; and sites with disturbances resulting from forest-authorized activities range from 391 sites in alternative B to 184 sites in alternative D (table 204). These disturbances may have occurred before Section 106 of the National Historic Preservation Act was fully implemented.

This information and the fact that Section 106 was not fully implemented until the mid-1970s indicates that past activities may have impacted some cultural resources across the forest, confirming the potential for some cumulative effects from past activities.

Table 204. Number of sites potentially at risk from motorized dispersed camping corridor by alternative*

Type of Disturbance	Alt. B (1,019 sites)	Alt. C (716 sites)	Alt. D (417 sites)	Alt. E (0 sites)	Alt. F (592 sites)	Alt. G (482 sites)
Motorized dispersed camping disturbance	104	82	54	N/A	65	61
Route-site intersections	268	217	140	N/A	184	160
Forest Service authorized	391	294	184	N/A	243	202

*Data from motorized dispersed camping corridor risk analysis from the DEIS (appendix D of cultural resources specialist report)

Current and Reasonably Foreseeable Projects

A list of current and foreseeable projects is provided in the Schedule of Proposed Actions (USDA Forest Service 2013b). These projects will go (or have gone) through Section 106 consultation and compliance using the R3 Heritage Programmatic Agreement before the project is (or was) implemented. Effects to cultural resources will be addressed via the Programmatic Agreement or Section 106 process, with the intent of avoiding or minimizing effects, resulting in determinations of No Effect or No Adverse Effect. Therefore, negative cumulative effects should be reduced or avoided for these projects.

Beneficial Cumulative Effects

As discussed earlier, 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, motorized areas, for motorized big game retrieval, or special use. Vehicles must stay in the confines of routes or corridors for driving; access outside of these routes will be reduced to foot traffic or other authorized access (equestrians, pack animals, special uses, for example).

Under the current condition, motorized cross-country travel is allowed across 2.44 million acres. Approximately 5,346 known sites are found within that space. Prohibiting motorized cross-country travel under any of the action alternatives would be highly beneficial to cultural resources and would reduce ease of access to sites located in areas that do not have designated routes. This would considerably reduce the potential for direct, indirect, and cumulative effects from motorized use. The potential risk of other indirect effects associated with recreational use of NFS lands may be reduced because access would be limited to nonmotorized traffic.

For travel management alternatives C, D, E, F, and G, actions considered new undertakings under the National Historic Preservation Act will go through Section 106 consultation and compliance, before they appear on the motor vehicle use map. These include: motorized dispersed camping corridors, motorized areas, and new route designations like adding unauthorized routes, reopening routes, and motorizing nonmotorized routes. If potential effects to cultural resources are identified, they will be addressed and either eliminated through avoidance or minimized through protection measures or mitigations. Therefore, negative cumulative effects should be reduced or avoided for these actions.

In summary, when the effects of travel management are added to effects of past, present, and reasonably foreseeable projects, there should not be an increase in cumulative effects. In fact, there should be a decrease in negative cumulative effects and an increase in beneficial cumulative effects to cultural resources across the forest. Therefore, under the National Historic Preservation Act, any cumulative effects resulting from travel management are not considered adverse.

Effects of Cultural Resources on Climate Change

Cultural resources on the Gila National Forest include prehistoric and historic sites. Most prehistoric sites consist of habitation remains in the form of pit or masonry dwellings; roasting pits; lithic (stone) and pottery artifact scatters; some agricultural features like check dams; cultural landscapes, etc. The natural degradation of these sites is not known to emit CO_2 or any other greenhouse gases.

Historic sites on the Gila National Forest consist of historic trash dumps; campsites; cabins; buildings; corrals; abandoned mines including features and associated artifacts; roads and trails; water wells; irrigation ditches; check dams; bridges; battle sites; remnants of frontier military forts and camps; Civilian Conservation Corps-associated camps and infrastructure, etc. Abandoned mines include gold and copper mines. These mines are treated and tested for mercury, arsenic, and lead. However, they are not known to emit CO_2 or other greenhouse gasses. The natural degradation of the rest of these site types is not known to emit CO_2 or other greenhouse gasses.

There are instances of unnatural degradation of cultural resources that can emit CO_2 and other greenhouse gasses. In particular, sites with wooden features are sometimes dismantled for use in modern campfires. Sites across the Gila National Forest have been impacted from this kind of vandalism. In addition, wildfires can cause these features to burn. However, the number of sites with this kind of vandalism or wildfire damage is unknown and the measure of CO_2 or other greenhouse gas emissions from these events is unknown.

Cultural resources on the Gila National Forest do not emit CO_2 or other greenhouse gasses to any known degree that would affect climate change.

Effects of Climate Change on Cultural Resources

For the Southwest, climate change models predict increased temperatures, a decrease in overall moisture and a possible increase in destructive flooding into the 21st century (USDA-Forest Service 2010b: 12-14). These changes may also bring about an increased risk of wildfires (USDA-Forest Service 2010b: 17-19). The predictive models have limitations, but are still considered credible when projecting possible climate scenarios (USDA-Forest Service 2010b).

Increases in temperature and decreases in moisture may not affect cultural resources directly. However, loss of vegetation during these events may cause wind- and water-related soil erosion, which may affect prehistoric and historic cultural deposits to varying degrees. An increase in destructive flooding may also affect prehistoric and historic sites located near ephemeral or year-round streams and rivers. Rushing water can cause erosion, move artifacts, affect the integrity of cultural resources, and damage or destroy sites.

Increases in temperature and decreases in moisture may also bring about an increased risk of wildfires in the Southwest. Wildfire may damage or destroy sites that have features or artifacts

that may melt or burn like wood, metal, glass, or plastic. Rock features can crack or spall dependent upon the type of rock and intensity of the fire. Wildfire suppression activities like creating dozer or hand lines may be destructive to cultural resources. These lines may be built in or near cultural resource sites causing damage to features and artifact scatters. These lines can also cause erosion if not properly rehabilitated. Burned trees within sites or near sites may fall causing cultural deposits to become disturbed. Because ground cover is compromised through wildfire, increased flooding and erosion may occur during monsoons. This may promote very similar effects as seen with destructive flooding above.

Effects of Forest Plan Amendments

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the Travel Management Rule.

Social and Economic

This section is a summary of the social and economic report (USDA Forest Service 2013k).

Affected Environment

The Gila National Forest is located in southwestern New Mexico. The forest lies within portions of Catron, Grant, Hidalgo, and Sierra counties. These four counties form the social and economic analysis area. County-level data are used for the social and economic analysis, since reliable demographic and economic data are readily available for counties. All four counties 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 eight times more populous than the least populated county (Catron). Table 205 provides a breakdown of population changes in the study area as well as the state and nation.

Table 205. Population data for study area, New Mexico, and the United States

Area	1980 Census	1990 Census	2000 Census	2010 Census	Change from 2000 to 2010
Catron County	2,720	2,563	3,543	3,725	5.1%
Grant County	26,204	27,676	31,002	29,514	-4.8%
Hidalgo County	6,049	5,958	5,932	4,894	-17.5%
Sierra County	8,454	9,912	13,270	11,988	-9.7%
Total Gila NF Counties	**43,427**	**46,109**	**53,747**	**50,121**	**-6.8%**
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 1980, 1990, 2000, and 2010 Decennial Census

Nearly all of the planning area counties experienced positive population growth rates between 1980 and 2000. However, population decreased between 2000 and 2010 in three of the four counties. Declining populations may be due to an aging population, natural population decrease (deaths exceeding births), and out-migration (individuals leaving the county). In the past decade, 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 in-migration of amenity retirees (Southwest New Mexico 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 206 lists the median age for planning area counties, the state, and the nation in 2010. The table also provides a comparison with the 1990 and 2000 median ages to identify trends.

The populations in Catron and Sierra counties are substantially older than the other planning area counties, the state, and the nation. 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 206. Median age trends, 1990 to 2010

Area	1990 Census	2000 Census	Percent Change (1990 to 2000)	2010 Census	Percent Change (2000 to 2010)
Catron County	37.7	47.8	27%	55.8	17%
Grant County	33.2	38.8	17%	45.9	18%
Hidalgo County	30.7	34.8	13%	40.9	18%
Sierra County	51.1	48.9	-4%	54.5	11%
New Mexico	31.2	34.6	11%	36.7	6%
United States	32.9	35.3	7%	37.2	5%

Source: U.S. Census Bureau, 1990, 2000, and 2010

The racial and ethnic composition of the study area offers context for the social analysis. Table 207 shows the racial and ethnic breakdown of the counties. The majority of residents self-identify as white. 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 207. Racial and ethnic breakdown of study area and New Mexico, 2010

Area	Ethnicity Non-Hispanic	Ethnicity Hispanic	Race White	Race African American	Race American Indian	Race Asian Pacific Islander	Race Other
Catron County	83%	17%	91%	0%	5%	0%	4%
Grant County	52%	48%	75%	1%	2%	1%	22%
Hidalgo County	43%	57%	78%	3%	1%	0%	18%
Sierra County	73%	27%	92%	1%	2%	0%	6%
New Mexico	54%	46%	72%	2%	9%	1%	15%

Source: U.S. Census Bureau, 2012

Note: Ethnicity relates to identification as either Hispanic/Latino or not. Hispanic/Latino individuals may identify as any members of any of the racial groups. The "Other" group includes two or more races.

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 four-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 differing values 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.

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 favor restrictions on 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 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 issued supplemental guidance to assist agencies' compliance (CEQ 1997). The Council on Environmental Quality 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 207 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 2011, the average poverty rate in the planning area was approximately equivalent to the poverty rate of the State (table 208). Among the four counties, the poverty rate varies substantially. In Hidalgo and Sierra counties, approximately one-fifth of the residents live below the poverty rate. The poverty rates in Hidalgo and Sierra 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 208. Per capita income and persons in poverty, 2011

Area	Median household income	Percentage of persons below poverty line
Catron County	$37,857	15.0%
Grant County	$36,925	16.6%
Hidalgo County	$35,532	23.7%
Sierra County	$28,373	20.0%
New Mexico	$44,631	19.0%

Source: U.S. Census Bureau, 2012

All counties in the planning area have median household incomes below the state and nation. The average household income in the four-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.

Employment and Income

The four-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 two 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 (UNM BBER) 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 209 disaggregates total employment to its component parts: private sector, public sector, and the industries within these sectors.

Of these industries, travel management on NFS 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 209. Non-labor income comprises dividends, interest, transfer payments (e.g., Social Security), and rent.

Table 210 identifies the division of labor and non-labor income in planning area counties, the State, and the Nation.

The four-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. Sierra County is 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.

Table 209. County employment by industry

Employment Industry	Catron County	Grant County	Hidalgo County	Sierra County	Total	Percent of Total
Total Private Sector	**761**	**7,674**	**1,476**	**3,430**	**13,639**	**70**
Agriculture, forestry, fishing and hunting	200	216	288	436	1,139	6
Mining	13	745	67	49	874	4
Utilities	7	85	15	40	147	1
Construction	57	770	46	430	1,303	7
Manufacturing	17	148	68	108	342	2
Wholesale trade	35	81	6	7	129	1
Retail trade	100	1,320	264	516	2,200	11
Transportation and warehousing	17	161	56	50	285	1
Information	8	124	80	21	234	1
Finance and insurance	14	318	132	84	548	3
Real estate and rental	32	176	85	54	347	2
Professional, scientific, and technical services	7	236	54	214	511	3
Management of companies	0	198	5	0	202	1
Administrative and waste services	62	212	1	69	344	2
Educational services	3	155	2	3	163	1
Health and social services	90	1,136	73	499	1,798	9
Arts, entertainment, and recreation	29	131	120	108	390	2
Accommodation and food services	50	906	157	413	1,526	8
Other services	22	551	255	329	1,159	6
Total Public Sector	**351**	**3,807**	**766**	**983**	**5,918**	**30**
Grand Total	**1,112**	**11,480**	**2,552**	**4,413**	**19,577**	**100**

Source: Minnesota IMPLAN Group 2009

Table 210. Share of labor and non-labor income

Area	Labor Income (%)	Non-Labor Income (%)
Catron County	45	55
Grant County	46	54
Hidalgo County	56	44
Sierra County	41	59
New Mexico	62	38
United States	65	35

Source: Bureau of Economic Analysis 2010, REIS Table CA30

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 211).

Table 211. Payments in lieu of taxes to the State and local counties for fiscal year 2012

Area	Payment	Total Acres
Catron County	$619,845	2,747,073
Grant County	$1,827,684	1,180,179
Hidalgo County	$728,153	823,734
Sierra County	$1,037,269	1,299,512
Statewide Total	$34,805,383	22,510,418

Source: U.S. Department of the Interior 2013

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 and in P.L. 112-141 (1-year extension through 2012). These laws ensure 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 formed via charter on April 23, 2010. The payments to counties within the administrative boundaries of the Gila National Forest for fiscal years 2008 through 2011 are summarized in table 212.

Table 212. Secure Rural Schools Act, PL 110-343, projected FY 2008–2011 payments

Eligible New Mexico County	Projected Total State or Transition Payment
Catron County	$1,795,796
Grant County	$411,201
Hidalgo County	$18,894
Sierra County	$305,695
Total	$2,512,692

Source: USDA Forest Service 2013a

In 2013, the Forest Service asked states to return a portion of their 2012 secure rural schools payments as a result of the automatic Federal budget cuts known as sequestration. Since the 2012 secure rural schools payments are provisional, they are not reported here.

Environmental Consequences

Assumptions and Methodology

The economic impact analysis uses IMPLAN Professional version 3.0 to estimate changes in employment and income in the four-county analysis area. The National Visitor Use Monitoring survey (NVUM) provides inputs on recreation use by activity type (USDA Forest Service 2012b). In the economic impact analysis, changes in road miles by alternative are used as a proxy for all changes contained in the alternative. Current visitor use data were used to conduct an economic contribution analysis, which estimates the employment and labor income supported by Forest Service activities. For each action alternative, the baseline economic contributions were adjusted using the road miles proxy.

It is not possible to incorporate camping corridor information nor is it possible to evaluate big game retrieval differences with IMPLAN, the economic modeling software. Differences not related to road miles are analyzed qualitatively.

The social and economic specialist report details the economic analysis procedures (USDA Forest Service 2013k).

Economic Modeling Limitations

A change in supply (motorized opportunities) will affect quantity demanded (visitation). However, the precise relationship between opportunities and visitation is uncertain. Given data limitations, an assumption of a linear relationship between motorized opportunities and motorized visitation is least likely to bias the analysis toward either motorized or nonmotorized interests. If we assume a nonlinear relationship, we would need to know how the rate of change in visitation varies across the function (i.e., between current miles and zero). This information is unknown and cannot be ascertained given available resources. The economic modeling, therefore, makes the simplest and most defensible assumption (linearity). The numerical nature of the economic outputs can give a false sense of precision. Therefore, it is appropriate to heavily weigh the qualitative social and economic analysis in the evaluation of tradeoffs. The qualitative analysis emphasizes the mitigating factors that would lessen the economic consequences, such as the prevalence of substitution behavior and the potential increased demand for the services of outfitter guides.

Social Effects of Alternative B (No Action)

Alternative B would not affect firewood gathering or access for mobility-impaired individuals relative to existing conditions. Alternative B would also not affect the traditional and cultural practices of tribes. However, alternative B may affect the quality of life of individuals who value the forest. Individuals who favor unfettered forest access are likely to prefer alternative B. However, individuals who prioritize resource protection and nonmotorized recreation activities would have less support for their values under alternative B compared to the other alternatives. Alternative B would provide the lowest levels of non-market values, such as erosion control. Alternative B would be most likely to cause conflict between motorized and nonmotorized users on the forest, since it has the largest potential for overlapping incompatible uses across the forest.

Alternative B would not disproportionately affect low-income or minority populations, since no social and economic changes are expected relative to existing conditions. Alternative B would not affect the social or economic values related to motorized big game retrieval or motorized dispersed camping on the forest.

Social Effects Common to Alternatives C through G

Firewood Gathering

Eliminating cross-country travel and closing roads to motor vehicle use under all action alternatives may affect how people 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. 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. Therefore, firewood will continue to be accessible for individuals who rely on it to heat their homes. None of the alternatives are expected to compromise contribution of firewood to social and economic well-being.

Access for Disabled and Elderly Populations

Some of the comments received during scoping and on the DEIS indicated that motorized access, both by motorized routes and cross-country travel, are important to them as they are 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. However, there is no legal requirement to allow persons with disabilities to use motor vehicles on roads, on trails, and in areas that are closed to motor vehicle use. Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory. Generally, granting an exemption from designations for people with disabilities would not be consistent with the resource protection and other management objectives of 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).

Economic Impacts to Tribes

The 11 federally recognized tribes identified in chapter 1 (page 7) may also have economic interests in the Gila National Forest. These tribes do not have treaty rights on the Gila National 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 0.5 percent (Hidalgo) to a high of 4.6 percent (Catron), compared to 9.3 percent for the entire State of New Mexico (U.S. Census Bureau 2012).

Because the Gila National Forest is not adjacent to tribal lands and reservations, long drive times are required to access the Gila National Forest. This makes visitation to the forest costly for tribal members (gas, vehicle, motel, food, etc.). This situation would remain essentially unchanged under all alternatives, including existing condition.

Data on local tribal businesses are unavailable; such businesses are not known to contribute to sectors 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. (These have been analyzed as traditional activities under the Cultural and Traditional Practices section, page 449.) Locations of such activities may fluctuate, and have not been specifically identified by tribes. Gathering forest products, such as pinion 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 Gila National Forest by tribal members is generally less frequent than to places closer to existing tribal lands, and would continue to be so. This visitation appears to be more socially and culturally driven, than economically driven. As such, it is important to 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 economic activities as a result of travel management designation are expected to be minor to none. Tribes would 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 (USDA Forest Service 2012c)).

Motorized access to the Gila National Forest lands is the most important aspect for tribal economic activities. Therefore, alternatives that propose more miles or acres of motorized access provide a better opportunity for such activities. There would be no change in motorized access to the Gila National Forest under alternative B. There is potential for minor effects to tribal economic activities under alternatives C through G due to the prohibition of motorized cross-country travel and reduction in route mileage, which reduces motorized access to some locations on the forest. Alternative E is the most restrictive in terms of motorized access, and could have the greatest effects on tribal economic activities. During tribal consultation, no concern was brought forth about economic effects. Therefore, economic impacts are considered to be minor.

Lifestyles, Values, Beliefs, and Attitudes

By limiting motorized access to designated roads and trails, all action alternatives reduce the probability of user conflict due to incompatible uses at sites on the forest. Individuals who value the forest primarily for resource protection and nonmotorized uses are likely to prefer the action alternatives relative to existing conditions. All action alternatives are expected to promote ecological health and provide numerous opportunities for solitude and quiet recreation. Individuals who value the forest primarily for unfettered access for big game retrieval, dispersed camping, and other motorized recreation activities are likely to feel worse off under the action alternatives. However, all alternatives are expected to support a diverse range of activities—including motorized and nonmotorized recreation, firewood gathering, and cultural practices—on the forest. The relationship between these outcomes and routes open to motorized use is uncertain. Alternatives with more motorized opportunities are likely to be preferred by the latter group; however, the precise variation in well-being outcomes between alternatives cannot be assessed given available information.

Economic Effects by Alternative

Economic analysis was conducted using the IMPLAN model with National Visitor Use Monitoring (NVUM) data. 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. The assumption of linearity is least likely to bias the economic impact analysis (table 213). A more detailed economic analysis is available in the social and economic specialist report (USDA Forest Service 2013k).

Table 213. Recreation-related employment and income by alternative

Employment and Income	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Jobs related to motorized recreation activities	73 – 138	68 – 128	47 – 89	37 – 69	53 – 101	53 - 100
Labor income from motorized recreation activities ($000s)	$1,532,501 - $2,884,365	$1,419,096 - $2,670,922	$988,463 - $1,860,415	$769,316 - $1,447,951	$1,117,193 - $2,102,702	$1,107,998 - $2,085,396
Total recreation-related jobs*	279	271	241	226	250	250
Total recreation-related labor income* ($000s)	$5,827	$5,664	$5,043	$4,728	$5,229	$5,216
Percent of total study area employment	1.26%	1.22%	1.09%	1.02%	1.13%	1.13%
Percent of total study area labor income	0.78%	0.75%	0.67%	0.63%	0.70%	0.70%

*Includes motorized and nonmotorized recreation activities. The socioeconomic specialist report contains a breakdown by activity type.

Most of the recreation-related employment occurs in three sectors: accommodation and food services, retail trade, and arts, entertainment, and recreation. The changes in employment and income are relatively minor, particularly within the context of the regional economy. Under all alternatives, the potential changes in employment and income due to travel management are equivalent to less than one-third of 1 percent in the local economy.

While travel management planning may reduce some recreation opportunities on the forest, it also has the potential to increase other recreation opportunities. For instance, outfitters may experience increased business in big game hunting and retrieval from individuals who are unable or unwilling to use nonmotorized means of retrieving big game. Other forest activities, such as hiking and other forms of nonmotorized recreation, may be more attractive to additional users, as conflict with off-road motorized users is less likely with travel management planning. In this analysis, the economic contribution of nonmotorized recreation is held constant across

alternatives. For these reasons, the differences in recreation-related employment and income between alternative B and the action alternatives are likely overstated.

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 individuals who use the forest for these purposes.

Environmental Justice

While the share of low-income individuals in the communities surrounding the Gila National Forest is greater than the share of low-income individuals in 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" portion of the affected environment section, approximately half of the homes in Catron County rely on wood as the primary heating source. Like all counties in the planning area, 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 designating 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 expected to mitigate any potentially adverse effects on low-income individuals who depend on firewood from the forest.

Cumulative Effects

The spatial scope for the social and economic cumulative effects analysis is Arizona and New Mexico, since recreation opportunities in this area may serve as substitutes. The temporal scope for the social and economic cumulative effects analysis extends from 2005 (the introduction of the Travel Management Rule) through the reasonably foreseeable future (approximately 10 years). 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. The reduction in motorized opportunities on public lands throughout the region may deteriorate the quality of the recreation experience for motorized users and limit opportunities for recreating at alternate sites. These actions may cause a shift toward nonmotorized recreation and change the relative contributions of motorized and nonmotorized recreation to local economic activity beyond what is estimated in this analysis. The selection of any of the action alternatives reduces cross-country access. However, the range of alternatives provides an array of motorized travel opportunities.

Effects of Forest Plan Amendments

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the forest plan with the Travel Management Rule.

Cultural and Traditional Practices - Tribes

This section is a summary of the cultural resources report (USDA Forest Service 2013j).

Certain tribes have cultural and geographical ties and knowledge about the lands now managed by the Gila National Forest. These include the Pueblo of Acoma, Alamo Navajo Chapter, Fort Sill Apache Tribe, The Hopi Tribe, Pueblo of Laguna, Mescalero Apache, The Navajo Nation, Ramah Navajo Chapter, San Carlos Apache, Ysleta Del Sur Pueblo, and Pueblo of Zuni.

The Gila National Forest does not manage any tribal lands, and is not located adjacent to any tribal lands (trust, reserved, or allotted). In addition, there are no tribal treaty rights on the Gila National Forest. Instead, tribal members sometimes visit the forest to gather traditional resources, engage in traditional activities, 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.

Traditionally, tribes with an interest in the Gila National Forest are:

1. Those descended from, or having cultural affiliation with prehistoric indigenous occupants of Gila National Forest lands (USDA–Forest Service Southwestern Region 1996);
2. Those who historically occupied lands now comprising the Gila National Forest (prior to establishment of the Gila National Forest in 1905); or
3. Both of the above.

Tribes have expressed these ancestral connections to land now administered as the Gila National Forest. Certain tribes identified the presence of unspecified locations on the Gila National Forest for origin stories, ceremonies, rituals, important hunting areas, clan origins, prehistoric affiliations, oral history, and shrines, representing current or past tribal traditions and land uses.

Concerns expressed by tribes in government-to-government travel management consultation include the need for access to unspecified or very general areas on the Gila National Forest for plant gathering and other traditional activities. Concern was also expressed about ATVs damaging the forest and impacting sites. No specific areas were identified (newly proposed ATV trails are analyzed within the Effects from Motorized Routes within Effect on Cultural Resources section of this report). No sacred sites or traditional cultural properties have been identified as being affected by the Travel Management Project, and no tribal concerns have been expressed about specific routes, motorized areas, motorized big game retrieval, or motorized dispersed camping corridors. Although general areas were identified for traditional use, these were not specific enough to assist in developing travel management alternatives.

Because the Gila National Forest is large, rural, and isolated, tribal members use its lands on an intermittent or occasional basis. Some tribes affiliated with the Gila National Forest's land base are now located a great distance from the Gila National Forest due to historic and prehistoric migrations and events. Current information on tribal land use suggests that it is widely dispersed and relatively low in frequency across a large area. This is supported by the few, non-specific tribal comments and concerns provided to the Gila National Forest for the Travel Management Project and other projects. However, this does not mean that tribal activities do not occur on the Gila National Forest or that such activities are not culturally important. Similarly, it does not mean that any potential sacred site or traditional cultural properties located on Gila National Forest lands are less important. Cultural ties to the Gila National Forest continue to be important to tribes.

Effects Analysis

Motorized cross-country travel is prohibited in all action alternatives. While nonmotorized travel including hiking, horseback riding, and use of pack animals may continue to be used by tribes to access important areas for traditional activities, it is not known if tribes typically access these areas in these nonmotorized ways. Overall, the prohibition of motorized cross-country travel and reduction of other motorized access may affect tribal land use on the Gila National Forest.

Travel management effects analysis for tribal land uses centers upon the ability of tribes to continue their traditional activities within the Gila National Forest and the potential risk of any effects to potential sacred sites or traditional cultural properties. The ability of tribes to continue their traditional activities may be negatively affected with the prohibition of motorized cross-country travel and, as proposed miles/acres of routes, motorized dispersed camping, motorized big game retrieval, and motorized areas are reduced per alternative. However, potential sacred sites or traditional cultural properties may be positively affected by these reductions.

While no potential sacred sites or traditional cultural properties were identified as being affected by the Travel Management Project through consultation, there is a chance that not all sacred sites or traditional cultural properties are known to the Gila National Forest. Travel management could have potential direct and indirect effects to these properties. These may include, but are not limited to, routes bisecting the property and the introduction of noise to traditional gathering areas or during other traditional activities. The reduction of miles and acres through closure of routes and prohibition of motorized cross-country travel may decrease motorized access to specific areas on the forest for tribal activities including ceremonies and traditional gathering areas. The effects associated with the inability to perform ceremonies or gather traditional materials are unknown but could be quite substantial. However, Tribes would still be able to continue these important traditional activities on the Gila National Forest. The forest would accommodate access for such activities under E.O. 13007, the 1978 American Indian Religious Freedom Act, and 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 (USDA Forest Service 2012)) and special use authorizations.

Beneficial effects from the closure of routes and the prohibition of motorized cross-country travel to potential sacred sites and traditional cultural properties may include, but are not limited to, a reduction in noise, route-property intersections, and interruption of traditional activities. These beneficial effects will increase as the number of acres proposed for motorized dispersed camping corridors, motorized big game retrieval, motorized areas, and miles of routes decrease.

Alternative B provides the maximum potential of motorized access to NFS lands through motorized cross-country travel. This action allows motorized use on 2.44 million acres. All other alternatives prohibit motorized cross-country travel (except for motorized big game retrieval and administrative use/ written authorization) limiting potential direct and indirect effects to potential sacred sites or traditional cultural properties. Therefore, alternative B would allow the most access to tribes for traditional activities and, therefore, the least relative risk of effects for these activities. However, alternative B would also have the highest relative risk of direct and indirect effects to any potential sacred sites or traditional cultural properties.

Changes presented in alternative C result in the most mileage for routes, the greatest acreage for motorized dispersed camping corridors, the greatest distance for motorized big game retrieval, and motorized areas of all action alternatives. Because of the prohibition of motorized cross-country travel, alternative C would provide less access to tribes for traditional activities than alternative B, but more access than all other action alternatives. Therefore, alternative C would provide the second lowest relative risk of effects to traditional activities. Outside of alternative B, alternative C provides the highest relative risk of direct and indirect effects to potential sacred sites and traditional cultural properties.

Changes presented in alternative D result in the second least potential risk for direct and indirect effects to potential sacred sites and traditional cultural properties. Alternative D proposes fewer route miles/acres, less acreage for motorized dispersed camping and motorized big game retrieval than seen in alternative B or proposed in alternatives C, F, and G. Alternative D does not propose any motorized areas, unlike alternatives C, F, and G. This means alternative D provides a lower relative risk of direct or indirect effects to potential sacred sites or traditional cultural properties when compared to alternatives B, C, F, and G. This also means that alternative D provides the second lowest motorized access to Tribes for traditional activities. Therefore, there is a higher relative risk of potential effects to traditional activities when compared to alternatives B, C, F, and G.

Changes presented in alternative E result in the least potential for direct and indirect effects to potential sacred sites or traditional cultural properties of all alternatives. Alternative E proposes the lowest number of miles/acres for routes, no motorized dispersed camping corridors, no motorized big game retrieval, and no motorized areas. Alternative E provides the lowest relative risk to potential sacred sites or traditional cultural properties when compared to all other alternatives. Alternative E provides the lowest number of miles/acres of Gila National Forest lands for motorized access to tribes for traditional activities. Therefore, this alternative provides the highest relative risk of potential effects to traditional activities when compared to all other alternatives.

Alternative F proposes less mileage/acreage for routes than seen in alternative B or proposed in alternative C; comparable to alternative G; and more than alternatives D and E. Alternative F proposes less motorized dispersed camping acreage than seen in alternative B or proposed in alternative C and more than alternatives D, E, and G. Alternative F proposes less motorized big game retrieval acreage than seen in alternative B or proposed in alternative C, and more than alternatives D, E, and G. Alternative F proposes the same acreage of motorized areas as do alternatives C and G. Changes presented in alternative F result in less relative risk of direct and indirect effects to potential sacred sites or traditional cultural properties when compared to alternatives B and C, but a higher relative for risk when compared to alternatives D, E, and G. Changes presented in alternative F result in a higher potential risk of effects to tribal traditional

activities when compared to alternatives B and C, but a lower relative risk when compared to alternatives D, E, and G.

Alternative G proposes less mileage/acreage for routes than seen in alternative B or proposed in alternative C; comparable to alternative F; and more than alternatives D and E. Alternative G proposes less motorized dispersed camping acreage than seen in alternative B or proposed in alternatives C and F ; comparable to alternative D; and more than alternative E. Alternative G proposes less motorized big game retrieval acreage than seen in alternative B or proposed in alternatives C or F; comparable to D; and more than alternative E. Alternative G proposes the same acreage of motorized areas as do alternatives C and F. Changes presented in alternative G result in less relative risk for direct and indirect effects to potential sacred sites and traditional cultural properties when compared to alternatives B, C, and F, but poses a higher relative risk when compared to alternatives D and E. Changes presented in alternative G result in a higher potential risk of effects to tribal traditional activities when compared to alternatives B, C, and F, but a lower relative risk when compared to alternatives D and E.

Tribes will have access to Gila National Forest lands for traditional activities like ceremonies and gathering areas under applicable laws, regulations, and Forest Service policies.

Cumulative Effects

As described in the Cumulative Effects section for Cultural Resources, there have been many past projects on the forest. Some of these projects were performed prior to the full implementation of the National Historic Preservation Act in the mid-1970s. Therefore, there is some potential for cumulative effects to both potential sacred sites or traditional cultural properties and tribal traditional activities.

A list of current and foreseeable projects is provided in the Schedule of Proposed Actions (USDA Forest Service 2013b). These projects will go (or have gone) through Section 106 tribal consultation and compliance using the R3 Heritage Programmatic Agreement before the project is (or was) implemented. Through this, tribes have been given the opportunity to provide comments and concerns on projects that could affect potential sacred sites or traditional cultural properties and traditional activities. When tribes provide such concerns, these effects have been or will be addressed via the Programmatic Agreement or Section 106 process, with the intent of avoiding or minimizing effects to historic properties (including traditional cultural properties). Sacred sites and ceremonial uses are also protected under American Indian Religious Freedom Act, E.O. 13007, and other laws, legislation, and policy. Therefore, negative cumulative effects should be reduced or avoided for these projects.

Concerns expressed by tribes in government-to-government travel management consultation include the need for access to unspecified and very general areas on the Gila National Forest for plant gathering and other traditional activities. However, specific areas, routes, or corridors were not identified. Tribes will have access to Gila National Forest lands for traditional activities like ceremonies and gathering areas as noted above.

No sacred sites or traditional cultural properties have been identified as being affected by the Travel Management Project. There is a chance that the Gila National Forest has not been provided with this information. Therefore, there would be a slight risk for effects to potential sacred sites and traditional cultural properties.

In summary, when the effects of travel management are added to effects of past, present, and reasonably foreseeable projects, there should not be an increase in cumulative effects. In fact, there should be a decrease in negative cumulative effects to potential sacred sites or traditional cultural properties and traditional activities across the forest. Therefore, any cumulative effects are not considered adverse.

Short-term Uses and Long-term Productivity

The change in driving on NFS 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 motorized routes, corridors for motorized dispersed camping and motorized big game retrieval, and areas present a risk of introduction, establishment and spread of invasive plants and invasive aquatic species to new locations.

Designating unauthorized routes may 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.

The forest determined that the proposed project may affect and is likely to adversely affect the Chiricahua leopard frog (*Lithobates [=Rana] chiricahuensis*) and its designated critical habitat, Gila trout (*Oncorhynchus gilae*), loach minnow (*Tiaroga cobitis*) and its designated critical habitat, and Mexican spotted owl (*Strix occidentalis lucida*) and its designated critical habitat, and spikedace (*Meda fulgida*) and its designated critical habitat. Per the biological opinion, the action, is neither likely to jeopardize the continued existence of the Chiricahua leopard frog, Gila trout, loach minnow, Mexican spotted owl, and spikedace, nor likely to destroy or adversely modify their designated critical habitat (USFWS 2013).

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 alternatives (C through G):

- All action alternatives propose an increase in miles of routes, ranging from 5 to 94 miles. While however minor the proposals are, and considering that none of these new routes

are located in riparian areas, wetlands areas, or adjacent to perennial, intermittent, or impaired waters, there would still be disturbance to and commitment of the soil resource. This disturbance may or may not be irreversible or irretrievable, depending on: (1) conditions of the route when traveled (wet or dry); (2) the amount of compaction created; (3) associated loss of soil productivity; and (4) related sediment losses or erosion created from the new route. Soil could be irretrievably lost and carried down the watershed, resulting in on-site loss of soil productivity. Compacted soils could take decades to improve soil properties, and while not irreversible, would be considered a long-term impact. Site-specific evaluation would be appropriate during establishment of these new routes to insure that mitigation measures or best management practices are in place to minimize the effects to the soil resource from such irreversible and/or irretrievable losses.

- There is a very small risk of irreversible commitment of cultural 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. 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.
- There is a very small risk of irreversible commitment of cultural resources in alternatives where motorized dispersed camping corridors, motorized areas, and newly proposed route designations are proposed. This risk is relative to the number of miles or acres proposed by each alternative. Alternative E would pose the least risk; alternative D would provide a slightly more risk than alternative E; alternative G would have slightly more alternative D; alternative F would have a slightly more risk than alternative G; and alternative C would provide the most (similar to the existing condition). All of these actions require Section 106 consultation and compliance. Through this process, direct and indirect effects to cultural resources will be or have been assessed and potential adverse effects mitigated or avoided as appropriate. This will greatly reduce the likelihood of any irreversible commitments of cultural resources.

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

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 (retired), 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.

Debby Hyde-Sato – Forest NEPA Coordinator (retired), 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.

Patti Johnston – Recreation Program Leader, USDA Forest Service, Nez Perce-Clearwater National Forests (NF) on detail to Region 3. Education: BS Agricultural Business Mgt Cal Poly State Unv, Range Mgt classes New Mexico State University. Experience: 31 years with Forest Service in Regions 1, 3 and 6 including seasonal time as a Trail Crew Supervisor on Eagle Cap RD Wallowa Whitman NF; Range technician on Glenwood RD Gila NF; and wilderness ranger on Wilderness RD Gila NF and full-time as Range Conservationist Reserve RD Gila NF 4 years, Resource Assistant Rocky Mtn RD Recreation and Trails, Lewis and Clark NF 15 years, Recreation Specialist Wisdom/Wise River RDs Beaverhead-Deerlodge NF 5 years, Recreation and Trails Program Leader Flathead NF 2 years, and Recreation, Wilderness, Trails, and Wild and Scenic Rivers Program Leader Nez Perce-Clearwater NF 2 years.

Delilah (Jordahl) Jaworski - – Social Scientist, USDA Forest Service, TEAMS Enterprise Unit. Education: B.A. Middle Eastern Studies with a minor in history, The George Washington University; M.S. Environment and Development, The London School of Economics. Experience: social scientist with TEAMS Enterprise Unit 2010 to present; social scientist with Bureau of Land Management 2008 to 2010.

Annette Joseph – Range Program Manager, USDA Forest Service, Gila National Forest. Education: B.S. Range Science and B.S. Animal Science, New Mexico State University, 1982. Experience: range program manager 2009 to present, rangeland management specialist 1982 to 2009, rangeland management specialist trainee 1978 to 1981 (other Forest Service experience: NEPA resource planner 2001 to 2002).

Erin Knolles – Assistant Forest Archaeologist, USDA Forest Service, Gila National Forest. Education: BA in Anthropology. Experience: 10 years of archaeological fieldwork; literature, record and archive searches; and report writing. Assistant Forest Archaeologist on the Gila NF (2009 to present).

Carolyn Koury – Hydrologist, USDA Forest Service, 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; hydrologist on Apache-Sitgreaves National Forests, 1998 to 2002; hydrologist trainee on Apache-Sitgreaves National Forests 1994 to 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 to 1999) and San Bernardino (1999 to 2003) National Forests. Interdisciplinary planner and assistant NEPA coordinator (2003 to 2011) and environmental coordinator (2011 to present) on the Gila National Forest, assisting, reviewing, and team leading various forest projects. Forest travel management coordinator since November 2005.

Jerry A. Monzingo – Wildlife, Fish and Rare Plant Program Manager/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 9 years, fishery biologist, Gila National Forest 8 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 21 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 to 2006.

Arthur Telles, Jr. – Wildlife Biologist, USDA Forest Service, Gila National Forest. Education: B.S. in Wildlife Science and Fishery Science. Experience: 24 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 (8 years), and forest natural resources staff officer (1 year).

Teresa Smergut – Range Management Specialist, USDA Forest Service, Gila National Forest. Education: B.S. Eastern Oregon State University; M.S. Rangeland Management, Oregon State University. Experience: range, wilderness, trails writer editor Wallowa Valley Ranger District, Wallowa Whitman National Forest 1993 to 1998; range specialist for Bureau of Land Management Vale District, Oregon, 1998 to 2001; District Range Program Manager 2001 to 2010, Wallowa Valley Ranger District and Hell's Canyon National Recreation Area; Gila NF Range Program Manager since 2011. Experience: rangeland monitoring/ analysis/ program management; ESA consultation;

NEPA coordination, planning and technical writing.

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 NF (2006 to present); wildland firefighter 9 years.

List of 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.

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 Forest Service in 2000.

Amanda Gehrt – District Wildlife Biologist, USDA Forest Service, Gila National Forest, Quemado Ranger District. Education: B.S. Comprehensive Biology: wildlife; natural resources. Minor: geography. Experience: District wildlife biologist, Quemado RD, Gila NF (2010 to present); biological science technician, Gila National Forest, 2009 to 2010; farm planner/habitat restorations, Snohomish Conservation District, Lake Steven, WA, 2006 to 2009; soil conservation technician, Natural Resources Conservation Service, Loup City, NE, 2003 to 2006.

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: 12 years in habitat and endangered species management, consultation, NEPA writing and reviewing, inventory and monitoring Mexican spotted owl, northern goshawk, and Chiricahua leopard frog; 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.

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.

Matthew Taliaferro – Archaeologist, USDA Forest Service, Gila National Forest. Education: B.A. Anthropology; M.A. Anthropology; Ph.D. (ABD) Anthropology. Experience: ten years of Section 106 and 110 CRM work in the southern United States, geographic information sciences, peer-review process, lithic analysis, ceramic analysis, drafting, report writing, etc. With the Forest Service since 2010.

John Titre – Forest Planner, USDA Forest Service, Gila National Forest. 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.

Elizabeth Toney – Assistant South Zone Archaeologist, USDA Forest Service, Gila National Forest. Education: B.A. Anthropology. M.A. Anthropology. Experience: 8 years working in cultural resource protection and preservation in both the public and private sector. Specific responsibilities have included: Section 106 consultation, public outreach, GIS modeling, cartography, and database management, fieldwork (excavation and survey), records and archival research, professional publications, specialist research (lithic analysis, ethnobotanical analysis, and exploratory electron microbeam analysis), and general report writing. Assistant South Zone Archaeologist on the Gila NF since 2010.

Bob Schiowitz – South Zone Archaeologist, USDA Forest Service, Gila National Forest. Education: B.A. Cultural Anthropology/Archaeology. Experience: 35 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, Gila National Forest. 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 and recovery action implementation, consultation, NEPA writing and reviewing with the Forest Service since 2008.

Laura Vallejos – Silviculturist, USDA Forest Service, Gila National Forest. 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.

Cooperating Agencies

Grant County Commissioners
Hidalgo County Commissioners
Sierra County Commissioners

Tribes

Pueblo of Acoma
Alamo Navajo Chapter
Fort Sill Apache Tribe
The Hopi Tribe
Pueblo of Laguna
Mescalero Apache
The Navajo Nation
Ramah Navajo Chapter
San Carlos Apache
White Mountain Apache
Ysleta Del Sur Pueblo
Pueblo of Zuni

List of Agencies, Organizations, and Persons to Whom Copies of the FEIS Were Sent

This final 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 FEIS include:

Advisory Council on Historic Preservation
Air Quality Bureau
Apache-Sitgreaves National Forests
Bureau of Land Management
Catron County Commissioners
Cibola National Forest
Coronado National Forest
Environmental Protection Agency, Region 6
Federal Aviation Administration
Federal Highway Administration
Grant County Commissioners
Grant Soil and Water Conservation District
Hidalgo County Commissioners
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
Sierra County Commissioners
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 6thlevel (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 or written authorization 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, FSM 7705). New Mexico Department of Motor Vehicle legislative definition includes all of the above and having an unladen dry weight of 1,000 pounds or less.

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 106 of the National Historic Preservation Act requires that a Federal agency consult with the State Historic Preservation Officer, Indian tribes, and other interested parties. Programmatic agreements are in place with State Historic Preservation Officer describing the process for Section 106 consultation.

Control – With respect to invasive species (plant, pathogen, vertebrate or invertebrate species), control is defined as any activity or action taken to reduce the population, contain, limit the spread, or reduce the effects of an invasive species (FSM 2900).

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.

Eradication – With respect to invasive species (plant, pathogen, vertebrate or invertebrate species), eradication is defined as the removal or elimination of the last remaining individual invasive species in the target infestation on a given site. It is determined to be complete when the target species is absent from the site for a continuous time period (that is, several years after the last individual was observed) (FSM 2900).

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 (23 U.S.C. 101; 36 CFR § 212.1; 36 CFR § 251.51; 36 CFR § 261.2; FSM 7705).

Forest Transportation System. The system of National Forest System Roads, National Forest System Trails, and airfields on National Forest System lands (36 CFR 212.1, FSM 7705).

Highway-legal vehicles – Any motor vehicle that is licensed or certified under state law for general operation on all public roads within the State. Operators of highway-legal vehicles are subject to state traffic law, including requirements for operator licensing (FSM 7705, FSH 7709.56.40.5).

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 – A species that is nonnative (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human, animal, or plant health (Executive Order 13112).

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 – Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria. (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:
    0.1 Discourage or prohibit passenger cars, or
    0.2 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 (MUTCD) 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. Management indicator 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 – Any vehicle that 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, 36 CFR 261.2, FSM 7705, FSH 2309.18.05).

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.

Motorized Mixed Use. Designation of a National Forest System road for use by both highway-legal and non-highway-legal motor vehicles (FSM 7705).

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 (NFSR) – 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, 36 CFR 251.51, 36 CFR 261.2, FSM 7705, FSH 7709.56.40.5).

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 probable 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, FSM 7705).

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) – Motorized trails designated for motorcycles.

Traditional cultural properties (TCP) – 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 forest road or trail or a temporary road or trail and that is not included in a forest transportation atlas (36 CFR § 212.1, FSM 2353.05, FSM 7705).

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.

Wheelchair – Mechanically operated or power-driven device designed primarily for use by an individual with a mobility disability for the main purpose of indoor or both indoor and outdoor locomotion (ADA Part 35.104). This definition does not apply to Federal Wilderness Areas; wheelchairs in such areas are defined in section 508(c)(2) of the ADA, 42 U.S.C. 12207(c)(2).

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.

Wilderness study areas (WSA) – One of the areas selected by Congress from an inventory of unroaded and undeveloped National Forest System lands as having apparent high qualities for wilderness. They will be studied to determine whether they should be recommended for addition to the National Wilderness Preservation System (USDA Forest Service 1986).

Written authorizations – A written document that authorizes specific activities; may be a permit, letter, or other written document.

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