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Environmental Assessment for Zuni Mountain Trails

Mt. Taylor Ranger District
Cibola National Forest

McKinley and Cibola Counties

Forest Service Cibola National Forest Mt. Taylor Ranger District June 2015

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1. Purpose of and Need for Action

The Mt. Taylor Ranger District of the Cibola National Forest and National Grasslands proposes to develop a mountain biking trail system in the Zuni Mountains. The proposed action includes:

- ◊ Adding 62 miles of unauthorized route to the system as mountain bike trails in the Zuni Mountains;
- ◊ Constructing 119 miles of new mountain bike trails;
- ◊ Developing six trailheads to serve the designated trails; and
- ◊ Improving watershed conditions by eliminating access to 132 miles of unauthorized routes.

This environmental assessment has been prepared to determine whether effects of the proposed activities may be significant enough to prepare an environmental impact statement. By preparing this environmental assessment, we are fulfilling agency policy and direction to comply with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. For more details of the proposed action, see the "Alternatives Including the Proposed Action" section of this document on p. 9.

Location of the Proposed Project Area

The proposed activities are located in the Zuni Mountains within the District, located south of Interstate 40 (I-40) between Gallup and Grants, New Mexico (Appendix A – General Location). Activities are proposed only for NFS lands managed by the District and do not include private in-holdings.

Background

In 2000, Adventure Gallup & Beyond and other trail advocates in McKinley County created a challenging trail network outside the National Forest System (NFS) boundary that has been drawing additional mountain bikers to the Gallup, New Mexico, area. Quickly, this increased use spilled over onto the adjacent Cibola National Forest, resulting in an increase in unmanaged and unauthorized mountain bike use.

To address this increasing unauthorized mountain bike use, the Zuni Mountain Trail Partnership (ZMTP) was formed with local county and non-profit organizations. The objective of the ZMTP is to work with the Cibola National Forest to expand mountain bike opportunities, incorporate sustainable design criteria, and maintain the trail system, using youth crews, grant sources, and local funding commitments. Collaboration between ZMTP and the US Forest Service has resulted in the development of 26 miles of NFS trails managed for hikers and mountain bike use, as well as the construction of the Hilso Trailhead to service these trails.

The popularity of mountain biking in the Zuni Mountains has quickly outpaced the capacity of the existing trail network. Increased demand for mountain bike trails in the Zuni Mountains has led to the development of unauthorized trails and informal parking areas. In addition, a century

of cross-country motorized travel has left the Zuni Mountains scarred with numerous unauthorized travel routes.

Need for the Proposal

The purpose of this project is to improve soil and watershed conditions, while providing dispersed recreation opportunities. There is a need to establish an official trail system to allow for improved management of the area and protect resources. The proposed action responds to the goals and objectives outlined in the *1996 Amended Cibola National Forest Land and Resource Management Plan* (ALRMP), and helps move the project area towards desired conditions described in that plan.

Forest Plan Direction

The *1996 Amended Cibola National Forest Land and Resource Management Plan* (ALRMP) contains management prescriptions that help to define the mission, goals, and objectives for the Cibola National Forest (USFS 1996). Guidelines and desired conditions for recreational development include evaluation of compatibility with other resources and activities, such as grazing, other recreational opportunities, riparian areas, soil, and wildlife. Recreation developments are to be evaluated to achieve compatibility with the effects on surrounding communities, as well as prehistoric and historic resources (USFS 1996). The ALRMP goal for watershed resources is to improve and maintain soil productivity and condition of watersheds and riparian areas (USFS 1996).

The proposed trails pass through Management Areas 8, 13, 14, and 18. The management emphasis for these areas includes increasing opportunity for dispersed and developed recreation through new construction and rehabilitation of existing facilities (USFS 1996:117, 158, 163). Development of the proposed mountain bike trail system is consistent with the goals and objectives outlined in the ALRMP and would help move the project area towards the desired conditions described in the ALRMP.

Watershed standard and guidelines for Management Area 8, 13, 14, and 18 for road management activities includes obliterating poorly located and poorly constructed roadways to improve watershed condition and reduce soil loss (USFS 1996:124, 160, 170, 197). In Management Area 14, maintenance and protection of sensitive soils is an important management objective (USFS 1996:163).

Trail Designation and Construction

Currently the District offers 28 miles of stacked loop mountain bike trails, serviced by the Hilso and Strawberry Canyon Trailheads located at the western end of the District. There is an increasing public demand for a high-quality and challenging network of mountain bike trails. As more and more recreationists move off system trails, they tend to follow wildlife or cattle trails or travel cross-country, which results in the creation of unauthorized routes. Some of these unauthorized routes cross into sensitive or impaired areas, impacting watershed resources and wildlife habitat or mountain meadows, or trespass onto private land.

As a result of unmanaged use, the western end of the District contains numerous miles of known unauthorized routes. The location of some segments of these routes is resulting in soil

loss/erosion. Repeated braking and sliding by mountain bikes, for example, loosen track surfaces, displace soil down slopes, and create ruts in the trail. Tire tracks are continuous and can form ruts through which water flows, exacerbating erosional losses (Davies and Newsome 2009). Further, as the use of the area has increased, two informal parking areas or pull-offs have developed along New Mexico Highway (NM) 400 and NFS Road 50, from which additional unauthorized routes have been created. Unmanaged recreation jeopardizes the health of National Forests, the quality of recreation experiences, and essential ecosystem functions (Brooks and Champ 2006).

Environmental damage can be minimized with appropriate trail siting, design, and management. Trails can be built on proper soils to resist erosion and so that water drains off in a non-erosive manner (Davies and Newsome 2009).

The ALRMP guides evaluation of compatibility of trail development with other resources. Proper design and placement of trails would help to minimize resource damage. Trails should avoid sensitive soils, threatened and endangered species critical habitat and foraging areas, and prehistoric and historic cultural sites. The opportunity exists to improve soil and watershed conditions by rehabilitating unauthorized trails, relocating them using sustainable trail design criteria. Establishment of an official trail system for mountain bike use and related developments would allow for improved management of the area and protection of resources.

Trailhead Development

The Hilso and Strawberry Canyon Trailheads provide access to the 28 miles of mountain bike trails at the western end of the District and can accommodate up to 12 vehicles. There are popular parking spots where mountain bikers park their vehicles along NM 400, near Milk Ranch Canyon and at Twin Springs, along NFS Road 50. This has created two unimproved parking areas and has encouraged the development of additional unauthorized bike routes. In addition, two designated parking areas are located in the central and southeastern parts of the Zuni Mountains. One parking area, near Bluewater Creek, provides bathroom facilities and parking. The other parking area, Quartz Hill, provides parking for about six vehicles and contains no bathroom facilities. The opportunity exists to develop access points and parking with appropriate facilities designed to support current and future use of the trail system, while ensuring compatibility with other resources, consistent with the ALRMP.

Watershed Improvement

A century of cross-country motorized travel has left the Zuni Mountains scarred with numerous unauthorized travel routes. Use of these routes has contributed to loss of soil productivity and sedimentation. This has resulted in environmental degradation, including loss of soil productivity and sedimentation, wildlife habitat fragmentation, as well as impacts to heritage resources, scenic quality and recreation settings. The opportunity exists to improve these conditions by rehabilitating unauthorized routes.

Public Involvement and Issues

Public Scoping

The district carried out a series of public outreach activities during initial scoping for this project. Three open houses were conducted as follows: October 29, 2012, in Grants at the Northwest New Mexico Visitor's Center; November 5, 2012, in Gallup at the Gallup Community Service Center; and November 7, 2012, in Ramah at the Ramah Middle/High School. News releases were published in the *Cibola County Beacon* and the *Gallup Independent*. The project has been posted on the Cibola National Forest and National Grasslands' Schedule of Proposed Actions since January 1, 2013. A second clarifying scoping letter was mailed on December 12, 2012, which further explained the Proposed Action, requested public input regarding the Proposed Action, and extended the public comment period.

Tribal Consultation

The Cibola National Forest and National Grasslands routinely consults with seven American Indian tribes that historically used, and may continue to use, the NFS lands managed by the District for traditional cultural purposes and that attach cultural and religious significance to locations on these lands. The tribes and chapters include: the Pueblos of Acoma, Laguna, Zuni, Jemez, and Santa Ana; the Hopi Tribe; and the Navajo Nation. At the request of the Navajo Nation, the Cibola National Forest also consults with the following Chapters: Ramah, To'Hajiilee, Thoreau, Baca/Prewitt, Casamero Lake, Crownpoint, Smith Lake, Mariano Lake, Whitehorse Lake, Ojo Encino, and Torreon. The Cibola National Forest and National Grassalnds began consultation with the Pueblo of Santa Ana in 2014, based on a request from the pueblo.

The Forest has been engaged in consultation and communication with the tribes for the past several years regarding this project. Project consultation pursuant to Section 106 of the National Historic Preservation Act was initiated in 2010, listed in the Cibola National Forest's annual project consultation letter. The project description was updated in the Forest's 2013 annual project consultation letter and again in 2014. As planning progressed and more details regarding the action alternatives became available, updated project maps were provided to those tribes that requested ongoing consultation.

The Hopi Cultural Preservation Office indicated its support for dedicated-use trails, as opposed to multiple use trails. There was a concern raised about potential impacts to Golden Eagle nests, and a request that the trail construction be planned to avoid critical time periods such as the mating and hatching season. The Pueblo of Acoma expressed its support for the rehabilitation of some routes, and urged the Forest to consider the potential effects of creating new bike trails.

The Pueblo of Jemez noted its historical connection to the Zuni Mountains and noted that the increase in trail use could increase the likelihood that cultural activities could be disrupted. The Pueblo of Laguna confirmed its use of the Zuni Mountains for certain cultural activities. At the Pueblo's request, the Forest provided a map showing the location of routes proposed for rehabilitation relative to the stands of Douglas fir. The Pueblo consulted with its Cultural Committee to determine if the rehabilitation of specific routes would limit their accessibility to collection areas, or if any of the proposed trails or trailheads might present a problem when the practitioners need privacy for certain cultural activities. The Pueblo indicated that the proposed rehabilitation of some routes would not impact their traditional activities. The Pueblo also

requested that the Forest Service avoid cutting down any Douglas fir during project implementation (trail and trailhead construction and rehabilitation activities). Lastly, the Pueblo encouraged the Forest to consider designing and rerouting the trails around clusters of sites, instead of focusing on avoidance of sites individually.

As mentioned above, scoping began in 2012; this scoping included the tribes and chapters. The Navajo Nation responded, stating that the proposed undertaking/project area may impact Navajo traditional cultural resources, and that the tribe had concerns.

To date, two tribes that regard the Zuni Mountains as culturally significant have expressed concern about the project. Both the Pueblo of Zuni and the Navajo Nation use the Zuni Mountains for a variety of traditional cultural and religious activities. The Pueblo of Zuni has expressed concern that providing the public with greater access to areas of cultural importance would have unanticipated effects, such as impacts to practitioners' ability to conduct cultural activities in private and potential disturbance to sites of cultural significance. The Pueblo of Zuni considers the Zuni Mountains in their entirety as culturally important; these mountains contain a variety of cultural resources and areas valued and utilized by Zuni practitioners. To date, few location-specific resources or areas of use affiliated with the Pueblo of Zuni have been identified. None were addressed in relation to the consultation for this project. It is not known whether sites of traditional and cultural significance will be affected by the project.

The Navajo use the Zuni Mountains (*Anaá Dziil)* for a variety of traditional cultural and religious activities. The tribe has expressed concern that the additional trail development in a widespread pattern across the mountains would attract more people to recreate in the Zuni Mountains and may result in more interference with Navajo use and disturbance to traditional cultural properties.

The tribe expressed concern about the proximity of several proposed trails relative to four culturally significant landscape or natural features where traditional activities are known to occur. Upon further consultation, it was determined that two of the features are of sufficient distance from the trails to satisfy the tribe's concern. This concern has been addressed in all action alternatives; therefore discussion of these two features will not be carried forward.

Also of concern is the potential conflict of uses between mountain bikers and Navajo practitioners who walk the trails to access culturally significant sites or places where cultural activities are conducted. The tribe provided anecdotal information of this kind of conflict occurring in the recent past.

Issues

The following issues were identified as a result of the analysis of comments received during the public scoping process and continuing internal review of the project. Details of the public scoping comment analysis are documented in the project record. The analyses of these issues and project objectives provide the basis of formulating alternatives that meet the purpose and need for the Proposed Action and for making a decision on the project (Forest Service Handbook 1909.15, Section 12.32–12.33).

1. The Proposed Action does not add enough unauthorized mountain bike routes.

The Proposed Action does not add enough unauthorized routes on the west end of the Zuni Mountains to the system as mountain bike trails to accommodate current and future demand. Respondents indicate that there are more trail users from the Gallup area that use the western end of Zuni Mountains necessitating the need to add more unauthorized routes to the system. Comments suggested that adding these unauthorized routes to the trail system would create a world class area that would bring mountain bikers from across the country and from around the world.

2. The Proposed Action reduces solitude for the Timber Lake residents.

The Proposed Action adds unauthorized routes to the trail system or constructs new mountain bike trails within the Pasture Hollow area near the Timber Lake subdivision. The Timber Lake residents believe that adding those routes would result in loss of peace and solitude. Comments received suggested that since the proposed trails in the Pasture Hollow area did not connect to the eastern trail network, they need to be eliminated from the proposal in order to protect and preserve the treasures that abound there.

3. The Proposed Action adds unauthorized routes in proximity to Navajo contemporary traditional use areas.

The Proposed Action adds unauthorized routes to the trail system or constructs new mountain bike trails in proximity of the Hogback, a linear, geologic feature that extends through the western portion of the Zuni Mountains, which is considered by the Navajo Nation to be culturally significant.

4. The Proposed Action designates trails within Threatened, Endangered, and Sensitive Species Habitat.

The Proposed Action designates trails within the protected activity centers (PACs) for the Mexican spotted owl (*Strix occidentalis lucida*) and within the post fledgling areas (PFAs) for the northern goshawk (*Accipiter gentilis*). Trails within PACs and PFAs may lead the birds to abandon a nest during the breeding season. This can result in take for Mexican spotted owls, which may have a negative effect on the species.

Decision Framework

The District Ranger is the Responsible Official for deciding:

- Whether or not to implement the proposed action or an alternative or portions of alternatives to meet the purpose and need.
- Which mitigation measures and monitoring requirements would be implemented as part of the selected alternative.

2. Alternatives Including the Proposed Action

This chapter describes and compares the alternatives considered for the Zuni Mountain Trails Project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental, social, and economic effects of implementing each alternative. Maps for each alternative can be found in Appendix A.

Alternative A - No Action

Under the No Action Alternative, the current level of management by the District would continue to guide resource management within the project area, as outlined in the ALRMP. The existing system of 28 miles of trail in the northwest portion of the Zuni Mountains would continue to be managed for hiker/pedestrian and mountain bike use and be served by the Hilso and Strawberry Canyon Trailheads. No additional trails would be added to the system and managed for mountain bike use; no trailheads would be constructed or reconstructed and no restroom facilities would be added. Maintenance of the existing trails and trailhead would continue at current pace; rehabilitation of unauthorized routes would occur as funding allowed in conjunction with the Watershed Condition Framework.

Alternative B - Proposed Action

Since scoping in October and December 2012 the District ID Team made the following modifications to the Proposed Action: 1) the prohibition of cross-country mountain bike travel was removed and 2) the hiking only trail has been changed to a mountain bike trail, which would be managed for both mountain bike and hiker/pedestrian use.

This proposal would meet the project's goal by creating stacked loop trail systems with connecting routes utilizing USFS and IMBA design parameters to develop a mountain biking trail system in the Zuni Mountains.

Trail Designation and Construction

Approximately 62 miles of unauthorized routes in the western and central parts of the project area would be added to the system as mountain bike trails. The existing tread would be used, with construction of minor reroutes and maintenance features where needed. Trail signs would also be installed.

About 119 miles of new mountain bike trails would be constructed in accordance with Forest Service Handbook 2309.18. Trails signs would also be installed.

Approximately 53 mountain bike cattle guards would be installed where the bike trail crosses pasture fences.

Construction of new trails would occur as funding becomes available. The ZMTP prioritized trail construction for several grouping of the proposed trails. The ZMTP gave each trail grouping a rating of low, moderate, or high, and assigned points (low = 1 point, medium = 2

points, high = 3 points). The trail groupings ranked as follows: Quartz Hill, Bluewater, McGaffey, Milk Ranch, Ramah, Ojo Redondo, Twin Springs, and Limekiln.

Trailhead Development

Five new trailheads would be constructed. Limekiln, Ojo Redondo, Twin Springs, Bluewater Creek 2, and Milk Ranch Trailheads would consist of a gravel parking area of the size to accommodate up to 10 passenger vehicles and 3 vehicles towing a trailer, with associated maneuvering space to unload trailers. The designed capacity would allow about 46 people at one time. Physical barriers, such as boulders or wooden fences, would be installed to restrict vehicles to the parking area. Kiosk-style bulletin boards would be erected to display information. Vault toilets would also be installed at each trailhead, with adequate capacity to accommodate anticipated use. Animal-resistant trash receptacles would also be put in. All facilities provided at trailheads would comply with the Architectural Barriers Act or USFS Outdoor Recreation Areas Accessibility Guidelines, as applicable.

The existing Quartz Hill parking area would be expanded to the size to accommodate up to 10 passenger vehicles and 3 vehicles towing a trailer, with associated maneuvering space to unload trailers. The designed capacity would allow about 46 people at one time. Installation of all the other features would be the same described for the rest of the trailheads: physical barriers to restrict vehicles to the parking area, bulletin board, vault toilet, and animal-resistant trash receptacles.

Watershed Improvement

Watershed conditions would be improved by eliminating access to 132 miles of unauthorized route. This would be accomplished by rehabilitating the first ¼-mile segment where unauthorized routes intersect system roads or trails, for approximately 60 miles of ground disturbance. Rehabilitation would include actions such as restoring natural contours and slopes; reseeding; and installing physical barriers to prohibit motorized traffic. Physical barriers may include lopping and scattering trees cut on-site to a height of no more than one foot, depending on location, proximity to proposed trails, presence of vegetation and other factors; placing boulders; installing fences; and constructing earthen berms.

When added to the 28 miles of existing system trails managed for mountain bike use at Hilso and in Strawberry Canyon, implementing the Alternative B would result in 209 miles of trails managed for mountain bike use and eight trailheads to provide access points, parking, and facilities. Soil, watershed, wildlife habitat, and scenic quality would be improved through the rehabilitation of unauthorized routes.

Alternative C

Alternative C responds to Issue #1 - The Proposed Action does not add enough unauthorized routes. Alternative C proposes to:

- Add approximately 71 miles of unauthorized routes to the system as mountain bike trails using the existing tread with construction of minor reroutes and maintenance features where needed, and installation of trail signs;
- Construct about 157 miles of new mountain bike trails and install trail signs;
- Install 58 mountain bike cattle guards where mountain bike trails cross pasture fences;

- Construct five new trailheads and redesign the existing Quartz Hill Trailhead as described under Alternative B; and
- Improve watershed conditions by eliminating access to 132 miles of unauthorized routes as described under Alternative B.

When added to the existing 28 miles of system trail managed for mountain bike use, implementing Alternative C would result in 256 miles of trails managed for mountain bike use and eight trailheads to provide access points, parking, and facilities. Soil, watershed, wildlife habitat, and scenic quality would be improved through the rehabilitation of unauthorized routes.

Alternative D

Alternative D responds to Issues #2-3:

1. The Proposed Action reduces solitude for the Timber Lake residence.
2. The Proposed Action adds unauthorized routes in proximity to Navajo Contemporary Traditional Uses.

Alternative D proposes to:

- Add 36 miles unauthorized routes to the system as mountain bike trails using the existing tread, with construction of minor reroutes and maintenance features where needed, and installation of trail signs;
- Construct 85 miles of mountain bike trails, and install trail signs;
- Re-align two sections of trail to create more distance from a culturally sensitive area;
- Eliminate the proposed trails along the Hogback in the Pasture Hollow area and in the vicinity of Stinking Springs;
- Install 41 mountain bike cattle guards on pasture fences;
- Construct three new trailheads (Limekiln, Twin Springs, and Bluewater Creek 2) and redesign the Quartz Hill Trailhead as described under Alternative B; and
- Improve watershed conditions by eliminating access to 132 miles of unauthorized routes as described under Alternative B.

When added to the existing 28 miles of system trail managed for mountain bike use, implementing Alternative D would result in 149 miles of trails managed for mountain bike use and six trailheads to provide access points, parking, and facilities. Soil, watershed, wildlife habitat, and scenic quality would be improved through the rehabilitation of unauthorized routes.

Alternatives Considered but Eliminated from Further Analysis

Alternatives considered but eliminated from further analysis include the following types of trail sections: trails that dead-end at a jurisdictional boundary or at private properties lacking legal easements to cross, trails that disturb cultural resources and traditional use areas, or other trails that do not meet the aforementioned design criteria. A number of proposed trails were excluded

from further analysis based on the rational outlined in Table 2-1. Due to private land ownership located throughout various sections of the Zuni Mountains, private land holdings that do not contain legal public use easements are excluded from further analysis. Likewise, trails that terminate at Bureau of Indian Affairs trust lands and private property boundaries are also excluded from further analysis.

Table 2-1. Rationale for trail exclusion from further analysis

Trail Section/Name	Include/Exclude from Further Analysis	Rational
All sections on private land	Exclude	Land ownership issue – no easements
Wonderful Beautiful	Exclude	Dead ends at BIA trust lands/private land – no easement
Milk Ranch connection	Exclude	Mitigated by moving trail head
Trails that overlap Hilso from Lost Lake northward	Exclude	Existing trail
Strawberry	Exclude	Existing trail

Design Criteria

Forest Plan standards and guidelines apply to all alternatives. Trail development design standards and design parameters outlined in Forest Service Handbook 2309.18, Chapter 20 will be incorporated. In addition, the following design criteria may be applied to any of the action alternatives.

1. Trail construction would not occur within northern goshawk PFAs and Mexican spotted owl PACs during the breeding season from March 1 to August 30 to reduce the impact these bird species.
2. Mountain bike cattle guards would be installed at all allotment and pasture fences.
3. Where possible, all mountain bike trails will be located at least 300 feet away from stream channels, springs, and riparian areas.
4. Under all of the action alternatives, IMBA design features and USFS BMPs would be used to ensure that proposed activities would limit the damages to the soil and water resources. The rehabilitation of unauthorized routes and closed roads would also use USFS-designated BMPs.
5. Crossings of perennial streams will not be in the water, allow for unrestricted flow of bankful width, and provide for flood flows, such as bridges or vented fords.
6. Crossings of intermittent and ephemeral streams will be hardened unless the bed material is predominately cobble sized or larger.
7. Approaches to stream crossings will be at an angle with drainage features that direct sediment and runoff away from the channel.
8. All stream crossings will provide for aquatic passage.
9. Stream crossings will not occur in deeply incised locations.
10. Trailheads will not be located in floodplains or within 300 feet of stream channels.

11. Hunting information would be posted at all trailhead kiosks and bulletin boards to alert trail users of potential for encountering hunters and to encourage the wearing of bright clothing during the hunting season.
12. Mitigations for eligible and undetermined properties include the following.
    - Reroute of the trail to maximize vegetation or topography that obscured the view of the property from the trail;
    - Provide biking guidelines that stress no off-trail activity and no collection of artifacts; and
    - Periodic monitoring to establish if guidelines are effective.

Comparison of Alternatives

Table 2-2 summarizes the differences among the alternatives and compares each of the alternatives against resource indicators.

Table 2-2. Comparison of Alternatives

Resource Indicator	Alternative A No Action	Alternative B Proposed Action	Alternative C	Alternative D
Miles of existing system trails managed for mountain bike use	28	28	28	28
Miles of unauthorized routes added to system as mountain bike trails	0	62	71	36
Miles of new mountain bike trail constructed	0	119	157	85
Total miles of trails managed for mountain bike use	28	209	256	149
Number of new trailheads constructed or redesigned trailheads	0	5	5	3
Number of existing parking areas redesigned	0	1	1	1
Number of mountain bike cattle guards	0	53	58	41
Miles of unauthorized routes rehabilitated	0	132	132	132

3. Affected Environment and Environmental Consequences

This chapter summarizes the physical, social, and economic environments of the analysis area and the effects of implementing each alternative on the environment. It also provides the basis for comparison of alternatives presented in chapter 2. Details of the analyses in this section are in the specialist's reports and on file in the project record.

Recreation

Affected Environment

Popular recreation activities in the project area include camping, hiking, mountain biking, driving for pleasure, horseback riding, piñon nut gathering, and wood gathering. The majority of these generally occur from April through October. In addition, snowmobiling and snowshoeing occur during winters with adequate snowfall.

One of the more popular uses is hunting. Hunters use the entire project area for big game hunting throughout the year. Elk hunting from September through December is the most popular hunt along with fall and spring turkey hunts. Mule deer, black bear, and cougar hunting are also common in the analysis area. Dispersed camping generally increases during the hunting season. There is anecdotal evidence that that hikers and bikers can spook animals and thus disrupt hunters' success, but there have not been any formal reports or complaints from hunters regarding specific incidents.

The project area contains three developed campgrounds, two developed fishing sites, two developed trailheads, and two observation sites. The campgrounds, McGaffey and Quaking Aspen, are open from May 15 to September 15. The majority of the existing recreation infrastructure is found in the northwest portion of the analysis area. McGaffey Campground offers the most diverse camping opportunities. Quaking Aspen Campground is located close to the Hilso trail system. Camping associated with mountain bike use at the existing campgrounds is fairly low, as indicated in the 2013 Northwest New Mexico Council of Governments Impact Study.

Approximately 28 miles of trails meander through the western part of the project area; these trails are managed for hiking, mountain biking and horseback riding. The Hilso Trailhead and Strawberry Canyon Trailhead serve as access points for the majority of these trails. Hilso Trailhead is located off NM State Highway (SH) 400, south of Fort Wingate, can be used to reach the 26 miles of non-motorized singe-track trails. The trailhead has parking for approximately 10 vehicles, an interpretive kiosk with trail maps, and vault toilets. Strawberry Canyon Trailhead is located east of McGaffey Campground. It also has parking for 10 vehicles, accesses the 1.9- mile long Strawberry Canyon Trail, which can be used to reach the McGaffey Lookout Tower, and is used by hikers and bikers.

According to the Gallup Trails Summary (Gallup Trails 2014a) the Hilso trail system receives the most use by hikers and mountain bikers between April-November, in the evenings and on weekends. The report estimates more than 300 trail users per week with 60% mountain bike (40% local, 20% destination travelers), 30% hiking, and 10% a variety of users ranging from trail

runners to birdwatchers. Informal endurance riding is a popular activity and bike packing is becoming increasingly popular.

Cumulative Effects Area
The cumulative effects analysis for recreation is defined by the project area and includes past and present actions, as well as reasonably foreseeable actions that will occur within the next ten years. Analyzing the cumulative effects of projects that may be implemented beyond ten years is considered too speculative to be meaningful. Past, present and reasonably foreseeably actions are listed in Table B-1 in Appendix B.

Environmental Consequences

Alternative A – No Action
No change is expected at the developed facilities under this alternative; however, use at trailheads and informal parking areas is expected to continue and potentially increase over time.

This alternative would not address short- and long-term demand for mountain bike trail opportunities in the Zuni Mountains, which would put additional pressure on the existing trail system, parking areas and associated infrastructure. This demand is expected to be proportionate to the current use such as season of use, peak use, and timing. Looped trail connections would not be provided.

There is a high likelihood that users will continue to use existing unauthorized trails, as well as develop more unauthorized trails on the west end of the Zuni Mountains. This would result in increased environmental degradation that would impact recreation opportunities and scenic quality of the area. Mountain bikers seeking a developed trail system, trails of different lengths and skill levels would continue to only have access to the current 28-mile trail system. There is a potential that users who prefer trails that are designed and managed for mountain bike use may be displaced to other locations that offer those opportunities. Mountain bikers who prefer to create their own trails would continue to do so, not necessarily in the most suitable locations.

This alternative would not address the potential conflicts between mountain bikers and hunters since signage would not be provided at trailheads informing bikers of the various hunt seasons. Unauthorized parking along NMSH 400 would continue, likely leading to the creation of additional unauthorized trails and informal parking areas.

Enhancement and expansion of mountain biking opportunities, collaboration with ZMTP, and improvements to scenic quality and the recreation setting through watershed restoration would be delayed until environmental analysis to rehabilitate unauthorized routes was completed.

Cumulative Effects
When incremental effects from past, present, and reasonably foreseeable future projects are added to this alternative, there would not be any cumulative effects.

Alternative B – Proposed Action
Opportunities for mountain biking would be enhanced under this alternative when compared with the Alternative A. The existing system of 28 miles of trail at Hilso and Strawberry Canyon would be increased by an additional 181 miles of trail would be managed for mountain bike use, designed for different levels of skill, varying distances and looped trail connections. This would

expand opportunities to include a broader spectrum of mountain bikers. It is anticipated that the desire of mountain bikers to travel off trail and create unauthorized routes would decrease when compared to the No Action Alternative with the addition of trails designed and managed for mountain bike use. Under this alternative, current and much of the anticipated future demand for mountain bike trails and associated parking would be met. Up to 75 parking spaces, including up to 15 spaces designed for vehicles towing trailers would be added with the construction of 5 new trailheads and the reconstruction of one parking area. Restrooms and trash receptacles would be provided at each trailhead, enhancing the recreation experience and minimizing environmental impacts.

Potential conflicts between hunters and mountain bikers may decrease slightly when compared to the No Action Alternative. Information and trail maps would be provided at the trailhead kiosks alerting mountain bikers of the presence of hunters during the various hunting seasons, as well as informing hunters know where mountain bikers might be encountered. Although minor, hunter success could be affected as use of the mountain bike trails increases. Residents of the Timberlake subdivision would likely be concerned and displeased with this alternative, since 13 miles of mountain bike trails would be located within two miles of their subdivision.

The rehabilitation of unauthorized routes would result in improved scenic quality and enhanced recreation opportunity by reversing environmental degradation and restoring a more natural-appearing landscape.

Visitation at the developed campgrounds may increase as a result of designing and managing more miles of trail for mountain bike use if mountain bikers plan to spend more than one day on the trails.

Cumulative Effects
When past, present, and reasonable foreseeable future activities listed in Appendix B with the effects of this alternative, the cumulative effect would be an increase in visitors to the Zuni Mountains.

Alternative C
The effects of this alternative regarding opportunities for mountain biking would be expanded when compared with the No Action Alternative and would be similar to those described under Alternative B for parking and trailhead amenities, and collaboration opportunities. Up to 228 miles of trail would be managed for mountain bike use in addition to the existing 28 miles of trail at Hilso and Strawberry Canyon, which would increase loop trails, trail connections, route choices and skill levels when compared to the No Action Alternative; the effects would be slightly greater than those described for Alternative B. Residents of the Timberlake would likely be the most displeased with this alternative as a result of 20 miles of mountain bike trails being located within two miles of the subdivision. The effects of rehabilitation of 132 miles of unauthorized routes would be the same as described under Alternative B. Visitation at the developed campgrounds may increase as a result of designing and managing more miles of trail for mountain bike use if mountain bikers plan to spend more than one day on the trails.

Cumulative Effects
Cumulative effects of past, present, and reasonably foreseeable future actions, combined with this alternative would have the same cumulative effects as described under Alternative B.

Alternative D

Effects of this alternative on opportunities for mountain biking, collaboration with ZMTP, parking capacity and trailhead amenities would be similar to, but somewhat less than as described for Alternative B. A total of up to 121 miles of trail would be managed for mountain bike use, in addition to the 28 miles of trail at Hilso and Strawberry Canyon. The construction of three new trailheads and reconstruction of one existing parking area would increase parking capacity by 52 spaces, including 12 spaces for vehicles towing a trailer.

Disturbances to Timberlake residents would be minimized under this alternative since no mountain bike trail would be located within seven miles of the subdivision.

Impacts to hunters would be as described for Alternative B.

The effects of rehabilitation of 132 miles of unauthorized routes would be the same as described under Alternative B. Visitation at the developed campgrounds may increase as a result of designing and managing more miles of trail for mountain bike use if mountain bikers plan to spend more than one day on the trails.

Cumulative Effects

Cumulative effects of past, present, and reasonably foreseeable future actions, combined with this alternative would have the same cumulative effects as described under Alternative B.

Socioeconomics

Affected Environment

According to the 2010 U.S. Census, the majority of the population of the state of New Mexico is white at 68.4% with the next largest representation consisting of the Hispanic or Latino ethnic group at 46.3% (Table 3-1). The majority of McKinley County's population consists of American Indian at 75.5% and the next two largest representations consist of the white ethnic group at 15.2% and the Hispanic or Latino ethnic group at 13.3%. The majority of Cibola County's is white at 41.8%, American Indian at 41% and Hispanic or Latino at 36.5 %. The demographic characteristics are summarized in Table 3-1.

Table 3-1. Demographic Characteristics

Race	McKinley County	Cibola County
Total population	71,492 (100%)	27,213 (100%)
White	10,834 (15.2%)	11,386 (41.8%)
African American	360 (0.5%)	275 (1%)
American Indian and Alaska Native	53,988 (75.5%)	11,156 (41%)
Asian	568 (0.8%)	149 (0.5%)
Hispanic or Latino	9,473 (13.3%)	9.934 (36.5%)
Some other race	3,522 (4.9%)	3,370 (12.4%)
Two or more races	2,197 (3.1%)	851 (3.1%)

Source: U.S. Census Bureau, 2010 Profile of General Population and Housing Characteristics. Percentages do not add up to 100% due to multiple ethnic identifications.

According to the Travel Management Plan (USFS 2010), both Cibola and McKinley Counties have seen an increase in jobs and decrease in unemployment since 1996. The U.S. Census 2010 data indicates that the predominant employment sectors are service, professional and government

employment within both counties. Government employment has been the largest contributor of new jobs in the area from 1990 to 2000, increasing employment within this sector by approximately 30 percent (Headwaters Economics 2014a, 2014b).

Local Economy

Many outdoor adventure advocates, including the supporters of this proposed project, consider the natural resources in the analysis area a key contributor to regional economic stability and future growth. McKinley County has been working on several economic development strategies including the promotion of Gallup and including the analysis area as a "world class" mountain biking destination.

Promoting these areas as a world class adventure tourist destination is based on significant private investment in business anchors, as well as public investment in trail construction, maintenance, and venue upgrades (NWCOG 2013).

The Economic Impact Study of Adventure Tourism in McKinley County identified that there were approximately 62,969 trails users associated with the McGaffey area National Forest trail system (NWCOG 2013). Applying the methodology used in the economic study, it is estimated that the economic impact of these users to be approximately $3,620,717.

The economic study also identified events as an important way to expose local communities, assets, venues, and trails to region. According to the economic study, the 24-Hours in the Enchanted Forest event generated approximately $125,744 in expenditures and lodging.

U.S. Census data summarizing the employment and income characteristics for the project area is presented in Table 3-2. The American Community Survey 2008–2012 5-year estimates for income, employment, and poverty status were compiled for McKinley County, Cibola County, and the state of New Mexico.

According to the American Community Survey 5-year economic profile data estimates, most of the population in McKinley County held The majority of the population in Cibola County held similar occupations with the majority in educational services and health care/social assistance occupations (25.6%), arts, entertainment, recreation, accommodation, and food services occupations (16%), and retail trade occupations (13.3%).

Table 3-2. Economic Characteristics

Income Characteristics	McKinley County	Cibola County
Percent below poverty level (all people)	33.6%	28.8%
Per capita income	$13,445	$15,508
Median family income	$37,361	$40,071
Employed civilian labor force	23,303 (44.7%)	9,106 (43.2%)
Percent Unemployed	11.8%	19.4%

Source: U.S. Census Bureau 2008–2012 American Community Survey 5-year estimates.

Environmental Justice

Approximately one-third of the population of McKinley County and one-quarter of the population of Cibola County were living below the poverty line in 1999 (Table 3-2). McKinley and Cibola Counties have the highest percentage of American Indian residents among counties that border the Cibola National Forest.

The entire Navajo Nation, which spans across portions of Arizona, New Mexico, and Utah includes 300,048 enrolled members with 65,764 members residing in New Mexico (University of New Mexico Bureau of Business and Economic Research 2010). Many Native Americans use the area to supplement their household income with use and sale of forest products such as piñon nuts and firewood.

Cumulative Effects Area

The cumulative effects area for socioeconomic analysis includes projects within the analysis area and communities within 30 miles of the analysis area boundary where mountain bike activities or venues are available or occur.

Environmental Consequences

Effects Common to All Alternatives

Minority and low-income population in McKinley and Cibola counties and their use of Nation Forest System lands would remain unchanged. The percentage of people living below the poverty level for McKinley County is at 33.6% and Cibola County at 28.8% with per capita income of $13,445 and $15,508 respectively. Low income households may not choose to own a mountain bike because of the relatively high purchase and maintenance costs. Therefore, no measurable effects to low-income populations are estimated for any of the alternatives.

It is speculative to predict population and demographic fluctuations resulting from a single industry such as mountain biking. There is no detail data available on what segment of the population in each occupation (educational/health care/social, retail, entertainment, and food services) that actually use NFS lands for mountain biking activities to calculate effects any direct effects.

Rehabilitation of unauthorized routes would not have any effect on minority and low-income populations because these routes are not available for use by the general public already.

Alternative A

Since there would be no construction of trails and trailhead and no rehabilitation of unauthorized routes, there would be no change to expenditures or production values related to mountain bike industry. The potential economic development opportunities to the affected communities located

within the McKinley and Cibola Counties would remain unchanged or would not occur. The gross receipts tax revenues and lodger's revenue over time would remain at current levels.

The potential for creating a 'world-class' mountain biking destination within the project area would not be realized. Trails and related infrastructure would continue to remain at existing levels.

Loss of peace and solitude for Timberlake residents from unauthorized routes near the Pasture Hollow area would continue to occur. This loss of peace and solitude has the potential to increase a greater rate than any of the action alternatives because of the District's capacity to manage unauthorized route development. The potential exist that new residence in the area may develop unauthorized routes in their backyards as the mountain biking becomes more popular.

Cumulative Effects
When incremental effects from past, present, and reasonably foreseeable future projects related to economic development are combined with effects associated with this alternative, there would not be any cumulative effects to socioeconomic component or to low-income/minority populations.

Alternatives B, C, and D

Local businesses would directly benefit from attracting adventure tourism user groups of the analysis area. The potential exist to provide socioeconomic benefits to local communities for outdoor recreation and adventure tourism. The expenditures (spending and lodging) associated the 24-Hour in the Enchanted Forest event could potentially increase as local communities market additional designated system trails that could be available for use for similar events. An increase in mountain biking activities from the action alternatives would likely require local bike stores to provide more labor and supplies in order to accommodate the additional trail users associated with the improved trail system. Such impacts to industries occurring from a change in local expenditures and production values associated with mountain biking is anticipated to increase. There are impacts such as a change in employment resulting from the changes in expenditures and/or production values caused by an action to increase the amount of adventure tourism within the region.

All of these proposed improvements would likely increase revenue and economic opportunities to the local economy within McKinley County. With an improved mountain biking trail system there would be an increase in demand for accessing these facilities from local, regional, and national mountain biking enthusiasts. With this increased use and demand, there would be a direct link to increased spending in local businesses, increased public and private investment in the trail system, and an overall directly beneficial economic effect on generated tax revenues for McKinley and Cibola Counties. The hospitality industry would also benefit from the Action Alternatives through providing lodging and food for out of town user groups.

Cumulative Effects
Effects of past, present, and reasonably foreseeable projects, when combined with the effects of all action alternatives, are expected to result in measurable increases in revenue generated in McKinley County, expansion of businesses, and employment opportunities. Minority and low-income populations would likely realize the improved economic conditions and would thus not be disproportionately affected.

Wildlife – Threatened and Endangered Species

The following Threatened, Endangered, and Sensitive species (TES), as displayed in Table 3-3, have the potential to occur within the analysis area of the Zuni Mountain Trails Project on the Mt. Taylor Ranger District of the Cibola National Forest and National Grasslands (CIF). The analysis area is defined as the National Forest Service system lands within the Zuni Mountains in McKinley and Cibola Counties of New Mexico. Listed species were identified using the U.S. Fish and Wildlife Service's (FWS) Information, Planning and Consultation (IPAC) System. Species identified as Sensitive are listed on the U.S. Forest Service, Southwestern Region's, Regional Forester's Sensitive Species list (USDA 2013). A list of other species considered but not evaluated further due to lack of habitat- within the analysis area is displayed in table 3-4. . Species with an asterisk (*) are those for which little information is available on the Mt. Taylor Ranger District.

Table 3-3. Threatened, Endangered, & Sensitive Species Evaluated

Common Name	*Scientific Name*	Status
Mexican spotted owl	*Strix occidentalis lucida*	Threatened
Zuni Flea bane	*Erigeron rhizomatus*	Threatened
Pecos sunflower	*Helianthus paradoxus*	Threatened
Northern goshawk	*Accipiter gentilis*	Sensitive
Spotted Bat*	*Euderma maculatum*	Sensitive
Gunnion's prairie dog	*Cynomys gunnisoni*	Sensitive
Zuni milkvetch	*Astragalus accumbens*	Sensitive
Villous groundcover milkvetch	*Astragalus humistratus var. crispulus*	Sensitive
Sivinski's fleabane	*Erigeron sivinskii*	Sensitive
Arizona leatherflower Clustered leatherflower	*Clematis hirsutissima var. hirsutissima*	Sensitive
Chaco milkvetch	*Astragalus micromerius*	Sensitive

Table 3-4. Other TES Species Considered but not Evaluated

Common Name	*Scientific Name*	Status	
Southwestern willow flycatcher	*Empidonax trailii extimus*	Have not been found within the analysis area.	Endangered
Zuni bluehead sucker	*Catostomus discobolus yarrow*	No habitat in analysis area	Endangered, Sensitive
Yellow-billed Cuckoo	*Coccyzus americanus*	Have not been found within the analysis area.	Threatened, Sensitive
Rio Grande Sucker	*Catostomus plebeius*	No habitat disturbance expected.	Sensitive
American peregrine falcon	*Falco peregrinus (anatum)*	No habitat within the analysis area	Sensitive
Cebolleta southern pocket gopher	*Thomomys bottae paguatae*	No habitat within the analysis area	Sensitive
Dumont's Fairy shrimp	*Streptocephalus henridumontis*	No habitat within the analysis area	Sensitive

Common Name	*Scientific Name*	Status	
Northern leopard frog	*Rana pipiens*	No habitat within the analysis area	Sensitive
Bald eagle	*Haliaeetus leucocephalus*	Winter habitat within analysis area, no nesting habitat.	Sensitive
Pale Townsend's big-eared bat	*Cynomys gunnisoni*	No habitat within the analysis area.	Sensitive

Mexican Spotted Owl

Affected Habitat

In general Mexican spotted owl habitat consists of dense multistory stands of mixed conifer with a component of large trees, often old remnant trees in younger stands or mature or over mature stands. Spotted owls also prefer shaded, cool, moist canyon sites and mountain slopes with rock outcrops, cliffs, talus, and standing dead and down woody material. Forests used for roosting and nesting often contain mature or old-growth stands with complex structure. Forests used by spotted owls are typically uneven-aged, are multistoried, and have high canopy cover. In these areas, nest trees are typically large (average diameter of nest trees is 24 inches), although owls roost in both large and small trees (USDI 1995). The Mexican Spotted Owl Recovery Plan has three levels of protection codified. These categories were added to the ALRMP as a Plan Amendment in 1996, and are summarized below.

Surveys were conducted on the Mt. Taylor Ranger District for the Mexican spotted owl (MSO) beginning in the early 1990's. Those surveys documented the presence of MSO on the District and 14 Protected Activity Centers (PACs) were established. All of the PACs are within the project area boundary. PAC monitoring occurred in the project area annually during the breeding seasons from 2005 to 2014 (no surveys were conducted in 2011; CIF unpublished data), according to FWS protocol. In 2013 and 2014 surveys in the Foster PAC elicited responses and a breeding pair of owls with fledglings were subsequently located. Another pair was located in the Sawyer PAC in 2014 with fledglings as well. Along the proposed trail that runs near the Hogback, two responses were heard: one female responded, and about two weeks later a male was also heard. There is suitable habitat within this area. There are no known PACs at this location, but because of these responses, a new PAC is expected to be established in coordination with the U.S. Fish and Wildlife Service.

Protected Activity Centers

PACs encompass a minimum of 600 acres surrounding known owl nest/roost sites. Management recommendations are most conservative within PACs, but by no means advocate a "hands-off" approach. The FWS recognizes situations exist where management is needed to sustain or enhance desired conditions for the owl, including fire-risk reduction, as well as monitoring owl response. Mechanical treatments in some PACs may be needed to achieve these objectives; determining which PACs may benefit from mechanical treatments requires a landscape analysis to determine where the needs of fire risk reduction and habitat enhancement are greatest.

Protected and Restricted Habitat

This habitat is primarily ponderosa pine-Gambel oak, mixed-conifer, and riparian forest that either currently is, or has the potential for becoming, nesting and roosting habitat, or does or could provide foraging, dispersal, or wintering habitats. Nesting habitat typically occurs either in well-structured forests with high canopy cover, large trees, and other late seral characteristics, or

in steep and narrow rocky canyons formed by parallel cliffs with numerous caves and/or ledges within specific geologic formations. Forested protected and restricted habitat management should vary by forest type and Recovery Unit. This habitat should be managed to replace habitat lost due to disturbance (e.g., fire) or senescence and to provide additional habitat to facilitate recovery of the owl. The remainder of forested habitat should be managed for other needs (such as foraging, dispersing, or wintering) provided that key habitat elements are retained across the landscape.

Other Forest and Woodland Types
Other forest and woodland types consist of habitats such as ponderosa pine forest, spruce-fir forest, and pinyon-juniper woodland. No specific management is suggested for these habitat types, recognizing that the current emphasis for sustainable and resilient forests should be compatible with the needs of the owl.

Cumulative Effects Area
The boundary for cumulative effects is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions are listed in Appendix B.

Environmental Consequences

Alternative A
Under this alternative, direct effects to Mexican spotted owls may occur, because unauthorized trails are within one known PAC or within MSO protected and restricted habitat or Critical Habitat. This means mountain bikers may disturb individual birds within the area. Locations of past nests are not directly adjacent to trails, but on slopes where bikers do not travel due to the steep terrain and thick undergrowth. Owls are not very active during the daylight hours and this would help minimize any affects to the owls. However, a mountain biker or hiker leaving the trail could flush the bird off their nest. Mountain bikers are also allowed to travel off of the trail with no restrictions; this could have a negative effect to individual owls.

Indirect effects are expected for the Mexican spotted owl because under this alternative rehabilitation of unauthorized routes would not occur. This could lead to increased illegal motorized use. Security zones for wildlife between the routes would be reduced even further, as the habitat becomes increasingly more fragmented. Unrestricted winter and summer use would increase disturbance (noise) impacts to wildlife incrementally over time. Impacts will become additive, as use increases, and private land development increases as well. User-created trails can be expected to increase erosion, which can have impacts to surrounding habitats far greater than just the trail surface itself (down-cutting and side channeling, as a result of heavy rains). New user-created trails would receive increasing use from all types of recreation users over time (mountain bikes, horses) adding to the current density of trails by an as yet unknown amount. Effects would be expected within the PAC, MSO protected and restricted habitat, and Critical Habitat because of the unauthorized trails. The determination for Alternative A is: "May affect species, not likely to adversely affect species" for the Mexican Spotted Owl.

Cumulative Effects
Mountain bike use on designated routes and trails could be expected to increase in the future, as well as other recreational activities such as OHV use, horseback riding, and hiking. All these increased activities will cause disturbance for a longer period during daylight hours (more people, less time the trails remain unused). Many areas where cattle grazing, timber harvesting and prescribed burning are ongoing, could affect MSO: birds would have to find other areas for

security during times of human disturbance, meaning their habitat could be fragmented and less secure.

Alternatives B, C, and D

A summary of all miles of unauthorized routes to be added to the system as mountain bike trails and miles of new mountain bike trails to be constructed within types of MSO habitat by each action alternative are presented in Table 3.5. All mileages are approximate.

Table 3-5. Comparison of Action Alternatives for MSO

Mexican Spotted Owl Habitat Type	Trail Type	Alternative B Proposed Action	Alternative C	Alternative D
Protected Activity Centers (PACs)	New	5	5	0
Protected Activity Centers (PACs)	Unauthorized	3	3	0
Critical Habitat	New	76	99	48
Critical Habitat	Unauthorized	15	24	15
Protected and Restricted Habitat	New	76	98	52
Protected and Restricted Habitat	Unauthorized	21	29	16

Alternative B

Under Alternative B direct effects to MSO may occur because portions of the proposed mountain bike trails travel through four MSO PACs in the project area. Miles of trail within PACs will total 8 miles: 5 miles of new construction, and 3 miles of unauthorized routes. Ninety one miles of trail will go through MSO critical habitat (76 new, 15 unauthorized). Protected and restricted habitat will contain 97 miles of trails (76 new, 21 unauthorized). This means mountain bikers may disturb individual birds within the area. Locations of past nests are not directly adjacent to trails, but on slopes where bikers do not travel due to the steep terrain and thick undergrowth. No direct effects are expected for owls on the nest, but a mountain biker may come into contact with an owl that is off its nest and flying through the area. Owls are not very active during the day so this effect is not expected to be a major factor for disturbance. From September 1 through February 28 no effects would be expected for nesting birds. Individuals may get spooked but would return once the bikers have passed.

The proposed rehabilitation of unauthorized trail routes may cause wildlife to leave the area while work is ongoing, but once the work is complete wildlife would be expected to return to the area. In areas of nesting owls, this would occur outside the breeding season.

No direct effects are expected for the proposed installation of 53 cattle guards or the construction of five new trailheads because this will occur outside of the breeding season (September 1-February 28) in areas of restricted and nesting habitat. Proposed trailheads are located along roads with regular disturbance, not within immediate roosting/foraging/nesting habitat.

Indirect effects would be expected for the Mexican spotted owl under Alternative B. Mountain bikers within a PAC causing noise disturbance for a period of time could cause owls to react by changing behavior and/or flushing from their perches (Delaney et al. 1999; Swarthout and Steidl 2001, 2003). These PACs lie near heavily used roads; however, surveys have shown owls continued to remain in the area. Owls are most active at night and tend to be inactive during the day when mountain bikers are present, which should reduce any negative effects to owls. The presence of mountain bikers is not expected to have a critical effect on the species or lead toward a negative trend. In addition, PACs are usually located in higher elevation areas and tend to retain snow, which would help to limit the amount of activity within the area until late spring when the snow has melted and trails are not saturated with water.

The proposed rehabilitation of unauthorized routes would reduce degradation to all habitat types within the project area, which could improve vegetation for prey species. Rehabilitation of these unauthorized routes would limit human disturbance and minimize fragmentation of the landscape. Work would be done outside of the breeding season in areas of PACs or restricted habitat to avoid negative effects to MSO.

The proposed construction and redesign of trailheads are not expected to have an effect on MSO because these areas are not within PACs and they are within areas already disturbed and along high traffic roads. Cattle guards would not be installed until after the breeding season has ended in areas that PACs are present. No effects would be expected from construction of new mountain bike trails because this would occur outside the breeding season and would not alter MSO nesting/roosting/foraging habitat. The determination for Alternative B is “May affect species, not likely to adversely affect species.”

Cumulative Effects
The cumulative effects to MSO from past, present, and reasonably foreseeable future activities, including Alternative B would be disturbance and habitat loss. The combination of mountain bike travel off existing trails and roads and ongoing projects, could potentially reduce short term forage recovery (and wildlife security).

Alternative C
Under this alternative, the effects to MSO would be similar to those described for Alternative B. Direct effects to MSO may occur but is expected to be minimal. Alternative C would result in about 256 miles of mountain bike trails, which is 47 miles more than Alternative B.. Miles of trail within PACs will total 8 miles: 5 miles of new construction, and 3 miles of unauthorized routes, as in Alternative B. One hundred and twenty three miles of trail will go through MSO critical habitat (99 new, 24 unauthorized). Protected and restricted habitat will contain 127 miles of trails (98 new, 29 unauthorized). The determination for Alternative C is “May affect species, not likely to adversely affect species.”

Cumulative Effects
The cumulative effects to MSO from past, present, and reasonably foreseeable future activities, including Alternative C would be the same as those described for Alternative B.

Alternative D
Alternative D would result in approximately 149 miles of mountain bike trails, which is 60 miles less than Alternative B. Direct effects are expected for Mexican spotted owls because there are still unauthorized trails within the Zuni Mountains. No direct effects are expected from the proposed trail construction under this alternative because they are not present within any PACs.

This reduces any chance for mountain bikers to disturb individual birds that may be traveling through the area. Sixty three miles of trail will go through MSO critical habitat (48 new, 15 unauthorized). Protected and restricted habitat will contain 68 miles of trails (52 new, 16 unauthorized). Owls are not very active during the day so this also reduces any chance of an individual coming into contact with a mountain biker.. Other than the difference in trail location and total mileage, effects are the same as described for Alternative B.

Indirect effects are expected to be minimal for Mexican spotted owls because there are no proposed trails that are within any known PACs, but there are unauthorized trails present within the Zuni Mountains that could indirectly affect MSO and its habitat, and proposed trails go through critical habitat as well as protected and restricted habitat. Otherwise the effects under this alternative are the same as described for Alternative B. The determination for Alternative D is "May affect species, not likely to adversely affect species."

Cumulative Effects
The cumulative effects to MSO from past, present, and reasonably foreseeable future activities, including Alternative C would be the same as those described for Alternative B.

MSO Critical Habitat

The project area contains about 203,000 acres of Critical Habitat for MSO, along with 14 PACs or nesting territories. The project area lies within the Colorado Plateau Recovery Unit (RU). According to the Mexican Spotted Owl Recovery Plan, the greatest threats to recovery in the RU are catastrophic fire, some forms of timber harvest and fuel wood harvest. Management guidelines for the Mexican spotted owl are specified in the LRMP (Amendment No. 7, pages71 – 71-5).

Critical Habitat Primary constituent elements
Primary constituent elements related to forest structure: (1) a range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different age of trees, 30% to 45% of which are large trees with a trunk diameter of 12 inches or more when measured at 4.5 feet from the ground; (2) a shade canopy created by the tree branches covering 40% or more of the ground; and (3) large dead trees (snags) with a trunk diameter of at least 12 inches when measured at 4.5 feet from the ground.

Primary constituent elements related to maintenance of adequate prey species: (1) high volumes of fallen trees and other woody debris; (2) a wide range of tree and plant species, including hardwoods; and (3) adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration.

The forest habitat attributes listed above usually are present with increasing forest age, but their occurrence may vary by location, past forest management practices or natural disturbance events, forest type, productivity, and plant succession. These characteristics may also be observed in younger stands, especially when the stands contain remnant large trees or patches of large trees from earlier stands. Certain forest management practices may also enhance tree growth and mature stand characteristics where the older, larger trees are allowed to persist.

Primary constituent elements related to canyon habitat include one or more of the following: (1) presence of water (often providing cooler and often higher humidity than the surrounding areas); (2) clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, and/or riparian vegetation;

(3) canyon wall crevices, ledges, or caves; and (4) a high percent of ground litter and woody debris.

Environmental Consequences

When considering effects to critical habitat, primary constituent habitat elements are reviewed to determine a project's potential affect. Primary Constituent elements for MSO are related to maintenance of desired forest structure, desired canyon habitat structure and maintenance of adequate prey species habitat.

Alternative A

This alternative could have an effect to MSO critical habitat with a determination of "may affect Critical Habitat, not likely to adversely affect Critical Habitat." Under this alternative there would be no rehabilitation of unauthorized routes, which means human disturbance would continue between designated routes throughout the project area causing a greater disturbance to vegetation. This alternative could also lead to an increase of unauthorized trails and/or roads which can cause degradation and natural resource damage within the habitat. The determination for Alternative A is "May affect species, not likely to adversely affect species."

Alternative B, C, and D

Under these alternatives, there is no effect expected for MSO critical habitat. There is critical habitat present within the project area, but the action alternatives are not expected to alter or change vegetation conditions.

Rehabilitation of unauthorized routes is expected to reduce degradation to all habitats within the project area and could improve nesting/roosting/foraging habitat within the project area because closing these unauthorized routes would limit human disturbance and minimize fragmentation of the landscape.

Construction and redesign of trailheads is not expected to have an effect on critical habitat because these areas are not changing vegetation structure and they are within areas already disturbed and near high traffic roads. Construction of new mountain bike trails would occur outside the breeding season and there would not be a change in vegetation. The determination for Alternatives B, C, and D is "No Effect" to Critical Habitat.

Cumulative Effects

The cumulative effects to MSO critical habitat from past, present, and reasonably foreseeable future activities, including Alternatives B, C, and D would be that mountain bike use on designated routes and trails could be expected to increase in the future, as well as other recreational activities such as OHV use, horseback riding, and hiking. Many areas where cattle grazing, timber harvesting and prescribed burning are ongoing, could affect MSO critical habitat. The combination of mountain bike travel off existing trails and roads, ongoing projects, such as timber treatments, cattle grazing, fuelwood gathering could potentially reduce short term forage recovery.

Zuni Fleabane

Affected Habitat

The Zuni fleabane occurs on nearly barren detrital clay hillsides with soils derived from shales of the Chinle or Baca formations (often seleniferous). It most often occurs on north or east-facing

slopes in open pinyon-juniper woodlands at 7,300-8,000 feet in elevation. The Zuni fleabane is an herbaceous perennial with creeping rhizomes. Stems are generally 2.5-4.5 cm. tall, sparsely branching from near the base, growing in clumps to about 3 cm. in diameter. The leaves are alternate, oblong, about 1.0 cm long, glabrous except for occasional ciliate hairs on the margins. Flower heads are solitary terminating branches, 13-16 mm wide. The involucral bracts are in several series with 25-45 ray flowers that are white or tinged with blue-violet, 6-7 mm long and 1.3-1.5 mm wide. Disk flowers are yellow. This fleabane flowers May and June. This is a very distinct species of *Erigeron*. The nearly glabrous achenes with 5-6 nerves, the rhizomatous habit, and the few hairs on the stems and leaves provide easy recognition. Surveys have been done in the past and are documented on the forest.

Cumulative Effects Area
The boundary for cumulative effects is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions are described in Appendix B.

Environmental Consequences

Alternative A
Effects to this species are expected because mountain bikes are allowed off designated routes and this could degrade habitat where the Zuni fleabane occurs. Impacts from bikes traveling off route could reduce suitable habitat. Rehabilitation of 132 miles would also not occur and this could allow motorists to travel illegally in areas where the Zuni Fleabane may occur, which could have a negative effect to the plant. There are also numerous existing unauthorized routes that bikers and hikers already use. Currently the known plants are not on the unauthorized routes and this is not expected to have an effect on the plants.

The determination of effects for Alternative A is: "May affect species, not likely to adversely affect species or its habitat."

Alternatives B, C, and D
Effects may occur because mountain bikers would be allowed to travel off designated mountain bike routes where the fleabane occurs. Effects are not expected to be adverse because known species occurrences are protected by fences and are not located along existing trails. The Zuni fleabane does not grow near any of the proposed new trail construction.

Rehabilitating unauthorized routes could have a positive impact for the Zuni fleabane by limiting human disturbance, minimizing fragmentation of the landscape, and allowing vegetation to grow; this could give the Zuni fleabane more areas to grow without disturbance.

Installation of mountain bike cattle guards and construction of trailheads is not expected to have an effect on the Zuni fleabane because they are within already disturbed areas near high traffic roads, and because these activities would not change vegetation structure. The determination of effects for these Alternatives is "May affect species, not likely to adversely affect species or its habitat."

Cumulative Effects
The cumulative effects to Zuni fleabane from past, present, and reasonably foreseeable future activities, including Alternatives B, C, and D would be a reduction in areas available for population expansion.

Pecos Sunflower

Affected Habitat

This species is found in saturated saline soils of desert wetlands. It is usually associated with desert springs (cienegas) or the wetlands created from modifying desert springs from 3,300-6,600 feet in elevaton. This plant is an annual, 1-2 meters tall, branched above, stem glabrous to hispid; leaves opposite below, alternate above, up to 17.5 centimeters (cm) long and 8.5 cm wide. It is lanceolate with 3 prominent veins, base tapering to a shore petiole, margins entire except for a few prominent teeth on larger leaves, surface scabrous; flower heads solitary, terminating branches, 3-5 cm across including ray flowers; ray flowers 12-20, and yellow. They have 15-25 phyllaries that are 3-4 mm wide, oblong-lanceolate, acuminate, hispid and margins are ciliate; pale glabrous at tips; achenes 3-4 mm long, glabrous. This species flowers August to October.

Cumulative Effects Area

The boundary for cumulative effects is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions are described in Appendix B.

Environmental Consequences

Alternative A

Effects to this species are expected because mountain bikes are allowed off designated roads and this could degrade suitable habitat where Pecos sunflower occurs. Impacts from bikes traveling off road could reduce suitable habitat. Rehabilitation of unauthorized routes would not take place and this would allow motorist to travel illegally in areas where the Pecos sunflower may occur, which could negatively affect the plant. Use of unauthorized trail routes would continue, which allows mountain bikers to travel in areas where the Pecos sunflower may occur. The determination of effects under Alternative A is “May affect species, not likely to adversely affect species or its habitat.”

Alternatives B, C, and D

Effects may occur because mountain bikers would be allowed to travel off designated mountain bike routes where the sunflower occurs. Effects are not expected to be adverse because the trail width is less than a foot and there is suitable habitat for this plant to grow in the surrounding area.

Rehabilitating unauthorized routes would limit human disturbance and minimize fragmentation of the landscape. Returning routes to the point where vegetation can grow could give the Pecos sunflower more areas to grow without disturbance.

Installation of mountain bike cattle guards and development of trailheads are not expected to affect the Pecos sunflower, because these areas have already been disturbed, they are near high traffic roads, and because these activities would not change vegetation structure. The determination of effects under these Alternatives is “May affect species, not likely to adversely affect species or its habitat.”

Cumulative Effects
The cumulative effects to Pecos sunflower from past, present, and reasonably foreseeable future activities, including Alternatives B, C, and D would be a reduction in areas available for population expansion.

Wildlife – R3 Sensitive Species

The Forest Service has developed policy requirements for the designation of sensitive plant and animal species (Forest Service Manual (FSM) 2670; Supplement 2600-94-2). The Regional Forester's sensitive species list contains taxa only when they meet one or more of the following three criteria: 1), the species is declining in numbers or occurrences and evidence indicates it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend, 2) the species habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the decline, and 3), the species' population or habitat is stable but limited.

Northern Goshawk

Affected Habitat
Throughout the southwestern U.S. nests are primarily found in ponderosa pine forest. Other forest types used by goshawks include Douglas fir, various pines, and aspen. Forests stands containing nests are often small, approximately 10-100 hectares. Territories may contain 1-5 alternate nest areas. Although goshawks prefer certain nest habitat structures, habitat characteristics in nest areas vary from territory to territory, depending on availability.

Nests are typically in mature to old-growth forests composed primarily of large trees, with (60%-90%) canopy closure, near the bottom of moderate hill slopes, with sparse ground cover. Closed stands may reduce predation and, along with north slopes, provide relatively cool environments. Nest habitat is single to multistoried, depending on forest type. Water is usually found near the nesting area, anything from a forest pond, ephemeral streams to a major river or large lake, but those water sources are not a habitat requirement.

Goshawks hunt in diverse habitats ranging from open-sage to dense forests, including riparian areas. Foraging individuals travel through the forest in a series of short flights, punctuated with brief periods of prey searching from elevated hunting perches. Goshawk behavior and morphology are adapted for hunting in moderately dense mature forests where prey species are most vulnerable. In some habitats, nest site preference increased with increasing canopy closure and some populations forage in open habitats.

Cumulative Effects Area
Cumulative impacts to northern goshawks are discussed in an outline that focuses on impacts to wildlife species from noise disturbance, direct mortality, and habitat degradation. The boundary for cumulative effects is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions are described in Appendix B.

Environmental Consequences

Alternative A

This alternative could impact to Northern goshawk owls, because under this alternative mountain bikers are allowed to travel off designated routes causing a greater disturbance to wildlife. Also under this alternative there would be no rehabilitation of unauthorized trail routes which means human disturbance would continue to be use in between designated routes throughout the project area causing birds to move during nesting season, which is a critical time and can increase stress and lead to nest abandonment. Mountain bikers would continue to use unauthorized trails, one of which passes through a known post fledgling area (PFA). While this could directly impact active nests along the trail, the impact could be minimal as long as mountain bikers stay on their bikes and do not stop in the area. Nest abandonment is not expected unless forest visitors harass the bird, which could cause the adult to abandon its nest.

If mountain bikers are within the PFAs for a period of time and making a lot of noise this could cause birds to react to noise disturbances by changing behavior and/or flushing from their perches. These PFAs are near motorized roads and have regular use on these roads but surveys have shown birds continued to remain in the area. The presents of mountain bikers is not expected to have a critical impact on the species or lead toward a negative trend. Individuals may get spooked from an area but would return once the bikers have passed. The current mountain bike trails along with the unauthorized trails are expected to have some impact to prey species. Trails pass through suitable habitat and could disturb small species such as rabbits, squirrel, and gophers, upon which goshawks are known to prey. Bikers may run over small mammals that get spooked and run across the trial they are on. This impact is not expected to cause a negative trend in species viability.

Indirect effects are expected for Northern goshawk because under this alternative rehabilitation of unauthorized routes would not occur, which could lead to increase illegal motorized use. Security zones for wildlife between the motorized routes would be reduced even further, as the habitat becomes increasingly more fragmented. Unrestricted winter and summer use would increase disturbance (noise) impacts to wildlife incrementally over time. Impacts will become additive, as motorized use increases, and private land development increases as well. User-created trails can be expected to increase erosion, which can have impacts to surrounding habitats far greater than just the trail surface itself (down-cutting and side channeling, as a result of heavy rains). New user-created trails would receive increasing use from all types of recreation users over time (mountain bikes, horses, OHVs) adding to the current density of trails and roads by an as yet unknown amount. A determination for this Alternative is: “May Impact Species but Would Not Result in a Trend toward Federal Listing or Loss of Viability” for the Northern Goshawk.

Cumulative Effects

Mountain bike use on designated routes and trails could be expected to increase in the future, as well as other recreational activities such as OHV use, horseback riding, and hiking. Many areas where cattle grazing, timber harvesting and prescribed burning are ongoing, could have an effect to Northern goshawk. Birds would have to find other areas for security during times when human disturbance is present, meaning their habitat could be fragmented and less secure.

Alternative B

Portions of the proposed mountain bike trails travel through five PFAs, which could have a direct impact if there is an active nest along the trail. This impact could be minimal if mountain bikers

stay on their bikes and do not stop in the area. Nest abandonment is not expected unless members of the public harass the bird which could cause the adult to abandon its nest. Also these PFAs are near motorized roads and have heavy use. Surveys have shown the birds continued to remain in the area which means this action is expected to have minimal impacts. The presents of mountain bikers is not expected to have a negative impact or lead to federal listing. Impacts would be greatest from March 30th through September 30 when birds are nesting and raising their young. Also these areas receive relatively significant snow fall which reduces mountain bike use until the snow has melted and the trail has had time to dry out, which means these areas could see use later in the spring. No impacts are expected from October 1 through February 28 because this is outside of the breeding season.

Rehabilitation of the unauthorized routes may cause wildlife to leave the area while work is ongoing, but once the work is complete wildlife is expected to return to the area. In areas of nesting goshawks, this would occur outside the breeding season which would eliminate this impact.

No direct effects are expected for the installation of cattle guards or the construction of new trailheads because this will occur outside of the breeding season (September 1- February 28) in areas of restricted and nesting habitat. Also the locations of the trailheads are not within the immediate areas of roosting/foraging/nesting habitat and are along motorized roads with regular disturbance.

If mountain bikers are within the PFA for a period of time and causing significant noise disturbance, birds may react by changing behavior and/or flushing from their perches. These PFAs are near motorized roads and have heavy use on these roads but surveys have shown birds continued to remain in the area. The presence of mountain bikers is not expected to have a critical impact on the species or lead toward a negative trend. Individuals may get spooked from an area but would return once the bikers have passed. Mountain bike trails are expected to have some impact to prey species. Trails go through suitable habitat and could disturb small species such as rabbits, squirrel, and gophers on which goshawks are known to prey. Bikers may run over small mammals that get spooked and run across the trial they are on. This impact is not expected to cause a negative trend in species viability.

Rehabilitation of unauthorized routes is expected to reduce degradation to all habitat types within the project area which could improve vegetation for prey species. This action would limit human disturbance and minimize fragmentation of the landscape. Work would be done outside of the breeding season in areas of PFAs or restricted habitat to avoid negative effects to northern goshawks.

Installation of cattle guards and construction/ redesign of trailheads are not expected to have effects on goshawks because installation would occur outside of the breeding season within PFAs, and many of them are within areas already disturbed and along high traffic motorized roads outside of suitable foraging and nesting habitat. No effects are expected from construction of new mountain bike trails because this would occur outside the breeding season and would not alter goshawk habitat. A determination for Alternative B is: “May Impact Species but Would Not Result in a Trend toward Federal Listing or Loss of Viability” for the Northern goshawk.

Cumulative Effects

The cumulative effects to Northern goshawk from past, present, and reasonably foreseeable future activities, including Alternative B would be disturbance and habitat loss. The

combination of mountain bike travel off existing trails and roads and ongoing projects could potentially reduce short term forage recovery (and wildlife security).

Alternative C
Under this alternative, the effects to Northern goshawk would be similar to those described for Alternative B. Direct effects to goshawk may occur but is expected to be minimal. Alternative C would result in about 256 miles of mountain bike trails, which is 47 miles more than Alternative B. However, less than two miles of new trail is located along the edge of two PFAs, which is not expected have any additional impact to the overall viability of the Northern goshawk. Impacts will be the same as Alternative B. A determination for Alternative C is: "May Impact Species but Would Not Result in a Trend toward Federal Listing or Loss of Viability" for the Northern goshawk.

Cumulative Effects
The cumulative effects to Northern goshawk from past, present, and reasonably foreseeable future activities, including Alternative C would be the same as those described for Alternative B.

Alternative D
Alternative D would result in approximately 149 miles of mountain bike trails, which is 60 miles less than Alternative B. The proposed mountain bike trails would pass through three PFAs under this alternative. Impacts are expected to be the same as Alternative B. A determination for this alternative is: "May Impact Species but Would Not Result in a Trend toward Federal Listing or Loss of Viability" for the Northern goshawk.

Cumulative Effects
The cumulative effects to Northern goshawk from past, present, and reasonably foreseeable future activities, including Alternative C would be the same as those described for Alternative B.

Spotted bat

Affected Habitat

The spotted bat ranges from Mexico through the western states to the southern border of British Columbia. It is found in various habitats from desert to montane coniferous stands, including open ponderosa pine, pinyon-juniper woodland, canyon bottoms, open pasture, and hayfields. Speculation has been made that captures outside coniferous forests reflect post-breeding wandering (NatureServe, 2008). Many bats in New Mexico were caught over waterholes near a sandstone cliff with numerous vertical cracks (NatureServe, 2008). The spotted bat is a relatively specialized feeder, subsisting almost entirely on moths. It catches all its prey in the air, in contrast to some bats which glean insects from vegetation or the ground. Some moth species can hear the high-frequency echolocation calls of many bats, and take evasive action to avoid being captured. The spotted bat however, has calls of lower frequency which are outside the hearing range of most moths, allowing it to successfully capitalize on this widespread source of food (Blood 1993).

Environmental Consequences

Alternative A
This alternative could have an impact to spotted bats which may impact species but would not result in a trend toward federal listing or loss of viability because there would be no

rehabilitation of unauthorized routes. This means that human disturbance would continue to occur in meadows and grass/shrub areas, reducing foraging habitat.

Mountain bikers would be allowed to travel off designated routes under this alternative but this action is not expected to have a big impact on spotted bats because they are active after sunset when mountain bikers are less active. Interaction expected between the two is expected to be minimal.

Indirect effects are expected for spotted bats because rehabilitation of unauthorized routes would not occur, leading to increased use. Security zones for wildlife between the routes would be reduced even further, as the habitat becomes increasingly more fragmented. Unrestricted winter and summer use would increase disturbance (noise) impacts to wildlife incrementally over time. Impacts will become additive, as use increases, and private land development increases as well. User-created trails can be expected to increase erosion, which can have impacts to surrounding habitats far greater than just the trail surface itself (down-cutting and side channeling, as a result of heavy rains). New user-created trails would receive increasing use from all types of recreation users over time (mountain bikes, horses) adding to the current density of trails and roads by an as yet unknown amount.

Alternative B

Impacts under Alternative B are expected to be minimal. Bats are most active at night when mountain bikers are not usually riding along the trails, which reduces the chance of a mountain biker coming into direct contact with a bat. Rehabilitation of unauthorized routes may impact tree dwelling bats in the short term, but once rehabilitation of an area is complete, no negative impacts are expected for the bat.

Construction and redesign of trailheads and cattle guards is not expected to cause an impact for spotted bats because, again, the work would occur in open areas where the bat is not expected to dwell during daylight hours, and these trailheads are located in already disturbed areas near high traffic roads.

Indirect effects are expected for spotted bats. If mountain bikers are within their habitat for a period of time and making a lot of noise this could cause birds to react to noise disturbances by changing behavior and/or flushing from their perches. The presence of mountain bikers is not expected to have a critical impact on the species or lead toward a negative trend. Individuals may get spooked from an area but would return once the bikers have passed. This impact is not expected to cause a negative trend in species viability which should not lead spotted bats toward a negative trend.

Rehabilitation of unauthorized routes is expected to reduce degradation to all habitat types within the project area which could improve vegetation for prey species. Closing these unauthorized routes would limit human disturbance and minimize fragmentation of the landscape.

Installation of cattle guards and construction/redesign of trailheads is not expected to have an effect on spotted bats because many of them are within areas already disturbed and along active motorized roads outside of suitable foraging and nesting habitat. No effects are expected from construction of new mountain bike trails because vegetation is not expected to be altered, such as large trees being cut down.

Alternative C
Under this alternative, the effects to spotted bat would be similar to those described for Alternative B; direct impacts to bats would be minimal. Alternative C would result in about 256 miles of mountain bike trails, which is 47 miles more than Alternative B. This is not expected to have any additional impact to the overall viability of spotted bats. A determination for this alternative is: "May Impact Species but Would Not Result in a Trend toward Federal Listing or Loss of Viability" for spotted bat.

Alternative D
Alternative D would result in approximately 149 miles of mountain bike trails, which is 60 miles less than Alternative B. Proposed mountain bike trails go through suitable habitat under this alternative. Impacts are expected to be the same as Alternative B. A determination for this alternative is: "May Impact Species but Would Not Result in a Trend toward Federal Listing or Loss of Viability" for spotted bats.

Gunnison's prairie dog

Affected Habitat
Gunnison's prairie dogs are usually found in areas with grassland/herbaceous and shrubland areas. High mountain valleys and plateaus at elevations of 1,830 – 3,660 meters, as well as open or slightly brushy country, sometimes with scattered junipers and pines is the preferred habitat type. They can be found mostly in areas with high abundance of native plants. They occupy burrows usually on slopes or in hummocks. Gunnison's prairie dogs are herbivorous (www.natureserve.org).

Environmental Consequences

Alternative A
This alternative could have an impact to Gunnison's prairie dog, which may impact species but would not result in a trend toward federal listing or loss of viability because under this alternative there would be no rehabilitation of unauthorized routes, which means human disturbance would continue to occur in meadows and grass/shrub areas, reducing foraging habitat.

Mountain bikers would be allow to travel off designated routes under this alternative, which could have a direct impact to this species because individuals could be run over by mountain bikers who do not see them or cannot stop in time when a prairie dog crosses their path.

Indirect effects are expected for Gunnison's prairie dogs because rehabilitation of unauthorized routes would not occur, which could lead to increase motorized use. Security zones for wildlife between the motorized routes would be reduced even further, as the habitat becomes increasingly more fragmented. Unrestricted winter and summer use would increase disturbance (noise) impacts to wildlife incrementally over time. Impacts will become additive, as motorized use increases, and private land development increases as well. User-created trails can be expected to increase erosion, which can have impacts to surrounding habitats far greater than just the trail surface itself (down cutting and side channeling, as a result of heavy rains). New user-created trails would receive increasing use from all types of recreation users over time (mountain bikes, horses, OHVs) adding to the current density of trails and roads by an as yet unknown amount.

Alternative B
Impacts under this alternative are expected to be minimal. Mountain bikers could have a direct impact to this species because and individual can be run over by mountain bikers who do not see them or cannot stop in time when a prairie dog crosses their path. Rehabilitation of unauthorized routes may impact their habitat in the short term, but once an area is complete no negative impacts are expected for the prairie dog.

Construction and redesign of trailheads and cattle guards are not expected to cause an impact for Gunnison's prairie dogs because again the work would occur in open areas where the prairie dog is not expected to dwell during daylight hours, also these trailheads are located in already disturbed areas near high traffic roads.

Indirect effects are expected for Gunnison's prairie dogs. If mountain bikers are within their habitat for a period of time and making a lot of noise this could cause prairie dogs to react to noise disturbances by changing behavior. The presence of mountain bikers is not expected to have a critical impact on the species or lead toward a negative trend. Individuals may get spooked from an area but would return once the bikers have passed. This impact is not expected to cause a negative trend in species viability.

Rehabilitation of unauthorized routes is expected to reduce degradation to all habitat types within the project area which could improve vegetation for prey species. Closing these unauthorized routes would limit human disturbance and minimize fragmentation of the landscape.

Installation of cattle guards and construction/ redesign of trailheads are not expected to have an effect on Gunnison's prairie dogs because many of them are within areas already disturbed and along active motorized roads outside of suitable foraging. No effects are expected from construction of new mountain bike trails because prairie dogs are mostly underground. If a trail intersects a colony of prairie dogs, they will use other holes to access dens. A determination for this Alternative is: "May Impact Species but Would Not Result in a Trend toward Federal Listing or Loss of Viability" for Gunnison's Prairie dogs.

Alternative C
Under this alternative, the effects to spotted bat would be similar to those described for Alternative B; direct impacts to prairie dogs may occur. Alternative C would result in about 256 miles of mountain bike trails, which is 47 miles more than Alternative B. This is not expected to have any additional impact to the overall viability of Gunnison's prairie dogs. A determination for this Alternative is: "May Impact Species but Would Not Result in a Trend toward Federal Listing or Loss of Viability" for Gunnison's Prairie dogs.

Alternative D
Alternative D would result in approximately 149 miles of mountain bike trails, which is 60 miles less than Alternative B. Proposed mountain bike trails go through suitable habitat under this alternative. Impacts are expected to be the same as Alternative B. A determination for this alternative is: "May Impact Species but Would Not Result in a Trend toward Federal Listing or Loss of Viability" for Gunnison's prairie dogs.

Zuni milkvetch

Affected Habitat

This species is limited to the Zuni and Datil Mountains of New Mexico (Fletcher 1978). It is found in gravelly clay banks and knolls, in dry, alkaline soils derived from sandstone, in pinon-juniper woodlands; from 6,200 – 7,900 feet in elevation. This plant is perennial; plants are low, tufted, stemless or with short stem (4 to 6 cm long), stems are prostrate; herbage usually silvery; foliage densely strigose with rather coarse straight and parallel, appressed, dolabriform hairs; stipulaes not connate; leaves 2-6.5 cm long; leaflets 7-15, obovate to oval, 2-8 cm long, prostrate in fruit; inflorescence (3) 5-14 flowered, axis little elongating in fruit; calyx 4.5-5 mm long, with mixed black and white or sometimes all white hairs; flowers pea-like; petal ochroleucous with indistinct lilac veins, or banner and wings distally tinged with dull lilac, longest petals (wings) 7.5-9 mm long; banner abruptly recurved 90-100 degrees, 7-8.3 mm long; pod spreading or ascending, long-persistent, plumply ovoid or oblong-ellipsoid, $\pm$ straight, 9-18 mm long, 4-7 (8) mm in diameter, rounded at base, abruptly contracted at tip into a stout cusp, exterior fleshy, green, smooth, strigulose, becoming leathery, brown or black, roughly netlike, either no septum or a rudimentary one up to 1.2 mm wide, dehiscing apically and ultimately through the length of the ventral (adaxial or upper) suture, the tips curling backward and gaping to release the seeds. This species flowers March through August.

Cumulative Effects Area
The boundary for cumulative effects is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions are described in Appendix B.

Environmental Consequences

Alternative A
Effects to this species are expected because mountain bikes are allowed off designated roads and this could degrade suitable habitat where Zuni milkvetch occurs. Impacts from bikes traveling off road could reduce suitable habitat. Rehabilitation of unauthorized routes would not take place, allowing motorist to travel in areas where Zuni milkvetch may occur; this could have a negative effect to the plant. The determination of effects under Alternative A is: "May affect species, not likely to adversely affect species or its habitat."

Cumulative Effects
Mountain bike use on designated routes and trails could be expected to increase in the future, as well as other recreational activities such as OHV use, horseback riding, and hiking. All these increased activities will cause disturbance for a longer period during daylight hours (more people, less time the trails remain unused). Many areas where cattle grazing, timber harvesting and prescribed burning are ongoing, could have an effect to the Zuni milkvetch: reduction in areas available for population expansion.

Alternatives B, C, and D
Effects may occur because mountain bikers would be allowed to travel off designated mountain bike routes where the Zuni milkvetch may occur. Effects are not expected to be adverse because the width of the trail is less than a foot and there is suitable habitat for this plant to grow in the surrounding area. Construction of trail would have a limited effect on the Zuni milkvetch.

Rehabilitating unauthorized routes could have a positive impact for the Zuni milkvetch because closing these unauthorized routes would limit human disturbance and minimize fragmentation of the landscape. Returning routes to the point where vegetation can grow could give the Zuni milkvetch more areas to grow without disturbance.

Installation of cattle guards and construction of trailheads are not expected to have an effect on the Zuni milkvetch because these areas are already disturbed and near high traffic roads. The determination of effects under these Alternatives B, C, and D is: "May affect species, not likely to adversely affect species or its habitat."

Cumulative Effects
The cumulative effects to Zuni milkvetch from past, present, and reasonably foreseeable future activities, including Alternatives B, C, and D would be a reduction in areas available for population expansion.

Villous groundcover milkvetch

Affected Habitat
This plant prefers sandy soils of volcanic origin on slopes, benches, and ledges in xeric pine forest; from 7,250-8,150 feet in elevation. This plant is perennial; pubescence gray-villous, villosulous, or subtomentose, the longer hairs basifixed, the shorter dolabriform; stems prostrate, divaricately branched, 1-5.5 dm long; stipules near base of stem 2.5-8 mm long, fully encircling the stem; leaves 1-5 cm long, with 11-15 narrowly lanceolate to ovate, usually acute leaflets 2-14 mm long; racemes 3-15 flowered, the axis 1-3 cm long in fruit; petals white, or whitish and faintly pink-tined, banner 7-9.2 mm long, wings slightly shorter than banner, keel 5.1-6.2 mm long, the blade half-ovate and incurved about 90 degrees to the sharply deltoid apex; pods usually lying on ground at maturity, sessile, 1-celled, 8-10 mm long, thinly papery, strigulose-villosulous, lunately half-ellipsoid, incurved through ¼-1/2 circle, laterally compressed and obscurely 3-sided, low-convex or shallowly grooved dorsally in lower half, carinate ventrally by the suture, cuspidate at apex; ovules 6-9.

Cumulative Effects Area
The boundary for cumulative effects is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions are described in Appendix B.

Environmental Consequences

Alternative A
Effects to this species are expected because mountain bikes are allowed off designated roads and this could degrade suitable habitat where villous groundcover milkvetch occurs. Impacts from bikes traveling off road could reduce suitable habitat. Rehabilitation of unauthorized routes would not take place, allowing motorists to travel in areas where the villous groundcover milkvetch may occur, which could have a negative effect on the plant. The determination of effects under Alternative A is: "May affect species, not likely to adversely affect species or its habitat."

Cumulative Effects
Mountain bike use on designated routes and trails could be expected to increase in the future, as well as other recreational activities such as OHV use, horseback riding, and hiking. All these increased activities will cause disturbance for a longer period during daylight hours (more people, less time the trails remain unused). Many areas where cattle grazing, timber harvesting and prescribed burning are ongoing, could have an effect to the villous groundcover milkvetch: reduction in areas available for population expansion.

Alternatives B, C, and D
Effects may occur because mountain bikers would be allowed to travel off designated mountain bike routes where the villous groundcover milkvetch may occur. Effects are not expected to be adverse because the width of the trail is less than a foot and there is suitable habitat for this plant to grow in the surrounding area. Construction of trail would have a limited effect on the villous groundcover milkvetch.

Rehabilitating unauthorized routes could have a positive impact for the villous groundcover milkvetch because human disturbance would be limited and fragmentation of the landscape would be minimized. Returning routes to the point where vegetation can grow could give the villous groundcover milkvetch more areas to grow without disturbance.

Installation of cattle guards and construction of trailheads is not expected to have an effect on the villous groundcover milkvetch because they are within areas already disturbed and near high traffic roads. The determination of effects under Alternatives B, C, and D is: "May affect species, not likely to adversely affect species or its habitat."

Cumulative Effects
The cumulative effects to villous groundcover milkvetch from past, present, and reasonably foreseeable future activities, including Alternatives B, C, and D would be a reduction in areas available for population expansion.

Sivinski's fleabane

Affected Habitat
This species is found in chinle shale in pinon-juniper woodland and Great Basin desert scrub; from 6,100-7,400 feet in elevation. It is a perennial herb arising from a thick taproot with numerous, short (1-3 cm), ascending erect caudex branches, the upper portion of these with persistent old leaf bases; stems erect, 5-8 cm tall, unbranched green, sparsely short-strigose with white, stiff, closely appressed trichomes, evenly distributed, even in length, 0.2-0.3 mm long; leaves green, similar in vestiture to the stems, arising in dense basal clusters from the caudex apices, erect to ascending, linear, 9-34 mm long, 0.5-0.8 mm wide, thickened, slightly flaring at the very base; stem leave strictly ascending and continuing relatively unreduced in size half way to nearly all the way up the stems; heads solitary, terminal, involucre cup-shaped, 10-14 mm wide, (pressed); phyllaries in 2-3 subequal series, 5-7 mm long, narrowly lanceolate with attenuate-filiform apices, minutely but prominenetly granular-grandular, the out also sparsely pilose with a few crisped-spreading hairs arising centrally; ray florets 21-33, the corollas 7-10 mm long, 1.0-2.4 mm wide, white, drying pinkish, distinctly coiling from the apices with maturity; disk corollas 3.6-4.2 mm long, narrowly funnelform, glabrate; stripe branches 0.5-0.6 mm long; achenes 2(-3) nerved, narrowly oblong, 2.8-3.1 mm long, the faces glabrous, the margins sparsely ciliate; pappus of 20-27 barbellate bristles. This species flowers primarily in May and June.

Cumulative Effects Area
The boundary for cumulative effects is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions include are described in Appendix B.

Environmental Consequences

Alternative A
Effects to this species are expected because mountain bikes are allowed off designated roads and this could degrade suitable habitat where Sivinski's fleabane occurs. Impacts from bikes traveling off road could reduce suitable habitat. Rehabilitation of unauthorized routes would not occur, allowing motorist to travel in areas where the Sivinski's fleabane may occur, which could have a negative effect on the plant. The determination of effects under Alternative A is: "May affect species, not likely to adversely affect species or its habitat."

Cumulative Effects
Mountain bike use on designated routes and trails could be expected to increase in the future, as well as other recreational activities such as OHV use, horseback riding, and hiking. All these increased activities will cause disturbance for a longer period during daylight hours (more people, less time the trails remain unused). Many areas where cattle grazing, timber harvesting and prescribed burning are ongoing, could have an effect to the Sivinski's fleabane: reduction in areas available for population expansion.

Alternatives B, C, and D
Effects may occur because mountain bikers would be allowed to travel off designated mountain bike routes where the Sivinski's fleabane may occur. Effects are not expected to be adverse because the width of the trail is less than a foot and there is suitable habitat for this plant to grow in the surrounding area, so construction of trail would have a limited effect on the Sivinski's fleabane.

Rehabilitating unauthorized routes could have a positive impact for the Sivinski's fleabane because it would limit human disturbance and minimize fragmentation of the landscape. Returning routes to the point where vegetation can grow could give the Sivinski's fleabane more areas to grow without disturbance.

Installation of cattle guards and construction of trailheads are not expected to have an effect on the Sivinski's fleabane because these areas are already disturbed and near high traffic roads. The determination of effects under Alternatives B, C, and D is: "May affect species, not likely to adversely affect species or its habitat."

Cumulative Effects
The cumulative effects to Sivinski's fleabane from past, present, and reasonably foreseeable future activities, including Alternatives B, C, and D would be a reduction in areas available for population expansion.

Arizona Leatherflower and Clustered Leatherflower

Affected Habitat
Stems generally simple, erect. Leaf blade: primary leaflets 7-13 or not distinctly differentiated; leaflets and larger lobes narrowly linear to narrowly lanceolate, 1-6 cm × 0.5-6(-10)mm; surfaces nearly glabrous to densely silky-hirsute. 2 n = 16.

It flowers in spring and summer. Moist mountain meadows, prairies, and open woods and thickets; 700-3300 m; Ariz., Colo., Idaho, Mont., N.Mex., Oreg., Utah, Wash., Wyo.

Plants from the vicinity of Flagstaff, Coconino County, Arizona (and in post-1943 identifications, some from New Mexico), with the lobes of the leaflets ca. 1 mm wide, were recognized by R. O. Erickson (1943) as *C. hirsutissima var. arizonica* , but these scarcely appear to constitute a distinct taxon; some plants from Washington, Oregon, Colorado, and elsewhere have leaflets quite as narrowly lobed, and other plants in the Flagstaff area have more widely lobed leaflets. The widely spreading leaves allegedly characteristic of *C. hirsutissima var. arizonica* likewise occur elsewhere in the range of the species. *Clematis hirsutissima var. hirsutissima*, as circumscribed here, is highly variable in the density of leaf pubescence throughout most of its range.

Cumulative Effects Area
The boundary for cumulative effects is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions are described in Appendix B.

Environmental Consequences

Alternative A
Effects to this species are expected because mountain bikes are allowed off designated roads and this could degrade suitable habitat where Arizona leatherflower occurs. Impacts from bikes traveling off road could reduce suitable habitat. Rehabilitation of unauthorized routes would also not occur, allowing motorists to travel in areas where the leatherflower may occur, which could have a negative effect on the plant. The determination of effects under Alternative A is: “May affect species, not likely to adversely affect species or its habitat.”

Cumulative Effects
Mountain bike use on designated routes and trails could be expected to increase in the future, as well as other recreational activities such as OHV use, horseback riding, and hiking. All these increased activities will cause disturbance for a longer period during daylight hours (more people, less time the trails remain unused). Many areas where cattle grazing, timber harvesting and prescribed burning are ongoing, could have an effect to the leatherflower: reduction in areas available for population expansion.

Alternatives B, C, and D
Effects may occur because mountain bikers would be allowed to travel off designated mountain bike routes where the leatherflower may occur. Effects are not expected to be adverse because the width of the trail is less than a foot and there is suitable habitat for this plant to grow in the surrounding area, so construction of trail would have a limited effect on the leatherflower.

Rehabilitating unauthorized routes could have a positive impact for the leatherflower because human disturbance would be limited and fragmentation of the landscape would be minimized. Returning routes to the point where vegetation can grow could give the leatherflower more areas to grow without disturbance.

Installation of cattle guards and construction of trailheads are not expected to have an effect on the leatherflower because they are within areas already disturbed and near high traffic roads. The determination of effects under Alternatives B, C, and D is “May affect species, not likely to adversely affect species or its habitat.”

Cumulative Effects
The cumulative effects to leatherflower from past, present, and reasonably foreseeable future activities, including Alternatives B, C, and D would be a reduction in areas available for population expansion.

Chaco milkvetch

Affected Habitat
Perennial herb; stems 5-30 cm long, prostrate, silvery-hairy, bearing densely crowded small leaves; leaves 4-20 mm long, pinnately compound with 3-9 leaflets; flowers usually solitary or in pairs, pea-like, about 6 mm long, petals greenish-white with pale purple veins or tips; pods ovoid, 4-5 mm long, slightly longer than broad, unilocular, the tip forming a flattened beak. It flowers in July and August.

Similar Species: Astragalus humistratus and A. chuskanus both have a similar prostrate (humistrate) growth form, but both have leaves and flowers at least twice the size of A. micromerius. Also, most of the hairs of A. humistratus are attached in the middle leaving both ends free (dolabriform), whereas A. micromerius and A. chuskanus have basally attached hairs.

Found on gypseous or limy sandstones in piñon-juniper woodland or Great Basin desert scrub; 2,000-2,250 m (6,600-7,300 ft).This diminutive endemic is usually associated with outcrops of sandstone that are blended with Todilto gypsum or limestone. It has a fairly wide range, but is sporadically distributed in isolated populations (NMRPTC 1999).

Cumulative Effects Area
The boundary for cumulative effects is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions are described in Appendix B.

Environmental Consequences

Alternative A
Effects to this species are expected because mountain bikes are allowed off designated roads and this could degrade suitable habitat where Chaco milkvetch occurs. Impacts from bikes traveling off road could reduce suitable habitat. Rehabilitation would also not occur, allowing motorists to travel in areas where Chaco milkvetch may occur, which could have a negative effect on the plant. The determination of effects under Alternative A is: “May affect species, not likely to adversely affect species or its habitat.”

Cumulative Effects
Mountain bike use on designated routes and trails could be expected to increase in the future, as well as other recreational activities such as OHV use, horseback riding, and hiking. All these increased activities will cause disturbance for a longer period during daylight hours (more people, less time the trails remain unused). Many areas where cattle grazing, timber harvesting and prescribed burning are ongoing, could have an effect to Chaco milkvetch: reduction in areas available for population expansion.

Alternatives B, C, and D
Effects may occur because mountain bikers would be allowed to travel off designated mountain bike routes where Chaco milkvetch may occur. Effects are not expected to be adverse because

the width of the trail is less than a foot and there is suitable habitat for this plant to grow in the surrounding area, so construction of trail would have a limited effect on Chaco milkvetch.

Rehabilitating unauthorized routes could have a positive impact for Chaco milkvetch because human disturbance would be limited and fragmentation of the landscape would be minimized. Returning routes to the point where vegetation can grow could give Chaco milkvetch more areas to grow without disturbance.

Installation of cattle guards and construction of trailheads are not expected to have an effect on Chaco milkvetch because they are within areas already disturbed and near high traffic roads. The determination of effects under Alternatives B, C, and D is "May affect species, not likely to adversely affect species or its habitat."

Cumulative Effects
The cumulative effects to Chaco milkvetch from past, present, and reasonably foreseeable future activities, including Alternatives B, C, and D would be a reduction in areas available for population expansion.

Wildlife – Management Indicator Species

The Forest Service is charged with managing all renewable resources, including wildlife, on National Forest lands. This obligation was enacted by Congress and set forth in the National Forest Management Act (NFMA) of 1976. As a federal law, the NFMA is the primary statute governing the administration of National Forests. The Forest Service first promulgated regulations implementing NFMA in September, 1979, and subsequently revised them in 1982 (known as the 1982 Rule). The 1976 legislation requires the Secretary of Agriculture to assess forest lands, and develop and implement a land and resource management plan for each unit of the National Forest System. These management plans, commonly known as forest plans, guide management activities on each National Forest. Therefore, site-specific projects proposed on national forests must comply with the applicable forest plan or the plan must be amended.

The 1982 regulations require forest plans to manage fish and wildlife habitat so viable populations of existing native and desired nonnative vertebrate species are maintained in the planning area (i.e., each individual National Forest). Under the 1982 regulations, a viable population is regarded as one that has the estimated numbers and distribution of reproductive individuals to insure its continued existence, is well distributed in the planning area, and that habitat must be well distributed so that those individuals can interact with others in the planning area.

Because it is impossible to address the thousands of species that occur on National Forests, the use of Management Indicator Species (MIS) serves as a barometer for more than the selected species and a surrogate for addressing other species' ecological needs. As directed by NFMA and the 1982 Rule, each forest plan identifies and selects certain vertebrate, invertebrate, or plant species present in each National Forest as MIS because ―their population changes are believed to indicate the effects of management activities (36 CFR 219.19(a)(1)).

Additionally, the 1982 regulations require that population trends of the management indicator species will be monitored and relationships to habitat changes determined (36

CFR 219.19(a)(6)). Forest Service Manual (FSM) 2621.1 defines management indicators as plant and animal species, communities or special habitats, selected for emphasis in planning, and which are monitored during forest plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent (FSM 2620.5). Therefore, important characteristics of MIS are that they have narrow habitat associations, representing ecosystem components important to multiple species, and are capable of being effectively monitored.

Under the 1982 Rule, Forest Service officials have broad discretion to select MIS. The deciding official, using information provided by an interdisciplinary planning team, determines whether the population changes of certain species are ―believed to indicate the effects of management activities. The 1982 Rule specifies that species are to be selected from various categories ―where appropriate, indicating there is no requirement that all categories of species or habitats be represented. For additional information the 2014 Forest-wide MIS Report to be located in the project record.

Table 3-6. Summary of Forest Service MIS evaluated for the Zuni Mountain Trails EA.

Common Name	Habitat Indicator or Listing Rationale	Habitat Description	Habitat Present in Project Area?	Analysis in Impacts Section?
Elk	Mtn. Grassland/mixed conifer	Elk require some element of escape and protection. Elk use dense cover for seclusion away from disturbance, and as thermal protection. Elk consume a combination of grasses, forbs, and shrubs.	Yes	Yes
Mule deer	Pinyon-juniper	Mule Deer occur in coniferous forests, desert shrubs, chaparral, grasslands with shrubs, and are often associated with early successional vegetation.	Yes	Yes
House wren	Riparain	In western foothills and mountains, found in deciduous or mixed deciduous-coniferous woodlands in canyons and riparian areas, in open ponderosa pine and Douglas fir parklands, in piñon-juniper, oak, and walnut woodlands, up to 3,000m in aspen groves and at edges or in clear-cut or thinned areas of denser montane coniferous forests.	Yes	Yes
Juniper titmouse	Pinion-juniper	Prefers warm, dry habitats of open woodland. Most common where juniper is dominant and where large, mature trees are present to provide natural cavities for nesting. In the Southwest, piñon-juniper woodland may be mixed with deciduous or evergreen oaks.	Yes	Yes
Red-breasted nuthatch	Spruce-fir	Typically mature and diverse stands of coniferous forest, especially where spruce, fir, pine, hemlock, larch, and cedar are present, and less frequently in pure stand of pine and hemlock. May also breed in mixed woodland when strong coniferous component is associated with deciduous trees such as aspen, oak and poplar.	No	No
Black bear	Spruce-fir/Mixed conifer	Black bears require some element of escape and protection. Black bears use dense cover for seclusion away from disturbance, and as thermal protection.	Yes	Yes
Pygmy nuthatch	Ponderosa pine	Shows a strong and almost exclusive preference for long-needled pine forests. Range almost co-extensive with that of ponderosa pine, Jeffrey pine, and similar species.	Yes	Yes
Hairy woodpecker	Mixed conifer	Primarily a forest bird; widely distributed in regions where mature woodlands prevalent. Also occurs in small woodlots, wooded parks, cemeteries, shaded residential areas, and other urban areas with mature shade trees, but often scarce within these habitats. In the southwest some preference for open pine forest.	Yes	Yes

Common Name	Habitat Indicator or Listing Rationale	Habitat Description	Habitat Present in Project Area?	Analysis in Impacts Section?
Red-naped sapsucker	Deciduous forest	Breeds in deciduous and mixed woodlands including aspen groves in open ponderosa pine forests, aspen-fir parklands, logged forests where deciduous groves remain, aspen groves in open rangeland, birch groves, mountane coniferous forest and occasionally, supblpine forest edges and residential gardens.	Yes	No
Merriam's wild turkey	Ponderosa pine	Not regularly found below the piñon-juniper zone and seldom occur where this does not adjoin a higher area with ponderosa pine for nesting and brood range. Historic merriami range includes both piñon-juniper and chaparral brush.	Yes	Yes
Long billed curlew	Plains grassland	Nests primarily in short grass or mixed prairie habitat with flat to rolling topography. Habitats with trees, high density shrubs and tall, dense grass generally avoided.	No	No
Grasshopper sparrow	Plains grassland	Prefers moderately open grasslands and prairies with patchy bare ground; they select different components of vegetation, depending on grassland ecosystem. Occupies lush areas with shrub cover in arid grasslands of the Southwest and West but selects sparser vegetation in East and Midwest, e.g., tallgrass and short grass prairie.	No	No
Rio Grande turkey	Eastern riparian	Occupies semiarid areas. Mostly found in mesquite grasslands. Principal tree species, usually in more mesic sites, are live oak, pecan, American elm, cedar elm, sugar hackberry, net leaf hackberry and cottonwood.	No	No

Rocky Mountain Elk

According to the Environmental Impact Statement (EIS) for the ALRMP, mountain grasslands were determined to cover approximately one percent of the total area on the Forest (page 142). Mountain grasslands are now estimated to cover 179,444 acres (11%). The most recent analysis indicates the quantity of mountain grassland acres has changed due primarily to the way grasslands are classified and some shifting upon the landscape. This habitat type is well represented and distributed across all four mountain districts of the Cibola National Forest and the habitat trend is currently considered stable.

Since elk are highly mobile and reclusive, determining actual numbers and trends for a project area is impractical. Elk numbers are currently held in check by hunting, both sport and depredation. Mountain grasslands or mixed conifer habitat condition and distribution have not proven to be a limiting factor for population expansion. This leads to speculation that the assumptions made during the analysis for the ALRMP, which led to the selection of elk as an MIS for mountain grassland and mixed conifer habitat conditions may not have been correct. Population levels will instead be determined by hunting pressure.

Mule Deer

According to the EIS for the ALRMP, mountain shrubs were determined to cover approximately seven percent of the total acres on the Forest (page 142). Now mountain shrub habitat occurs on four percent of the total. Mountain shrub is estimated to cover 69,731 acres. The amount of mountain shrub habitat has decreased due to tree encroachment since approval of the ALRMP, largely due to fire suppression. These acres will continue to degrade and decrease unless landscape scale fires or other vegetation treatments occur within the next 10 to 20 years indicating a downward trend for mountain shrub habitat.

Mountain shrub and piñon-juniper habitat have not proven to be a limiting factor for population expansion. Naturally this brings into question the assumptions made during analysis for the ALRMP, which led to the use of mule deer as an MIS for mountain shrub and piñon-juniper habitat conditions. The mule deer population trend on the Forest is downward.

Juniper titmouse

In July 1985, piñon-juniper was estimated to cover 33 percent of the Cibola NF. This habitat type is well represented and distributed across all four mountain Districts of the Cibola NF. This habitat type is now estimated to cover 702,112 acres (44 percent). Piñon-juniper habitat is considered stable on the Forest and the availability of large snags is considered adequate with low to moderate departure from reference conditions.

The juniper titmouse appears to be declining on the Cibola NF, judging by recent counts that are generally lower than average. The overall negative trend for NM, suggests a future downward trend on the Cibola National Forest.

Black Bear

According to the EIS for the ALRMP, spruce fir was determined to cover approximately 6,356 acres on the Cibola NF representing about one percent of the total Forest (page 142). The most recent analysis indicates the quantity of spruce-fir habitat has changed slightly representing about 0.48 % of the habitat types due to improved mapping techniques on the Cibola NF. Spruce-fir habitat remains stable. This habitat type is well represented and distributed at the highest elevations of the Sandia, Magdalena and Mt. Taylor Ranger Districts of the Cibola NF.

In 1985, mixed conifer habitat covered approximately four percent of the Cibola NF (ALRMP EIS, p. 142). The most recent estimates indicate that mixed conifer represents 12% of the acreage on the Forest due to improved mapping techniques, rather than an increase in the habitat type. This habitat type is well represented and distributed across all four mountain Districts. The mixed conifer habitat remains stable.

Habitat in general and spruce fir and mixed-conifer in specific, have not proven to be a limiting factor for population expansion. This leads to speculation that the assumptions made during the 1990s, although certainly valid from a public interest point of view, which led to the selection of black bear as an MIS for spruce fir and mixed-conifer conditions may not have been correct. Population levels instead appear to be determined by hunting pressure, and availability of mast as a result of weather patterns. Black bear populations appear to be stable on the Cibola National Forest.

Pygmy nuthatch

In 1985 ponderosa pine was estimated to cover 23 percent of the Forest. Recent calculations estimates there are 702,112 acres of ponderosa pine on the Cibola NF. Ponderosa pine habitat is considered to be stable on the Forest.

Pygmy Nuthatches are seen on the Cibola NF transects in expected numbers. The long term outlook is positive for Pygmy Nuthatch because considerable restoration is planned for ponderosa pine habitat, i.e. it is being thinned and burned allowing for the growth of fewer but larger healthier trees less susceptible to wildfire, insects and disease infestations. The availability of large snags in ponderosa pine habitat is considered adequate with low departure from reference conditions. The population trend for pygmy nuthatch is considered stable on the Cibola NF.

Hairy woodpecker

In 1985 mixed conifer was estimated to cover four percent of the Forest (ALRMP EIS, p. 142). Now mixed conifer represents about 12% of the forest due to the way mixed conifer is mapped using advanced techniques. This habitat type is well represented and distributed across all four mountain Districts of the Cibola NF. Habitat trend for mixed conifer is considered stable.

For a species with low detectability like the hairy woodpecker the Cibola NF surveys are probably more accurate in assessing the local populations since the duration of the count period is longer. The hairy woodpecker is the most widespread MIS bird and one of the most abundant on the Cibola NF. Numbers however are indicating a change from an upward population trend on the Forest to a stable trend. The availability of large snags is considered adequate for this species with low departure from reference conditions.

Merriam's Turkey

In 1985 ponderosa pine was estimated to cover 23 percent of the Cibola NF. Ponderosa pine now covers an estimated 454,780 acres representing about 28 percent of the total Forest acres according to current mapping indicating a stable trend for ponderosa pine habitat. Turkey roost trees and associated stands are generally protected from harvest, although some have certainly been lost to wild fires.

Most mountain ranges in New Mexico support healthy self-sustaining Merriam's turkey populations. Harvest surveys and brood surveys have been conducted to index population trends. Harvest surveys are still performed; however, brood surveys have not been conducted since 1988. The general statewide turkey population trend between the 1920's and the late 1950's was steadily upward based upon hen to poult ratio collected annually. According to the EIS for the ALRMP, the total turkey population for the Forest was estimated at 2,780 birds in 1985 (p. 91). The present statewide population is likely around 31,500 Merriam's turkeys.

Since numbers are subject to fluctuation dictated by annual weather cycles, numbers within the state may tend to vary between 27,000 and 36,000. However, population numbers are expected to increase in the future indicating an upward population trend on the Cibola National Forest (NMDGF Long Range Plan for the Management of Wild Turkey in New Mexico 2001-2005).

Red-naped Sapsucker

In July 1985, deciduous forest was estimated to cover about 1 percent of the Forest. This habitat type is well represented and distributed across all four mountain Districts of the Cibola NF, with larger stands of aspen on the Mt. Taylor Ranger District. Currently this habitat type covers only about 2,733 acres of the Forest. The habitat trend in the deciduous forest remains stable.

Ten of the 32 BBS on the Cibola NF have detected red-naped sapsuckers. The sites on the Cibola NF having these sapsuckers continue to attract them year after year. Routes on the Cibola NF exhibit a stable trend. The fact that these sapsuckers are local does make them vulnerable to habitat loss especially regarding the trend for the mixed conifer with aspen habitat type which is showing a 13% downward trend compared to reference condition for aspen/mixed deciduous (all sizes - open and closed).

House Wren

The ALRMP estimated riparian habitat occurred on less than 1 percent of the Forest and Grasslands. Current mapping of this habitat type indicates there are 7,565 acres on the Cibola NF. This habitat type is well represented and distributed across all four mountain Districts of the Cibola NF. Although the quality of the riparian habitats has improved somewhat with the implementation of livestock and vehicle exclosures around riparian habitat, and the implementation of the Travel Management Rule which resulted in an overall reduction in the miles of motorized roads and trails in riparian habitat, riparian areas on the Cibola are expected to continue to degrade due to legacy management reasons. The effects of herbivory are being managed through wildlife and livestock management plans with levels well below what existed before the establishment of the Cibola National Forest. These lower levels have allowed some of the riparian areas to recover from past effects, where possible. The Sandia Ranger District does not have livestock use, but recreation developments and dispersed uses are concentrated in riparian habitat. Where projects have been developed to conserve or protect remaining riparian areas or to rehabilitate and restore missing riparian areas, local conditions might be expected to improve, and these areas can move closer to proper functioning condition. However, external factors such as climate change and continued drought can be assumed to continue to exert stress on these areas.

Based on this information, the habitat trend of riparian habitat is expected to decline and is in a downward trend. Although the house wren is the designated indicator for riparian areas, this designation applies primarily at lower elevation from about 7,500 feet (sometimes even lower) to about 8,500 feet. Above that, riparian structure with willow and cottonwood trees is no longer necessary.

The overall downward trend for New Mexico is deemed fairly reliable by USGS. The USGS surveys on the CIF however do not have a sufficiently long history to be reliable. Cibola NF surveys that regularly pick up house wrens indicate a downward population.

Cumulative Effects Area

The cumulative effects area for MIS is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions are described in Appendix B.

Environmental Consequences

Alternative A

This alternative could impact MIS. Under this alternative mountain bikers are allowed to travel off designated routes causing a greater disturbance to wildlife. Mountain bikers could come into contact with MIS, which could cause the animal to leave the area or abandonment of their nest or den. For animals passing through the area or foraging impacts would be minimal because they are expected to return to the area once mountain bikers have passed. No direct impacts are expected for MIS habitat for all species because mountains bikers are not expected to alter habitat.

Rehabilitation of unauthorized routes would not occur. This could lead to increase motorized use. Security zones for wildlife between the motorized routes would be reduced even further, as the habitat becomes increasingly more fragmented. Unrestricted winter and summer use would increase disturbance (noise) impacts to wildlife incrementally over time. Impacts will become additive, as motorized use increases, and private land development increases as well. User-created trails can be expected to increase erosion, which can have impacts to surrounding habitats far greater than just the trail surface itself (down cutting and side channeling, as a result of heavy rains). New user-created trails would receive increasing use from all types of recreation users over time (mountain bikes, horses, OHVs) adding to the current density of trails and roads by an as yet unknown amount. Also under this alternative there would be no rehabilitation and decommissioning of unauthorized motorized routes which means human disturbance would continue to use in between designated routes throughout the project area causing wildlife to move during critical times and increase stress. This alternative could also lead to an increase of unauthorized roads which can cause degradation and natural resource damage within each of the habitat types contributing toward a downward trend.

Cumulative Effects

Mountain bike use on designated routes and trails could be expected to increase in the future, as well as other recreational activities such as OHV use, horseback riding, and hiking. Many areas where cattle grazing, timber harvesting and prescribed burning are ongoing could fragment habitat.

Alternative B

Under this alternative direct impact to management indicator species could occur, portions of the proposed mountain bike trails travel through MIS habitat. This could have a direct impact because there is a chance for a biker to come across one of the species listed in the table. Any birds nesting in the area could be impacted if members of the public harass birds which could cause the adult to abandon its nest. Also some of these proposed trials are near or along motorized roads and have heavy use on these. The presents of mountain bikers is not expected to have a negative impact. Impacts are expected to be minimal from September 1 through March 31for bird species because this is outside of the breeding season.

Actual work to rehabilitate unauthorized routes may cause wildlife to leave the area while work is ongoing, but once the work is complete wildlife is expected to return to the area.

No direct effects are expected for the installation of 53 cattle guards or the construction of five new trailheads because this will occur outside of the breeding season (September 1- February 28). Also the locations of the trailheads are not within the immediate areas of

roosting/foraging/nesting habitat and are along motorized roads with regular human disturbance which means management indicator species usually avoid these areas.

Indirect effects are expected for management indicator species. If mountain bikers are within one area for a period of time and making a lot of noise this could cause wildlife to react to noise disturbances by changing behavior and/or flushing from their perches. The presence of mountain bikers is not expected to have a critical impact on the species or lead toward a negative trend. Individuals may get spooked from an area but would return once the bikers have passed. Mountain bike trails are expected to have some impact to prey species. Bikers may run over small mammals that get spooked and run across the trial they are on. This impact is not expected to cause a negative trend in species viability which should not lead any of MIS toward a negative trend. Also building and maintaining of new and existing trails is not expected to alter habitat for MIS which means it would not lead it toward a negative trend in recovery.

Rehabilitation of unauthorized routes is expected to reduce degradation to all habitat types within the project area which could improve vegetation for prey species. This action would limit human disturbance and minimize fragmentation of the landscape.

Installation of cattle guards and construction of trailheads are not expected to have an effect on management indicator species or their habitat because these activities would not alter or change their habitat, they are also in areas regularly disturbed by humans. No effects are expected from construction of new mountain bike trails because this would occur outside the breeding season.

Cumulative Effects
The cumulative effects to MIS from past, present, and reasonably foreseeable future activities, including Alternative B would be disturbance and habitat loss. The combination of mountain bike travel off existing trails and roads and ongoing projects could potentially reduce short term forage recovery (and wildlife security).

Alternative C
The impacts to MIS are the same as the Alternative B; direct impacts to management indicator species may occur. The difference is the additional 47 more miles of new and unauthorized trail to be built and maintain to standard within this alternative. This is not expected to have any additional impact to the management indicator species or to their habitat. Impacts will be the same as Alternative B.

Cumulative Effects
The cumulative effects to MIS from past, present, and reasonably foreseeable future activities, including Alternative C would be the same as those described for Alternative B.

Alternative D
There is a difference of 69 total miles less of proposed trail within this alternative is not expected to have any additional impact to the management indicator species or to their habitat. Impacts will be the same as the proposed action. There will still be 34 miles of unauthorized trails that will not be added to the system. The use of these trails will still occur and could still have a direct impact to management indicator species.

Cumulative Effects
The cumulative effects to MIS from past, present, and reasonably foreseeable future activities, including Alternative C would be the same as those described for Alternative B.

Wildlife – Migratory Birds

Section D, item 2 of the draft December 9, 2002 Memorandum of Understanding between the US Forest Service, Bureau of Land Management, and US Fish and Wildlife Service provides direction to "avoid or minimize the unintentional take of migratory birds to the extent practicable." Section D, item 3 provides direction applicable to site-specific actions and directs the responsible official to review the effects of actions on migratory birds prior to approval of a decision/action. Items 3 (a) and (b) clarify the need "to identify if any species of concern are likely to be present in the area of the proposed action" and to "utilize best available demographic, population, or habitat association data in the assessment of impacts to Fish and Wildlife Service Birds of Conservation Concern."

Affected Habitat

Band Tailed pigeon

Data Sources, including surveys conducted: Population Trend according to FWS (http://www.nmpartnersinflight.org/bandtailedpigeon.html). Band-tailed Pigeon achieves Watch List status largely due to strong negative population trends. Breeding Bird Survey (BBS) data show the U.S. population has decreased by an average of two percent a year since the mid-1960s. The New Mexico population shows an extremely sharp downward trend on BBS, though based on only 9 routes. BBS data can be found in the Wildlife Specialist Report, in the project record.

This species may be found from pinon-juniper(p-j) up through spruce/fir depending on availability of food that includes a wide variety of mast such as fruits and nuts, especially acorns and pinyon pine nuts. In August and September it often descends into the foothills to for shrub live-oak and gray oak acorns. In the Southwest, Band-tailed Pigeons inhabit montane forests dominated by pines and oaks, sometimes extending upward in elevation to timberline. Multi-layer forests with tall trees and an understory are most favored. In New Mexico, the species is most common in southern ponderosa pine and pine-oak communities (Keppie and Braun 2000).

Black Throated gray warbler

Data Sources, including surveys conducted: The Forest's Rinconada Canyon BBS, the last conducted in 1999, detected the black-throated gray warbler as occurring within the survey area. The black-throated gray warbler prefers piñon (Pinus edulis)-juniper (Juniperus spp.) and oak (Quercus spp.) woodlands, along with ponderosa pine (Pinus ponderosa) forest and open woodlands. This migrant bird is common to the Mount Taylor Ranger District and is a breeding season/summer resident of this part of New Mexico. Black-throated Gray Warbler is not extensively sampled by BBS in New Mexico. State trends based on a small number of routes are sharply and significantly negative, but less so since 1980. Range wide population trends appear stable. BBS data can be found in the Wildlife Specialist Report.

This species can be found in p-j with some oak understory between 7000 to 8000 feet, but can also be common in more mesic p-j with a high canopy closure. Black-throated Gray Warbler is generally associated with middle-elevation coniferous or mixed coniferous/deciduous woodland with brushy undergrowth, sometimes ranging into montane shrub associations or open forests with a mix of pines and deciduous trees (Guzy and Lowther 1997, Parmeter et al. 2002). This species tends to prefer large woodland stands, but it often uses edge habitat (Sedgwick 1987). During migration, it may occur statewide in wooded areas at lower and middle elevations (Hubbard 1978).

Flammulated owl

Data Sources, including surveys conducted: Population Trend according to the FWS (http://www.nmpartnersinflight.org/flammulatedowl.html). No present monitoring system provides adequate data to determine a long-term trend at the state or regional level. The local population trend score of 2 was assigned by expert opinion, and indicates a stable or increasing population.

Flammulated Owls occur across a fairly broad altitudinal range, but are primarily associated with open ponderosa pine forest. At higher elevations, the species may be found in mixed conifer habitat, in association with Douglas-fir, white fir, or blue spruce. It also uses aspen groves and montane oak woodlands. Across its range, the owl consistently selects habitat that combines open forest stands with large trees and snags for nesting, with adjacent openings that provide edge habitat for foraging (McCallum 1994). Thickets of denser foliage also seem to be a necessary habitat component, and are used for calling and roosting (McCallum and Gehlback 1988).

Olive sided flycatcher

BBS data have shown widespread declines of this species across much of its breeding range, worsening since the 1980s. In Arizona, Colorado and New Mexico, populations appear to be more stable, but numbers are relatively small in this area and BBS data are limited. BBS data can be found in the Wildlife Specialist Report.

This species breeds in habitat along forest edges and openings, including; burns, natural edges of bogs, marshes, open water; semi-open forest, and harvested forest with some structure retained. It favors open forest and forest edges with snags. Historically this species was probably dependent on post-fire habitat, but in some cases it also responds favorably to timber harvests, provided a few snags and live trees are retained. There seems to be evidence, however, that a harvested forest may be an “ecological trap,” where nesting success is compromised compared to a burned forest. Olive-sided Flycatcher is associated with openings and edges in coniferous forest habitat. In the west, it is generally more abundant in mixed confer, late-successional forest with less than 40% canopy cover (Verner 1980). The species may also be present in early-successional habitats where residual snags or live trees provide foraging and singing perches. On a landscape scale, Olive-sided Flycatchers are typically most abundant in fragmented, selectively logged, or recovering burn or clear-cut areas (Altman and Sallabanks 2000).

Gray Flycatcher

The USGS Mount Taylor BBS, last conducted in 2004, detected the gray flycatcher as occurring within the survey areas. The gray flycatcher is common to the Forest from May to late September, and breeds from southern Washington and southwestern Wyoming south to eastern California, central Arizona and central New Mexico. This bird winters in southern California and southern Arizona

The gray flycatcher prefers sagebrush (Artemisia spp.) and piñon-juniper woodland habitats, similar to the woodland habitat found within the proposed project area. This bird constructs a cup nest placed low in sagebrush or a small tree. This species is found in p-j woodland up into the fringes of ponderosa pine, together with some understory of oak, mountain mahogany, etc., and often in semi-mixed xeric conditions.

Piñon Jay

Data Sources, including surveys conducted: The USGS Mount Taylor BBS, last conducted 2004, detected the piñon jay as occurring within the survey area. The piñon jay is a resident species, and prefers piñon-juniper woodlands and sagebrush dominated habitats. Pinyon Jay has shown declining population trends in New Mexico, the southwest region, and nationally over the last several decades. Balda (2002) suggests major declines in numbers may have occurred 40-70 years ago, due to habitat conversion. Conventional census methods may be inadequate to determine accurate population numbers, because the species has such a large home range, is wide ranging, and occurs in flocks. BBS data can be found in the Wildlife Specialist Report.

Suitable habitat within the Forest for the piñon jay includes piñon-juniper woodlands and sagebrush dominated sites. The piñon jay's nest consists of a bowl of piñon, juniper or oak twigs. This bird is a colony nester. Pinyon Jays are predominantly associated with pinyon-juniper habitat, due to the species' tightly co-evolved relationship with pinyon pines. In New Mexico, Pinyon Jays are associated primarily with Colorado pinyon (*Pinus edulis*). These trees rely on the jay for dispersal of their wingless seeds, and the jay has a suite of morphological and behavioral adaptations to efficiently exploit the rich food resource that pinyon seeds provide. Pinyon seed production is sporadic, and mobile flocks require large stands of mature trees spread over a wide area (Balda 2002, Yanishevsky and Petring-Rupp 1998). Despite its close association with the pinyon pine, the Pinyon Jay is an omnivore and sometimes occurs in areas dominated by ponderosa pine, sagebrush, or chapparal vegetation (Balda 2002).

Virginia's Warbler

Data Sources, including surveys conducted: The USGS Mount Taylor BBS, last conducted in 2004, detected the Virginia's warbler as occurring within the survey area. The Virginia's warbler is common to the Forest from May to late September, and breeds from east-central California, central Nevada, southeastern Idaho and southern Wyoming south to south-central California, central and southeastern Arizona, central and southern New Mexico and extreme western Texas. The warbler vacates all of these areas by October and winters in Mexico. Like many endemic western species, Virginia's Warbler is not extensively sampled by BBS. Survey data indicate that population trends are generally stable. BBS data can be found in the Wildlife Specialist Report in the project record.

The Virginia's warbler prefers generally arid montane woodlands ranging in elevation from 6,000 to 9,000 feet. Preferred habitats consist of brushy slopes, oak dominated canyons, scrub brush interspersed with piñon-juniper woodland and ponderosa pine forest. This is especially true for the Forest when an oak understory is present. The Virginia's warbler frequents dense growths of mountain mahogany (*Cercocarpus montanus*) and choke cherry (*Prunis virginiana*), along with rocky steep slopes and ravines, chaparral, riparian willow (*Salix* spp.) and alder (*Alnus* spp.) thickets. It is found in mixed-conifer forests near scrubby thickets. The Virginia's warbler builds its nest on the ground in scrubby vegetation, embedded among dead leaves or in loose soil, sometimes at the base of a bush or hidden under a tussock of grass, but usually concealed by overhanging vegetation. The bird forages on the ground, as well as in foliage, and hawks insects on the wing.

Black-chinned hummingbird

Data Sources, including surveys conducted: Population Trend according to FWS (http://www.nmpartnersinflight.org/black-chinnedhummingbird.html). BBS data indicate both increases and decreases in different regions and over different time periods. Overall trends for

both the United States and New Mexico appear to be stable or slightly increasing, although there are some deficiencies in the BBS data. BBS data can be found in the Wildlife Specialist Report.

Black-chinned Hummingbirds use a wide range of habitats, including riparian woodlands, lush urban vegetation, pinyon-juniper, and xeric desert washes (Kingery 1998, Baltosser and Russell 2000). In New Mexico, the species most often breeds in riparian areas dominated by cottonwood, sycamore, and willow. In southwestern New Mexico, the species is often found in relatively open areas interspersed with clumps of sycamore and cottonwood. Along the Gila River, the species nests in areas dominated by cottonwood, maple, and willow with an understory of Porter's wild lovage and great ragweed (Baltosser 1986). Along the Rio Grande, the species nests most frequently in areas dominated by mature cottonwoods, and densities are thicker where there is a moderate to dense understory of shrubs (Hawks Aloft Inc., unpublished data). Nesting also occurs in urban areas with tall trees and numerous flowering plants.

On the Cibola National Forest this species is the foothills hummingbird that occurs on all mountain Districts up to about 7,000 ft. It is often found in mesic riparian habitat with strong deciduous component, especially Arizona Sycamore.

Broad-tailed hummingbird

Data Sources, including surveys conducted: Population Trend according to the FWS (http://www.nmpartnersinflight.org/broad-tailedhummingbird.html). BBS data indicate that the United States population may be experiencing a slight decrease. In New Mexico, the population appears to be stable. BBS data can be found in the Wildlife Specialist Report.

Across its range, Broad-tailed Hummingbirds occupy many different vegetation types. It is generally associated with open woodlands, especially pinyon-juniper and pine-oak associations, as well as montane riparian areas and wet meadows, and areas of relatively open mixed conifers including fir, spruce, and pine (Calder and Calder 1992). In Colorado, although breeding bird atlasers recorded Broad-tailed Hummingbirds in ponderosa pine forest, it was recorded in higher densities and more frequently in areas dominated by aspen. Reports in foothill riparian, montane shrubland, and pinyon-juniper woodland also outnumbered ponderosa pine, but there is no indication of the quality of the ponderosa pine stands where breeding season observations were reported. Breeding was confirmed up to around 3,320 meters (10,300 feet) in elevation (Kingery 1998). Likewise, in New Mexico, the species also uses a variety of habitats, including pinyon-juniper woodlands, montane riparian areas and thickets, and open, mixed conifer forests. Surprisingly little research on this species has occurred over the past 20 years, and more specific data on habitat preference in New Mexico are lacking.

This mountain hummingbird is found from about 7,000 feet upwards. It frequents meadows and open forest with a shrubby component and forbs. It frequents meadows and open forests with a shrubby component and forbs. Gooseberry, figwort and Indian paintbrush are among its favorite flowers. Insects are an important part of the diet, especially when females are incubating and feeding young.

Lewis's woodpecker

Data Sources, including surveys conducted: Population Trend according to the FWS (http://www.nmpartnersinflight.org/lewisswoodpecker.html). The overall population of Lewis's Woodpecker may have declined as much as 60% from the 1960s to the early 1990s, based on both BBS and Christmas Bird Count data (Tobalske 1997). BBS data through 1994 showed a negative annual trend of -3.4 range-wide; however, data through 2004 show a more moderate

rate of decline. BBS coverage is insufficient to determine a statistically significant long-term trend for Lewis's Woodpecker in New Mexico, though a highly negative trend is indicated for the state's small number of routes on which the species is recorded. Tobalske (1997) urges caution in interpreting patterns of apparent decrease, noting that the species' sporadic distribution, relatively uncommon status, and sometimes cyclical patterns of local abundance all make censusing problematic. BBS data can be found in the Wildlife Specialist Report in the project record.

Lewis's Woodpecker requires open canopy forests with large dead or decaying trees for nesting. It breeds in both lowland riparian and montane forest habitats. In New Mexico, breeding occurs most commonly in riparian woodland with large, mature cottonwoods. At higher elevations, Lewis's Woodpecker occurs in ponderosa pine forests with large trees and an open canopy. It is absent from dense ponderosa stands where fire suppression and grazing have prevented development of an open forest structure. The species also occupies burned (and sometimes selectively logged) forest areas, in the ponderosa zone and above, where large snags remain standing. Lewis's Woodpecker does not occupy some areas of apparently suitable habitat.

On the Mt. Taylor Ranger District this species occurs in mid to high elevation, riparian woodland and open ponderosa forests. In addition to the open park-like ponderosa forests with brushy understory and dead and down materials, Lewis's will also use burned forests-- and to a lesser degree oak woodlands.

Red-naped sapsucker

Data Sources, including surveys conducted: Population Trend according to FWS (http://www.nmpartnersinflight.org/rednapedsapsucker.html). BBS data for the sapsucker superspecies indicate mostly stable trends, with some localized declines. This species is not well sampled by BBS in New Mexico and state trends are uncertain. BBS data can be found in the Wildlife Specialist Report in the project record.

Until 1983, Red-naped Sapsucker was considered conspecific with Yellow-bellied Sapsucker and Red-breasted Sapsucker. In New Mexico, Red-naped Sapsuckers breed in higher montane forests and mixed woodlands, particularly aspen groves. It avoids woodland edges (Dobkin et al. 1995). In breeding areas, this species drills sap wells in conifers, aspen or willow, and defends a constantly maintained network of wells from other species and other sapsuckers (Walters et al. 2002). It also forages for insects, particularly ants, when feeding young.

On the Cibola they are found in riparian woodland, ponderosa, mixed conifer and spruce/fir. This species prefers aspen and cottonwoods for nesting and are often found in oaks in winter.

Grace's warbler

Data Sources, including surveys conducted: Population Trend according to FWS (http://www.nmpartnersinflight.org/graceswarbler.html). Grace's Warbler is not extensively sampled by BBS. Nevertheless, it meets most standard criteria for an adequate sample size and a robust trend. Data indicate negative population trends across the southwest, particularly in New Mexico. BBS data can be found in the Wildlife Specialist Report in the project record.

Grace's Warbler is a pine specialist. It prefers park-like stands of mature tall pines, a habitat that has declined over time due to logging and fire suppression. In the southwest United States, it occurs primarily in ponderosa pine habitat, though Chihuahua pine and pine-oak woodlands of the Mexican Highlands are also used. Breeding may sometimes extend upslope into mixed

conifer habitat (Stacier and Guzy 2002). In New Mexico, it is described as inhabiting mesa tops and canyon bottoms with ponderosa pine (Travis 1992), and may prefer areas with a Gambel oak understory (Levad 1998). In appropriate habitat in Arizona, Grace's Warbler may be one of the more abundant species (Rosenstock 1996), but its densities are as much as 50% lower in New Mexico (Stacier and Guzy 2002). In northern Arizona, the species was common on both silviculturally thinned plots and control plots (Szaro and Balda 1979). It avoids lower elevation areas, even during migration, with far fewer records from the lowlands during migration than other migrant montane species.

On the Mt. Taylor RD this species is fairly common in ponderosa pine but may extend into mixed conifer if ponderosa also present.

Vesper sparrow

Data Sources, including surveys conducted: Population Trend according to FWS (http://www.nmpartnersinflight.org/vespersparrow.html). Vesper Sparrow is still a widespread and common species, but it has shown moderate, statistically significant declines across its range. Regional declines have been more severe, particularly in the East and Southwest. Over the entire range, BBS data show a 1.1% annual decline ($p = 0.00$) from 1966 to 2004. This has been attributed to loss of grassland habitat to development, agriculture and forest re-growth. Data indicate a 3% annual decrease in New Mexico, although the number of routes is relatively small. BBS data can be found in the Wildlife Specialist Report and the project record.

Vesper Sparrows are found in open habitats, including old fields, shrub-steppe, grasslands, and cultivated crop fields. This species expanded its range historically with the clearing of forests, and now is declining in areas where abandoned farms are reverting back to tree cover. Vesper Sparrows occupy agricultural lands in the midwest, and continue to be common in shrub-steppe and open rangelands in the west (Jones and Cornely 2002). This species occupies a variety of different grassland types. It generally prefers short, sparse, and patchy herbaceous vegetation with some bare ground, and low to moderate shrub or tall forb cover for concealment and song perches (Swanson 1996, Yanishevsky and Petring-Rupp 1998).

On the Mt. Taylor RD this species is found in dry meadows with some shrub component on all mountain Districts from about 7,000 feet to at least 8,400 feet.

Dusky Grouse

Regularly occurs only on Mount Taylor, where it was introduced. It may occur casually in the Magdalenas, and possibly also the San Mateos. Prefers open shrubby high meadows in summer and coniferous forest in winter. A probable sighting in the Magdalenas at 9,600 feet on 5-20-02, if true, would indicate possible breeding in the meadows on or below the summit of this range. BNA: Creating or maintaining shrubby openings might be good for the species, but excessive grazing in these openings most certainly detrimental. Florence Bailey (1928) says (but not recorded in BNA): "The Dusky Grouse is one of the most notable game birds of the region, but if overgrazing is allowed to continue and as more and more campers go the mountains, it will become lamentably scarce unless wisely protected."

Willamson's Sapsucker

Williamson's sapsucker is uncommon in Ponderosa, M/C and Spruce/Fir throughout mountain districts, especially in aspen groves, except on Magdalena RD, where it is probably rare in summer, or possibly absent. BNA: Seems to prefer aspen, utilizing live trees and snags for nesting. Also nests in pine snags, often in vicinity of open ponderosa. BNA is very specific re

management guidelines: "Forest management plans should emphasize conservation of groups of large snags, rather than random assortment of variably sized snags. Patches of snags and areas of high snag density should be preserved, especially those in drainage bottoms or other low-lying areas. Fire in mixed coniferous forest that creates snags may increase breeding densities. Availability of sap trees (often large conifers) also would be important."

Hammond's Flycatcher

Although a migrant in all our mountains, it occurs only on Mount Taylor RD in summer, primarily in Ponderosa (old growth) and M/C, especially where Blue Spruce or aspen is part of the mix, but also in Middle/High Elevation Riparian, as at Rinconada, where it breeds in the alder/oak bosque. BNA: Generally inhabits cool mesic forests of mature or old-growth development, but also found in mixed forest with aspen, alder or oak. Birds prefer intact older stands rather than merely old trees widely spaced. Woodcutting, according to a study in the Jemez Mountains, can reduce a population.

Juniper Titmouse

This species was formerly known as the "Plain Titmouse," which has recently been subjected to a "split" that created the Juniper Titmouse in the Southwest and the Oak Titmouse in California. While in the general sense this titmouse is associated with P/J, it must be noted that its primary abundance lies at the lower end of that habitat spectrum, where juniper usually predominates. Thus its elevation preference on the Cibola is in the range of 6000 feet to about 7200 feet, but can extend to 7500 feet at dry and relatively open P/J sites. The Juniper Titmouse is especially well suited to be an Indicator Species because it is so sedentary and disinclined to wander, even in winter.

Although this titmouse is not generally considered a sensitive species outside its position as an MIS, the latest NMPIF list promoted it to Level One status with the very high score of 17. This High Priority designation was largely in response to its overall negative trend in NM.

The Juniper Titmouse appears to be relatively stable on the Cibola, judging by recent counts that are generally higher than the average or mean and the fact that the projected Trend is positive on all USGS BBS routes, except the Horse Mountain route. The latter, and the overall negative trend for NM suggest real and impending declines, especially since USGS has labeled its analysis for this species "blue," or fairly reliable.

Brewer's Sparrow

Usually associated with the "Big Sage," it has adapted to the rabbitbrush in the Zunis, especially where it grows in large unbroken tracts, as in upper Bluewater Canyon. It is also found sparingly on Mount Taylor. BNA: This species is losing ground, because the shrublands it inhabits are being lost to agriculture, pastures and subdivisions. Also exotic grasses and weeds like cheatgrass are speeding up the fire regime and thus interfering with shrub regeneration. But even if the habitat is just fragmented instead of displaced completely, it forfeits suitability.

Important Bird Areas

There are no Important Bird Areas (IBAs) associated with the project area. There would be no effects/impacts on IBAs resulting from the proposed project. There is no direct association or important link between the bird communities within the proposed project site and the Rinconada Basin IBA(north of I-40).

Over-wintering Areas

Important over-wintering areas have not yet been recognized as occurring on the Forest. The project site does not provide important wintering habitat for unique avian species or a high diversity of wintering birds. Significant concentrations of birds do not occur within the general location of the project area.

Cumulative Effects Area

The cumulative effects area for MIS is the Zuni mountain range. Treatments and projects considered as past, present, and reasonably foreseeable future actions are described in Appendix B.

Environmental Consequences

Alternative A

This alternative could have an impact to migratory birds. Under this alternative mountain bikers are allowed to travel off designated routes causing a greater disturbance to wildlife. Mountain bikers could flush migratory birds from their nest if they are too loud or get off their bikes. Depending on where the nest is located, some birds may abandon their nest or stay on it. There is also a chance for a biker to come into contact with birds that may be flying in the area, but this impacted is expected to be minimal. Direct impacts are expected for migratory bird habitat because mountains bike trails may cause habitat fragmentation, especially if trails continue to be created illegally.

Indirect effects are expected for migratory birds because under this alternative rehabilitation of unauthorized routes would not occur. This could lead to increase use. Security zones for wildlife between the motorized routes would be reduced even further, as the habitat becomes increasingly more fragmented. Unrestricted winter and summer use would increase disturbance (noise) impacts to wildlife incrementally over time. Impacts will become additive, as motorized use increases, and private land development increases as well. User-created trails can be expected to increase erosion, which can have impacts to surrounding habitats far greater than just the trail surface itself (downcutting and side channeling, as a result of heavy rains). New user-created trails would receive increasing use from all types of recreation users over time (mountain bikes, horses, OHVs) adding to the current density of trails and roads by an as yet unknown amount. Also under this alternative there would be no rehabilitation of unauthorized routes which means human disturbance would continue, causing wildlife to move during critical times. This alternative could also lead to an increase of unauthorized roads which can cause degradation and natural resource damage within each of the habitat types contributing toward a downward trend.

Cumulative Effects

Cumulative impacts over time to migratory birds from noise disturbance and habitat loss would be greatest under Alternative A and could lead to a downward trend in species and habitat.

Alternative B

Under this alternative direct impact to migratory birds could occur, portions of the proposed mountain bike trails travel through the habitat of the migratory bird species listed above. This could have a direct impact because there is a chance for a biker to come across one of the species. Any birds nesting in the area could be impacted if members of the public harass birds

which could cause the adult to abandon its nest. Also some of these proposed trials are near or along motorized roads and have heavy use on these. The presence of mountain bikers is not expected to have a negative impact. Impacts are expected to be minimal from September 1 through March 31for bird species because this is outside of the breeding season.

Actual work to rehabilitate unauthorized routes may cause wildlife to leave the area while work is ongoing, but once the work is complete wildlife is expected to return to the area. In areas of nesting migratory bird species, this would occur outside the breeding season which would eliminate this impact.

No direct effects are expected for the installation of cattle guards or the construction of new trailheads because this will occur outside of the breeding season. Also the locations of the trailheads are not within the immediate areas of roosting/foraging/nesting habitat and are along motorized roads with regular human disturbance which means migratory bird species usually avoid these areas.

Indirect effects are expected for migratory birds. If mountain bikers are within one area for a period of time and making a lot of noise this could cause wildlife to react to noise disturbances by changing behavior and/or flushing from their perches. The presence of mountain bikers is not expected to have a critical impact on migratory bird species or lead toward a negative trend. Individuals may get spooked from an area but would return once the bikers have passed. Mountain bike trails are expected to have some impact to prey species. Building and maintaining of new and existing trails is not expected to alter habitat for migratory birds which means it would not lead it toward a negative trend in recovery.

Rehabilitation of unauthorized routes is expected to reduce degradation to all habitat types within the project area which could improve vegetation for prey species. This activity could also limit human disturbance and minimize fragmentation of the landscape.

Installation of cattle guards and construction/ redesign of trailheads are not expected to have an effect on migratory birds or their habitat because installation would not alter or change their habitat, they are also in areas with regular human disturbed and along motorized roads. No effects are expected from construction of new mountain bike trails because this would occur outside the breeding season and there would not alter nesting/roosting/foraging habitat.

Cumulative Effects

The cumulative effects to migratory birds from past, present, and reasonably foreseeable future activities, including Alternative B would be disturbance and habitat loss. The combination of mountain bike travel off existing trails and roads and ongoing projects could potentially reduce short term forage recovery (and wildlife security).

Alternative C

The impacts to migratory birds are the same as Alternative B; direct impacts to migratory birds may occur. The difference is the additional miles of new and unauthorized trail to be built under this alternative. This is not expected to have any additional impact to the migratory birds or their habitat.

Cumulative Effects

The cumulative effects to migratory birds from past, present, and reasonably foreseeable future activities, including Alternative C would be the same as those described for Alternative B.

Alternative D
Fewer miles of proposed trails within this alternative are not expected to have any additional impact to the migratory birds or their habitat. Impacts will be the same as Alternative B. The use of these trails will still occur and could still have a direct impact to migratory birds.

Cumulative Effects
The cumulative effects to migratory birds from past, present, and reasonably foreseeable future activities, including Alternative D would be the same as those described for Alternative B.

Watershed Resources

Watershed resources in the project area include soils and water resource features. General soil characteristics in the project area are described by the Terrestrial Ecological Unit Inventory (TEUI) (Strenger et al. 2007). Terrestrial Ecosystem Units (TEU) are integrated combinations of landscape elements including climate, soils, potential natural vegetation, geology, and geomorphology. TEUs provide information about the ability to produce vegetation and respond to management activities and natural disturbances (US Department of Agriculture 2005).

Water resources features in the project area include watersheds, streams, springs, and riparian areas. The data source for these features is a combination of U.S. Geological Survey National Hydrography Dataset (NHD), Watershed Condition Framework (WCF 2011), and other existing data. In addition, geographic information system (GIS) software was used to analyze spatial relationships including proximity to features and locations. As a result, due to the resolution of data, the results will have a degree of error. However, this error tends to result in the over estimation of intersections and proximity of features and provides a basis for the comparison of alternatives to the baseline conditions.

Affected Environment

Soil
Soil condition is an evaluation of soil quality based on the interpretation of the three factors which affect soil functions. These factors are soil hydrology, nutrient cycling, and soil stability (USFS 1999). Using these three factors, soils are rated into one of three categories. Satisfactory condition is where the soil is being maintained and is operating as expected, and the ability of the soil to maintain resources values and sustain outputs is high. Impaired condition is where the ability of the soil to function properly has been limited or it has less resistance to the forces of degradation. Unsatisfactory condition is the loss or degradation of vital soil functions have occurred resulting in the inability to maintain resource values, sustain outputs, and recover from impacts. Soils rated as unsatisfactory are candidates for improved management or active restoration designed to recover soil functions (USFS 2013).

Soil hydrology is the ability of the soil to absorb, store, and transmit water as it percolates into or flows over the ground surface. Changes in porosity, surface structure, bulk density, infiltration, or penetration resistance such as compaction alter soil hydrology. Roads and trails on NFS lands result in increased soil compaction. Another property of soils is nutrient cycling. Nutrient cycling relates to soil organic matter and sustaining long-term soil productivity and plant growth. Woody material, soil crusts, litter, roots, and vegetation are all indicators of nutrient cycling. Roads and trails affect nutrient cycling by removing topsoil, organic litter, and vegetation and changing soil properties (Gucinski et al. 2001). The third factor which contributes to soil

condition is soil stability, the ability of the soil to resist erosion. Soil stability is a function of both slope and inherent soil erodibility.

On existing trails, impacts of mountain biking include trail widening, vegetation damage on trail edges, soil compaction and erosion. These same types of impacts have been observed in other areas, including in the southwest United States (White et al. 2006 and Davis and Newsome 2009). Many unauthorized routes are located where soil condition is unsatisfactory due to the lack of beneficial hydrologic, nutrient, and stability features.

There currently 28 miles of designated mountain bikes trails in the project area. There are currently 159 miles of mapped unauthorized routes within the project area. These routes are compacted, and lack vegetation and stability, resulting in unsatisfactory soil conditions in these areas.

The current condition of the soils in the project area is 72% impaired, 13% unsatisfactory, and 15% satisfactory. Figure 1 below depicts soil conditions in the project area. Impaired and unsatisfactory soils within the project area are largely this way because of the lack of ground cover and/or lack of down woody material, where applicable. The lack of ground cover results in high erosion rates while the lack of woody material reduces nutrient cycling and results in decreased long term soil productivity. Less than satisfactory soil conditions occur within the project area as a result of past and current management activities

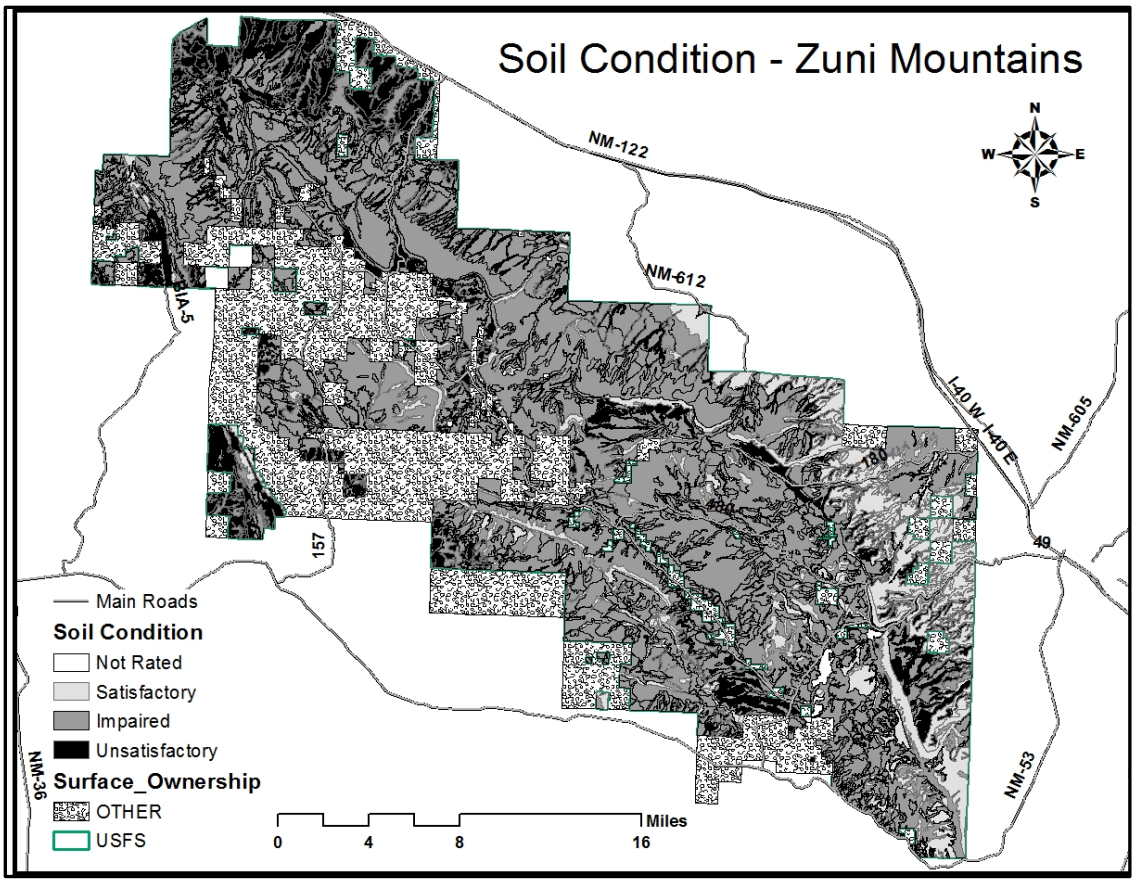


Figure 3-1. Current soil condition within the area

Cumulative Effects Area

The cumulative effects area for soil consists of the project area. Past, present, and reasonably foreseeable future activities are listed in Table B-1 in Appendix B.

Watersheds

Watersheds are topographically delineated areas drained by a stream system; that is, the total area above some point on a stream that drains past that point (Brooks et al. 2003). Watersheds are mapped according to federal interagency standards in a database called Watershed Boundary Dataset (FGDC 2004). Watersheds are classified using a nested hierarchy consisting of regionals, sub-regions, basins, sub-basins, watersheds, and sub-watershed. Regional are the largest unit and are composed of sub-regions; sub-regions are composed of basins, and so on. Each watershed has a Hydrologic Unit Code (HUC) based on a numbering system with set of 2 digits that represent the different levels of the mapping hierarchy. The first two digits refer to the region, with the next two digits referring to the sub-region, and so on. The 12 digit sub-watershed is the smallest official mapping unit. The 12 digit sub-watersheds are the scale used in this analysis for watershed condition.

There are 31 sub-watersheds that intersect the project area. Fourteen of these watersheds drain to the Rio Grande drainage. Seventeen drain to the west into the Lower Colorado River (figure 2).

The current condition of the watersheds intersecting the project area was determined using the Watershed Condition Framework (USDA FS 2011). This rating method uses 12 indicators to determine watershed condition at the 12 digit HUC. Each indicator has its own rating which combines with the other indicators for the overall watershed condition rating of functioning properly, functioning at risk, or impaired. As shown in table 1, sixteen of the watersheds within the project area are functioning at risk, 13 watersheds rated as functioning properly, and two watersheds were not rated because less than 5% of their area is on National Forest System Lands. No watersheds within the project area were rated as impaired.

One of the 12 indicators, Roads and Trails, is relevant to the proposed project activities. This indicator affects watershed condition as an indicator of changes to the hydrologic and sediment regimes due to density, location, distribution, and maintenance of the trail and road networks. This indicator uses a rating system of good, fair, and poor. Twenty four sub-watersheds are rated as poor, three rated as fair, and two sub-watersheds were rated good. Two were not rated due to the small percentage of NFS lands within the boundaries. Proximity of roads and trails to stream courses is one of the main factors for this rating.

There have been many projects to improve watershed conditions in Bluewater Creek. This includes riparian treatments, improvements to roads drainage, and uplands treatments. To this end, the Bluewater Lake-Bluewater Creek watershed was selected as a high priority watershed for restoration and has a watershed restoration action plan (WRAP) which describes essential projects needed to bring the watershed condition to functioning properly. Some of the essential projects identified in the WRAP are proposed as part of this project such as restoration of routes.

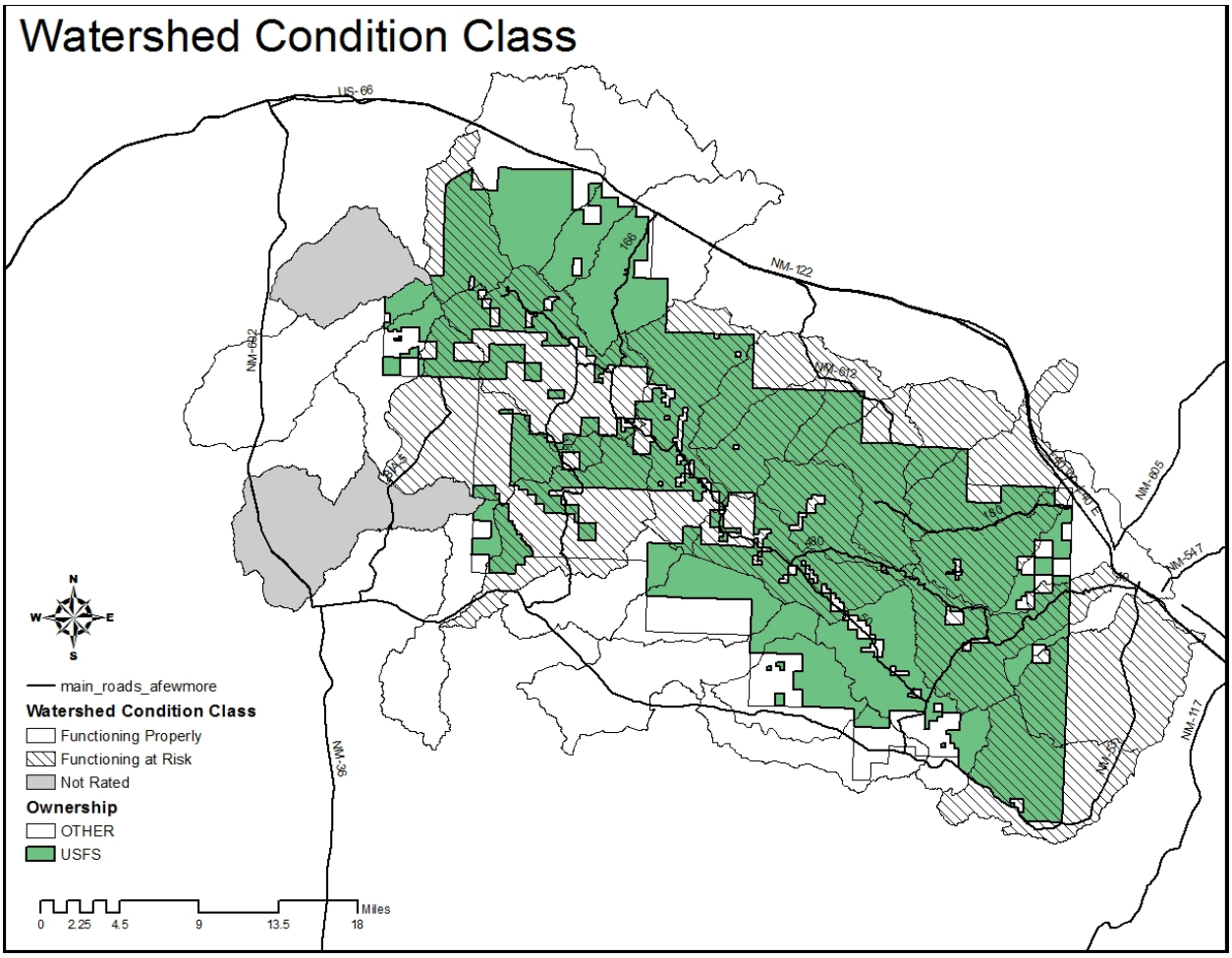


Figure 3-2. Sub-watersheds (12 digit HUC) with Watershed Condition Rating

Table 3-7. Sub-watersheds, Condition Rating, and Road and Trail Indicator Rating

Sub-Watershed Name	Hydrologic Unit Code (HUC)	Rating on FS Lands	Road & Trail Indicator Rating
Agua Fria Creek	130202060704	Functioning Properly	Poor
Bonita Canyon	130202060705	Functioning at Risk	Poor
Log Cabin Canyon	130202060706	Functioning at Risk	Poor
Agua Medio-Bluewater Creek	130202070201	Functioning at Risk	Poor
Headwaters Cottonwood Creek	130202070202	Functioning at Risk	Poor
Sawyer Creek	130202070203	Functioning at Risk	Poor
Outlet Cottonwood Creek	130202070204	Functioning at Risk	Poor
Ojo Redondo-Bluewater Creek	130202070205	Functioning at Risk	Poor
Bluewater Lake-Bluewater Creek	130202070206	Functioning at Risk	Poor
Reynold Draw-Bluewater Creek	130202070207	Functioning at Risk	Good
Limekiln Canyon	130202070401	Functioning at Risk	Poor
Prop Canyon-Rio San Jose	130202070402	Functioning at Risk	Poor
Zuni Canyon	130202070403	Functioning at Risk	Poor

Sub-Watershed Name	Hydrologic Unit Code (HUC)	Rating on FS Lands	Road & Trail Indicator Rating
Zuni Canyon-Rio San Jose	130202070404	Functioning Properly	Fair
Muerto Canyon	150200040101	Functioning Properly	Poor
Togeye Canyon	150200040102	Functioning Properly	Fair
Cebolla Creek	150200040103	Functioning at Risk	Poor
Upper Rio Nutria	150200040201	Functioning at Risk	Poor
Stinking Spring	150200040202	Functioning Properly	Poor
Middle Rio Nutria	150200040203	Functioning at Risk	Poor
Lower Rio Nutria	150200040205	Not Rated	Not Rated
Valle Largo	150200040305	Functioning Properly	Fair
Monument Lake	150200040306	Functioning Properly	Poor
Togeye Lake	150200040307	Functioning Properly	Poor
Pescado Draw-Rio Pescado	150200040310	Functioning Properly	Good
Smith Canyon-South Fork Puerco River	150200060101	Functioning Properly	Poor
Fourmile Canyon-South Fork Puerco River	150200060102	Functioning Properly	Poor
Milk Ranch Canyon	150200060103	Functioning at Risk	Poor
Milk Ranch Canyon-South Fork Puerco River	150200060104	Functioning Properly	Poor
Headwaters Bread Springs Wash	150200060401	Not Rated	Not Rated
Skeets Arroyo-Whitewater Arroyo	150200060501	Functioning Properly	Poor

Water Resource Features

Water resource features in the project area include streams, springs, and riparian areas. A map of the water resource features within the project area can be found below in Figure 3.

From the National Hydrography Dataset (NHD), there are 1,196.8 miles of mapped intermittent and ephemeral stream channels within the project area on National Forest System lands. There are 6.8 miles of mapped perennial streams at Bluewater Creek. Most of the water courses found within the project area are ephemeral streams, which are defined as streams where portions flow briefly in direct response to precipitation in the immediate vicinity and whose channels is at all times above the groundwater reservoir (Levick et al. 2008). In addition, intermittent streams are streams which flow continuously only at certain times of the year, usually during snow melt and monsoon storms. Perennial streams flow year-round (Levick et al. 2008). Smaller perennial stream sections exist in the project area but are not mapped. Many of these are related to springs.

There are 10.5 miles of intermittent and ephemeral streams located within 300 feet of the existing trail system. These are mostly (7.5 miles) in the Milk Ranch Canyon watershed on the northwest side of the project area, with a small amount (.6 miles) in the Upper Rio Nutria watershed. There are no perennial stream miles located within 300 feet of the existing designated system trails. There are 45 locations where existing trails cross intermittent or ephemeral streams. These locations are not designed specifically for crossings; therefore these locations are sources of sediment and have unstable banks due to loss of vegetation and compaction.

There are 38 mapped springs within the project area. None of these springs are within 300 feet of the existing trail system.

The riparian area data used for the analysis was the Regional Riparian Mapping Project (RMAP) data layer created by the USFS. There are 2540.7 acres of mapped riparian areas within the project area. Under the current trail system there are no acres of mapped riparian vegetation within 300 feet of the trails within the project area. There is little information regarding the condition of riparian areas in the project area. Conditions in Bluewater Creek have been assessed using several different methods in the past, including PFC (BLM) and T-Walk (USDA FS). Bluewater Creek has been in a state of recovery for the last few decades as the result of projects which have improved road conditions, riparian condition, and uplands. Currently, portions of Bluewater Creek are properly functioning and properly functioning at risk.

Water Quality

The federal Clean Water Act requires states to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Designated uses refer to what the water is used for, such as livestock watering, municipal water, or aquatic life. A review of the 2014-2016 State of New Mexico's Integrated Clean Water Act §303(d)/§305(b) Report indicates that one listed reaches and one freshwater reservoir are within the project's analysis boundaries (NMED, 2014). There are listed reaches are Bluewater Creek (Bluewater Reservoir to headwaters) for coldwater aquatic life. The probable cause is temperature. The probable sources for the impairment are listed as forest roads, loss of riparian habitat, silviculture harvest, and streambank modifications/destabilization. A study showed that groundwater inputs are important to this reach (Curtis 2008). This means water entering the stream as groundwater is cold; therefore it is the environment which contributes to higher temperatures.

The listed reservoir is McGaffey Lake for warmwater aquatic life. Nutrients/eutrophication is listed as probable cause of impairment. The probable sources for the impairment are listed as unknown. Currently, McGaffey Lake is dry due to drought conditions. No other waters in the project area have been assessed for water quality standards. Sediment is a water quality concern as it can increase turbidity, which causes cloudiness and can reduce the available dissolved oxygen for aquatic life (Brooks et al. 2003).

Excessive amounts of sediment can also change the geomorphological and hydrological conditions due to deposits into stream channels as bottom deposits. Both problems with sediment are related to the length of trails and roads adjacent to channels and the number of times these routes cross the stream (Gucinski et al. 2001). As discussed previously, there are 10.5 miles of intermittent/ephemeral streams within 300 feet of the existing trail system and 45 locations where streams are crossed by trails as mapped by existing GIS data. There is no trail system currently authorized along the perennial re ach of Bluewater Creek.

Cumulative Effects Area

The cumulative effects area for watersheds and water resource features consists of the watersheds through which the proposed trails would pass. There are two cumulative effects of interest for water resources; watershed condition and effects to the perennial stream, Bluewater Creek.

Environmental Consequences

The proposed activities are listed in Table 3-7 with potential effects to water and soil resources. From this list, activities were related to direct and indirect effects, described in each resource section. The effects listed on this table are those with the potential to change from the current

condition as a result of the proposed alternatives. From this table it can be seen that watershed condition and bacterial input to water quality are not expected to change as a result of the proposed actions. Bacterial inputs are not expected to change since toilets will be constructed at new trail heads, thereby preventing the potential for waste to enter the environment at these focused locations. Watershed condition is not expected to change since the proposed activities would not result in a change in watershed condition as measured by the watershed condition framework (USDA 2011). Therefore, effects to these two aspects of watershed resource features will not be carried through the alternatives. Soil condition, sediment inputs to water quality, and impacts to streams, springs, and riparian areas will be carried through the alternatives.

Table 3-8. Proposed Activities and Related Potential Direct and Indirect Effects to Soil and Water Resources as Compared to Baseline Conditions

Actions	Soil Condition	Water Quality – Bacteria (pathogens)	Water Quality - Sediment	Water Resource Feature – streams and riparian	Water Resource Features - springs	Watershed Condition
Add unauthorized route to the system as mountain bike trails in the Zuni Mountains	no change	no change	increase	increase	no change	no change
Construct new mountain bike trails	reduce	no change	increase	increase	no change	no change
Construct new trail heads with restrooms to serve the designated trails	reduce	no change	increase	no change	no change	no change
Construct mountain bike cattle guards	reduce	no change	increase	increase	no change	no change
Rehabilitate routes	improve	no change	decrease	decrease	improve	no change

Soils

Table 3-8 identifies potential direct and indirect effects to soil condition which will be analyzed and the associated measure for the analysis. Only those activities which were identified in Table 3-7 as having a potential change to soil condition indicators are carried through the alternative analysis. Adding unauthorized routes to the system as mountain bikes trails would not change soil condition in these areas since soil condition is already unsatisfactory due to lack of vegetation and compaction. Because of this, adding unauthorized mountain bike trails to the system is not carried through the analysis of soil condition.

Within the project area, measures are used to assess potential effects to soil condition as shown in Table 3-8. The timeframe for effects to soil resources related to the proposed activities is ten years. This is because within ten years, it may be possible to observe changed in soil condition related to the proposed actions. While the impacts to soil condition from the proposed activities of new trail and trail head construction and mountain bike cattle guards would be evident immediately, the effects of rehabilitation would take longer. Ten years is enough time for soil compaction, loss of nutrients, and erosion to be evident (Ampooter et al 2010). While ten years

is not enough time for soils to completely recover from the effects of being a trail or other developed surface, it is enough time for changes to become apparent. Erosion rates can be reduced within ten years through stabilization and revegetation. However recovery from soil compaction and nutrient cycling is different. While revegetation can reestablish within ten years and reduce erosion, effects to soil compaction and nutrient cycling takes longer to recover (Kolka and Smidt 2004, Froehlich et al 1985, Webb et al 1986). Effects to soil condition are analyzed using the measures in Table 3-8.

Table 3-9. Effects to Soil Condition from Proposed Activities and Related Measures

Proposed Activity	Direct and Indirect Effects to Soil Condition	Measure
Add unauthorized route to the system as mountain bike trails in the Zuni Mountains	no change since soil condition is already unsatisfactory due to compaction and lack of vegetation	No measure needed. Not carried through the analysis
Construct new mountain bike trails	Loss of vegetation, increased compaction, reduced soil functions	Acres of new trail
Construct new trail heads with restrooms and expand one trail head and add restroom	Loss of vegetation, increased compaction, reduced soil functions	Number of new trail heads
Construct mountain bike cattle guards	Loss of vegetation, increased compaction, reduced soil functions	Acres of soil disturbance
Rehabilitate routes	Revegetation, reduced compaction, improved soil condition	Acres of routes rehabilitated

Negative effects to soil compaction and nutrient cycling are based on new construction of trails, trail heads, and mountain bike cattle guards. A width of eight feet was used to determine acres for mountain bike trails. This is based on a study of the impacts of mountain bike trails in the southwestern United States (White et al 2006). This study found that in the Arizona/New Mexico Mountains region, the width of visual impacts on mountain bike trails averaged between 2.5 to 4.1 feet, depending on slope. In order to account for nonvisual impacts to soils, this width was increased to eight feet for analysis purposes. Trail heads were analyzed assuming one acre of disturbance for each trail head. The trail head proposed for expansion is analyzed using an increase of 0.5 acres. Mountain bike cattle guards were analyzed using a 20 foot by 20 foot disturbance area, = 0.01 acre.

Positive effects are analyzed using the acres of routes proposed for rehabilitation activities. While only a quarter mile of the ends of each segment of route is proposed for rehabilitation, preventing access by motorized traffic will allow the untreated sections to improve so the entire mileage of routes will be considered to improve soil condition. The width used to analyze the acres of improvement related to rehabilitation of routes is 12 feet. Table 3-9 lists the measures results for each of the alternatives.

Table 3-10. Measures for Soil Condition by Alternative

Proposed Activity	Measure	Alternative A	Alternative B	Alternative C	Alternative D
Construct new mountain bike trails	Acres of new trail	0	115	152	83
Construct new trail heads and expand one existing trail head	Acres of new trail heads	0	5.5	5.5	3.5

Proposed Activity	Measure	Alternative A	Alternative B	Alternative C	Alternative D
Construct mountain bike cattle guards	Acres of mountain bike cattle guards	0	.5	1.8	.4
Rehabilitate routes	Acres of routes rehabilitated	0	193	193	193

Alternative A
By maintaining the current condition under alternative A, there would be no new construction related to proposed mountain bike trails. This means there would be no new construction for mountain bike trails, additional trail heads, and cattle guard crossings for mountain bikes. Further, there would be no improvement to the routes identified for rehabilitation.

Overall, this means there would be no change to the existing soil condition in the project area. Current areas of unsatisfactory soil condition would continue to be unsatisfactory where unauthorized routes occur with no rehabilitation activities to recover soil functions. Soil condition in areas proposed for new mountain bike trail construction would continue in their present state without impacts from new trail construction.

Cumulative Effects
The soil cumulative effect of interest is the amount of soils which would be unsatisfactory or impaired across the project area. Numerous activities occur in the project area as listed in Table B. Overall, the number of acres of changed soil condition is less than less than 1%, either improved or reduced soil condition across the project area. Because of this, there is no additive cumulative effect to soil condition which is already rated as largely impaired and unsatisfactory condition.

Alternative B
Proposed activities in Alternative B would work to improve soil condition on 193 acres while reducing soil conditions in on 121 acres. Soil condition would be reduced to unsatisfactory on 115 acres of land proposed for new mountain bike trail construction, 5.5 acres related to new construction for trail heads, 0.5 acres related to mountain bike cattleguards. This totals 121 acres of reduced soil condition as a result of the proposed action. This would be offset by 87 acres of direct improvement to soils related to rehabilitation activities on the ¼ miles ends of identified routes. In addition, 61 acres would be indirectly improved by preventing access on the interior portions of these routes.

Alternative B, if implemented, would improve soil condition on 193 acres while reducing soil condition on 121 acres. This would lead to an overall improvement of soil functions on 71 acres across the project area, should this alternative be selected.

Cumulative Effects
The soil cumulative effect of interest is the amount of soils which would be unsatisfactory or impaired across the project area. Numerous activities occur in the project area as listed in Table B-1, in Appendix B. Overall, the number of acres of changed soil condition is less than less than 1%, either improved or reduced soil condition across the project area. When combined with the effects of other activities, this does not add or subtract to the existing condition of largely impaired. Because of this, there is no additive cumulative effect to soil condition which is already rated as largely impaired and unsatisfactory condition.

Alternative C
Proposed activities in alternative C would work to improve soil condition on 193 acres while reducing soil conditions in on 159.3 acres. Soil condition would be reduced to unsatisfactory on 152 acres of land proposed for new mountain bike trail construction, 5.5 acres related to new construction for trail heads, 1.8 acres related to mountain bike cattleguards. This totals 159.3 acres of reduced soil condition as a result of the proposed action. This would be offset by 87 acres of direct improvement to soils related to rehabilitation activities on the ¼ miles ends of identified routes. In addition, 61 acres would be indirectly improved by preventing access on the interior portions of these routes.

Alternative C, if implemented, would improve soil condition on 193 acres while reducing soil condition on 159.3 acres. This would lead to an overall improvement of soil functions on 33.7 acres across the project area, should this alternative be selected.

Cumulative Effects
The cumulative effects to soil from past, present, and reasonably foreseeable future activities, including Alternative C would be the same as those described for Alternative B.

Alternative D
Proposed activities in Alternative D would work to improve soil condition on 193 acres while reducing soil conditions in on 86.9 acres. Soil condition would be reduced to unsatisfactory on 83 acres of land proposed for new mountain bike trail construction, 3.5 acres related to new construction for trail heads, .4 acres related to mountain bike cattleguards. This totals 86.9 acres of reduced soil condition as a result of the proposed action. This would be offset by 87 acres of direct improvement to soils related to rehabilitation activities on the ¼ miles ends of identified routes. In addition, 61 acres would be indirectly improved by preventing access on the interior portions of these routes.

Alternative D, if implemented, would improve soil condition on 193 acres while reducing soil condition on 86.9 acres. This would lead to an overall improvement of soil functions on 106.1 acres across the project area, should this alternative be selected.

Cumulative Effects
The cumulative effects to soil from past, present, and reasonably foreseeable future activities, including Alternative D would be the same as those described for Alternative B.

Soil Condition – Summary
Compared to alternative A, the no action alternative, there would be an overall improvement to soil condition should any of the action alternatives be selected, as shown in Figure 3-3. The number of acres proposed for improvement through rehabilitation of identified routes is the same for all action alternatives, 193 acres. However, the acres of reduced soil condition vary across the alternatives. No additional acres would be reduced in soil condition should Alternative A be selected. However, by proposing different miles of new trails, trail heads, and mountain bike cattleguards, the acres of reduced soil condition would vary by alternative. As a result of the proposed actions, alternative C has the potential to reduce soil condition on the greatest number of acres, 159.3. If selected, alternative B would lead to reduced soil function on 121 acres. Alternative D, if implemented, would result in the least amount of acres impacting soil condition, 86.9 acres.

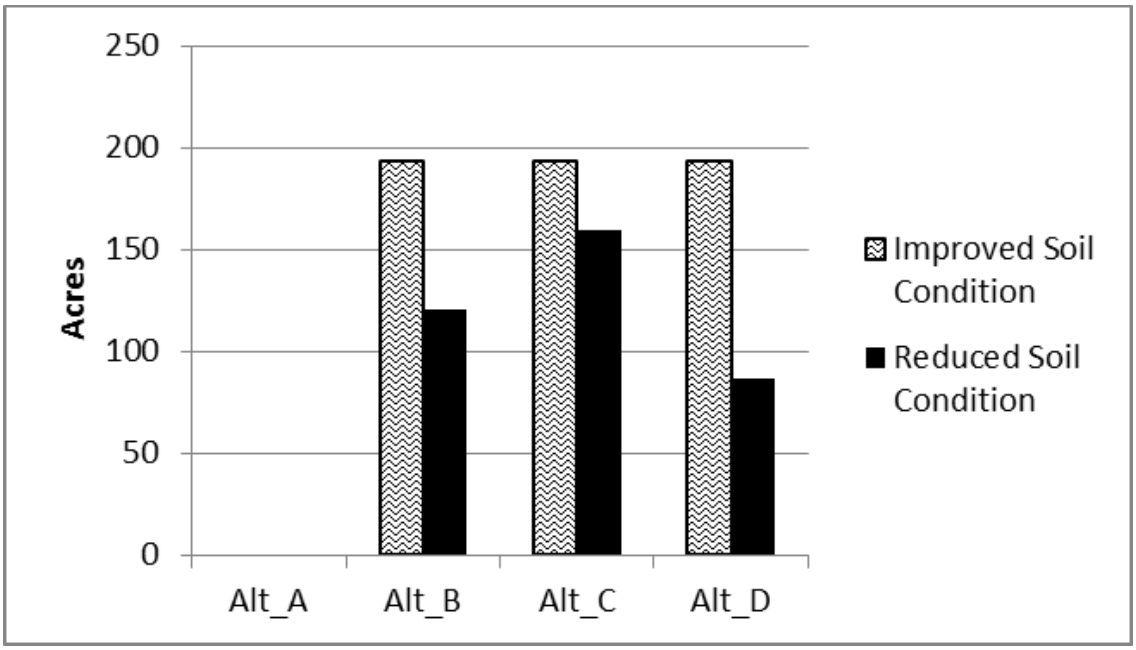


Figure 3-3. Acres of Improved and Reduced Soil Condition by Alternative

Water Resources

Table 3-7 lists the proposed activities and related potential effects to water resource features. These potential effects are carried through to Table 3-10 with associated measure to assess the effect. Water resource features include streams, springs, and riparian areas and associated water quality. The analysis area is the project area since it is this area where the proposed activities could contribute to effects to water resource features. The analysis timeframe is ten years. This is because in ten years it may be possible to observe or measure changes related to the selected alternative.

Exposed soil surfaces like trails concentrate runoff, which results in higher rates of soil erosion and subsequent sedimentation (White et al 2006, Davies and Newsome 2009, Reid and Dunne 1984, Brooks et al 2003). The amount of use on a trail or road is related to the erosion and sediment yield, with the greatest amount of erosion found on the most intensely used trails and roads (Håkansson et al 1988; MacDonald and Stednick 2003; Zhi-Hua et al 2009). Therefore, the amount of use on a forest trail has the potential to affect the soil stability in terms of erosion, which leads to sedimentation into stream channels.

As seen in Table 3-10, proximity to water resource features is the main risk factor for effects to water resources. The effect of mountain bike cattle guards is assessed through the assessment of the proposed new construction and designation of unauthorized trail as mountain bike trails. This is because the cattle guards would be located along the proposed trail systems. Because of this, the analysis of the effect of cattle guards on water resource features would be part of the trail assessment. Sediment and soil disturbance related to the cattle guards was analyzed in the soils section. Effects to springs are only carried through the analysis of alternatives for rehabilitation of routes since no springs are within 300 feet of the other proposed activities. By keeping the proposed activities 300 feet away from riparian areas, springs and their associated ecosystems, there will be no effects related to the proposed activities to those riparian areas and springs. 300 feet has been shown to be an effective buffer width for many water resource

features, such as springs (Gucinski et al 2001, MacDonald and Stednick 2003). This is why 300 feet is the distance used to as a conservative measure to assess effects to water resource features as listed in Table 3-10.

Table 3-11. Potential Direct and indirect Effects to Water Resource Features from Proposed Activities and Related Measures

Proposed Activity	Effect to Water Resources	Measure
Add unauthorized route to the system as mountain bike trails in the Zuni Mountains	Water Quality - sediment Stream condition impacts	Number of stream crossings by type Miles of stream by type within 300 feet of trail
Add unauthorized route to the system as mountain bike trails in the Zuni Mountains	Riparian area impacts	Acres of riparian area within 300 feet of trail
New construction of mountain bike trails	Water quality - sediment Stream condition impacts	Number of stream crossings Miles of stream by type within 300 feet of trail
New construction of mountain bike trails	Riparian area impacts	Acres of riparian area within 300 feet of trail
Construct new trail heads with restrooms and expand one existing trail head and add restroom	Water quality - sediment Stream condition impacts	Number of new and expanded trail heads within 300 feet of stream by type
Construct new trail heads with restrooms and expand one existing trail head and add restroom	Riparian area impacts	Acres of riparian area within 300 feet of new and expanded trail head
Rehabilitation of unauthorized routes.	Water Quality - sediment Stream condition impacts	Number of stream crossings by type Miles of stream by type within 300 feet of rehabilitated route
Rehabilitation of unauthorized routes.	Riparian area impacts	Acres of riparian area within 300 feet of rehabilitated route
Rehabilitation of unauthorized routes.	Spring impacts	Number of springs within 300 feet of rehabilitated route

Adverse effects to water resource features including water quality are analyzed using the measures in table 5. The activities carried through the analysis of alternatives include adding unauthorized mountain bike trails, constructing new mountain bike trails and constructing new trail heads. Important factors that influence the risk of adverse effects from unpaved roads and trails to water resource features, as well as water quality include the length of streams, springs, and riparian areas within close proximity of these proposed activities and the number of times trails cross the stream (Gucinski et al 2001, MacDonald and Stednick 2003).

Beneficial effects to water resource features from the proposed rehabilitation of routes are analyzed using the miles of water resource features within 300 feet of proposed activities. The conditions of the streams, springs, and riparian areas as well as sediment input in the project area are expected to be improved from the restoration of routes near these features. Stream crossings within the active rehabilitation areas, the first ¼ miles of the routes proposed for rehabilitation, are expected to recover while the stream crossings outside of these areas are likely to continue to be unstable depending on site characteristics. This is because of the active processes in these areas from flows and impacts from existing routes as they cross stream channels. Because of this, the measure for improved stream condition and water quality related to stream crossings will only count the crossings within the ¼ mile of active rehabilitation.

Table 3-12. Measures for Streams, Springs, and Water Quality by Alternative

Proposed Activity	Measure	Alternative A	Alternative B	Alternative C	Alternative D
Add unauthorized route to the system as mountain bike trails	Number of perennial stream crossings	0	0	0	0
Add unauthorized route to the system as mountain bike trails	Number of intermittent/ephemeral stream crossings	0	116	122	66
Add unauthorized route to the system as mountain bike trails	Miles of perennial stream within 300 feet (% of total)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Add unauthorized route to the system as mountain bike trails	Miles of intermittent/ephemeral stream within 300 feet (% of total)	0 (0%)	18.2 (1.5%)	19.6 (1.6%)	10.6 (0.9%)
Add unauthorized route to the system as mountain bike trails	Acres of riparian area within 300 feet and % of total	0	81.6 (3.2%)	87.7 (3.4%)	81.6 (3.2%)
New construction of mountain bike trails	Number of perennial stream crossings	0	19	19	19
New construction of mountain bike trails	Number of intermittent/ephemeral stream crossings	0	116	200	65
New construction of mountain bike trails	Miles of perennial stream within 300 feet (% of total)	0 (0%)	3.4 (50.0%)	3.4 (50.0%)	3.4 (50%)
New construction of mountain bike trails	Miles of intermittent/ephemeral stream within 300 feet (% of total)	0 (0%)	21.8 (1.8%)	37.1 (3.1%)	12.8 (1.1%)
New construction of mountain bike trails	Acres of riparian area within 300 feet and % of total	0	316.4 (12.4%)	326.0 (12.8%)	117.6 (4.6%)
Construct new trail heads with restrooms and expand one existing trail head and add restroom	Miles of perennial streams within 300 feet of trail head	0	0.1	0.1	0.1
Construct new trail heads with restrooms and expand one existing trail head and add restroom	Miles intermittent/ephemeral streams within 300 feet of trail heads	0	0.3	0.3	0.2
Construct new trail heads with restrooms and expand one existing trail head and add restroom	Acres of riparian area within 300 feet and % of total	0	9.0 (0.4%)	9.0 (0.4%)	6.9 (0.3%)
Rehabilitation of unauthorized routes.	Number of perennial stream crossings and number within ¼ mile active rehabilitation areas	0	0	0	0
Rehabilitation of unauthorized routes.	Number of intermittent/ephemeral stream crossings within ¼ mile active rehabilitation areas	0	81	81	81
Rehabilitation of unauthorized routes.	Miles of perennial stream within 300 feet (% of total)	0	.6 (8.8%)	.6 (8.8%)	.6 (8.8%)
Rehabilitation of unauthorized routes.	Miles of intermittent/ephemeral stream within 300 feet (% of total)	0	49.2 (4.1%)	49.2 (4.1%)	49.2 (4.1%)
Rehabilitation of unauthorized routes.	Acres of riparian area within 300 feet and % of total	0	109.3 (4.3%)	109.3 (4.3%)	109.3 (4.3%)
Rehabilitation of unauthorized routes.	Number of Springs within 300 feet	0	1	1	1

Streams, Riparian Areas. Springs, and Water Quality

As discussed in the affected environment section, there are many stream channels in the project area. However, there is only one mapped perennial reach, Bluewater Creek. While all channels have important ecological and hydrological significance (Levick et al 2008), the perennial stream is particularly important as the only continuous reach in the project area. Because of this, the analysis shows the measures for the perennial stream and intermittent/ephemeral streams separately. Measures used to assess effects to streams, springs, and water quality are combined in Table 3-12 to show the overall effect by grouping potential positive and negative measure for each alternative.

Table 3-13. Combined Measures for Streams, Springs, and Water Quality (italics are beneficial effects)

Measure	Alternative A	Alternative B	Alternative C	Alternative D
Number of perennial stream crossings on new trails and added unauthorized routes	0	19	19	19
Number of intermittent/ephemeral stream crossings on new trails and added unauthorized routes	0	232	322	131
Number of perennial stream crossings within ¼ mile active rehabilitation areas	*0*	*0*	*0*	*0*
Number of intermittent/ephemeral stream crossings within ¼ mile active rehabilitation areas	*0*	*81*	*81*	*81*
Miles of perennial stream within 300 feet of new trails, added unauthorized routes, and new or expanded trail heads and (percent of total)	0	3.4 (50%)	3.4 (50%)	3.4 (50%)
Miles of intermittent/ephemeral stream within 300 feet of new trails, added unauthorized routes, and new or expanded trail heads and (percent of total)	0	40.0 (3.3%)	56.7 (4.7%)	23.4 (1.9%)
Miles of perennial stream within 300 feet of rehabilitated routes and (percent of total)	*0*	*0.6 (8.8%)*	*0.6 (8.8%)*	*0.6 (8.8%)*
Miles of intermittent/ephemeral stream within 300 feet of rehabilitation routes and (percent of total)	*0*	*49.2 (4.1%)*	*49.2 (4.1%)*	*49.2 (4.1%)*
Number of Springs within 300 feet of rehabilitation routes	*0*	*1*	*1*	*1*
Number of springs within 300 feet of new, added unauthorized trails, and trail heads	0	0	0	0

Alternative A

This alternative is the no action alternative meaning none of the proposed actions with the potential to change stream condition, springs, or water quality would occur. There would be no additional trails or trail heads built or designated near streams. In addition, there would be no rehabilitation of routes, including those in proximity to streams and springs.

Overall, this means there would be no change to the existing condition of streams, riparian areas, springs, or water quality within the project area. This includes proposed rehabilitation activities as well as impacting activities such as mountain bike trails and trail heads. 81 crossings on intermittent and ephemeral streams along the first ¼ mile of routes proposed for active rehabilitation would continue to be unstable due to stream processes interacting with these routes. 49.2 miles of intermittent/ephemeral stream channel across the project area and .6 miles

of perennial stream in Bluewater Creek would continue to be influenced by routes needing rehabilitation activities. In addition, a new trail head and parking area would not be built in the floodplain, less than ¼ mile from an existing developed area in the same floodplain. Brennan Spring, an intermittent spring would not benefit from route rehabilitation and continue to be impacted from the road which is a source of sediment.

Cumulative Effects
Activities which occur in the project area are listed in Table B-1, in Appendix B. Of particular interest for water resources those activities which relate to the 12 indicators which combine to result in the watershed condition rating (USDA FS 2011). These include roads, trails, existing vegetative condition, fire regime, wildfires, prescribed fires, invasive species, insect and disease, grazing, wildlife use, and soil condition.

Bluewater Creek is the only continuous perennial mapped stream in the project area. There are several features which have impacted Bluewater Creek. Historical activities in Bluewater Creek, including railroad logging, intensive grazing, roads, and clearing riparian vegetation have impacted its functioning. Many restoration programs have occurred in Bluewater Creek, resulting in the current condition of being largely restored, with most reaches rated as properly functioning or at risk; an improvement from non-function status in the past.

However, impacts continue to influence Bluewater Creek, making further restoration activities challenging. In the perennial reach, there are a series of structures which were meant to improve stream functions for fish habitat but instead have caused lateral movement and instability along this reach. A road parallels much of Bluewater Creek along the perennial reach with the effect of increasing sediment inputs. This is related to the design of the road and maintenance activities which allow runoff and sediment to enter the floodplain of Bluewater Creek below. At the upstream end of the perennial reach the road enters the floodplain of Bluewater Creek with an existing picnic area located in the floodplain. This developed area has impacted the riparian area by reducing vegetative growth and reducing floodplain functions.

Alternative B

Streams, Water Quality, and Springs
As shown in Table 3-11, there could be as many as 232 stream crossings on intermittent and ephemeral streams and 19 crossings on the perennial reach of stream in the project area. Proposed trail crossings on the perennial portion of Bluewater Creek would be designed so that mountain bikes do not cross in the water and the crossing would not impede bankful or flood flows. The number of stream crossings would be minimized where terrain permits to reduce this effect. Where proposed trails cross intermittent and ephemeral channels, the crossing would be stabilized and/or hardened as needed to prevent sedimentation and destabilization of banks. With these mitigations, effects would be reduced, but not eliminated. The rehabilitation of routes would include 81 crossings on intermittent/ephemeral channels within the active rehabilitation areas. This would improve stream condition and reduce sediment inputs to these areas as stabilization occurs.

The overall effect, however, is there could be up to an additional 151 crossings on intermittent/ephemeral streams (after 81 crossings are restored) and 19 on the perennial reach of Bluewater Creek. For perspective, this is about 3 crossings per mile on the perennial reach of Bluewater Creek and less than one crossing per 100 miles on the intermittent/ephemeral streams in the project area.

The proposed new mountain bike construction and the addition of unauthorized routes to the mountain bike trail system have a similar pattern. Under alternative B, forty miles of intermittent and ephemeral streams would be located within 300 feet of a proposed mountain bike trail. New construction would be located further away where possible but existing unauthorized routes are likely to stay in the same locations, with improved design to minimize effects to nearby streams, such as drainage features. 3.4 miles of new trail construction is proposed within 300 feet of Bluewater Creek, the only continuous perennial stream in the project area. This is 50% of the perennial stream miles in the project area, all of in Bluewater Creek. This reach is largely a narrow confined valley, making it difficult to locate the trail without impacts to the stream and its associated features. In addition, the end of the proposed new trail does not lead anywhere on the downstream end, which mean trailing could continue beyond the proposed constructed trail, leading to additional impacts to the stream. Bluewater Creek is already listed as not attaining water quality to support designated uses due to sediment. This proposed action could add to this existing effect.

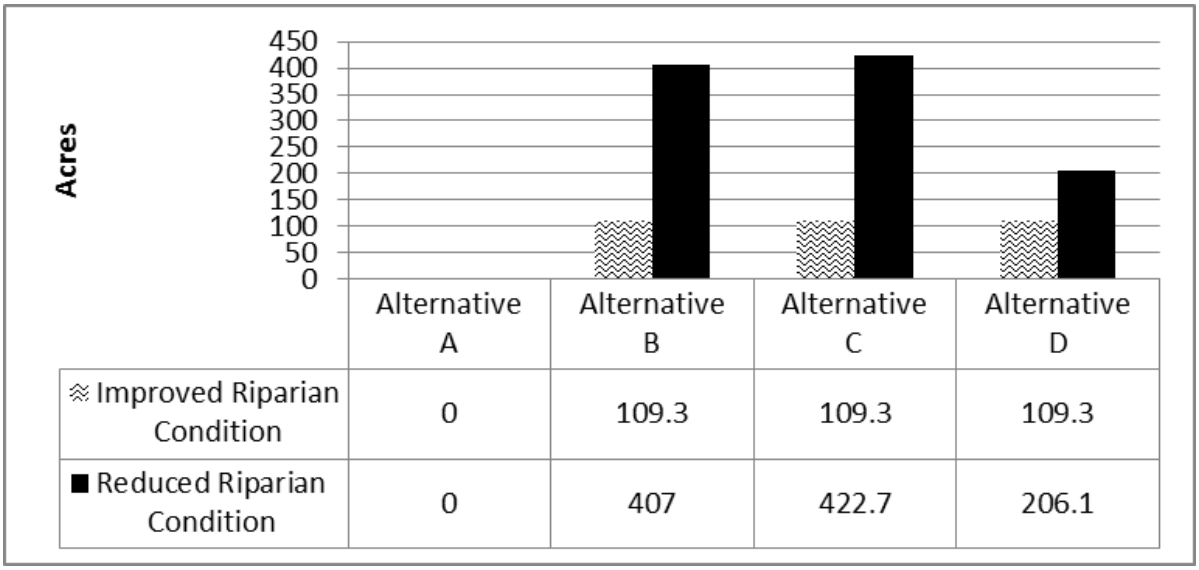
Routes proposed for rehabilitation have the potential to improve condition along .6 miles of Bluewater Creek, 49.2 miles of intermittent/ephemeral channels, and one springs. One spring, Brennan Spring, would benefit from route rehabilitation by restoring an adjacent route along the west edge of the meadow it is located in. This would reduce runoff and sediment related to this route, allowing for improved function at the spring.

The overall effect to stream condition and water quality is greatest to the perennial reach of Bluewater Creek. A mountain bike trail with up to 19 crossings is proposed along 50% of the mapped perennial miles of Bluewater Creek within a narrow confined valley. In contrast, mountain bike trails are proposed within 3.3 % of the intermittent/ephemeral stream miles in the project. Many of these trails have the potential to be located further away as terrain permits.

Riparian Areas

Measures for effects to riparian areas are shown in Table 3-11 and summarized in Figure 5. Acres of riparian area within 300 feet of proposed activities are the measure for effects to riparian areas. Proposed additions to the mountain bike trail system including trail heads are counted as negative effects. Improved riparian areas are expected where routes are proposed for rehabilitation while impacts are associated with new mountain bike trails, adding unauthorized routes to the mountain bike system, and building and expanding trail heads.

Compared to the existing condition, as reflected by alternative A, alternative B has the potential to reduce the condition of 407 acres of riparian area by locating proposed activities within 300 feet of these features. This is 16% of the riparian areas in the project area. Since details about proposed trail locations are not known, all 407 acres are considered as effects. However, where possible, proposed activities will be located at least 300 feet away from riparian areas, but terrain may preclude this in many locations. The rehabilitation of routes has the potential to improve 109.3 acres of riparian areas by improving drainage, revegetation, and stabilization.



	Alternative A	Alternative B	Alternative C	Alternative D
Improved Riparian Condition	0	109.3	109.3	109.3
Reduced Riparian Condition	0	407	422.7	206.1

Figure 3-4. Potential improved and reduced acres for riparian condition

Cumulative Effects

Activities which occur in the project area are listed in Table B-1, in Appendix B. Of particular interest for water resources those activities which relate to the 12 indicators which combine to result in the watershed condition rating (USDA FS 2011). These include roads, trails, existing vegetative condition, fire regime, wildfires, prescribed fires, invasive species, insect and disease, grazing, wildlife use, and soil condition. None of the proposed actions would result in a changed condition rating for the sub-watersheds in the project area. Further, none of the proposed actions would change the indicator ratings which inform the overall watershed condition rating. Overall, the construction of new trails and trail heads is a small footprint relative to the surrounding landscape and is not expected to impact watershed health enough (positive or negative) to result a change in watershed condition class.

Bluewater Creek is the only continuous perennial mapped stream in the project area. There are several features which have impacted Bluewater Creek. Historical activities in Bluewater Creek, including railroad logging, intensive grazing, roads, and clearing riparian vegetation have impacted its functioning. Many restoration programs have occurred in Bluewater Creek, resulting in the current condition of being largely restored, with most reaches rated as properly functioning or at risk; an improvement from non-function status in the past.

However, impacts continue to influence Bluewater Creek, making further restoration activities challenging. In the perennial reach, there are a series of structures which were meant to improve stream functions for fish habitat but instead have caused lateral movement and instability along this reach. A road parallels much of Bluewater Creek along the perennial reach with the effect of increasing sediment inputs. This is related to the design of the road and maintenance activities which allow runoff and sediment to enter the floodplain of Bluewater Creek below. At the upstream end of the perennial reach the road enters the floodplain of Bluewater Creek with an existing picnic area located in the floodplain. This developed area has impacted the riparian area by reducing vegetative growth and reducing floodplain functions. The addition of a mountain bike trail along 50% of this perennial reach would add to the existing impacts in this reach of Bluewater Creek, possibly contributing to a downward trend.

Alternative C

Streams, Water Quality, and Springs

Like the other action alternatives, activities associated with alternative C have the potential for negative and positive effects to streams, springs, and water quality. Measures to assess these potential effects are shown in Table 3-12.

Increased impacts to streams, water quality, and springs are greatest in this alternative, as shown by the higher number of potential stream crossings of intermittent and ephemeral streams. 322 crossings of intermittent and ephemeral are possible as part of this alternative. As with all action alternatives, crossings would be minimized where possible and designed for stability and prevention of sedimentation. As in alternative B, up to 19 crossings could be needed for the new trail proposed along the perennial reach of Bluewater Creek. Mitigations to ensure this trail does not cross in the water, allows for the unimpeded flow of the bankful discharge, and passage of flood flows would be in place. While it is unlikely that all 19 crossings will be needed, it is unknown at this time which crossings would be built or not. This is why all 19 crossings are considered. Additional mitigations such as alignment, approach pathways, and location are found in the mitigation section. The rehabilitation of routes is the same for all action alternatives with the restoration of 81 crossings on intermittent and ephemeral channels proposed. The restoration of these locations would improve stability for stream channels, reduce sediment inputs, and allow for revegetation of banks.

The miles of streams within 300 feet of new trails and added authorized trails to the mountain bike system have the potential to decrease the condition of streams and associated water quality as discussed earlier and shown in Table 3-12. All action alternatives propose to add 3.4 miles of trail within 300 feet of Bluewater Creek, largely in a narrow confined valley. Bluewater Creek is the only continuous perennial stream in the project area. Because of this, it will be difficult to locate the proposed trail 300 feet away from the stream, and it would be located in the floodplain, adding to effects. As mentioned, 3.4 miles is 50% of the perennial section of Bluewater Creek. Mitigations would be used to minimize effects to this important resource but due to the nature of the terrain, effects are likely to this perennial reach. As Bluewater Creek is already listed as not meeting water quality standards to support designated uses due to sediment, proposed activities which could increase sediment inputs is of particular concern. In addition to the miles of proposed activities located along the perennial stream, there are also up to 56.7 miles of intermittent and ephemeral streams located along proposed trails. This is 4.7% of the intermittent and ephemeral channels in the project area. These trails would be located further away from the stream channel and floodplain where possible to minimize effects.

This alternative would result in the greatest amount of impacting activities, by resulting in more stream crossings and miles of streams within 300 feet of proposed activities. There could be up to an additional 322 crossings on intermittent/ephemeral streams, adding to the 45 crossing which already exist along mountain bike trails in the project area. 19 new crossings are proposed along the perennial reach of Bluewater Creek. For perspective, this is about 3 crossings per mile on the perennial reach of Bluewater Creek and less than one crossing per 100 miles on the intermittent/ephemeral streams in the project area. In addition, mountain bike trails are proposed within 300 feet of 50% of the perennial stream miles in the project area and 4.7% of the intermittent and ephemeral streams. These areas would be mitigated where possible by moving trails away from channels and floodplains where terrain permits and proper stream crossing designs.

As with all action alternatives, routes proposed for rehabilitation have the potential to improve condition along .6 miles of perennial Bluewater Creek, 49.2 miles of intermittent/ephemeral channels, and one spring. The .6 miles of Bluewater Creek could improve conditions along this reach, representing 8.8% of the perennial miles in the project area. Intermittent and ephemeral streams have the potential to be improved on 4.1% of the total miles in the project area. 81 intermittent and ephemeral stream crossings on routes proposed for rehabilitation would be stabilized and restored, resulting in improved conditions in these areas. In addition, Brennan Spring would benefit from route rehabilitation by restoring an adjacent route along the west edge of the meadow it is located in.

Riparian Areas
Currently, there are no riparian areas within 300 feet of mountain bike trails in the project area, as reflected by alternative A. 422.7 acres of riparian area would be located within 300 feet of proposed trails and trail heads should the activities associated with Alternative C be implemented. This is 16.6% of the mapped riparian areas in the project area. The conditions of these riparian areas are likely to decrease due to loss of vegetation and increased runoff effects. Where possible trials will be located away from riparian areas but it is not known where this could occur due to lack of detailed information. As with the other action alternative, the rehabilitation of routes has the potential to improve 109.3 acres of riparian area, representing 4.3% of riparian areas in the project areas. This would offset the 16.6% of riparian areas which could decrease in condition as a result of the proposed activities.

Cumulative Effects
The cumulative effects to water resources from past, present, and reasonably foreseeable future activities, including Alternative C would be the same as those described for Alternative B.

Alternative D

Streams, Water Quality, and Springs
Activities associated with Alternative D have the potential for negative and positive effects to streams, springs, and water quality. Measures to assess these potential effects are shown in Table 3-12.

Increased impacts to streams, water quality, and springs are the least in this alternative, as shown by the lower number of potential stream crossings of intermittent and ephemeral streams. 131 crossings of intermittent and ephemeral are possible as part of this alternative. As with all action alternatives, crossings would be minimized where possible and designed for stability and prevention of sedimentation. As in the other action alternative, up to 19 crossings could be needed for the new trail proposed along the perennial reach of Bluewater Creek. Mitigations to ensure this trail does not cross in the water, allows for the unimpeded flow of the bankful discharge, and passage of flood flows would be in place. While it is unlikely that all 19 crossings will be needed, it is unknown at this time which crossings would be built or not. This is why all 19 crossings are considered. Additional mitigations such as alignment, approach pathways, and location are found in the mitigation section. The rehabilitation of routes is the same for all action alternatives with the restoration of 81 crossings on intermittent and ephemeral channels proposed. The restoration of these locations would improve stability for stream channels, reduce sediment inputs, and allow for revegetation of banks.

The miles of streams within 300 feet of new trails and added authorized trails to the mountain bike system have the potential to decrease the condition of streams and associated water quality

as discussed earlier and shown in Table 3-12. As discussed under Alternatives B and C, 3.4 miles of new mountain bike trail is proposed within 300 feet of Bluewater Creek, largely in a narrow confined valley. As mentioned, 3.4 miles is 50% of the perennial section of Bluewater Creek. Mitigations would be used to minimize effects to this important resource but due to the nature of the terrain, effects are likely to this perennial reach. In addition to the miles of proposed activities located along the perennial stream, there are also up to 23.4 miles of intermittent and ephemeral streams located along proposed trails. This is 1.9% of the intermittent and ephemeral channels in the project area. Where terrain permits, these trails would be located further away from the stream channel and floodplain where possible to minimize effects.

Except for the no action alternative A, this alternative would result in the least amount of impacting activities, due to less miles of proposed trails resulting in less stream crossings and miles of streams within 300 feet of proposed activities. There could be up to an additional 131 crossings on intermittent/ephemeral streams (after 81 are restored), adding to the 45 crossing which already exist along mountain bike trails in the project area. 19 new crossings are proposed along the perennial reach of Bluewater Creek. Where possible, trail locations would be constructed away from channels and stream crossings would be reduced.

As with all action alternatives, routes proposed for rehabilitation have the potential to improve condition along .6 miles of perennial Bluewater Creek, 49.2 miles of intermittent/ephemeral channels, and one spring. The .6 miles of Bluewater Creek could improve conditions along this reach, representing 8.8% of the perennial miles in the project area. Intermittent and ephemeral streams have the potential to be improved on 4.1% of the total miles in the project area. 81 intermittent and ephemeral stream crossings on routes proposed for rehabilitation would be stabilized and restored, resulting in improved conditions in these areas. In addition, Brennan Spring would benefit from route rehabilitation by restoring an adjacent route along the west edge of the meadow in which it is located.

Riparian Areas

Currently, there are no riparian areas within 300 feet of mountain bike trails in the project area, as reflected by Alternative A. 206.1 acres of riparian area would be located within 300 feet of proposed trails and trail heads should the activities associated with Alternative D be implemented. This is 8.1% of the mapped riparian areas in the project area. The conditions of these riparian areas are likely to decrease due to loss of vegetation and increased runoff effects. Where possible trials will be located away from riparian areas but it is not known where this could occur due to lack of detailed information. As with the other action alternatives, the rehabilitation of routes has the potential to improve 109.3 acres of riparian area, representing 4.3% of riparian areas in the project areas.

Cumulative Effects

The cumulative effects to water resources from past, present, and reasonably foreseeable future activities, including Alternative D would be the same as those described for Alternative B.

Cultural Resources

Affected Environment

The project area contains significant cultural resources (historic properties) that date across most of the span of human history in the American Southwest. Most of these properties are archeological sites, while some include buildings and structures. At least one archeological site is a traditional cultural property. These properties are associated with events and persons in, and contain information about, the history of the Zuni Mountains and its surrounding areas, the American Southwest, and the nation.

The properties in the project area fall within four different historic periods of significance. The first set of properties are the archeological remains of encampments of the Native American Archaic people, who occupied the Southwest prior to advent of farming and settled life (4500 B.C. to A.D. 200). These properties contain scientific information that can help understand human ways of life in the region after the end of the last ice age (the early Holocene), and can help understand the origins of agriculture and village life. The second set of properties are the archeological remains of encampments, settlements, resource collection areas, and features of religious significance of ancestral Pueblo people (the ancestors of contemporary Pueblo Indian people), who utilized the Zuni Mountains prior to and following the arrival of European people in the Southwest (A.D. 500 to the present day). These properties contain scientific and humanistic information that can help understand the economic, social, and religious importance of high mountain areas to the Native American settled farming peoples of the region during this time period. One of the sites from this time period is also associated with events and persons important in the history of contemporary Pueblo people, and is important to maintaining the continuing cultural identity of a Pueblo community.

The third set of properties is the archeological remains of Navajo settlements and encampments that date to the last two centuries (A.D. 1860 to 1960). These sites contain scientific and humanistic information on the economic and social relationships of the Navajo people to high mountain areas in the Southwest, and the economic integration of the Navajo into American commercial and industrial life in the late nineteenth and early twentieth centuries. The fourth set of properties is the archeological remains, and intact structures and buildings, associated with commercial logging and industrial mining in the last two centuries (A.D. 1890 to 1960). These properties contain scientific and humanistic information on the economic and social dimensions of commercial logging and industrial mining in the Southwest and its importance to the commercial and industrial development of the region and the nation in the late nineteenth and twentieth centuries. A few of the properties also contain structures and buildings that are important in the events associated with logging and mining in the Southwest during this time period.

Cumulative Effects Area
The cumulative effects area for cultural resources consists of the project area: the Zuni Mountains. Past, present, and reasonable foreseeable future activities are listed in Table B-1 in Appendix B.

Environmental Consequences

Alternative A

Under Alternative A, a designated trail system would not be established. There would be no construction of trails and trailheads, no unauthorized trails added to the system, and no unauthorized routes rehabilitated. The development and use of unauthorized routes that cross heritage resource sites would continue to have a direct effect to heritage resources.

The current extent of direct effects to cultural resources under Alternative A cannot be fully evaluated, because the entire network of unauthorized routes to be rehabilitated has not been inventoried for cultural resource sites. There are 62.4 miles of unauthorized routes that were surveyed for the Proposed Action, and 11 historic properties (cultural resource sites that are eligible to the National Register of Historic Places, or have an undetermined National Register eligibility), are located along these unauthorized routes. Direct effects to historic properties from the use of the existing network of unauthorized routes can be extrapolated from the impacts to these sites.

Of the 11 sites documented for the Proposed Action that are along existing unauthorized routes, two have evidence of direct effects. At one, trail construction and use has disturbed intact archeological deposits, and artifacts are eroding out of the trail bed. At the second, the trail has been constructed over a historic stone and earth water diversion feature. These impacts are damaging artifacts and features at the site that have the potential to contribute significant information about the past, as defined in the Affected Environment, above. Similar direct impacts are anticipated at other heritage resources sites along other existing unauthorized routes that have not been surveyed, or that may be established**.**

The inventory of historic properties along the unauthorized routes to be rehabilitated is not yet complete; as such, the current extent of direct effects to cultural resources. Along the routes to be rehabilitated, there are 31 historic properties that have been recorded for activities other than route rehabilitation. Of these, two show evidence of direct effects from motorized use. The travel management decision for the Mt. Taylor Ranger District dated April 14, 2011 now prohibits motorized use off the designated system as displayed on the Motor Vehicle Use Map, including motorized cross-country travel. As such, the impacts from use are no longer occurring. As motorized use is no longer authorized along the unauthorized routes to be rehabilitated, no direct effects to cultural resources along these roads from Alternative A are anticipated.

Alternative A, would not address short- and long-term demand for recreation including the demand for mountain bike activities in the Zuni Mountains. As mountain biking demand increases, as it is projected to do, there would be increased visitation of the area. This increase of people and use of the trail system could have the following indirect effects:

- Greater potential of off trail activity and inadvertent discovery of sites near the trail with subsequent unauthorized collection, graffiti, repurpose of wood artifacts for fire wood; damage of site features;
- Camping in or near the trail with increased potential for wildfire; and
- Creation of unauthorized, user-defined trails off the existing system of trails.

The same 11 heritage resource sites recorded for the Proposed Action to describe direct effects above can be used to describe indirect effects here. Of the 11 sites, five show evidence of indirect effects, including recreational use (camping), the removal of wooden feature elements,

artifact collection, and possible unauthorized excavation of archeological deposits. At four of the five sites, however, system roads also pass adjacent or through the sites, and the impacts may be indirect effects of use of the roads by motorized and non-motorized users, rather than by non-motorized users of the trails. Similar indirect impacts are anticipated at other heritage resources sites along other existing unauthorized routes that have not been surveyed, or that may be established.

Among the 31 historic properties that have been recorded for activities other than road rehabilitation, four show evidence of indirect effects from motorized use, mainly vandalism to standing features. As motorized travel along these roads is no longer allowed, these indirect effects are no longer occurring. No indirect effects to cultural resources along these roads from Alternative A are anticipated.

Cumulative Effects
Cumulative effects of the Alternative A are measured by examining the effects of the No Action Alternative in combination with other recent land management actions in the vicinity of the project area. None of actions were found to have any significant impacts to cultural resources. As such, there would be no cumulative impacts under this alternative.

Alternative B

To identify the cultural resources that are located in the area directly impacted by the construction and use of the trail system and trailheads, an intensive pedestrian survey was completed to identify and record cultural resource sites. Table 3-13 details the acres and miles surveyed, the acres and miles that were previously surveyed to current standards, and acres and miles in the total project area. There are approximately 1,509 total acres (up to 246 total miles) of trails and trailheads, including the reroutes to avoid eligible sites, within the project area, given a 15 meter (49 foot) wide investigation corridor for each trail. Of that total, there were 482.18 acres (80.65 miles) of previously surveyed area that met current standards. This investigation covered 972.44 acres (155.82 miles) of the project area.

Table 3-14. Acres and Miles Surveyed within the Total Project Area

Area	Acres Surveyed	Miles Surveyed	Acres Previously Surveyed	Miles Previously Surveyed	Total Acres	Total Miles
New construction	641.96	108.44	113.30	18.98	**755.26**	**127.42**
Unauthorized routes added to the trail system	253.41	43.03	116.14	19.37	**369.55**	**62.40**
Reroutes	29.27	5.82	0	--	**29.27**	**5.82**
Trailheads	54.88	--	0	--	**54.88**	
Total	**979.52**	**157.29**	**229.44**	**38.35**	**1208.96**	**195.64**

There are 57 cultural resources in the trail system and trailhead project area. Of those, 38 are historic properties (eligible to the National Register of Historic Places, or their National Register eligibility is undetermined [undetermined sites are treated as eligible until their National Register eligibility can be determined]).

There are several potential direct effects to historic properties from Alternative B, absent mitigations. At all of the 38 sites, construction and use of trails and trailhead facilities could uncover, disturb, and destroy intact features and subsurface archeological deposits. The damage or destruction of such deposits and features could prevent those sites from contributing significant scientific and humanistic information relevant to local, regional, and national history. In addition, the use of the trail could disrupt the viewshed of sites with intact structures or buildings, impacting their setting. The use of the trail could also disrupt the contemporary use of properties for traditional uses, affecting their ability to contribute to the cultural identity of the associated community. Mechanical activities associated with the rehabilitation and closure of roads could also uncover, disturb, and destroy intact features and subsurface archeological deposits at historic properties.

There will be no direct effects to cultural resources from Alternative B. All potential impacts to cultural resource sites will be mitigated through the redesign of the project or other activities. To avoid direct impacts to historic properties, mountain bike trails and trailheads were rerouted or relocated, or the trails are routed to cross portions of the properties that are considered elements non-qualifying to their National Register eligibility.

The inventory of roads to be rehabilitated is not yet complete. However, all historic properties located along roads to be rehabilitated will be avoided by all rehabilitation activities. As such, there will be no direct impacts to cultural resources.

Alternative B would address short- and long-term demand for recreation, including the demand for mountain bike activities in the Zuni Mountains. As mountain biking demand increases, as it is projected to do, there would be increased visitation of the area. The increase of people and use of the trail system could have the following indirect effects:

- Greater potential of off-trail activity and inadvertent discovery of properties near the trail with subsequent unauthorized collection, graffiti, repurpose of wood artifacts for fire wood, and damage of property features;
- Camping in or near the trail with increase of fire activity; and
- Creation of unauthorized trails off the existing system of trails.

To record the potential indirect effects to cultural resources, the resources that are located near the trail were visited and assessed for potential impacts. Historic properties that were within 50 m (164 feet) on either side of the trail were assessed. There were 87 cultural resource sites in addition to the 57 that were in the immediate trail corridor, 144 total sites. Of these 70 are historic properties.

There will be no indirect effect to cultural resources from the Proposed Action. Design criterion #12 would help to mitigate potential indirect effects.

All road rehabilitation activities will be designed to prevent indirect impacts to historic properties in the vicinity of rehabilitation. No indirect effects to cultural resources are anticipated from road rehabilitation activities.

Cumulative Effects
As there are no direct and no indirect effects on cultural resources from Alternative B, there will be no cumulative effects to cultural resources from Alternative B.

Alternative C
Direct effects pertaining to developing a designated trail system by constructing new trails and trailheads, adding unauthorized trails to the system, and rehabilitating unauthorized routes that would result from this alternative are similar to Alternative B. All 38 of the historic properties located in the project area for Alternative B are also located in the project area for Alternative C. Alternative C adds miles of trails that have not yet been inventoried for heritage resource sites. As with Alternative B, once survey of these additional miles of trails was complete, trail corridors could be rerouted around any located historic properties to avoid direct impacts, or routed through portions of sites where the route would not significantly impact the property. As with Alternative B, other site-specific mitigation measures to avoid direct effects might also be necessary.

The potential indirect effects for Alternative C would be the same as those listed under Alternative B. The mitigation measures to eliminate indirect effects would also be the same. There are no indirect effects for Alternative C.

Cumulative Effects
The cumulative effects for Alternative C would be the same as those listed under Alternative B.

Alternative D
Alternative D proposes fewer miles of designated mountain biking trail than the Proposed Action (Alternative B). All of the trails in this alternative were included in the area surveyed for Alternative B. In Alternative D, there are 29 cultural resource sites that are eligible to the National Register, or that have a National Register eligibility that is undetermined. The 29 sites are identified in Appendix B (Table B-1). The potential direct effects to these 29 sites are the same as those described for Alternative B.

There will be no direct effects to cultural resources from Alternative D. The same mitigation measures applied to the 29 sites in Proposed Action (Alternative B) would be applied under this alternative.

The potential indirect effects for Alternative D would be the same as those listed in Alternative B. The mitigation measures to eliminate indirect effects would also be the same. There are no indirect effects for Alternative D.

Cumulative Effects

The cumulative effects for Alternative D would be the same as those listed under Alternative B.

4. Agencies and Persons Consulted

Interdisciplinary Team Members

- Arnold Wilson, Project Manager
- Cheryl Prewitt, NEPA Specialist
- Ruth Doyle, Recreation
- Livia Crowley, Watershed and Soils
- Virginia Yazzie-Ashley, Grazing
- Consuelo Zamora, Wildlife
- Zack Parsons, Wildife
- Richard Graves, Transportation
- Cynthia Benedict, Tribal Resources
- Jeremy Kulisheck, Heritage Resources

Federal, State, and Local Agencies

- Zuni Mountain Trail Partnership, including:
    - McKinley County
    - Cibola County
    - Gallup Trails 2010
    - Adventure Gallup and Beyond
    - Future Foundations, Inc.
    - Connections, Inc.
- International Mountain Bicycling Association
- Northwest New Mexico Council of Governments
- New Mexico Department of Game and Fish
- New Mexico Energy, Minerals, and Natural Resources Department
- New Mexico State Parks
- New Mexico State Land Office
- National Park Service
- Bureau of Land Management

Tribes

The following American Indian tribes and Navajo Chapters were consulted:

- Acoma Pueblo
- Laguna Pueblo
- Zuni Pueblo
- Jemez Pueblo
- Santa Ana Pueblo
- Hopi Tribe

- Navajo Nation
- Ramah Chapter
- To'Hajiilee Chapter
- Thoreau Chapter
- Baca/Prewitt Chapter
- Casamero Lake Chapter
- Crownpoint Chapter
- Smith Lake Chapter
- Mariano Lake Chapter
- Whitehorse Lake Chapter
- Ojo Encino Chapter
- Torreon Chapter

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